BIDDING DOCUMENTS

Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Line, and House Wiring Installation of the Twenty (20) Sitios Under 2024 SEP GAA

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Glossary of Terms, Abbreviations, and Acronyms

ABC – Approved Budget for the Contract.

ARCC – Allowable Range of Contract Cost.

BAC – Bids and Awards Committee.

Bid – A signed offer or proposal to undertake a contract submitted by a bidder in response to and in consonance with the requirements of the bidding documents. Also referred to as *Proposal* and *Tender*. (2016 revised IRR, Section 5[c])

Bidder – Refers to a contractor, manufacturer, supplier, distributor and/or consultant who submits a bid in response to the requirements of the Bidding Documents. (2016 revised IRR, Section 5[d])

Bidding Documents – The documents issued by the Procuring Entity as the bases for bids, furnishing all information necessary for a prospective bidder to prepare a bid for the Goods, Infrastructure Projects, and/or Consulting Services required by the Procuring Entity. (2016 revised IRR, Section 5[e])

BIR – Bureau of Internal Revenue.

BSP – Bangko Sentral ng Pilipinas.

CDA – Cooperative Development Authority.

Consulting Services – Refer to services for Infrastructure Projects and other types of projects or activities of the GOP requiring adequate external technical and professional expertise that are beyond the capability and/or capacity of the GOP to undertake such as, but not limited to: (i) advisory and review services; (ii) pre-investment or feasibility studies; (iii) design; (iv) construction supervision; (v) management and related services; and (vi) other technical services or special studies. (2016 revised IRR, Section 5[i])

Contract – Refers to the agreement entered into between the Procuring Entity and the Supplier or Manufacturer or Distributor or Service Provider for procurement of Goods and Services; Contractor for Procurement of Infrastructure Projects; or Consultant or Consulting Firm for Procurement of Consulting Services; as the case may be, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

Contractor – is a natural or juridical entity whose proposal was accepted by the Procuring Entity and to whom the Contract to execute the Work was awarded. Contractor as used in these Bidding Documents may likewise refer to a supplier, distributor, manufacturer, or consultant.

CPI – Consumer Price Index.

DOLE – Department of Labor and Employment.

DTI – Department of Trade and Industry.

Foreign-funded Procurement or Foreign-Assisted Project – Refers to procurement whose funding source is from a foreign government, foreign or international financing institution as specified in the Treaty or International or Executive Agreement. (2016 revised IRR, Section 5[b]).

GFI – Government Financial Institution.

GOCC – Government-owned and/or –controlled corporation.

Goods — Refer to all items, supplies, materials and general support services, except Consulting Services and Infrastructure Projects, which may be needed in the transaction of public businesses or in the pursuit of any government undertaking, project or activity, whether in the nature of equipment, furniture, stationery, materials for construction, or personal property of any kind, including non-personal or contractual services such as the repair and maintenance of equipment and furniture, as well as trucking, hauling, janitorial, security, and related or analogous services, as well as procurement of materials and supplies provided by the Procuring Entity for such services. The term "related" or "analogous services" shall include, but is not limited to, lease or purchase of office space, media advertisements, health maintenance services, and other services essential to the operation of the Procuring Entity. (2016 revised IRR, Section 5[r])

GOP – Government of the Philippines.

Infrastructure Projects – Include the construction, improvement, rehabilitation, demolition, repair, restoration or maintenance of roads and bridges, railways, airports, seaports, communication facilities, civil works components of information technology projects, irrigation, flood control and drainage, water supply, sanitation, sewerage and solid waste management systems, shore protection, energy/power and electrification facilities, national buildings, school buildings, hospital buildings, and other related construction projects of the government. Also referred to as *civil works or works*. (2016 revised IRR, Section 5[u])

LGUs – Local Government Units.

NFCC – Net Financial Contracting Capacity.

NGA – National Government Agency.

PCAB – Philippine Contractors Accreditation Board.

PhilGEPS - Philippine Government Electronic Procurement System.

Procurement Project – refers to a specific or identified procurement covering goods, infrastructure project or consulting services. A Procurement Project shall be described, detailed, and scheduled in the Project Procurement Management Plan prepared by the agency which shall be consolidated in the procuring entity's Annual Procurement Plan. (GPPB Circular No. 06-2019 dated 17 July 2019)

PSA – Philippine Statistics Authority.

SEC – Securities and Exchange Commission.

SLCC – Single Largest Completed Contract.

UN – United Nations.



Section I. Invitation to Bid

Invitation to Bid for

Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Line, and House Wiring Installation of the Twenty (20) Sitios under 2024 SEP GAA

1. The **CAMARINES SUR II ELECTRIC COOPERATIVE, INC.** (**CASURECO II**), through the 2024 General Appropriations Act (GAA) - Sitio Electrification Program (SEP) Subsidy under the National Electrification Administration (NEA) 2024 SEP Subsidy intends to apply the sum of, to wit:

Lot No.	Project Name	Project Project Name Identification No.	
1	Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Lines for ten (10) Sitios in Calabanga, Milaor, Minalabac, and Pili	CB No. 2024-06-01	Php17,102,467.85
2	Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Lines for ten (10) Sitios in Siruma and Tinambac	CB No. 2024-06-02	Php27,036,950.46
3	Supply of Labor and Materials for the House Wiring Installation of the Twenty (20) Sitios	CB No. 2024-06-03	Php3,145,353.60

being the Approved Budget for the Contract (ABC) to payments under the contract for each lot. Bids received in excess of the ABC for each lot shall be automatically rejected at bid opening.

2. **CASURECO II** now invites bids for the above Procurement Project. Completion of the Works is required as shown below:

Lot	Pre-Construction/ Installation Phase	Construction/ Installation Phase	Total
Lot 1	5 days	55 days	60 days
Lot 2	5 days	85 days	90 days
Lot 3	5 days	85 days	90 days

Notes:

- 3. Bidding will be conducted through open competitive bidding procedures using non-discretionary "pass/fail" criterion as specified in the 2016 revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184.
- 4. Interested bidders may obtain further information from **CASURECO II** and inspect the Bidding Documents at the address given below from the date of publication until the deadline of submission of Bids, except Saturdays, Sundays and holidays,

^{*}Shall commence upon receipt of Notice to Proceed (NTP).

^{*}Bidders should have completed a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II (Instructions to Bidders).

- 5. A complete set of Bidding Documents may be acquired by interested bidders from **June 20 to July 09, 2024, from 8:00 A.M. to 5:00 P.M.**, except Saturdays, Sundays and holidays, if any, and on **July 10, 2024 at 8:30 A.M.** from given address and website/s below and upon payment of the applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB, in the amount of Lots 1 & 2: Php25,000.00 and Lot 3: Php5,000.00. The Procuring Entity shall allow the bidder to present its proof of payment for the fees in person.
- 6. **CASURECO II** will hold a Pre-Bid Conference¹ on **June 28, 2024, 9:00 A.M.** at CASURECO II Main Office Board Room, which shall be open to prospective bidders.
- 7. Bids must be duly received by the BAC Secretariat through manual submission at the office address as indicated below, **on or before July 10, 2024, at 8:30 A.M.** Late bids shall not be accepted.
- 8. All bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in **ITB** Clause 16.
- 9. Bid opening shall be on **July 10, 2024, 9:00 A.M** at the given address below. Bids will be opened in the presence of the bidders' representatives who choose to attend the said activity.
- 10. Any prospective bidder may bid on any or all Lots. However, considering the purpose that **CASURECO II** intends to achieve, Lot 1 and Lot 2 shall be awarded to two (2) different bidders. Winning bidders for Lot 1 and 2 are still eligible to be awarded for Lot 3. Further instructions shall be discussed in the ITB.
- 11. **CASURECO II** reserves the right to reject any and all bids, declare a failure of bidding, or not award the contract at any time prior to contract award in accordance with Sections 35.6 and 41 of the 2016 revised Implementing Rules and Regulations (IRR) of RA No. 9184, without thereby incurring any liability to the affected bidder or bidders.
- 12. For further information, please refer to:

Ms. Jessica C. Rosit, BAC Secretariat CASURECO II

Del Rosario, Naga City 4400 casureco2bac@yahoo.com (054) 205-2900 local 2002 09930291139 www.casureco2.com.ph

13. You may visit the following websites:

For downloading of Bidding Documents: CASURECO II at www.casureco2.com.ph

June 20, 2024

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(SGD) ENGR. MARY FRANCE D. MORALES BAC Chairman

Noted by:

(SGD) ENGR. EDGARDO R. PIAMONTE

Acting General Manager

Section II. Instructions to Bidders

1. Scope of Bid

The Procuring Entity, Camarines Sur II Electric Cooperative, Inc (CASURECO II) invites Bids for the Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Line, and House Wiring Installation of the Twenty (20) Sitios under 2024 SEP GAA, with Project Identification Numbers CB No. 2024-06-01, CB No. 2024-06-02, and CB No. 2024-06-03.

The Procurement Project (referred to herein as "Project") is for the Construction/Installation Works, as described in Section VI (Specifications).

2. Funding Information

2.1. The source of funding is 2024 General Appropriations Act (GAA) - Sitio Electrification Program (SEP) Subsidy under the National Electrification Administration (NEA) 2024 SEP Subsidy

3. Bidding Requirements

The Bidding for the Project shall be governed by all the provisions of RA No. 9184 and its 2016 revised IRR, including its Generic Procurement Manual and associated policies, rules and regulations as the primary source thereof, while the herein clauses shall serve as the secondary source thereof.

Any amendments made to the IRR and other GPPB issuances shall be applicable only to the ongoing posting, advertisement, or invitation to bid by the BAC through the issuance of a supplemental or bid bulletin.

The Bidder, by the act of submitting its Bid, shall be deemed to have inspected the site, determined the general characteristics of the contracted Works and the conditions for this Project, such as the location and the nature of the work; (b) climatic conditions; (c) transportation facilities; (c) nature and condition of the terrain, geological conditions at the site communication facilities, requirements, location and availability of construction aggregates and other materials, labor, water, electric power and access roads; and (d) other factors that may affect the cost, duration and execution or implementation of the contract, project, or work and examine all instructions, forms, terms, and project requirements in the Bidding Documents.

4. Corrupt, Fraudulent, Collusive, Coercive, and Obstructive Practices

The Procuring Entity, as well as the Bidders and Contractors, shall observe the highest standard of ethics during the procurement and execution of the contract. They or through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and obstructive practices defined under Annex "I" of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

5. Eligible Bidders

- 5.1. Only Bids of Bidders found to be legally, technically, and financially capable will be evaluated.
- 5.2. The Bidder must have an experience of having completed a Single Largest Completed Contract (SLCC) that is similar to this Project, equivalent to at least fifty percent (50%) of the ABC adjusted, if necessary, by the Bidder to

current prices using the PSA's CPI, except under conditions provided for in Section 23.4.2.4 of the 2016 revised IRR of RA No. 9184.

A contract is considered to be "similar" to the contract to be bid if it has the major categories of work stated in the **BDS**.

- 5.3. For Foreign-funded Procurement, the Procuring Entity and the foreign government/foreign or international financing institution may agree on another track record requirement, as specified in the Bidding Document prepared for this purpose.
- 5.4. The Bidders shall comply with the eligibility criteria under Section 23.4.2 of the 2016 IRR of RA No. 9184.

6. Origin of Associated Goods

There is no restriction on the origin of Goods other than those prohibited by a decision of the UN Security Council taken under Chapter VII of the Charter of the UN.

7. Subcontracts

The Procuring Entity has prescribed that Subcontracting is not allowed.

8. Pre-Bid Conference

The Procuring Entity will hold a pre-bid conference for this Project on the specified date and time and at its physical address **CASURECO II Main Office Board Room on June 28, 2024, at 9:00 A.M.** as indicated in paragraph 6 of the **IB**.

9. Clarification and Amendment of Bidding Documents

Prospective bidders may request for clarification on and/or interpretation of any part of the Bidding Documents. Such requests must be in writing and received by the Procuring Entity, either at its given address or through electronic mail indicated in the **IB**, at least ten (10) calendar days before the deadline set for the submission and receipt of Bids.

10. Documents Comprising the Bid: Eligibility and Technical Components

- 10.1. The first envelope shall contain the eligibility and technical documents of the Bid as specified in **Section IX. Checklist of Technical and Financial Documents**.
- 10.2. If the eligibility requirements or statements, the bids, and all other documents for submission to the BAC are in foreign language other than English, it must be accompanied by a translation in English, which shall be authenticated by the appropriate Philippine foreign service establishment, post, or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines. For Contracting Parties to the Apostille Convention, only the translated documents shall be authenticated through an apostille pursuant to GPPB Resolution No. 13-2019 dated 23 May 2019. The English translation shall govern, for purposes of interpretation of the bid.

- 10.3. A valid special PCAB License in case of Joint Ventures, and registration for the type and cost of the contract for this Project. Any additional type of Contractor license or permit shall be indicated in the **BDS**.
- 10.4. A List of Contractor's key personnel (e.g., Project Manager, Project Engineers Foremen, and Electrician, *as applicable*) assigned to the contract to be bid, with their complete qualification and experience data shall be provided. These key personnel must meet the required minimum years of experience set in the **BDS**.
- 10.5. A List of Contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership, certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be, must meet the minimum requirements for the contract set in the **BDS**.

11. Documents Comprising the Bid: Financial Component

- 11.1. The second bid envelope shall contain the financial documents for the Bid as specified in **Section IX. Checklist of Technical and Financial Documents**.
- 11.2. Any bid exceeding the ABC indicated in paragraph 1 of the **IB** shall not be accepted.
- 11.3. For Foreign-funded procurement, a ceiling may be applied to bid prices provided the conditions are met under Section 31.2 of the 2016 revised IRR of RA No. 9184.

12. Alternative Bids

Bidders shall submit offers that comply with the requirements of the Bidding Documents, including the basic technical design as indicated in the drawings and specifications. Unless there is a value engineering clause in the **BDS**, alternative Bids shall not be accepted.

13. Bid Prices

All bid prices for the given scope of work in the Project as awarded shall be considered as fixed prices, and therefore not subject to price escalation during contract implementation, except under extraordinary circumstances as determined by the NEDA and approved by the GPPB pursuant to the revised Guidelines for Contract Price Escalation guidelines.

14. Bid and Payment Currencies

- 14.1. Bid prices may be quoted in the local currency or tradeable currency accepted by the BSP at the discretion of the Bidder. However, for purposes of bid evaluation, Bids denominated in foreign currencies shall be converted to Philippine currency based on the exchange rate as published in the BSP reference rate bulletin on the day of the bid opening.
- 14.2. Payment of the contract price shall be made in Philippine Pesos.

15. Bid Security

- 15.1. The Bidder shall submit a Bid Securing Declaration or any form of Bid Security in the amount indicated in the **BDS**, which shall be not less than the percentage of the ABC in accordance with the schedule in the **BDS**.
- 15.2. The Bid and bid security shall be valid until **One Hundred Twenty (120)** calendar days from the date of the opening of bids. Any bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

16. Sealing and Marking of Bids

Each Bidder shall submit one copy of the first and second components of its Bid.

The Procuring Entity may request additional hard copies and/or electronic copies of the Bid. However, failure of the Bidders to comply with the said request shall not be a ground for disqualification.

If the Procuring Entity allows the submission of bids through online submission to the given website or any other electronic means, the Bidder shall submit an electronic copy of its Bid, which must be digitally signed. An electronic copy that cannot be opened or is corrupted shall be considered non-responsive and, thus, automatically disqualified.

17. Deadline for Submission of Bids

The Bidders shall submit on the specified date and time and either at its physical address or through online submission as indicated in paragraph 7 of the **IB**.

18. Opening and Preliminary Examination of Bids

18.1. The BAC shall open the Bids in public at the time, on the date, and at the place specified in paragraph 9 of the **IB**. The Bidders' representatives who are present shall sign a register evidencing their attendance. In case videoconferencing, webcasting or other similar technologies will be used, attendance of participants shall likewise be recorded by the BAC Secretariat.

In case the Bids cannot be opened as scheduled due to justifiable reasons, the rescheduling requirements under Section 29 of the 2016 revised IRR of RA No. 9184 shall prevail.

18.2. The preliminary examination of Bids shall be governed by Section 30 of the 2016 revised IRR of RA No. 9184.

19. Detailed Evaluation and Comparison of Bids

- 19.1. The Procuring Entity's BAC shall immediately conduct a detailed evaluation of all Bids rated "passed" using non-discretionary pass/fail criteria. The BAC shall consider the conditions in the evaluation of Bids under Section 32.2 of 2016 revised IRR of RA No. 9184.
- 19.2. If the Project allows partial bids, all Bids and combinations of Bids as indicated in the **BDS** shall be received by the same deadline and opened and evaluated simultaneously so as to determine the Bid or combination of Bids offering the lowest calculated cost to the Procuring Entity. Bid Security as

required by **ITB** Clause 15 shall be submitted for each contract (lot) separately.

19.3. In all cases, the NFCC computation pursuant to Section 23.4.2.6 of the 2016 revised IRR of RA No. 9184 must be sufficient for the total of the ABCs for all the lots participated in by the prospective Bidder.

20. Post Qualification

Within a non-extendible period of five (5) calendar days from receipt by the Bidder of the notice from the BAC that it submitted the Lowest Calculated Bid, the Bidder shall submit its latest income and business tax returns filed and paid through the BIR Electronic Filing and Payment System (eFPS), and other appropriate licenses and permits required by law and stated in the **BDS**.

21. Signing of the Contract

The documents required in Section 37.2 of the 2016 revised IRR of RA No. 9184 shall form part of the Contract. Additional Contract documents are indicated in the **BDS**.



Section III. Bid Data Sheet

Bid Data Sheet

ITB Clause	
5.2	For this purpose, contracts similar to the Project refer to contracts which have the same major categories of work, which shall be:
	Lot 1 - Supply of Labor and Materials for Construction of Primary and Secondary Distribution Lines Lot 2 - Supply of Labor and Materials for Construction of Primary and Secondary Distribution Lines Lot 3 - Supply of Labor and Materials for House Wiring Installation
7.1	Subcontracting is not allowed.
10.3	No further instructions.
10.4	 The key personnel must meet the required minimum years of experience set below: For Lot I & 2 The Project Manager/Engineer shall be a Registered Electrical Engineer with at least three (3) years of experience in similar and comparable projects. The Foreman must have at least three (3) years of experience in similar and comparable projects and must have a certificate of training from NEA and/or Electric Distribution Utility (private or electric cooperative) or other training institution related to the project. The Lineman must have at least one (1) year of experience in similar and comparable projects and shall preferably have a certificate of training from NEA and/or Electric Distribution Utility (private or electric cooperative) or other training institution related to the project. Heavy Equipment Operator must have at least two (2) years of experience in similar and comparable projects and shall preferably have a certificate of training from NEA and/or Electric Distribution Utility (private or electric cooperative) or other training institution related to the project. The Safety Officer must be an accredited safety practitioner by the Department of Labor and Employment (DOLE) and has undergone the prescribed 40-hour Basic Occupational Safety and Health Training
	 (BOSH). For Lot 3 The Project Manager/Engineer shall be a Registered Electrical Engineer with at least two (2) years of experience in similar and comparable projects. The Electrician must be a Registered Master Electrician (RME) with at least one (1) year of experience.
10.5	No further instructions.
12	No further instructions.
12	110 further histractions.

15.1	The bi	ne bid security shall be in the form of a Bid Securing Declaration or any of					
	the fol	_	ng forms and amounts:				
	a.	a. The amount of not less than,					
		Lot	Amount of	Bid Security			
		Lot	(Equal to Percen	tage of the ABC)			
		Lot 1	2% of ABC - Php342,04				
		Lot 2	,				
		Lot 3	2% of ABC - Php62,907	7.07			
		if bid security draft/guarantee or	is in cash, cashier's irrevocable letter of credi	_			
	b.	The amount of not	t less than,				
		Lot		Bid Security			
			i .	tage of the ABC)			
		Lot 1	5% of ABC - Php855,12				
		Lot 2	5% of ABC - Php1,351,				
		Lot 3	5% of ABC - Php157,26	57.68			
		if bid security is in	n Surety Bond.				
19.2	Partial	bids are allowed, as	s follows:				
	Lot	Proje	ct Location	Approved Budget for the Contract (ABC)			
	1	Construction of Pr Distribution Lines	nd Materials for the imary and Secondary for ten (10) Sitios in Minalabac, and Pili	Php17,102,467.85			
	2	Supply of Labor at Construction of Pr	of Labor and Materials for the ction of Primary and Secondary ation Lines for ten (10) Sitios in				
	3	Supply of Labor	and Materials for the stallation of the Twenty	Php3,145,353.60			
20	No fur	ther instructions.		<u> </u>			
21		ther instructions.					



Section IV. General Conditions of Contract

1. Scope of Contract

This Contract shall include all such items, although not specifically mentioned, that can be reasonably inferred as being required for its completion as if such items were expressly mentioned herein. All the provisions of RA No. 9184 and its 2016 revised IRR, including the Generic Procurement Manual, and associated issuances, constitute the primary source for the terms and conditions of the Contract, and thus, applicable in contract implementation. Herein clauses shall serve as the secondary source for the terms and conditions of the Contract.

This is without prejudice to Sections 74.1 and 74.2 of the 2016 revised IRR of RA No. 9184 allowing the GPPB to amend the IRR, which shall be applied to all procurement activities, the advertisement, posting, or invitation of which were issued after the effectivity of the said amendment.

2. Sectional Completion of Works

If sectional completion is specified in the **Special Conditions of Contract (SCC)**, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date shall apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).

3. Possession of Site

- 3.1 The Procuring Entity shall give possession of all or parts of the Site to the Contractor based on the schedule of delivery indicated in the SCC, which corresponds to the execution of the Works. If the Contractor suffers delay or incurs cost from failure on the part of the Procuring Entity to give possession in accordance with the terms of this clause, the Procuring Entity's Representative shall give the Contractor a Contract Time Extension and certify such sum as fair to cover the cost incurred, which sum shall be paid by Procuring Entity.
 - 3.2 If possession of a portion is not given by the above date, the Procuring Entity will be deemed to have delayed the start of the relevant activities. The resulting adjustments in contract time to address such delay may be addressed through contract extension provided under Annex "E" of the 2016 revised IRR of RA No. 9184.

4. The Contractor's Obligations

The Contractor shall employ the key personnel named in the Schedule of Key Personnel indicating their designation, in accordance with **ITB** Clause 10.3 and specified in the **BDS**, to carry out the supervision of the Works.

The Procuring Entity will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are equal to or better than those of the personnel listed in the Schedule.

5. Performance Security

5.1. Within ten (10) calendar days from receipt of the Notice of Award from the Procuring Entity but in no case later than the signing of the contract by both

parties, the successful Bidder shall furnish the performance security in any of the forms prescribed in Section 39 of the 2016 revised IRR.

5.2. The Contractor, by entering into the Contract with the Procuring Entity, acknowledges the right of the Procuring Entity to institute action pursuant to RA No. 3688 against any subcontractor be they an individual, firm, partnership, corporation, or association supplying the Contractor with labor, materials and/or equipment for the performance of this Contract.

6. Site Investigation Reports

The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to in the SCC supplemented by any information obtained by the Contractor.

7. Warranty

- 7.1. In case the Contractor fails to undertake the repair works under Section 62.2.2 of the 2016 revised IRR, the Procuring Entity shall forfeit its performance security, subject its property(ies) to attachment or garnishment proceedings, and perpetually disqualify it from participating in any public bidding. All payables of the GOP in his favor shall be offset to recover the costs.
- 7.2. The warranty against Structural Defects/Failures, except that occasioned-on force majeure, shall cover the period from the date of issuance of the Certificate of Final Acceptance by the Procuring Entity. Specific duration of the warranty is found in the **SCC**.

8. Liability of the Contractor

Subject to additional provisions, if any, set forth in the **SCC**, the Contractor's liability under this Contract shall be as provided by the laws of the Republic of the Philippines.

If the Contractor is a joint venture, all partners to the joint venture shall be jointly and severally liable to the Procuring Entity.

9. Termination for Other Causes

Contract termination shall be initiated in case it is determined *prima facie* by the Procuring Entity that the Contractor has engaged, before, or during the implementation of the contract, in unlawful deeds and behaviors relative to contract acquisition and implementation, such as, but not limited to corrupt, fraudulent, collusive, coercive, and obstructive practices as stated in **ITB** Clause 4.

10. Dayworks

Subject to the guidelines on Variation Order in Annex "E" of the 2016 revised IRR of RA No. 9184, and if applicable as indicated in the SCC, the Dayworks rates in the Contractor's Bid shall be used for small additional amounts of work only when the Procuring Entity's Representative has given written instructions in advance for additional work to be paid for in that way.

11. Program of Work

- 11.1. The Contractor shall submit to the Procuring Entity's Representative for approval the said Program of Work showing the general methods, arrangements, order, and timing for all the activities in the Works. The submissions of the Program of Work are indicated in the **SCC**.
- 11.2. The Contractor shall submit to the Procuring Entity's Representative for approval an updated Program of Work at intervals no longer than the period stated in the SCC. If the Contractor does not submit an updated Program of Work within this period, the Procuring Entity's Representative may withhold the amount stated in the SCC from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program of Work has been submitted.

12. Instructions, Inspections and Audits

The Contractor shall permit the GOP or the Procuring Entity to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors of the GOP or the Procuring Entity, as may be required.

13. Advance Payment

The Procuring Entity shall, upon a written request of the Contractor which shall be submitted as a Contract document, make an advance payment to the Contractor in an amount not exceeding fifteen percent (15%) of the total contract price, to be made in lump sum, or at the most two installments according to a schedule specified in the SCC, subject to the requirements in Annex "E" of the 2016 revised IRR of RA No. 9184.

14. Progress Payments

The Contractor may submit a request for payment for Work accomplished. Such requests for payment shall be verified and certified by the Procuring Entity's Representative/Project Engineer. Except as otherwise stipulated in the SCC, materials and equipment delivered on the site but not completely put in place shall not be included for payment.

15. Operating and Maintenance Manuals

- 15.1. If required, the Contractor will provide "as built" Drawings and/or operating and maintenance manuals as specified in the **SCC**.
- 15.2. If the Contractor does not provide the Drawings and/or manuals by the dates stated above, or they do not receive the Procuring Entity's Representative's approval, the Procuring Entity's Representative may withhold the amount stated in the **SCC** from payments due to the Contractor.

Section V. Special Conditions of Contract

Special Conditions of Contract

GCC Clause						
2	Lot	Project Location	Duration			
		Extension of Distribution Line in the				
	1	Municipalities of Calabanga, Milaor,	60 days			
		Minalabac, and Pili				
	2	Extension of Distribution Line in the	90 days			
		Municipalities of Siruma	90 days			
	3	Housewiring Installation	90 days			
4.1	No furt	her instructions.				
6	No furt	her instructions.				
7.2	Fifteen	(15) years.				
10	No day	No dayworks are applicable to the contract.				
11.1		The Contractor shall submit the Program of Work to the Procuring				
	Entity's	Entity's Representative within five (5) days of delivery of the Notice to				
		Proceed (NTP).				
11.2	Mobiliz	Mobilization of 15% of the Contract shall not be released until Program				
	of Work is submitted.					
13		sount of the advance payment is fifteen percent (1				
		t price per lot upon written request and submission	on of equivalent			
		letter of credit by the Contractor.				
14		No further instructions.				
15.1	The date by which "as built" drawings/staking sheets are required is					
		7) calendar days upon project completion.				
15.2		mount to be withheld for failing to produ				
	•	gs/staking sheets by the date required is equ	•			
	percent	(50%) of the total contract price per lot (2 nd Prog	ress Billing).			

Section VI. Technical Specifications (Terms of Reference)

TERMS OF REFERENCE

Name of the Contract	:	Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Line, and House Wiring Installation of the Twenty (20) Sitios under 2024 SEP GAA
Source of Fund	:	NEA Subsidy
Approved Budget	:	Lot 1: Php17,102,467.85
of the Contract		Lot 2: Php27,036,950.46
(ABC) per Lot		Lot 3: Php3,145,353.60

I. APPROVED BUDGET OF THE CONTRACT (ABC)

The Approved Budget of the Contract (ABC) inclusive of taxes and duties are broken down as follows:

Lot No.	Project Name	Approved Budget for the Contract (ABC)	Project Identification No.
1	Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Lines for ten (10) Sitios in Calabanga, Milaor, Minalabac, and Pili	Php17,102,467.85	CB No. 2024-06-01
2	Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Lines for ten (10) Sitios in Siruma and Tinambac	Php27,036,950.46	CB No. 2024-06-02
3	Supply of Labor and Materials for the House Wiring Installation of the Twenty (20) Sitios	Php3,145,353.60	CB No. 2024-06-03

Any prospective bidder may bid on any or all Lots, however, if a bidder wins in both Lot 1 and Lot 2, they will only be awarded the lot with the higher bid value and the next Bidder with Lowest Calculated and Responsive Bid (LCRB) shall be declared as the Winning Bidder for the other lot. Therefore, a bidder cannot be awarded both Lot 1 and Lot 2. Despite this restriction, the bidder remains eligible to win Lot 3.

In the event of a Single Calculated and Responsive Bid (SCRB), Section 36 of the 2016 Revised Implementing Rules and Regulations of Republic Act No. 9184 shall apply.

II. OBJECTIVES OF THE PROJECT

- A. To provide electricity to household beneficiaries through Sitio Electrification Program (SEP) within the franchise area of CASURECO II;
- B. To ensure that the construction of primary and secondary distribution lines through Sitio Electrification Program (SEP) including house wiring installation conforms to the NEA and CASURECO II's standards;
- C. To maintain the quality, efficiency, and reliability of CASURECO II's electric distribution system upon energization of the new distribution line for twenty (20) sitios.

III. PROJECT DESCRIPTION AND LOCATION

REF.	Location Of		rangay Municipality	№. Of	KILOMETER of LINE		
ITEM №.	Project Barangay	Barangay		POLES	1ø	U.B.	O.S.
1	Zone 7	Burabod	Calabanga	16	0.57	0.52	0.38
2	Zone 4	Lugsad	Calabanga	41	1.93	1.04	1.16
3	Maytagas	Quinale	Calabanga	33	1.48	0.79	0.99
4	Zone 4	Cabugao	Milaor	20	1.40	1.40	0.11
5	Zone 6	Del Socorro	Minalabac	4	0.00	0.00	0.25
6	Zone 3	Timbang	Minalabac	19	0.74	0.68	0.36
7	Zone 1	Binobong	Pili	20	0.64	0.64	0.55
8	Zone 6	Binobong	Pili	9	0.00	0.00	0.55
9	Zone 2	Del Rosario	Pili	3	0.00	0.00	0.16
10	Zone 7	Pawili	Pili	38	2.01	1.69	0.32
Total				203	8.76	6.76	4.82

Lot 2

REF.	Location Of		Municipality	№. Of	KILON	IETER of	f LINE
ITE M №.	Project	Barangay		POLE S	1ø	U.B.	O.S.
1	Kalebhok	Cabugao	Siruma	15	0.64	0.38	0.34
2	Proper	Pamintan- Bantilan	Siruma	18	0.17	0.17	0.57
3	Punta	Pinitan	Siruma	18	0.53	0.53	0.47
4	Goroyan	San Ramon	Siruma	82	4.37	1.15	1.06
5	Lemonsitohan	San Ramon	Siruma	29	1.34	0.32	0.50
6	Kinastillohan	San Ramon	Siruma	39	2.17	0.00	0.25
7	San Isidro	Bataan	Tinambac	35	1.69	0.54	0.30
8	Zone 4	Bataan	Tinambac	14	0.39	0.41	0.40
9	Baries	Mananao	Tinambac	27	0.40	0.00	1.17
10	Laming	Pantat	Tinambac	39	2.15	0.72	0.22
Total				316	13.82	4.20	5.28

REF. ITEM №.	LOCATION OF PROJECT	BARANGAY	MUNICIPALITY	№. Of H.H.
1	Zone 7	Burabod	Calabanga	12
2	Zone 4	Lugsad	Calabanga	20
3	Maytagas	Quinale	Calabanga	35
4	Zone 4	Cabugao	Milaor	11
5	Zone 6	Del Socorro	Minalabac	27
6	Zone 3	Timbang	Minalabac	20
7	Zone 1	Binobong	Pili	13
8	Zone 6	Binobong	Pili	19
9	Zone 2	Del Rosario	Pili	10
10	Zone 7	Pawili	Pili	13
11	Kalebhok	Cabugao	Siruma	27
12	Proper	Pamintan-Bantilan	Siruma	43



13	Punta	Pinitan	Siruma	31
14	Goroyan	San Ramon	Siruma	28
15	Lemonsitohan	San Ramon	Siruma	10
16	Kinastillohan	San Ramon	Siruma	10
17	San Isidro	Bataan	Tinambac	12
18	Zone 4	Bataan	Tinambac	22
19	Baries	Mananao	Tinambac	22
20	Laming	Pantat	Tinambac	23
Total				408

IV. MATERIAL REQUIREMENTS

Item No.	Description	Qty	Unit
1	Attachment, Guy, Malleable Type with 11/16" Hole Diameter	117	pieces
2	Bolt, Double Upset, 5/8" x 10"	101	pieces
3	Bolt, Machine, 5/8" x 8"	271	pieces
4	Bolt, Machine, 5/8" x 10"	82	pieces
5	Bolt, Machine, 5/8" x 12"	56	pieces
6	Bolt, Machine, 5/8" x 14"	32	pieces
7	Bolt, Oval Eye, 5/8" x 9"	92	pieces
8	Bolt, Oval Eye, 5/8" x 10"	137	pieces
9	Bolt, Single Upset, 5/8" x 8"	77	pieces
10	Bolt, Single Upset, 5/8" x 10"	37	pieces
11	Bolt, Thimble Eye, 5/8" x 9", Straight Type	1	piece
12	Bracket, Clevis Deadend without Spool	66	pieces
13	Bracket, Transformer Pole Mounting for Single Transformer	16	sets
14	Clamp, Anchor Rod Bonding, Single Eye	117	pieces
15	Clamp, Deadend Strain, #1/0 ACSR	35	pieces
16	Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	236	pieces
17	Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	31	pieces
18	Clamp, Loop Deadend, #1/0 ACSR	304	pieces
19	Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	14	pieces
20	Clevis, Secondary Swinging without Spool	186	pieces
21	Conductor, Bare, ACSR #1/0, AWG 6/1	21,127	meters
22	Conductor, Bare, ACSR #2, AWG 6/1	8	meters
23	Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	13,313	meters
24	Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	16	meters
25	Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	4,571	meters
26	Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	89	pieces
27	Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	370	pieces
28	Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	11	pieces
29	Connector, Ground Rod (Clamp) for 5/8" Steel Rod	33	pieces
30	Cutout and Arrester Combination, Porcelain	15	sets
31	Insulator, Pin Type, Porcelain, ANSI, Class 55 – 5, White Color	136	pieces
32	Insulator, Spool, 1-3/4", ANSI, Class 53 – 2, White Color	331	pieces
33	Insulator, Spool, 3", ANSI, Class 53 – 4, White Color	136	pieces

34	Insulator, Suspension, 6", Porcelain, Clevis Type, White Color	98	pieces
35	Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	16	pieces
36	Log, Anchor, Concrete, 8" x 4'	117	pieces
37	Nut, Eye, 5/8", Conventional	25	pieces
38	Nut, Lock, Mf Type, 5/8"	851	pieces
39	Nut, Thimble Eye, 5/8", Single Eye	1	piece
40	Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	136	pieces
41	Pole, Steel, 30', 3.5 mm	70	pieces
42	Pole, Steel, 35', 3.5 mm	133	pieces
43	Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	117	pieces
44	Rod, Armor, Preformed, #1/0 ACSR, Double Support	14	pieces
45	Rod, Armor, Preformed, #1/0 ACSR, Single Support	375	pieces
46	Rod, Ground Steel, Galvanized, 5/8" x 10'	33	pieces
47	Rod, Tapping, Preformed, #1/0 ACSR	23	pieces
48	Shackle, Anchor, Forged Steel, Galvanized	49	pieces
49	Spacer, Pipe, 3/4" x 1-1/2"	56	pieces
50	Transformer, Pole Type, Conventional, Amorphous, 15 KVA,	5	units
~.	Cu-Cu Winding		
51	Transformer, Pole Type, Conventional, Amorphous, 25 KVA, Cu-Cu Winding	3	units
52	Washer, Square, Curved, 3" x 3" x 5/16" with 11/16" Diameter	1	piece
	Hole		
53	Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter	806	pieces
<i>E</i> 1	Hole	117	
54	Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	117	pieces
55	Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	1992.5	feet
56	Wire, Guy, Steel, 3/8", 7 Strand	5920	feet
57	Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	152	feet
58	Wire, Tie, Aluminum Alloy, Soft, #4 AWG	1,616	feet
59	Wire, Tie, Insulated, Soft, #4 AWG	1,084	feet

Item No.	Description	Qty	Unit
1	Attachment, Guy, Malleable Type with 11/16" Hole Diameter	216	pieces
2	Bolt, Carriage 3/8" x 4-1/2"	20	pieces
3	Bolt, Double Arming, 5/8" x 18"	17	pieces
4	Bolt, Double Upset, 5/8" x 10"	66	pieces
5	Bolt, Machine, 1/2" x 6"	2	pieces
6	Bolt, Machine, 1/2" x 8"	5	pieces
7	Bolt, Machine, 1/2" x 10"	3	pieces
8	Bolt, Machine, 5/8" x 6"	20	pieces
9	Bolt, Machine, 5/8" x 8"	390	pieces
10	Bolt, Machine, 5/8" x 10"	169	pieces
11	Bolt, Machine, 5/8" x 12"	148	pieces
12	Bolt, Machine, 5/8" x 14"	44	pieces
13	Bolt, Machine, 5/8" x 18"	1	piece
14	Bolt, Oval Eye, 5/8" x 9"	124	pieces
15	Bolt, Oval Eye, 5/8" x 10"	167	pieces
16	Bolt, Single Upset, 5/8" x 8"	84	pieces

17	Bolt, Single Upset, 5/8" x 9"	8	pieces
18	Bolt, Single Upset, 5/8" x 10"	54	pieces
19	Bolt, Thimble Eye, 5/8" x 9", Straight Type	1	pieces
20	Brace, Crossarm, 28", Steel or Wood	20	pieces
21	Brace, Sidearm, Diagonal, 7 Feet	2	pieces
22	Bracket, Clevis Deadend without Spool	128	pieces
23	Bracket, Mounting for Transformer Pole	4	sets
24	Bracket, Transformer Pole Mounting for Single Transformer	18	sets
25	Clamp, Anchor Rod Bonding, Single Eye	216	pieces
26	Clamp, Deadend Strain, #1/0 ACSR	57	pieces
27	Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	434	pieces
28	Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	40	pieces
29	Clamp, Loop Deadend, #1/0 ACSR	394	pieces
30	Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR	25	pieces
30	(Maximum)	23	pieces
31	Clevis, Secondary Swinging without Spool	249	pieces
32	Conductor, Bare, ACSR #1/0, AWG 6/1	21,966	pieces
33	Conductor, Bare, ACSR #2, AWG 6/1	11	pieces
34	Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	10,905	pieces
35	Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	22	pieces
36	Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	15,899	pieces
37	Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	122	pieces
38	Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	623	pieces
39	Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	26	pieces
40	Connector, Ground Rod (Clamp) for 5/8" Steel Rod	64	pieces
41	Connector, Split Bolt	1	piece
42	Crossarm, Steel, 3" x 4" x 8', 3.0 mm	12	pieces
43	Cutout and Arrester Combination, Porcelain	20	sets
44	Insulator, Pin Type, Porcelain, ANSI, Class 55 – 3, White Color	14	pieces
45	Insulator, Pin Type, Porcelain, ANSI, Class 55 – 5, White Color	258	pieces
46	Insulator, Spool, 1-3/4", ANSI, Class 53 – 2, White Color	430	pieces
47	Insulator, Spool, 3", ANSI, Class 53 – 4, White Color	159	pieces
48	Insulator, Suspension, 6", Porcelain, Clevis Type, White Color	164	pieces
49	Link, Fuse, Universal, Bottom Head, Type K, 2 Amperes	2	pieces
50	Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	18	pieces
51	Log, Anchor, Concrete, 8" x 4'	216	pieces
52	Nut, Eye, 5/8", Conventional	75	pieces
53	Nut, Lock, Mf Type, 1/2"	9	pieces
54	Nut, Lock, Mf Type, 3/8"	20	pieces
55	Nut, Lock, Mf Type, 5/8"	1,255	pieces
56	Nut, Thimble Eye, 5/8", Single Eye	1,233	pieces
57	Pin, Crossarm, Steel, 1-3/8" x 14", 23KV	4	pieces
58	Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	127	-
		14	pieces
59 60	Pin, Pole Top, Channel, 1" Thread, 20" Long Pin, Pole Top, Channel, 1" Thread, 25" Long	127	pieces
-			pieces
61	Pole, Steel, 30', 3.5 mm	58	pieces
62	Pole, Steel, 35', 3.5 mm	226	pieces
63	Pole, Steel, 40', 3.0 mm	5	pieces

64	Pole, Wood, 30', Class 1, US	19	pieces
65	Pole, Wood, 35', Class 3, US	6	pieces
66	Pole, Wood, 45', Class 3, US	2	pieces
67	Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	216	pieces
68	Rod, Armor, Preformed, #1/0 ACSR, Double Support	1	piece
69	Rod, Armor, Preformed, #1/0 ACSR, Single Support	392	pieces
70	Rod, Ground Steel, Galvanized, 5/8" x 10'	64	pieces
71	Rod, Tapping, Preformed, #1/0 ACSR	22	pieces
72	Shackle, Anchor, Forged Steel, Galvanized	82	pieces
73	Spacer, Pipe, 3/4" x 1-1/2"	164	pieces
74	Staple, Groundwire, 1/2" x 2"	17	pieces
75	Transformer, Pole Type, Conventional, Amorphous, 15 KVA,	6	units
	Cu-Cu Winding		
76	Transformer, Pole Type, Conventional, Amorphous, 25 KVA,	4	units
	Cu-Cu Winding		
77	Truss Guy for Down Guy	3	pieces
78	Washer, Round, 1-3/8" Diameter with 9/16" Diameter Hole	9	pieces
79	Washer, Square, Curved, 3" x 3" x 5/16" with 11/16" Diameter	1	piece
	Hole		
80	Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter	1,151	pieces
	Hole		
81	Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	216	pieces
82	Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	3,758	feet
83	Wire, Guy, Steel, 3/8", 7 Strand	10,870	feet
84	Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	197	feet
85	Wire, Tie, Aluminum Alloy, Soft, #4 AWG	1,616	feet
86	Wire, Tie, Insulated, Soft, #4 AWG	2,676	feet

Item No.	Description	Qty	Unit
1	Conductor, Duplex, #6, AWG	12,240	meters
2	Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2	816	pieces
3	Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected	408	pieces
4	Circuit Breaker (15 Amps.)	408	sets
5	Receptacle	816	pieces
6	CFL Bulb (15W)	816	pieces
7	Tumbler Switch	816	sets
8	Convenience Outlet (2 gang)	408	sets
9	Junction Box (plastic with cover)	816	pieces
10	PDX Wire #10	2,040	meters
11	PDX Wire #12	4,080	meters
12	PDX Wire #14	4,080	meters
13	Electrical Tape	408	rolls
14	Insulated, Staple Wire	12,240	pieces
15	EMT Entrance Cap, 3/4"	408	pieces
16	EMT LB Conduit, 3/4"	408	pieces
17	EMT Pipe, 3/4"	408	length

18	EMT Elbow, 3/4"	1,224	pieces
19	EMT Reducer 1" x 3/4"	816	pieces
20	EMT Connector, 3/4"	2,040	pieces
21	EMT Coupling	1,632	pieces
22	PVC C-Clamp	2,448	pieces
23	Rod, Ground Steel, Galvanized, 5/8" x 10'	408	pieces
24	Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG	1,224	meters
25	Clamp, Ground Rod for 5/8" Steel Rod tamperproof	408	pieces

V. TECHNICAL SPECIFICATION

Equipment, Poles, Line Hardware, kWh Meters and Conductors (as applicable) to be used must pass and be in accordance with the standards set forth by the National Electrification Administration (NEA). (Kindly see attached Annex A-1 and Annex A-2 for details)

VI. SCOPE OF WORKS

The proposed "Construction of Primary and Secondary Distribution Line for Sitio Electrification Program" for Lot 1 and 2 is composed of supply of labor and materials for the pole erection, pole dressing, payout of conductor, installation of transformer and other line equipment, and right-of-way clearing of lines. For Lot 3, supply of labor and materials for the installation of house wiring and service dropping of Household Beneficiaries.

All construction works shall be done in a thorough and workmanlike manner pursuant to the technical specifications indicated in this Terms of Reference (TOR).

A. Construction of Primary and Secondary Distribution Line (Lot 1 & 2)

1. Pre-Construction Phase

- a. The staking sheets, plans, specifications, and drawings shall be provided by CASURECO II, which is included in this Terms of Reference.
- b. Any changes in plans, drawings, specifications, and scope of works of this project shall be coordinated by CASURECO II to the Contractor.
- c. The Contractor must thoroughly review the staking sheets, plans, specifications and drawings of the project. Additional details required by the Contractor pertaining to the original and approved staking sheets, plans, specifications and drawings of the project shall be prepared and provided by CASURECO II.
- d. If the Contractor has any changes on staking sheets, plans, specifications, and drawings, it must be coordinated, documented and subject for approval of CASURECO II.
- e. The Contractor shall submit to CASURECO II a detailed Program of Work showing the general methods, arrangements, order, and timing for all the activities in the Works, but not necessarily limited to the construction plans and schedule within five (5) days upon receipt of Notice to Proceed (NTP).
- f. Delivery of line materials and equipment such as poles, line hardware, conductors, transformers and other materials must be provided by the CONTRACTOR during this phase. Additional equipment and/or materials may be permitted if coordinated by the CONTRACTOR to CASURECO II

during the pre-construction phase, provided that there is a justifiable reason for said add-ons.

g. All distribution transformers must undergo CASURECO II's standard testing and all units that will fail must be replaced within five (5) days. Poles, conductors, and other line materials shall be subjected to inspection by the Quality Assurance Team (QAT) of CASURECO II prior to acceptance and installation.

2. Construction Phase

The Contractor is required to perform the following scope of works:

1) Review of Existing Information

Review the basic parameters specified in the pre-construction phase. The Contractor shall ensure that it has first-hand information of site development plan, construction data, topographic maps, and other documents that are readily available from CASURECO II for the project.

2) Field Survey and Site Inspection

The Contractor shall conduct the appropriate site survey including staking, establishing the location of poles and others should the Contractor deem it necessary. The contractor shall have inspected the site and its surroundings and orient himself with the following:

- i. Location and nature of work;
- ii. Climatic condition;
- iii. Geologic conditions at the site;
- iv. Transportation and communication facilities;
- v. Availability of construction materials, labor, water services, electric and power supply;
- vi. Location and extent of aggregate resources; and
- vii. Other factors that might affect the cost, duration and execution of work.

3) Actual Construction Works

The Contractor shall perform the following construction activities but is not limited to the following:

i. Mobilization/Demobilization

The Contractor shall mobilize and bring out into work, all personnel, and equipment in accordance with the Contractor's approved construction program.

Mobilization shall include the transporting to jobsite of equipment, materials, tools, personnel and all necessary items for the execution and completion of the work.

Demobilization shall include dismantlement and removal from the site of the Contractor's equipment and temporary facilities. It shall also include a clean-up of the site after completion of the contract as well as the transportation from the site of Contractor's personnel.

ii. Site Clearing and Proper Waste Disposal

General site clearing operations include the removal of demolished materials and objectionable matter, protection of existing structures/facilities left functional and clearing to allow for new construction.

The Contractor is obliged to provide barricades, coverings, or other types of protection necessary to prevent damage to existing structures and facilities. Likewise, the Contractor is to dispose of materials, trash and debris in a safe and acceptable manner in accordance with applicable laws and ordinances. Burying and burning of trash and debris at the site will not be permitted. Trash and debris shall be removed from the site at regular intervals to prevent these from accumulating and ultimately delaying the course of the work.

iii. Siteworks

The works shall be in accordance with the Scope of Works and Specification for Construction indicated in this TOR.

(Kindly see Annex B-1 for Specifications of Construction)

B. House Wiring Installation (Lot 3)

1. Pre-Installation Phase

- a. The plans, and specifications shall be provided by CASURECO II, which is included in this Terms of Reference.
- b. Any changes in plans, specifications, and scope of works of this project shall be coordinated by CASURECO II to the Contractor.
- c. The Contractor must thoroughly review the plans, and specifications of the project. Additional details required by the Contractor pertaining to the original and approved plans, and specifications of the project shall be prepared and provided by CASURECO II.
- d. If the Contractor has any changes on plans, and specifications, it must be coordinated, documented and subject for approval of CASURECO II.
- e. The Contractor shall submit to CASURECO II a detailed Program of Work showing the general methods, arrangements, order, and timing for all the activities in the Works, but not necessarily limited to the construction plans and schedule within five (5) days upon receipt of Notice to Proceed (NTP).
- f. Delivery of kWh meters, service drop wires, and other house wiring materials which are indicated in the breakdown of materials shall be supplied by the CONTRACTOR during this phase. Additional equipment and/or materials may be permitted if coordinated by the CONTRACTOR to CASURECO II during the pre-construction phase, provided that there is a justifiable reason for said add-ons.
- g. All kWh meters must undergo CASURECO II's standard testing and all units that will fail must be immediately replaced within five (5) days. kWh meters, service drop wires, and other house wiring materials shall be subjected to inspection by the Quality Assurance Team (QAT) of CASURECO II prior to acceptance and installation.

2. Installation Phase

The Contractor is required to perform the following scope of works:

4) Review of Existing Information

Review the basic parameters specified in the pre-installation phase. The Contractor shall ensure that it has first-hand information of site development plan, construction data, topographic maps, and other documents that are readily available from CASURECO II for the project.

5) Field Survey and Site Inspection

The Contractor shall conduct the appropriate site survey should the Contractor deem it necessary. The contractor shall have inspected the site and its surroundings and orient himself with the following:

- i. Location and nature of work;
- ii. Climatic condition;
- iii. Geologic conditions at the site;
- iv. Transportation and communication facilities;
- v. Availability of construction materials, labor, water services, electric and power supply;
- vi. Location and extent of aggregate resources; and
- vii. Other factors that might affect the cost, duration and execution of work.

6) Actual Installation Works

The Contractor shall perform the following activities but is not limited to the following:

i. Mobilization/Demobilization

The Contractor shall mobilize and bring out into work, all personnel and equipment in accordance with the Contractor's approved program of work.

Mobilization shall include transporting to jobsite of equipment, materials, tools, personnel and all necessary items for the execution and completion of the work.

Demobilization shall include dismantlement and removal from the site of the Contractor's equipment and temporary facilities, if any. It shall also include a clean-up of the site after completion of the contract as well as the transportation from the site of Contractor's personnel.

ii. Site Clearing and Proper Waste Disposal

General site clearing operations include the removal of demolished materials and objectionable matter, protection of existing structures/facilities left functional and clearing to allow for new construction.

The Contractor is obliged to provide barricades, coverings, or other types of protection necessary to prevent damage to existing structures and facilities. Likewise, the Contractor is to dispose of materials, trash and debris in a safe and acceptable manner in accordance with applicable laws and ordinances. Burying and burning of trash and debris at the site will not be permitted. Trash and debris shall be removed from the site at regular intervals to prevent these from accumulating and ultimately delaying the course of the work.

iii. Siteworks

The works shall be in accordance with the Scope of Works and Specifications indicated in this TOR.

(Kindly see Annex B-2 for Technical Specifications)

VII. ELIGIBILITY REQUIREMENTS

Lot 1 & 2

The eligibility requirements shall conform with the eligibility criteria under Section 23.4.2 of the 2016 IRR of RA No. 9184.

A. Legal Documents

- 1. Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages) in accordance with Section 8.5.2 of the IRR;
- 2. DTI business name registration/Securities and Exchange Commission (SEC) registration certificate, whichever is appropriate under laws of the Philippines.
- 3. Valid and current Mayor's permit/municipal license: (principal place of business)
- 4. Tax Clearance Certificate;
- 5. Philippine Contractors Accreditation Board (PCAB) License at least Category B with Specialty in Electrical Works SP-EE classification; and registered to undertake projects with Size Range of at least Medium A;
- 6. Audited Financial Statement of the previous year;

B. Technical Documents

- 1. Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; and
- Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided under the rules; and
- 3. Special PCAB License in case of Joint Ventures and registration for the type and cost of the contract to be bid; and
- 4. Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission or original copy of Notarized Bid Securing Declaration; and
- 5. Project Requirements, which shall include the following:
 - a. Organizational chart for the contract to be bid;
 - b. List of contractor's key personnel (e.g., Project Manager/Engineers, Foreman, Lineman, Heavy Equipment Operator, and Safety Officer), to be assigned to the contract to be bid, with their complete qualification and experience data;
 - c. List of contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership or certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be; and

6. Original duly signed Omnibus Sworn Statement (OSS) and if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

C. Financial Documents

- 1. The prospective bidder's computation of Net Financial Contracting Capacity (NFCC).
- 2. If applicable, duly signed joint venture agreement (JVA) in accordance with RA No. 4566 and its IRR in case the joint venture is already in existence or duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

Lot 3

The eligibility requirements shall conform with the eligibility criteria under Section 23.4.2 of the 2016 IRR of RA No. 9184.

A. Legal Documents

- 1. Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages) in accordance with Section 8.5.2 of the IRR;
- 2. DTI business name registration/Securities and Exchange Commission (SEC) registration certificate, whichever is appropriate under laws of the Philippines.
- 3. Valid and current Mayor's permit/municipal license: (principal place of business)
- 4. Tax Clearance Certificate;
- 5. Philippine Contractors Accreditation Board (PCAB) License at least Category C & D with Specialty in Electrical Works SP-EE classification; and registered to undertake projects with Size Range of at least Small B;
- 6. Audited Financial Statement of the previous year;

B. Technical Documents

- 1. Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; and
- Statement of the bidder's Single Largest Completed Contract (SLCC) similar
 to the contract to be bid, except under conditions provided under the rules;
 and
- 3. Special PCAB License in case of Joint Ventures and registration for the type and cost of the contract to be bid; and
- 4. Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission or original copy of Notarized Bid Securing Declaration; and
- 5. Project Requirements, which shall include the following:
 - a. Organizational chart for the contract to be bid;

- b. List of contractor's key personnel (e.g., Project Manager/Engineers, and Electrician), to be assigned to the contract to be bid, with their complete qualification and experience data;
- c. List of contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership or certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be; and
- 6. Original duly signed Omnibus Sworn Statement (OSS) and if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

C. Financial Documents

- 1. The prospective bidder's computation of Net Financial Contracting Capacity (NFCC).
- 2. If applicable, duly signed joint venture agreement (JVA) in accordance with RA No. 4566 and its IRR in case the joint venture is already in existence or duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

VIII. CONSTRUCTION PERSONNEL

The key professionals and the respective qualifications of the construction personnel shall be as follows:

Lot 1 & 2

A. Project Manager/Engineer

The Project Manager/Engineer shall be a Registered Electrical Engineer with at least three (3) years of experience in similar and comparable projects and must be knowledgeable about NEA standards.

B. Foreman

The Foreman must have at least three (3) years of experience in similar and comparable projects and must have a certificate of training from NEA and/or Electric Distribution Utility (private or electric cooperative) or other training institution related to the project.

C. Lineman

The Lineman must have at least one (1) year of experience in similar and comparable projects and shall preferably have a certificate of training from NEA and/or Electric Distribution Utility (private or electric cooperative) or other training institution related to the project.

D. Heavy Equipment Operator

The Heavy Equipment Operator must have at least two (2) years of experience in similar and comparable projects and shall preferably have a certificate of training from NEA and/or Electric Distribution Utility (private or electric cooperative) or other training institution related to the project.

E. Safety Officer

The Safety Officer must be an accredited safety practitioner by the Department of Labor and Employment (DOLE) and has undergone the prescribed 40-hour Basic Occupational Safety and Health Training (BOSH).

Lot 3

A. Project Manager/Engineer

The Project Manager/Engineer shall be a Registered Electrical Engineer with at least two (2) years of experience in similar and comparable projects and must be knowledgeable about NEA standards.

B. Electrician

The Electrician must be a Registered Master Electrician (RME) with at least one (1) year of experience.

The key personnel listed above are required. The Contractor may, as needed and at its own expense, add additional professionals and/or support personnel for the optimal performance of all Construction Services, as stipulated in these Terms of Reference, for the PROJECT. Prospective bidders shall attach each individual's resume and PRC license of the (professional) staff, proof of qualifications, and related documents as necessary.

IX. LOGISTICS REQUIREMENTS

List of contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership or certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be.

X. PROJECT SCHEDULE/DURATION

The project shall be carried out within the duration herein specified:

Lot	Pre-Construction Phase	Construction Phase	Total
Lot 1	5 days	55 days	60 days
Lot 2	5 days	85 days	90 days
Lot 3	5 days	85 days	90 days

Notes: Shall commence upon receipt of Notice to Proceed (NTP).

- A. Pre-Construction/Installation Phase, which shall include the review of the staking sheet, plans, specifications and drawings as well as revisions by CASURECO II and permit acquisition.
- B. Construction Phase, which encompasses all works stipulated in the TOR as well as post-construction evaluation.

XI. POST CONSTRUCTION AND ACCEPTANCE

- A. The Contractor shall prepare and submit as-built plans and drawings (hard and soft copies); and all necessary documents to be required by CASURECO II seven (7) calendar days upon project completion.
- B. CASURECO II shall review and verify the as-built plans through conducting onsite inspection.

- C. Any non-conformity with the staking sheets, plans, specifications and drawings as well as discrepancy of actual to the as-built plan must be corrected by the Contractor prior to the acceptance of the project.
- D. CASURECO II shall be responsible for the tapping and energization of the completed project in the presence of the Contractor or its representative.

XII. WARRANTY AND DEFECTS LIABILITIES

- A. The Contractor shall be solely responsible and liable for defects and/or failures of the completed project within a warranty period of one (1) year upon energization/installation.
- B. The Contractor is given a period of thirty (30) days for the correction of defects within warranty period.

XIII. TERMS OF PAYMENT

- A. Fifteen percent (15%) payment of the contract Price as Mobilization Fee shall be released upon written request and submission of equivalent letter of credit by the Contractor.
- B. Twenty-Five percent (25%) of the Contract Price shall be paid to the Contractor for an accomplishment of at least 25% of the construction phase within thirty (30) days after the submission of the following documents:
 - 1. Progress Billing
 - 2. Detailed Statement of Work Accomplished (SWA)
 - 3. Request of payment by the Contractor
 - 4. Pictures/photographs of original site conditions (for first billing only)
 - 5. Pictures/photographs of work accomplished.
- C. Fifty percent (50%) of the Contract Price shall be paid to the Contractor within thirty (30) days upon completing the project and submitting the following documents.
 - 1. Billing Statement
 - 2. Detailed Statement of Work Accomplished (SWA)
 - 3. As-built plans and drawings
 - 4. An inspection report from CASURECO II's authorized personnel/representative.
 - 5. Request of payment by the Contractor
 - 6. Pictures/photographs of the completed project
- D. CASURECO II shall withhold the remaining ten percent (10%) of the Contract Price within one (1) year to cover warranty obligations of the Contractor. This shall be released upon the issuance of a Certificate of Acceptance from CASURECO II's authorized personnel/representative.

XIV. PERFORMANCE SECURITY

A. The CONTRACTOR shall file a performance security in the form of cash, cashier's check, letter of credit or surety bond acceptable to CASURECO II in the amount and form stipulated in section 39, Performance Security of the

Revised IRR 9184 for a term or effective period co-terminus with the duration of this Contract, to guarantee the faithful and satisfactory compliance of all the CONTRACTOR's obligations under this Contract.

B. This security shall answer for any and all damages and losses that may be suffered by CASURECO II as a result of the failure of the CONTRACTOR to perform any of its obligations under this Contract. This security shall be released by CASURECO II at the expiration or termination of this Contract provided that there are no pending claims filed against the CONTRACTOR and/or the surety company.

XV. LIQUIDATED DAMAGES

Failure to comply with the terms and conditions of the contract will result in the payment of corresponding penalties/liquidated damages in the amount to 1/10 of 1% of the cost of the unperformed portion of every day of delay. Once the cumulative amount of liquidated damages reaches 10% of the amount of the contract, CASURECO II shall rescind the contract, without prejudice to other courses of action and remedies open to it.

XVI. TERMINATION FOR OTHER CAUSES

Contract termination shall be initiated in case it is determined prima facie by the Procuring Entity that the Contractor has engaged, before, or during the implementation of the contract, in unlawful deeds and behaviors relative to contract acquisition and implementation, such as, but not limited to corrupt, fraudulent, collusive, coercive, and obstructive practices as stated in ITB Clause 4.

XVII. SANCTION AND BLACKLISTING OF ERRING CONTRACTORS

CASURECO II reserves the right to sanction or blacklist contractors who have violated or have records of any violations of the terms and conditions of any contract with CASURECO II or any record of unsatisfactory performance measured within the context of this Contract as deemed significant by CASURECO II's representative. The sanction/blacklisting shall be enough ground to disqualify the said contractor from entering into another contract with CASURECO II. CASURECO II shall act as arbitrary/conciliatory from the complaints against the Contractors, its employees, recommends and/or impose appropriate disciplinary/preventive or legal actions.

XVIII. RESERVATION CLAUSE

The Camarines Sur II Electric Cooperative Inc. (CASURECO II) reserves the right to reject any quotations, annul the procurement process, and reject all quotations at any time without incurring any liability to the affected service provider.

"ANNEX A-1"

Transformer, Pole Type, Conventional, Amorphous, 15kVA and 25kVA, Cu-Cu Winding

Winding **SPECIFICATION** Description Pole mounted, single phase, overhead-type, oil immersed, high permeability grain oriented amorphous steel core, conventional double primary bushing distribution transformers. Quantity (15kVA) 11 pcs. Quantity (25kVA) 7 pcs. Maximum altitude 1,000 meters above sea level Maximum ambient 40 deg C temperature ambient : Average 30 deg C temperature Rated **Primary** 7620/13200GrdY Volts Voltage Full wave (BIL), Crest 95 kV Chopped wave (BIL), 105 kV Crest Min. time : 1.8 microseconds Flashover **Secondary Voltage** 240V (25 to 50kVA) Full wave (BIL), Crest 30kV Chopped wave (BIL), 33 kV Crest Min. time : 1.0 microsecond Flashover Two (2) -2.5% tap above and two (2) - 2.5% taps below rated Tap Changer (offcircuit) primary voltage. Tap 3 shall be the nominal tap. All tap ratings shall be at rated capacity De-energized operation only Clockwise direction from the highest to the lowest tap position Caution marking: Do Not Operate When Energized Frequency 60 Hz 2% with $\pm 10\%$ tolerance (25 to 50kVA); Difference in impedance Percent Impedance between transformers of the same rating shall not exceed 7.5% of the specified value. **Audible Sound Level** 50kVA and below 48 dB Maximum Allowable Losses (at Nominal Tap and Rated kVA) Core Loss (No-Load) in watts 15kVA 15 25kVA 18 Copper Loss (Full-Load) in watts

15kVA	:	195
25kVA	:	290
Reference Temperature	:	30 deg C for Core Loss and 85 deg C for Copper Loss
Tolerance for guaranteed values (Rejection)	••	10% for Core Loss and 6% for Total Losses
Core Type	:	Shell Type
Winding Materials (HV/LV)	:	Copper/Copper
Insulating Oil	••	New Mineral (PCB Free) insulating oil for electrical apparatus, ASTM D3487
Material/Finishes	:	Tank coating exceeds ANSI C75.12.31.2
(Tank)		Shall be made of steel
		Shall be of sealed type construction with a steel and bolted type cover
		Shall be provided with usable gasket
Tank Grounding Connector	:	Tank cover shall be grounded to the tank body using a copper strap adequately sized for short circuit rating of the transformer
		Shall have an eyebolt- type grounding connector (8mm ² - 30mm ²) made from tinned copper alloy material)
Support and Lifting	:	Shall have a support lug for pole mounting.
Lugs		Shall have a balance vertical lifting lugs
Lugs		Shall be painted with two coats
		Light gray paint, ANSI70
		Gray, over a suitable prime coat
Tank Marking	•	Shall have a black painted or reflectorized and weatherproof sticker (3" block letters) transformer kVA rating below the low voltage bushing.
Primary Bushings	:	High voltage and neutral bushing: (double bushing), made in porcelain
		Shall be equipped with eyebolt-type connectors made from tinned copper-alloy material with stainless spring washers, terminal connectors
		Shall accommodate 8mm ² - 30mm ² stranded copper conductors
Secondary Bushings	•	Low voltage bushing (three bushing) shall be made from high grade, wet process porcelain, glazed entire exposed surface, light gray color ANSI 70, Munsell notation 5BG 7.0/0.4,
		It shall be designated as X1, X2 and X3 depending on secondary voltage rating in accordance with IEEE std C57.12.20,
		For 25-50kVA, conductor size 30mm ² (AWG No. 2) solid to 700mm ² (350kcmil) stranded copper conductor that low voltage terminal can accommodate.
		Shall be equipped with tinned copper alloy, eyebolt-type connectors or tinned spade terminal pads arrange for cable vertical takeoff, size of terminal opening, 20.6mm (13/16 inch)

Features	:	Meets or exceeds ANSI and NEMA standards
		Nameplate (stainless steel) in accordance with IEEE Std. C57.12.00 properly attached on the tank with technical specifications etched on the surface and coated with black enamel;
		. serial no.,
		. class,
		. number of phases,
		. frequency,
		. voltage rating,
		. kVA rating,
		. temperature rise deg C,
		. polarity,
		. percent impedance,
		. BIL,
		. total weight in kg.,
		. connection diagram,
		. name of manufacturer,
		. type of insulating liquid,
		. date/year manufactured
		. full load copper loss in watts
		. core loss in watts
		All energized hardware i.e. bolts; nuts and washers shall be made of tinned copper alloy material such as silicon bronze.
Others	:	The kVA rating shall be continuous and based on not exceeding either a 65 deg C (average) winding temperature rise or an 80 deg C hottest-spot temperature rise above an ambient of 30 deg C. The temperature rise of insulating oil shall not exceed 65 deg C when measured near the top of the tank.
		The transformer shall be guaranteed to have the loading capability in accordance with ANSI/IEEE STD C57.92, latest revision.
		The transformer shall withstand the mechanical and thermal stresses produce by external short-circuit currents specified in IEEE Std. C57.12.00, latest revision. Cooling class, self-cooled (OA or ONAN)

NATIONAL ELECTRIFICATION ADMINISTRATION

NEA ENGINEERING BULLETIN DX2211

September 1993

SUBJECT: WOOD POLES, STUBS AND ANCHOR LOGS (Technical Specification TS460)

1. SCOPE:

This specification describes the minimum acceptable quality of wood poles, stubs and anchor logs (hereinafter called poles, except where specifically referred to as stubs or anchor logs) purchased by or for Coop borrowers.

2. GENERAL STIPULATIONS:

Poles shall be warranted to conform to this specifications. If any pole shall be found defective or non-conforming under this specification in any detail except preservative retention, shall be replaced as promptly as possible by the producer.

Preservative retention (See Table 7) shall meet specification as a minimum at time of shipment. A reduction in preservation retention of not more than ten (10%) percent will be acceptable within thirty (30) days from date of delivery.

It is the responsibility of the producer to furnish material in a accordance with this specification in its entirety. This responsibility remains notwithstanding any certificate (report) of inspection agency or others. Acceptance of an order for material under this specification shall also constitute evidence of the producer's acceptance of this responsibility.

Poles will be inspected by NEA or their agents at the pole treatment plant for penetration and retention prior to delivery. Poles not meeting the requirements set forth in this specification will be rejected.

No poles shall be shipped for use later than one year following the treatment date. In such cases, the poles should be retreated and reinspected in accordance with NEA specification.

3. MATERIAL REQUIREMENTS:

All poles shall conform to the material requirements shown in appendix A, which are

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Douglas fir and western larch poles shall not be treated with CCA preservatives.

 Materials treated with waterborne preservatives shall be free of visible surface deposits.

5. PRESERVATIVE TREATMENT:

A. Conditioning Prior to Treatment

- Poles (see table 1, appendix A) which are partially seasoned by natural air
 circulation shall be air dried within the limits of paragraph 4.1.2.1, of
 Appendix A. Extreme care shall be taken to assure that air seasoned poles
 do not have pretreatment decay in their (refer also so paragraph 4.2.2 of
 appendix A). All poles in this category shall be further artificially
 conditioned prior to treatment by kiln drying.
- Poles which are partially seasoned by natural air circulation or shed drying shall be further conditioned by kiln drying.

B. Treatment (Pressure Process):

All poles treated by this process shall be treated in a cycle in which the temperatures and pressures shown in the following paragraphs, are not exceeded. These pressures and temperatures shall be recorded on a recording chart and shall be verified by visual observations of the direct reading gauges, at least hourly throughout the treating cycle by a qualified representative of the treating plant and/or independent inspector.

Preservative treatment shall not exceed 120 degrees F for CCA, 150 degrees F for ACA/ACZA and 210 degrees F for Crossote and Penta.

Impregnation pressure shall not exceed 200 psi, except for Red Pine and Douglas Fir (coast) for which the pressure shall not exceed 150 psi.

All poles treated with waterborne salts shall be by full cell process as described in AWPA Standards CI-82 and C4-81 except as modified by the provisions of ANSI 05.1-1979.

- C. Treatment (Thermal Process). Full-length Treatment: Western larch, Alaska yellow codar, lodgepole pine.
 - All poles treated by this process shall be adequately seasoned by natural and/or artificial methods prior to treatment so that specification requirements for penetration and retention are met.

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primarily extracted from ANSI 05.1-1979.

4. PRESERVATIVES:

Preservative shall be selected from one of the following:

- A. Creosote: Creosote shall be distillate derived from tar produced by the high temperature carbonization of bituminous coal and shall conform to all requirements of AWPA Standard P1-78 when analyzed in accordance with the methods in AWPA Standard A1-80, sections 2, 3, 4, either 5 or 9 and 6.
- B. Pentachlorophenol: Pentachlorophenol shall contain not less than 95 percent chlorinated phenols and shall conform to AWPA Standard P8-77 when analyzed in accordance with AWPA Standard A5-83. The hydrocarbon solvents for introducing the preservative into the wood shall meet the requirements of AWPA Standard P9-81 Types A, B, D, or E determined in accordance with reference ASTM standards for physical properties.

C. Waterborne Preservatives:

- Astimoniacals Copper Zinc Assessate (ACZA) shall meet the requirements of AWPA Standard P5-83, when analyzed in accordance with methods in AWPA Standard A2-84, A9-70, A10-82 or A11-83.
- Chromated copper arsenate (CCA) shall meet the requirements of one of the formulations given in AWPA Standard P5-83, sections 4, 5 or 6 and 10 and AWPA Standard C4-81. Tests to establish conformity shall be made in accordance with AWPA Standard A2-84, A9-70, A10-82 or A1i-83.
- Determination of the required pH of treating solution of the waterborne salts shown in AWPA Standards P5-83, section 10, shall be determined in accordance with AWPA Standard A2-82, section 9.
- Waterborne preservatives are available either as oxides which form nonionizing chemical compounds in the wood, or as saits which leave ionizing
 compounds as well as non-ionizing compounds in the wood. Sait
 formulations of a waterborne preservative are more corrosive to metal
 than the oxide formulations and may cause surface deposits. Unless
 otherwise specified in the purchase order, the oxide formulation of
 waterborne preservatives shall be supplied. If visible surface deposits
 appear on the wood within the 1-year guarantee period, it shall not be in
 compliance with this specification and shall be replaced by the producer.

DX2211.2

 The temperature of the preservative during the hot oil phase shall not exceed 235°F.

D. Results of Treatment:

- Penetration and retention of preservative shall be tested on borings taken at any point on the pole periphery approximately within the zone 1 foot above to 1 foot below the brand on all species of poles.
- Retention of preservative shall be not less than that specified in table 7, as determined by:
 - a. Croosote by AWPA Standard A6-83.
 - b. Penta by AWPA Standard A5-83, time ignition or copper pyridine. Copper pyridine method is required when timber may have been in contact with salt water, and for all species native to the Pacific coast region.
 - c. Salts by test in accordance with the recognized standards methods for chromium, copper, zinc, and arsenic ions listed in AWPA Standards A2-84, A7-75, A9-70, A10-82 or A11-83.
- Penetration of preservative shall not be less than that specified in table 7.
 When testing, the sampling will be as follows:
 - For poles with a circumference of less than 37.5 inches at 6 feet from butt:
 - Bore 20 percent of poles in a charge or 20 poles from charge, whichever is greater; accept if 100 percent conform; otherwise bore all poles.
 - (2) Re-treat the charge if more than 15 percent of the boringsare found to be nonconforming.
 - (3) Re-treat all nonconforming poles found in the penetration sampling if 15 percent or less fail the requirements.
 - (4) Re-treated poles shall be 100 percent tested for penetration boring. Poles which are still nonconforming after the second re-treatment, shall be permanently rejected.

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- For poles with a circumference of 37.5 inches or more at 6 feet from the butt:
 - Forty-five feet and shorter bore each pole and retreat only those found to be nonconforming unless more than 15 percent fail; in which case re-treat the entire lot.
 - Fifty feet and longer bore each pole twice at 90 degrees apart approximately in the same plane around the pole; and accept only those pole conforming to the penetration requirement in both borings.
 - Nonconforming poles shall be re-treated and 100 percent retested for penetration. Poles which are still nonconforming after a second re-treatment shall be permanently rejected. (3)
- Penetration depth shall be measured along a boring from the outer end toward the inner end for a distance throughout which there is continuous preservative penetration as indicated by evidence of preservative in each annual ring included.
- When poles which have been deep incised or radial drilled are bored for penetration and/or retention testing, the borings shall be taken midway on a diagonal between an incision or hole and an incision or hole in the next vertical row above or below.
- Re-treatment: Poles may be re-treated only twice.
 - Crossole and Penja Re-treatment of reserve treated stock poles shall be by submersion in hot preservative (crossole or pestachlorophenol-petroleum solution) for not less than 10 minutes under 25 pounds per square inch gauge pressure or not less than 30 minutes at atmospheric pressure.

 Waterborne Preservatives Poles which require re-treatment shall be air dried sufficiently to accept re-treatment. Re-treatment shall be within original treatment limitations.
 - Re-treated poles shall conform fully to all the requirements of this

is; otherwise they shall be permanently rejected.

Re-treated poles shall have a letter "R" die-stamped, harnmer-stamped or burn-branded in the sawed butt surface following the charge number to indicate that the poles have been re-treated.

DRAWINGS:

DX2211.5

AWPA A2-82 Standards Methods for Analysis of Water-Borne Preservatives and Fire

AWPA A3-83 Standard methods for Determining Penetration of Preservatives and Fire

AWPA A5-83 Standard Methods for Analysis of Oil-Borne Preservatives

AWPA A6-83 Method for the Determination of Water and Oil-type Preservatives in Wood

AWPA A7-75 Wet Ashing Procedure for Preparing Wood for Chemical Analysis

AWPA A9-70 Standard Method for Analysis of Treated Wood and Treating Solutions by X-ray Emission Spectroscopy

AWPA A10-82 Analysis of CCA Treating Solutions and CCA Treated Wood by

AWPA A11-83 Analysis of Treated Wood and Treating Solutions by Atomic Absorption Spectroscopy

May be purchased form:

American Wood Preservers' Association (AWPA) P. O. Box 849 Stevensille, Maryland 21666

The attached drawings (801 & M-20) show in detail the framing (gains and bolt-hole) for poles ordered under this specifications. Poles should be ordered by Drawing Number, and should included any desired detail not shown on this drawings.

RELATED SPECIFICATIONS:

The following listed specifications may be considered as pertinent to this specification subject to the restrictions in the paragraph under "Scope".

ANSI 05.1-1979 American National Standard Specifications and Dimensions for Wood

ANSI/ASTM D9-76e American National Standard Definitions of Terms Relating to

May be purchased from:

American National Standards Institute, Inc. 1430 Broadway New York, New York 10018

AWPA C1-82 Standard for Preservative Treatment by Pressure Processes - all timber

AWPA C4-81 Standard for the Preservative Treatment of Poles by Pressure Processes

AWPA C10-73 Lodgepole Pine Poles - Preservative Treatment by Full-Length Thermal

AWPA PI-78 Standard for Coal Tar Creosote for Land and Fresh Water Use

AWPA P5-83 Standards for Water-Borne Preservatives

AWPA P8-77 Standards for Oil-Borne Preservatives

AWPA P9-77 Standards for Solvents for Organic Preservative Systems

AWPA M1-76 Standard for the Purchase and Preservations of Forest Products

AWPA M2-83 Standard Instructions for the Inspection of Preservative Treatment of

AWPA M3-81 Standard Quality Control Procedures for Wood Preserving Plants

AWPA M4-80 Standard Instructions for the Care of Preservative Treated Wood Products

AWPA A1-80 Standards Methods for Analysis of Creosote and Oil-Type Preservatives

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APPENDIX A Material Requirements

t. SCOPE:

The material in Appendix A is reprinted from the American National Standards Institute (ANSI) Standard 05.1-1979, "American National Standard Specifications and Dimensions for Wood Poles." Copies of ANSI 05.1-1979 may be purchased from the American National Standards Institute, 1430 Broadway, New York, New York.

DEFINITIONS:

The following definitions shall apply to the terms used in this standard:

- Air Seasoning: Drying by the use of air where the air temperature is not more than 140°F either in the open or under cover.
- Check: The lengthwise separation of the wood that usually extends across the rings of annual growth and commonly results from stresses set up in wood during
- Compression Wood: Abnormal wood formed on the lower side of branches and inclined trunks of softwood trees. Compression wood is identified by its relatively wide annual rings, usually eccentric; relatively large amount of summerwood, sometimes more than 50 percent of the width of the annual rings. Compression wood, compared with normal wood, shrinks excessively lengthwise. c.
- Cross Break: A separation of the wood cells across the grain. Such breaks may be due to internal strains resulting from unequal longitudinal shrinkage or to external forces.
- Dead Streak: An area, devoid of bark, resulting from progressive destruction of the growth cells of wood and bark at the edge of the streak. On a pole, a dead streak is characterized by a discolored weathered appearance and by lack of evidence of overgrowth along the edges of the deadened surface.
- Decay: The decomposition of wood substance by fungi.
 - Decay. Advanced (or Typical): The older stage of decay in which the destruction is readily recognized because the wood has become punky, soft and spongy, stringy, ring-shaked, pitted, crumbly, or in poles nof stored or raffed in water, is in a soggy condition. Decided discoloration or bleaching of the rotted wood is often apparent.

- <u>Docay, Incipient</u>: The early stage of decay that has not proceeded far enough to soften or otherwise perceptibly impair the hardness of the wood. It is usually accompanied by a slight discoloration or bleaching of the wood.
- <u>Decayed Knot</u>: A knot containing decay. Two types of decayed knot are recognized.
 - Type I Knots containing soft or loose fibers (decay) which may extend the full length of the knot into the pole and which are associated with heart rot.
 - Type Π Knots containing soft or loose fibers (decay) which are not associated with heart rot.
- Face of Pole: The concave side of greatest curvature in poles with sweep in one plane and one direction, or the side of greatest curvature between groundline and top in poles having reverse or double sweep.
- Ground Line Section: That portion of a pole between 1 foot above and 2 feet below the ground line, as defined in the pole dimension tables.
- i. Hollow Heart: A void in the heartwood caused by decay or insect attack.
- Hollow Pith Center: A small hole at the pitch center of the trunk or of a knot caused by disintegration of the pith (small soft core occurring in the structural center of tree or branch).
- k. <u>Insect Damage</u>: Damage resulting from the boring into the pole by insects or insect larvae. Scoring or channeling of the pole surface is not classed as insect damage.
- 1. Kiln Drying: Drying by the use of heated air in batch or progressive-type kilns.
- m. Knot Diameter: The diameter of a knot on the surface of the pole measured in a direction at right angles to the lengthwise axis of the pole. The sapwood as well as the heartwood portion of a knot shall be included in the measurement.
- n. <u>Red Heart</u>: A condition caused by a fungus, Fornes pini, that occurs in the living tree. It is characterized in the early stages of infection by a reddish or brownish color in the heartwood; known as "firm red heart". Later the wood of the living

tree disintegrated (decays) in small, usually distinct, areas that develop into whiletine pockets.

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- 4.1.1 Species: See table 1
- 4.1.2 Conditioning, Seasoning, and Treatment Limitations:
 - Air seasoning shall be in conformance with this specification for preservative treatment without developing pretreatment decay.

All air seasoned poles shall be conditioned prior to or during treatment so that the pith center of the pole shall have been heated for at least 2 hours at a temperature of not less than 150°F. (Heat transfer usually requires 1 hour for each inch of diameter at 150°F).

Poles to be saft treated shall be kiln dried prior to treatment. Kiln dried poles shall be treated within 1 month from the time they are removed from the kiln.

4.1.2.2 Kiln Drying: Where kiln drying is employed on southern pine, red pine, jack pine, lodgepole pine, Douglas fir (coss) and western larch, the maximum dry bulb temperature shall be increased gradually and shall not exceed 170°F. In compartment kilns operating at temperatures up to 170°F, the maximum wet bulb depressions shall not exceed 50°F with the exception that during the first 24 hours there is no limitation on wet bulb depression. In progressive-type kilns operating at temperatures up to 170°F, the maximum wet bulb depression shall not exceed 50°F in the body of the kiln and 90°F at the entrance to the kiln.

Exception: Drying over 170°F is permitted for southern pine, lodgepole pine, Douglas fir (coast) and western larch species. The maximum dry bulb temperature shall not exceed 230°F for these species. For dry bulb temperatures over 200°F, the wet bulb depression shall be not less than 50°F with the exception that during the first 24 hours there is no limitation on wet bulb depression.

4.1.3 <u>Solvent Recovery</u>: When poles of any species have been treated with a system using an organic solvent-based preservative solution, a solvent recovery cycle of not over 15 hours at a maximum temperature of 225°F is permitted provided each pole before treatment has a maximum moisture content 25 percent when measured with a resistance-type moisture meter.

- Sap Stain: A discoloration of the sapwood, caused by the action of certain molds and fungi, that is not accompanied by softening or other.
- p. <u>Scar</u>: A depression in the surface of the pole resulting from a wound where the living tree has not compartmentized the wound and reestablished the normal cross section of the note.
- q. Sear, Turpestine Acid Face: An area in the lower portion of a Southern Pine pole where back hack removal with acid applied has caused resin to flow. No removal of sapwood has occurred.
- r. Scar. Turpentine Cat Face: A depression in the surface of a Southern Pine pole resulting from a wood hack into the sapwood, where the tree has not compartmentized the wound and reestablished the normal cross section of the pole.
- Shake: A separation along the grain, the greater part of which occurs between the rings of annual growth.
- Short Crook: A localized deviation from straightness which, within any section 5 feet or less in length, is more than 1/2 the mean diameter of the crooked section (see fig. 1, diagram 3).
- u. Spiral Crained (Twist-Grained) Wood: Wood in which the fibers take a spiral course about the trunk of a tree instead of a vertical course. The spiral may extend in a right-hand or left-hand direction around the tree trunk. Spiral grain is a form of cross grain.
- v. <u>Spiit:</u> A lengthwise separation of the wood due to the tearing apart of the wood cells.
- w. Sweep: Deviation of a pole from straightness (see figure 1, diagrams 1 and 2).

3. POLE CLASSES:

Poles meeting the requirements of this standard are grouped in the classes identified in tables A through E and tables 3 through E, based on their circumference measured 6 feetfrom the butt. Poles of a given class and length are designed to have approximately the same load carrying capacity regardless of species.

- 4. MATERIAL REQUIREMENTS:
 - 4.1 General

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(calibrated to the basis of oven dry weight moisture content) with insulated pins at 2.0 inches form the surface at mid-length.

4.1.4 <u>Rate of Growth</u>: The average rate of growth measured on the sawed butt surface in the outer 2 inches of poles having a circumference of 37.5 inches or less at 6 feet from the butt, and in the outer 3 inches of poles having a circumference of more than 37.5 inches at 6 feet form the butt, shall be not less than six rings per inch. Exception: Poles with four and five rings per inch are acceptable if 50 percent or more summerwood is present.

As an alternative, the ring count and summerwood measurements mentioned above may be made on an increment core taken at 6 feet from the butt directly above the place where the average rate of growth is indicated on the butt surface.

4.2 Prohibited Defects:

- 4.2.1 Cross breaks (cracks).
- 4.2.2 Decay, except as permitted for firm red heart in 4.3.1, defective butts in 4.4.4 and decayed knots in 4.4.6 When conditions indicate on distribution poles, and on all transmission poles (in the white), a boring to the center of the pole should be taken at approximately 1 foot above the groundline, at midpoint, near (within 2 inches) a check or at any other suspicious area. The borings should be examined by the quality control supervisor and the inspector for any signs of decay.

Where a question of possible decay and/or infection remains, the pole should be further tested using techniques such as the Pilodyn, Shigometer, culturing or microscopic examination. Evidence of fungal fruiting bodies and/or mycelium or/in a piece of wood shall be considered as evidence of decay and the piece of wood shall be permanently rejected as nonconforming.

- 4.2.3 Dead streaks
- 4.2.4 Holes, other than drilled holes provided for in the specification, open or plugged, except holes for test purposes, which shall be plugged with treated plugs.
- 4.2.5 Hollow butts or tops, except as permitted under hollow pith centers and defective butts.

- 4.2.6 Marine borer damage.
- 4.2.7 Nail, spikes and other metal not specifically authorized by the purchaser.

4.3 Permitted Defects:

- 4.3.1 Firm Red Heart: Firm red heart not accompanied by softening or other disintegration (decay) of the wood is permitted.
- 4.3.2 Hollow pith Centers: Hollow pith centers in tops or butts and in knots are permitted in poles that are to be given full-length treatment.
- 4.3.3 Sap Stain: Sap stain that is not accompanied by softening or other disintegration (decay) of the wood in permitted.
- 4.3.4 <u>Scars</u>: Turpentine acid face scars are permitted anywhere on the pole surface.

Limited Defects:

- 4.4.1 <u>Bark Inclusions</u>: Depressions containing bark inclusions shall be not more than 2 inches in depth, measures from the surface of the pole.
- 4.4.2 Compression Wood: The outer 1 inch of all poles shall be free from compression wood visible on either end.
- 4.4.3 <u>Dead Streaks:</u> A single, sound dead streak is permitted in Western Red Cedar and Northern White Cedar, provided the greatest width of the streak is less than 1/4 of the cicumference of the pole at the point of
- 4.4.4 <u>Defective Butts</u>: Hollowing in the butt caused by "splinter pulling" in felling the tree is permitted, provided that the areas of such a hollow is less than ten percent (10%) of the butt area.
- 4.4.5 <u>Insect Damage</u>: Insect Damage, consisting of holes 1/6 inch or less in diameter, or surface scoring or channeling is permitted. All other forms of insect damage are prohibited, except those associated with hollow
- 4.4.6 Knot: The diameter of any single knot and the sum of knot diameters in any 1-foot section shall not exceed the limits of table 2. Knots shall not occur within two (2) ft. above and or below the groundline.

Type II "decayed knots" are permitted.

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- (b) Poles 55 feet and longer shall meet the 1-inch-in-10-feet requirement in 75 percent or more of an inspection lot. In the remainder of the lot (25 percent), the pole may have a deviation of 1 inch for each 6 feet of length when measured
- Where sweep is in two planes (double sweep), or in two directions in one plane (reverse sweep), a straight line connecting the midpoint at the ground line with the midpoint at the top shall not at any intermediate point pass through the surface of the pole (see figure 1, diagram 2).
- 4.4.10 Soirai Grain: Soiral grain (twist grain) is permitted as follows:

Length of Pole (Feet)	Maximum Twist of Grain Permitted
30 and shorter 35-45, inclusive 50 and longer	1 complete twist in any 10 ft. 1 complete twist in any 16 ft. 1 complete twist in any 20 ft.

4.4.11 Splits and Checks:

- In the top: A split or a combination of two single checks (each check terminating at the pith center and separated by not less than 1/6 of the circumference) having one or both portions located in a vertical plane within 30 degrees of the top bolt hole shall not extend downward along the pole more than 12 inches. (Two checks or approximately the same width, each check terminating at the pith center and separated by 1/2 inch or less of wood fiber at any point on the pole circumference, shall be considered as a single continuous check).
- In the Butt: A split or combination of two single checks, as defined in 4.4.1 (1), in its entirety, shall not extend upward along the pole more than 2 feet.
- (3) Checks located two (2) ft, above and below the groundline portion shall not be permitted.
- The manufacturer may use bands, caps or cats of galvanized steeling to reduce the natural splitting of the species.

- 4.4.7 <u>Scars (Cat Face)</u>: A scar is the result of injury to the living tree which has begun to compartmentize and contain the injury. This provision does not refer to damage to the tree (pole) after it has been cut. No pole shall have a scar or turpentine cat face located within 2 feet of the ground line. Turpentine cars need be trismed only to the extent necessary for examination for evidence of fungus infection and insect damage. Other nound scars are permitted elsewhere on the pole surface, provided they are smoothly trimmed and do not interfere with the cutting of any gain and provided that:
 - The circumference at any point on trimmed surfaces located between the butt and 2 feet below the ground line is not less than the minimum circumference specified at 6 feet from the butt for the class and length of the pole; and The depth of the trimmed scar is not more than 2 inches, if the diameter is 10 inches or less, or 1/5 the pole diameter at the location of the scar if the diameter is more than 10 inches.
- 4.4.8 Shakes: Shakes in the butt surface which are not closer than 2 inches to the side surface of the pole are permitted, provided they do not extend to the ground line. Shakes or a combination of connected shakes which are closer than 2 inches to the side surface of the pole are permitted, provided they do not extend farther than 2 feet from the butt surface and do not have an opening wider than the 1/8 inch. Shakes in the top surface are permitted in poles that are to be given full-length preservative treatment, provided that the diameter of the shake is not greater than 1/2 the diameter of the top of the pole and is not closer than 2 inches from the surface.
- 4.4.9 Shape: Poles shall be free from crooks. A pole may have sweep subject to the following limitations.
 - (1) Where sweep is in one plane and one direction only:
 - For poles 50 feet and shorter of all species, a straight line joining the surface of the pole at the ground line and the edge of the pole at the top in 90 percent or more of an inspection lot shall not be distant from the surface of the pole at any point by more than one 1 inch for each 10 feet of length between these points. In the remainder of the inspection lot (10 percent), the poles may have a deviation

of 1 inch for each 6 feet of length when measured as

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DIMENSIONS:

For dimensions of particular species of poles, see tables 3 through 6 and A through E. For dimensions of stabs and anchor logs, see tables 8 and 9, respectively.

- Length: Poles less than 50 feet in length shall be not more than 3 inches shorter or 6 inches longer than nominal length. Poles 50 feet or more in length shall be not more than 6 inches shorter or 12 inches longer than nominal length.
- Circumference: The minimum circumference at 6 feet from the butt and at the top, for each length and class of pole, are listed in table A through E and 3 through 6. The circumference at 6 feet from the butt of a pole shall be not more than 7 inches or 20 percent larger than specified minimum, whichever is greater.

The top dimensional requirements shall apply at a point corresponding to the minimum length permitted for the pole.

Classifications: The true circumference class shall be determined as follows: <u>Classifications:</u> The frite directimenence class shall be obsermined as follows: Measure the circumference at 6 feet from the butt. This dimension will determine the true class of the pole, provided that its top (measured at the minimum length point) is larger enough. Otherwise, the circumference at the top will determine the true class, provided that the circumference at 6 feet from the butt does not exceed the specified minimum by more than 7 inches or 20 percent,

MANUFACTURING REQUIREMENTS:

6.1 Bark Removal: Outer bark shall be completely removed from all poles.

On all poles, no patch of inner bark more than ℓ inch wide shall be left on the pole surface between the butt and 2 feet below the ground line.

On poles that are to be given full-length treatment, no patch of inner bark larger than 1 inch wide and 6 inches long shall be left on the pole surface between the butt and 2 fect below the ground line.

NOTE: These provisions are intended to allow an occasional patch of bark and shall not be interpreted to allow numerous patches of bark.

6.2 Sawing: All pokes shall be neatly sawed at the top and at the butt along a plane which shall not be out of square with the axis of the pole by more than 2 inches per foot of diameter of the sawed surface. Beveling at the edge of the sawed butt surface not more than 1/12 the butt diameter in width, or an equivalent area unsymmetrically located, is permitted. The sawed surface should be smooth enough to allow the inspector's mark to be clear and legible after treatment.

6.3 <u>Trimming</u>: Completely overgrown knots, rising more than 1 inch above the pole surface, branch stubs, and partially overgrown knots shall be closely trimmed. Completely overgrown knots less than 1 inch high need not be trimmed.

Trimming may be done by shaving machine or by hand.

- Shaving: If shaving is used, the depth of cut shall not be more than necessary to remove inner bank and to trim smoothly and closely all branch stubs and overgrown knots. There shall be no abrupt change in the contour of the pole surface between the ground line and the above-ground sections. The lower 2 feet of poles may be trimmed to remove wood fibers causing but flare, provided sufficient sapwood remains to obtain customer's minimum penetration
- Marking and Code Letters: The information in items (1) and (5) below shall be bumbranded legibly and permanently on the pole face or included on a metal tag affixed hereto. The metal tag for the face of the pole shall be round, noncorrosive, tight-fitting and recessed 1/4 inch. It shall be fastened with a barbed or serrated noncorrosive nail.

The information in items (5) and (6) below shall be placed on the sawed but surface. If so desired by the producer or the purchaser, items (1), (3) and (4) below may also be placed on the sawed but surface.

- (1) The supplier's code or trademark.
- Insured warranty or quality assurance mark if applicable (2)
- (3) Plant location and month and year of treatment.
- (4) Code letters denoting the pole species, preservative and retention used.
- The true circumference-class numeral and numerals showing the length of the pole. (5)
- (6) The charge number. (An "R" shall also be die-stamped, hammer-stamped or bumbranded in the sawed butt surface of re-treated pokes). The code letters, not less than 5/8-inch bumbranded, and not less than 1/8-inch high if on a metal tag, designating the pole species preservative used shall be as

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Preservatives	Code Letters
Creosote	c
Pentachlorophenol-Petroleum	PA
(Heavy Solvent)	
Penta-LPG Cellon	PB
Penta-Methylene Chloride	PD
(Dow Process)	
Penta-Water Dispersod	P6
Astimoniacal Copper Arsenate	A2
Ammoniacal Copper Zinc Arsenate	SZ
Chromated Copper Arsenate	
Type A	SC SC
Type B	. SJ
Туре С	SK
Retention	
Extra Heavy	хн

The bottom of the brand or mark shall be placed squarely on the face of the pole and at 10 feet \pm 2 inches from the butt of poles 50 feet or less in length and at 14 feet \pm 2 inches from the but of poles 55 feet or more in length or as otherwise specified in the purchase order. Anchor logs shall have the brand or mark at the midpoint and the designation for length and diameter.

The following details shall be included in the brand or disk on the face of the pole or stub;

- The Supplier's code or trademark
- The plant location, month & year of treatment Code letters denoting pole specie and preservative used. Numerals indicating the length and class of poles.
- - Framine
 - 6.6.1 All distribution poles shall be bored, gained and cut to length prior to final
 - 6.6.2 All framing shall be in accordance with the attached drawings or with the drawings which accompany the order.
 - 6.6.3 When gains are required on one side only, they shall be cut on the face of the pole, and the gained surfaces shall be in approximately parallel planes. Transmission poles (e.g., poles 50 feet or longer) may be treated undrilled.

	Species	Code Letters
A.	Forcien Wood Alaska yellow codar Dougtas fir (coast) Larch (western) Pine Jack Lodgepole Ponderosa Radiata (New Zealand) Red (Norway) Southern Lobiolity Longleaf Shortheaf Shash	YC DF WL JP LP WP RP NP SP
В.	Finish/Scott Pine Philippine Wood Apitong Bagtikan Toog Benguet Pine Mindoro Pine Red Launn Tangile Pahutus Almon Manggasinoro Makaarim Manggachapui	Ap Ba To P MP RL Ta Pa Al Mgs Ma mg

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- 6.6.4 Anchor logs shall be bored as required by the order for them.
- 6.7 <u>Incising or Drilling:</u> Incising or drilling shall be cleanly done to prevent tearing or excessive shattering of fibers. Incisions shall be along (in line with) the axis of the pole.

STORAGE AND HANDLING:

Storage: When it is necessary to hold poles in storage, they shall be stacked on treated or other nondecaying skids, stickers, etc., of such dimensions, and so arranged, as to support the poles without producing noticeable distortion of any of them. The height of the pole stack shall be limited to avoid damage to poles on the bottom layers. All wood skids, stickers, etc., shall be treated.

Poles shall be piled and supported in such a manner that all poles are, at any point, at least I foot above the general ground level and any vegetation growing thereon. Stacks of poles shall not be allowed so settle at any point to less than I foot above the ground or any adjacent vegetation growing thereon. No decayed or decaying wood shall be permitted to remain undermeath stored poles or in the yard area adjacent to the stored poles. Unseasoned poles shall not be dead piled at any time for air seasoning. This restriction does not apply to short term piling associated with normal manufacturing procedures. Where special conditions exists, such as in arid areas, a waiver to this dead piling restriction may be requested from NEA.

- Handling: Poles shall not be dragged along the ground. Cant hooks, pole thongs, or other pointed tools shall not be applied to the ground line section of
- 7.3 Mechanical Damage: Poles are not acceptable if they contain indentations attributed to loading or handling slings that are 1/4 inch or more deep over 20 percent or more of the pole circumference, or more than 1/2 inch deep at any point. Other indentations or abrassions, for example, forklift damage, chain-saw damage, etc., shall not be more than 1/10 the pole diameter at the point of damage up to a maximum of one (1) inch. Such damage is permitted in an oversized section, where the excess of wood shall be taken into consideration in evaluating the effects of the damage. In any case, the remaining circumference for a given class is still required to be not less than the specification minimum.

TABLE I GENERAL REQUIREMENTS

TREATMENT GROUP	GENUS AND SPECIES	FIBER STRESS (psi)
A. Treatment Group A (Air Seasoned) Pine, Jack	Pinus Banksiana	6,600
Pine, Lodgepole	Pinus Contorta	6,600
Pine, Red (Norway)	Pinus Resinosa	6,600
Cedar, Alaska Yeliow	Chamaecyparis Nootkatensis	7,400
B. Treatment Group D (Kila Drying)		
Douglas Fir (Coast)	Pseudotsuga Menziesii	8,000
_Larch, Western	Larix Occidentalis	8,400
Pine, Jack	Pinus Banksiana	6,600
Pine, Lodgepole	Pinus Contorta	6,600
Ponderoza	Ponderosa	6,000
Radiata (New Zealand)	Radiata	6,000
Pine, Red (Norway)	Pinus Resinosa	6,600
*Pine, Mindoro	Pinus Merchusii Junetod	8.090
Finish/Scott Pine	Pinus Sylvestris	7,800
Pine, Southern	1	8,000
Lobielly	Pinus Taeda	
Longleaf	Pinus Palustris	
Shortleaf	Pinus Echinata	
Siash	Pinus Elliottii	•
*Tangile	Shorea Polysperma (Blanco)	8,090
*Almon	Merr	6,900
*Manggasinoro	Shorea Almon Foxw.	6,900
*Red Luan	Shorea Philippiicasis	7.600
*Bagtikan	Brandis	9,100
*Apitong	Shorea Negroseasis Foxw.	9,100
*Manggachapui	Parashorea Plicata	11,100
*Makaasim	Diptero Carpuz	11,100
*Narig	Hopea Squamata Herr	11.100
"Narig, thick leafed	Syzigium Nitidum	11,100
	Vatica Manggachapui	,,,,,,
	Blanco	
	Vatica Pachyphylla Merr.	

Note: * Philippine Wood Species

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TABLE 3
issension of Jack Pine, Lodgspole Pine, Red Pine, Redwood,
Sitics Spruce, Weetern Pin, and White Spruce Poles

Redwood on Eller Spruce of 8 670 cm

		(8	assect on	Fiber 8	rose of	a,oco pa	Ω			
	Class		7	1	4	3	-	7	,	10
Giniaeso C a pop (Sach	ireanianos m)	27	25	23	21	19	17	15	15	12
Langth of Pale (feet)	Oreandian Distance from But. (feat)			Main		ference at (Inche	c)			
23	3	34.0	39.5	31.0	29.0	27.0	25.5	23.0	20.0	19.5
30	5.5	39.0	36.5	34.8	31.5	29.0	17.6	25.0	21.0	-
35	- 6	41.3	38.5	36.0	33.5	31.0	24.3	783	-	-
40	- 6	44.0	41.0	34.0	33.3	33.0	30.5	-	-	-
45	5,5	46.G	43.0	49.8	37.0	34.5	32.0	-	-	
50	7	49.0	45.0	42.0	39.0	36.0	-	-	-	-
35	7.5	49.5	46.5	43.5	40.5	-	= -		-	_
60		31.5	48.0	45.0	42.0	-	-	-		-
8	1.3	53,0	49.5	46.0	43.0	-	-			-
70	3	343	31.0	47.5	44.3			-		-
75	9.3	56.D	52.5	49.0	-			-	-	•
90	19	37.3	54.0	30.5	-		-	-	-	~

to acces, straightness, etc.

(NTE: Change and implies to which circumferences at 6 feet from the best are leads in boldlace type are the preferred straightness. These alrems is tiple type are included for anglessing proposes only.

TABLE 2 LIMITS OF KNOT SIZE

	Maximum	Sizes Permitte	đ		
Length of Pole	Dian of any Sir (Inc	ngle Knot	Sum of Diameters of All knots Greater Than 0.5 Inch. in Any 1-Foot Section (Inches)		
	Classes H6 to 3	Classes 4 to 0	Classes H6 to H1	Classes 1 to 10	
45 feet and shorter Lower half of length Upper half of length	3 5	2 4	8*	8*	
50 feet and longer Lower half of length Upper half of length	4 6	6	1/3 of the circumference in any 1 foot section or 14 inches, which- ever is less*	10*	

* Both unner and lower halves.

NOTE: See section 3 and tables A through E and 3 to 6 pole classes.

TABLE 4

Dimension of Ponderous Pine and Radium Pine (New Zealand) Poles
(Sanct on Piner Stress of 6 000 rei)

	Dime	asian o	f Postle	roes Pin	e and R	ulian Pi	ne (Nev	v Zcaba	d) Poks		
			(8≃	ođan P	iber Stn	asofó,	000 psi)	·			
	Ches	.1.	2	3	4	3 3	+	7		10	
Miconner at top fin	Circunserence rhea)	27	25	25	21	19	17	15	15	12	
Besker	Lond (powerles)	4500	3700	300.	2400	1900	150	1300			
League of Pole (Gect)	Grandline Distance from But (feet)		Minister Circumference at 6 feet from Bett (inches)								
25	. 5	37.0	34.5	32.5	30.0	28.0	25	24.0	20,5	16.	
30	5.5	40.0	37.5	35.0	32.5	30.8	28.0	26.0	22.0	-	
35	6	42.5	0.0	37.5	34.3	32.0	30.0	27.5		-	
40	6	45.0	42.5	39.5	36.5	34.9	31.5			-	
45	6.5	47.5	44.5	41.5	303	36.6	33.0		-	-	
\$0	7	49.5	46.5	43.5	40.0	37.5	-	, _	-	-	
55	7.5	51.5	48.5	45.0	42.0		-		-	-	
60	1	53,5	\$0.0	46.5	41.5	-	-		-	٠	
65	1.5	55.0	31.3	48.0	45.0			-	-	-	
70	,	56.5	33.0	49.5	46.0		-	-		-	
75	9.5	58.0	54.5	31.0		-				ΓŦ	
80	10	59.5	\$6.0	52.0	-	-	-			-	

* The figures in this column are intended for one only when a definition of groundline is necessary in or

NOTE: Chance and lengths for which concentration at 0 first from the but are listed in fashifted type are the prefer standard since. These shows in light type are sactored for engineering preposes only.

		(E	tased or	Filber 8	tress of	8,000 ps	0				
	Class	1	2	7 3	- 4	3	6	7	9	10	
Miceimani (al top (inclu	ermuniferance es)	27	25	23	21	19	17	15	15	12	
Length of Pole (feet)	Groundline Distance from But (feet)		Minimum Circumstateure at 6 feet from Butt. (inches)								
25	5	33.5	31,5	29.5	27.5	25.5	23.5	21.5	19.5	15.0	
33	5.5	36.3	34.0	32.0	29.5	27.5	25.0	23.5	20.5	-	
35	6	39.0	36.5	34.0	31.5	29.0	27.0	25.0		-	
40	- 6	41.0	38.5	36.0	33.5	31,0	28.5				
45	6.5	43.0	40.5	37.5	35.0	32.5	30.0	-	-	-	
50	7	45.0	42.0	39.0	36.5	34.0		-		-	
55	7.5	46.5	43.5	40.5	38.0		-				
60		48.0	45.0	42.0	39.0		-				
65	8.5	49.3	46.5	43.5	40.5	-	-	-	-	-	
70	9	51.0	68.6	45.0	48.5						
75	9.5	52.5	49.0	46.0	-						
20	10	54.0	50.5	67.6		-	-		-	-	

TABLE 7
Preservative and Results of Treatment
For Full Length Pressure Treatest Poles, States and Anchor Logs

		Properties.			l	Ī		•	i			
Species			, ,				Ad Frederick Parameters Wanterson Street Personnel					Transact Library
	-	P) mAn	(injure	CC.4 # KEA	hola for fulke	idalma julus	E -/ E-B-	T of Supressi				
Employees on allows to Table 1	- 16	1	1.5	15	Krtz D	Nat D		(164	324			
Southern Plan	16		133	1.35	05-17	3,5"	-		XH.			
Ent Pas	*		1.8	. 3	BJ - 2.5	3.5-	-	es 90	XX.			
First/Sout Piss. Fundamen			1				T					
Radiob (No Andred)	16	<u></u>	1.25	1.5	3.) - 25 d of Diags			20195	XH			
Other Lend and Fermige Species	18		1.25	125	8 j - 12% al Comp	i		95 miles	204	1		
Shows as Table 1 with filter	l	ļ.		ł j		l	f !			1		
when the of \$100 PM	ļ	i				1 :						
F ====					L	i	L		Ł			

A reduction of 10 period from the values shows whose will be acceptable at district an until 20 steps from the date of determy

Amony with to protected by a qualified analyst under the pinnessian of this quadrants, and 1916 for pinnessia (Addison (MISSA). In the page of the region of the protection of the pinnessia and protection (Addison (MISSA). In the page of the region of the pinnessia page of the administration of the pinnessia and pinnessia a

Mark E. Full Supremel for Enralgement

TABLE 6 Dimension of Western Larch Poles

			(Base)	d on Fibr	ir Stress	018,40) bed			
	Cian	1	2	3	4	- 5	- 3	7	•	10
Minimum Circumference at top (inches)		27 25 23 21 19 (7 65								12
rode (fort)	Greenfliss Dutance from But (feet)			Ministra	ш Сосич	ference at (mobs		No.		
25	\$	33.0	31.0	29.0	26.5	24.5	23.0	21.0	18.5	4.5
30	3.5	35.3	33.5	31.0	29.0	26.5	24.5	23.6	19.5	-
73	6	38.0	35.5	33.0	31.0	29.3	26.5	24,5		-
40		40.0	37.5	25.0	32.5	30.0	28.0	-	-	-
45	6.5	42.0	39.5	37.0	34.0	31.5	29.0	-	-	-
50	7	44.0	41.0	383	33.3	33.0		-	-	-
55	7.5	45.5	42.5	40,0	37.0	-	-	-		-
60	3	47,0	46.0	41.0	38.5			-		
46	1.5	48.5	46.0	425	39.5	-	-	-	-	-
70	9	50.0	47.0	44.0	41.0	-	-	*	-	
75	9.5	313	44.0	45.0			-	-	-	-
80	10	52.5	44.5	6.0	_	-	-		-	-

TABLE 8

2.70	the state of		Class of	ck Pine Stub	g . Harr	e
1	. 2 ir s	- 3	4 ***	5	6	7
10	er Book M	Controvert To	p Circum	ference*	(inches)	N Jak
37.0	34.5	32.0	29.5	27.0	25,0	22.5
39.5	37.5	34.0	31.5	29.5	26,5	24.0
42.0	39.0	36.0	33.5	31.0	28.5	26.0
13.5	40.5	37.5	34.5	32.0	29.5	27.0
45.5	42.5	39.5	36.5	33.5	31.0	28,5
	39.5 12.0 13.5	37.0 34.5 39.5 37.5 12.0 39.0 13.5 40.5	17.0 34.5 32.0 39.5 37.5 34.0 12.0 39.0 36.0 13.5 40.5 37.5	17.0 34.5 32.0 29.5 19.5 37.5 34.0 33.5 12.0 39.0 36.0 33.5 12.0 39.0 36.0 33.5 13.5 40.5 37.5 34.5	2 3 4 5	1. 2 3 4 5 6 Minimum Top Circumference* (inches) 17.0 34.5 32.0 29.5 27.0 25.0 19.5 37.5 34.0 31.5 29.5 26.5 12.0 39.0 36.0 33.5 31.0 28.5 13.5 40.5 37.5 34.5 32.0 29.5

Length of State	1	2		ase of Sta	5.		9
(fee)	្សាល្អក្នុង ខ្លា	Mi	aimen Top	Circumf	cronce* (i	nches)	24.7.5
10.5	36.0	33.5	31.0	28.5	26.5	24.5	22.5
11	38.0	35.5	33.0	30.0	28.0	25.5	23.5
11.5	40.0	37.5	35.0	32.0	29.5	27.0	25.0
12,5	42.0	39.5	36.5	34.0	31.0	28.5	26.5
13	43.5	40.5	37.5	35.0	32.0	29.5	27.0
	Maxima	ım circumi	erence not	more than	n these fig	wes	
	plus 4 is	aches.					

TABLE 9 Dimensions of Auchor Logs Southern Pine, Lodgepole Pine, Red Pine, Jack Pine, Douglas Fir (Coast) and Western Larch

Designation	F2-1	F2-2	F2-3	P2-4	TA-1-5	TA-1-8
Length (feet)	4'-0"	4'~6"	5'-0"	5'-0"	5'-0"	8'-0"
Diameter (Min)	8"	9*	10"	12"	8"	8"
Boring - as ordered						

TABLE A
Dimension of Makacaim, Mangachapui & Narig
(Based on Fiber Strees of 11.100 neh

			(Based	on Filtrer	Street o	11,100	(ieq f	-		
	Class	1	2	3	4	- 5	6	7	9	10
Minimum (al top (inch	ircumference	27	25	23	21	19	17	i		
	sed (pounds)	4500	3700	3000	2400	1930	1500	15	15	13
Leagus of Pole (feet)	Orounding Distunce from But (feet)		<u> </u>		impra Corp	universace			!	
25	5	30.5	28.6	26.7	24.8	72.9	21.2	19.7	17.1	13,
30	5 - 1/2	32.8	30.8	28.6	26.6	24.6	22.7	21.1	18.5	
35	6	34.8	72.6	30.4	28.3	26.1	24.2	22.4		
40	6	36.8	34.5	32.2	29.9	27.6	25.6	23.7		
45	6 - 1/2	38.4	36.0	33.6	31.2	21.8	26.7			
50	7	39.9	37,4	34,9	32.4	30.0	27,7			
55	7 - 1/2	41.3	38.7	36.t	33.5	3£.1				
60	1	42.6	39.9	37.2	34.6	32.0				
હ્ય	8 - 1/2	43.9	41.4	39.3	35.6					
70	9	44.4	42.2	39.3	36.6					
75	9-1/2	45,2	43.3	40.3	37.4					
80	10	47.2	44.2	41.2						

TABLE C
Diremsion of Paintan, Tanglie & Mindoro Pine
(Based on Fiber Stress of 8090 pul)

		@	ased on	Fiber St	reas of 8	9000 pml	}			
	Class	1	2	3	4	T ŝ	6	7	} 9	10
Ministers Circumferesce et top (inches)		27 25 23 21 19 17						15	15	12
Breaking Load (pounds)		4500	3700	3000	2400	1900	1500	1200	1	
Length of Poin (fool)	Groundline Distance from Butt (feet)			Min		ches)	at 6 loct fe	om Butt		
25	5	33.9	31.8	29,6	27.5	25.4	13.6	21.9	19.1	15.
30	5 - 1/2	36.4	34.2	31.8	29.6	28.1	35.3	23.5	20.5	
35	6	38,7	36.2	33.6	31.4	30.7	26.8	24.9		
8	6	40.9	38.3	35.7	33.2	33.4	28.4	26.4		
45	6 - 1/2	42.7	40.0	37.3	34.6	35.9	29.6	27.5		
50	7	44.4	41.6	31.1	36.0	38.4	30.8	21.6		_
55	7 - 1/2	45.9	43.0	40.1	37.2	40.8	31.8			
60	8	47.4	44.4	41.4	38.4	43.2	12.9			
65	8 - L/2	44.7	45.7	42.6	39.5	45.5				
70	9	49.0	46.9	43.7	40.4	47.7				
75	9-1/2	\$1.3	49.0	44.8	4].6					
80	10	52.4	49.1	45.8	42.5					

122.0

TABLE 8 Dimension of Apitong, Bagilican & Toog

		Į84	ISSU ON	HOW SO	888 OI 3	TOO DEE)						
	Class	1	2	3	- 4	5	5	7	9	ю		
Minimum (irandoese:											
at top (inches)		27 25 23 21 19						15	15	12		
Arcabing Lood (pounds)		4500	3700	3000	2400	1900	1500	1200				
anger of	Grandline											
Pole	Distract	ì	Minimust Circumference at 6 feet from But:									
	from Butt	i				- (free	thes)					
(feet)	(fixet)											
25	5	30	30	24	26	24	22.5	20.5	žĘ	14		
70	5-1/2	34,5	32.5	30	28	26	24	22.5	9			
35	- 5	37	34.5	32.5	30	27.5	26	24				
40	6	39	M.5	34	31.5	29	27	25.5				
45	6 - 1/2	41	38.5	16	33	30.5	28					
50	7	43	40	37.5	34.5	12	29.5					
\$5	7 ~ L/2	44.5	41.5	39	36	33.5						
60	g	46	43	40	37.5	34.5	_ ·					
45	8 - 1/2	47	45	41.5	38.5							
70	9	48.5	46	43	40							
75	9 - 1/2	S	46.5	- 44								
#0	10	31	48	45				[

12

TABLE D
Dimension of Benguet Pine Poles & Red Lauen
(Besed on Piber Stress of 7600 psl)

		UR	(Base		er Stres					
	Clea	1	2	3	4	3	-	7	9	10
	Hintilion Currenterence iz top (inches)		27 25 23 21 19 17						11	13
	end (pumels)	4500	3700	3000	2400	1900	1500	1200		
Longsh of Pale (fact)	Groundline Distance from Bett (feet)				іж Сігона		6 feet from			
ž	5	34.0	32	30	27.5	25.5	24.0	21,5	19,0	15,0
.10	3-1/2	36.5	34.5	3,2	30.0	27.5	25.5	24.0	20,0	
35	6	39.5	36.5	34.0	32.0	29.5	27.5	25.5		
46	- 6	41.5	39.0	36.0	33.5	31.0	29.5	27.0		
45	6 - 1/2	43.5	41.0	38.5	35.0	32.5	30.0	21.0		
50	7	45.5	42.5	40.0	36.5	34.0	31.5	29,5		
35	7 - 1/2	47,6	44.0	41.5	38.5	35.5	32.5			-
60	1	44.5	45.5	42.5	40.0	36.5	34.0			
65	8 - 1/2	50.0	47.5	44.0	41.0	38.0		i		
70	9	\$1.5	4.5	45.5	42.5	39.5				
75	9-1/2	53.0	49.5	46.5	43.5	\vdash				
30	10	34.5	51.0	47,5	44.5					

DX22

TABLE E
Dimension of Almon, and Manggasinoro
(Based on Fiber Stress of ASM) nell

		- R	lated or	Fiber B	tress of	6000 pa	9			
	Cless		2	3	4	5	6	7	,	li li
	dissumen Circumference (Fop (melies)		27 25 23 21 19 17					15	[5	12
Breaking L	oki (poemds)	4500	3700	3000	2400	1900	1500	1200		1
Longth of Pole (feet)	Orometime Distance from Bust (foot)		•	Minute	en Circus	ference at (sache	é écct from			
25	5	35.7	33.44	31.27	79.0	26.8	24.81	23.0		_
10	5 - 1/2	38.5	35.88	33.6	31.2	21.8	26.6	24.8		
35	6	40.6	38,24	35.61	33.1	30.6	28.3			
40	6	43.1	40.41	37.69	35.0	32.3				
45	6 - U2	45.0	42.2	39.14	36.6					-
50	7	46.79	43.83	40.33						
55	7 - 1/2	41.42	45.4							
60		49.93						1		
65	# - 1/2									
70	9									
75	9 - 1/2									
20	10									

DIACRAM 2—MEASUREMENT OF SWEET IN TWO PLANES (DOUBLE SWEET)

CR IN TWO DESCRIPTIONS IN CHE PLANE (REVERSE SWEET)

DIAGRAM 3—MEASUREMENT OF SHORT CROCK (THREE CASES SHOWN)

DIAGRAM 3—MEASUREMENT OF SHORT CROCK (THREE CASES SHOWN)

CASE 11 WHERE THE REPUBLICA AREA AND AREA APPROXIMATELY PARALLE.

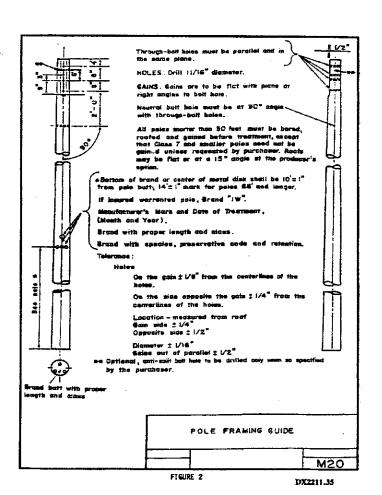
DIAGRAM 2—MEASUREMENT OF SHORT CROCK (THREE CASES SHOWN)

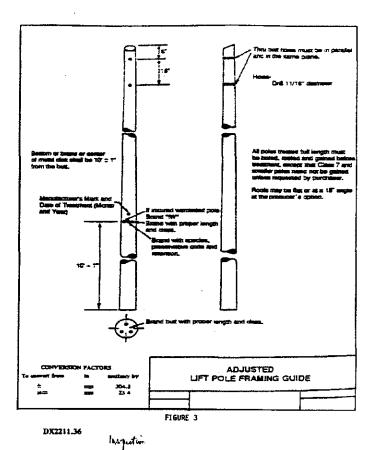
CASE 11 WHERE THE REPUBLICA AREA AND AREA APPROXIMATELY PARALLE.

DIAGRAM 2—MEASUREMENT OF SHORT AND AREA APPROXIMATELY PARALLE.

DIAGRAM 3—MEASUREMENT OF SHORT AREA APPROXIMATELY PARA

DX2211.34





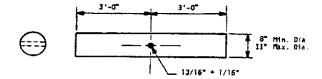


FIGURE 4
Anchor Log

DX2211.37

NATIONAL ELECTRIFICATION ADMINISTRATION

NEA ENGINEERING BULLETIN DX2213

DECEMBER 1992

SUBJECT: NEA SPECIFICATION FOR STEEL POLES

This specification establishes the physical characteristics and performance requirements of steel poles for use on the cooperatives electric system.

Poles furnished to NEA specifications shall conform in all respects to the performance of this standard. The text, figures and references of other standards supplement each other and shall be considered part of this standard. The poles are to be of the embedded type and not to require a special foundation.

Steel poles shall be fabricated from structural quality hot rolled steel which conforms to ASTM A570-79, "Standard Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality."

WELDING, DRILLING AND PUNCHING:

All welding, drilling and punching shall be completed prior to applying the galvanizing. Care shall be taken to clean all filings and weld splatters from the pole surface prior to finishing. The weld shall have 60 percent fusion in welds between plates having a thickness of 38 inch or less and 80 percent where plate thickness is greater than 38 inch. No cracking, undercutting of weld metal or weld blow holes shall be permitted.

The pole shall be cleaned of scale, rust, oil, paint and other surface contaminants and then rinsed in an alkaline cleaning bath. The steel shall then be bathed in a diluted acid (sulfuric or hydrochloric) bath for at least five minutes. Just prior to galvanizing, the acid cleaned steel shall be immersed in a flux solution of 30% zinc ammonium chloride with wetting agents and maintained at 65 deg. C until galvanizing is completed. Steel poles shall be hot dip galvanized in accordance with ANSI/ASTM A153-82, Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware. This standard

TABLE 1 POLE STRENGTH AND GROUND LINE DIMENSION POLE LENGTH-CLASS' STRENGTH REQUIREMENT³ 25/2 25/3 3700 3000 2400 25/4 25/5 1900 25/6 1500 30/2 30/3 3700 3000 30/4 2400 1900 30/5 30/6 1500 35/2 35/3 3700 2400 35/5 1900 40/2 3700 40/3 40/4 2400 45/2 3700 45/3 3000 2400

requires a minimum zinc coating of 610 grams / sq. m. The coating shall be continuous, smooth, reasonably uniform in thickness and free of blemishes and other imperfections which are inconsistent with commercial practice. Galvanized articles shall be from crasted areas, blisters, flux deposits, acid and black spots, and dross inclusions. Lumps, projections, globules, or heavy deposits of zinc which will interfere with the intended use of the material will not be permitted. All holes shall be clean and reasonably free from excess zinc.

FACTEMEDS.

All fasteners, such as thread inserts, shall be of non-corrosive and/or non-resting material compatible with the steel and its coating. All holes shall be filled with plastic or other sattable insert to reduce wind noise from whistling pole holes and to reduce potential damage to the holes.

If the pole is to be provided in two sections, it shall have at least two (2) foot slip joint and shall be keyed so the pole only can be field assembled as intended by the manufacturer.

- The poles are specified in accordance with the ANSI Standard for classification of wood poles, that is by length and strength class. The first number is the overall length in feet and the second number is the designation of the strength class. A 35 foot pole with a strength classification of 5 is abbreviated 35/5. The diameter of the pole at ground line shall be similar to an equivalent wood pole of that height and class to assure that the earth surrounding the pole will provide the necessary resistance to develop the strength of the pole.
- sional tolerance from that shown on the attached Table 1 shall be as follows:

Length	+ 3.0",- 0.0"
Diameter at Ground line	+/- 0.25*
Brand Marking	+/- 2.0"
bolt hole or Insert Specing	+/- 0.125*
bolt hole location from top of noie	+/- 0.125*

STRENGTH:

The strength of the pole is specified as a force acting at 90 degrees to the center line of the pole at a point two feet from the top of the pole. The amount of force in pounds that

DX2213.2

each classification must be able to withstand without damage is shown on Table 1.

FRAMING:

To assure adoquate attachment points for crossarms, guys, acutral and pole top brackets and crossarm braces, each pole shall have proper fittings to make these attachments. Also proper fittings shall be provided for detachable pole climbing steps or stairs to facilitate stock filing of pole. Figures 1 through 3 provide an attachment guide detailing the required location for each hole for 25, 30, 35, 40 and 45 foot seel poles. The attachment points are to be provided with clither a through hole or a "rivnut", a hollow that the pole of the po attachment points are to be provided with either a through hole or a "rivnut", a hollow rivet type fastener with internal threads for mounting equipment onto the pole. An alternative fastening method is with a steel banding system and this method will be used in the field for special equipment mounting requirements. All holes and or rivnut attachment points shall be included as part of the pole unit. The rivnuts and their installation tool may be supplied for installation in the field provided they are properly labeled for location, size and strength and properly packaged. The purpose of this requirement is to reduce the material stocking requirements of the purchaser and to keep the construction methods compatible with the existing materials and equipment.

11. MARKINGS:

Each steel pole shall be identified by the vendor by stamping into the pole, prior to coating, with letters not less than $1/2^{\alpha}$ high squarely on the face of the pole at ten (10) feet from the ball of the pole. The following information shall be stamped into the pole:

- Vendor's name
- Month and year of manufacture Length of pole Class of pole

- Type of coating Pole production or serial number

The marks shall be legible after application of the protective coating.

The poles must have sufficient strength, durability and ability to withstand inertial loading so that it will not be damaged under the following conditions:

- with the pole horizontal, picking it up with a single point lift and transport on a small trailer, without a special cradle and using one of the poles for towing the trailer for long distances on any of the Philippine roads and unloading a pole by sliding the pole endways off of a truck bed, allowing it to tip down and then drop to the ground or shoulder of the road bed and unloading a pole by rolling it off the side of a truck bed, down a ramp, with one

Pole length in feet and strength classification.

Pole strength designated as a force in pounds acting at right angles to the centerline of the pole at a point two feet below the top of the pole, and is applicable to both axes of the pole cross section.

foot of rise in two foot of run, onto the pole storage, which may be ground or

13. INSPECTION AND TESTING:

The manufacturer shall conduct factory tests to verify that the poles comply with the requirements of this standard. NEA reserves the right to wimess ANY OR ALL factory tests and the Supplier shall notify NEA fifteen (15) days before each test is to be conducted. The Supplier is required to furnish NEA a copy of all test reports. NEA expects to commission an internationally recognized third party, independent inspection and/or testing agency for independent inspection and/or testing at the factory, prior to shipping or after receipt of the poles in the Philippines. The galvanizing shall be tested in accordance with ASTM Standard A 123-89. Any pole that fails an inspection is automatically rejected and additional poles from that lot must be tested in accordance with the following testing schedule:

TESTING SCHEDULE

One pole out of every lot of 25 poles shall be tested to 50 percent of its rated strength and a record kept of the deflection after a two (2) minute hold at each multiple of 10 percent. This is a non-destructive test unless it shows some weakness indicating the pole could not meet the strength requirements and then it is to be carried to destruction.

One pole out of every lot of 100 poles shall be tested to destruction. If it fails at less than rated strength, then four additional poles from the same lot shall be tested to rated load. If they all pass, the lot is considered to have passed that test. If two or more of the additional test poles fail, the entire lot will be rejected. If only one of them fails, ton more from the same lot my be tested to rated load. If there are no failures, the remaining poles of that lot are considered to have passed that test, however, if there are any failures in these ten, then the lot is automatically rejected.

PROCEDURE

Proof Load Test:

Initially set the dynamometer to a load of 40% of the minimum breaking load. Apply load steadily until it reaches 40%. Hold for two (2) minutes. Note for the development of weld cracks or splitting. If any appear at the 40% load, the pole is considered to have FAILED the test and the batch represented shall be rejected.

Break Load Test:

Initially set the dynamometer to a load of 40% of the minimum breaking load. Apply load steadily until it reaches 40%. Hold for one (1) minute. Note for the development

DX2213.5

Pole Gains
Rivnuts
Pole roof
Pole Butt Cover
Ground line Pole Protection
Ladder Clip Bolts for Rivauts
Galvanizing Patching Material, either Zinc rich points or metallizing unsterial

of weld splits or cracks. If cracks appear at 40% load, the pole is considered to have failed the test. The batch represented shall be rejected.

If no cracks or splits appear after the application of 40% load, set the dynamometer to a load of 50% of the minimum breaking load. Apply load stendily until it reaches 50%. Rold for one (1) minute. Note for the development of cracks or splits. If found the pole is considered to have failed the test. Release load to zero.

Upon removal of the load, immediately increase the load gradually to 70% of the minimum breaking load and hold for two (2) minutes. Note for the development of additional cracks or splits.

Again remove the load and sussessively increase the load by an amount equal to 10% of the minimum breaking load up to 80% and thereafter increase by 5% of the minimum breaking load until failure occur, hold each load for two (2) minutes.

Measure load at the point of failure to the searest 5 kilograms.

The pole is considered to have failed the break load test if it yielded at less than the minimum breaking load.

14. REPORT

For tests conducted at source, the test shall be prepared by the manufacturer in coordination with the witnessing inspection engineer or test engineer.

The following test data shall be collected and recorded in accordance with the attached format:

Manufacturer's serial numbers of the test pole sample. Pole Class Date Manufactured

Date Tested
Pote dimensions
Load, including point of failure

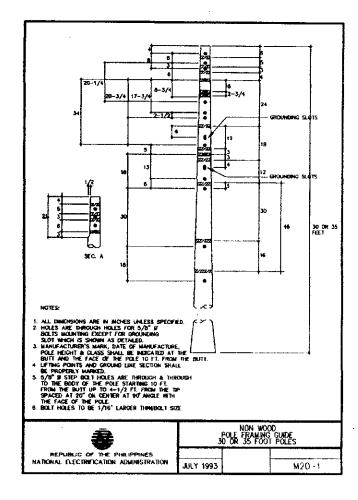
Deflection

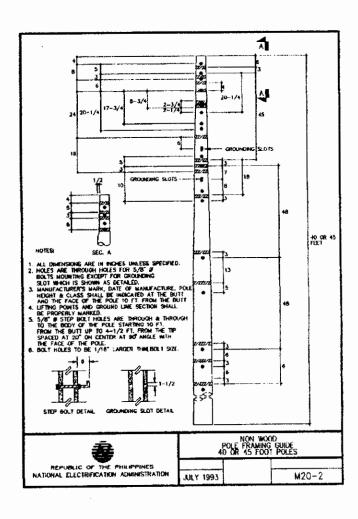
Galvanizing thickness measured at ground line, pole butt and pole top

Ladder Clips

15. HARDWARE INCLUDED WITH POLES

DX2213.6





NATIONAL ELECTRIFICATION ADMINISTRATION

NEA ENGINEERING BULLETIN DX2246

SEPTEMBER 1993

SUBJECT: NEA CONDUCTOR, WIRE AND ATTACHMENTS SPECIFICATIONS

Line materials furnished to NEA specifications shall conform in all respects to the performance requirements of these standards. The text, figures and references to other standards supplement each other and shall be considered part of this standard. This bulletin covers the following NEA Technical Specifications:

SPECIFICATION	
NUMBER	DESCRIPTION
200	Insulators
218	Support, Groundwire
219	Tie, Distribution
220	Wire, Ground
221	Wire, Tie
222	Tie, Spool, Preformed
223	Conductor, Bare Copper
224	Conductor, Duplex ACSR
225	Conductor, Bare, ACSR
227	Conductor, Insulated, ACSR
228	Wire, Armor Tape, .03 x .05
240	Armor Rod, Preformed
241	Deadend Grip, Service, Preformed
242	Deadend Grip, Guy

The above materials were included in the World Bank IFB 72 and have been used as a basis for

DX2240.1

ers, Line (Cont.)

4. MARKING:

Each insulator shall bear the manufacturer's symbol and year of manufacture.

Each insulator shall have a smooth glazed surface, free from imperfections or blemishes which can impair service life and performance.

Each insulator type shall be tested using methods described in ANSI C29.1-1982, [6], or IEC 383:1983, [7]. Tests required for specific insulator types are described in their associated ANSI specifications listed in Section 2. These tests are as follows:

1. Electrical tests including:

- s. Low-frequency dry flashover voltage
 b. Low-frequency wet flashover voltage
 c. Low-frequency dry withstand voltage
 d. Low-frequency wet withstand voltage
 e. Impulse withstand voltage
 f. Radio-influence voltage
 g. Visual corona
 h. Puncture

2. Mechanical tests selected from:

- a. Tensile strength
 b. Cantilever strength if applicable
 c. Compression strength if applicable
 d. Torsional strength if applicable
 c. Transverse strength if applicable
 f. Mechanical impact strength if applicable
- 3. Combined mechanical and electrical strength test for suspension insulators only.
- 4. Time-load-withstand-strength test.
- 5. Porosity test.
- 6. Thermal test.
- 7. Pinhole gauging test.



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification establishes the performance requirements, application criteria, and manufacturing tolerances of porcelain insulators to be used on Coop overhead distribution lines. The insulator may be porcelain, glass or composite materials such as silicone

2. GENERAL:

Porcelain insulator types furnished to NEA specifications shall each conform in all respects to ANSI specifications as follows (non-porcelain to conform in-so-far as applicable):

NEA Code No.	Турс	Class	ANSI Specification
3428 10 11	Clevis Suspension	52-1	C29.2-1983, [I
3426 10 11	Spool	53-1	C29.3-1986, [2]
3426 20 11	Spool	53-2	•
3426 40 11	Spool	53-4	•
3422 31 10	Medium Voltage pin	55-3	C29.5-1984, [3]
3422	Medium Voltage pin	55-5	•

All porcetaia insulators covered by this specification shall be fabricated from good commercial wet-process porcetain. All other insulators shall be of a material that has demonstrated suitability and long life in service, or through aging tests, for use as insulators. Ferrous parts of clevis type suspension insulators, other than stainless steel aluminum, shall be hot-dip galvanized in accurdance with ANSU/ASTM A153-82, [5].

TECHNICAL SPECIFICATION 200								
SUBJECT:	ORIGINAL JUNE, 19)3						
INSULATORS, LINE	Rev. No							
	PAGE 1	OF 12						

- 8. Galvanizing test in accordance with ANSI/ASTM B499-75 (1980), [7].
- 9. Routine electrical tests including:
 - a. High-frequency tests
 b. Low-frequency tests
- 10. Routine mechanical tests for suspension insula

7. PERFORMANCE REQUIREMENTS:

Insulators shall meet the following minimum performance ratings:

A. Suspension Insulators (ANSI C29.2-1983,[1]).

		ANSI Class	Refer to ANSI C29.1-1982
	ltem	52-1	Section
ì.	Electrical:		
	a. Low-frequency dry		
	flashover (Kv)	60	4.2
	b. Low-frequency wet		
	flashover (Kv)	30	4.3
	 c. Critical impulse flashover, 		
	positive (Kv)	100	4.7
	 d. Critical impulse flashover, 		
	negative (Kv)	100	4.7
	e. Low-frequency puncture (Kv)	80	4.11
2.	Radio-influence voltages (RIV):		
	a. Low-frequency test voltage		
	(rms-ground) Kv	7.5	4.9
	b. Maximum RIV @ 1.0 Mhz		
	micro-volts	50	4.9

	ltem	ANSI Class 52-1	Refer to ANSI C29.1-1982 Section
3.	Mechanical:		
	a. Combined mechanical and		
	electrical strength (lbs)	10,000	5.2
	 b. Mechanical impact 		
	Strength (inch-lbs)	45	5.1.2.2
	c. Tension proof (lb)	5,000	7.2.1
	d. Time load (lb)	6,000	5.3
4.	Dimensions:		
	a. Leakage distance (inches)	7	2.5.2

B. Spool Insulators (ANSI C29.3-1986, [2]).

		53-1	ANSI C 53-2	lass 53-4	Refer to ANSI C29,1982 Section
1.	Electrical:				
	a. Low frequency dry flashover (Kv) b. Low frequency wet flashover (Kv)	20	25	25	4.2
	1. Vertical	8	12	12	4.3
	2. Horizontal	10	15	15	4.3
2.	Mechanical:				
	a. Transverse Strength (lbs)	2,000	3,000	4,500	5.1.6

Page 4 of 12 TS 200

ers, Line (Cout.)

C. Pin Insulators (ANSI C29.5-1984, [3].

Item	ANSI Class 55-3	Refer to ANSI C29.1-1982 Section
1. Electrical:		
a. Low-frequency dry		
flashover (Kv)	65	4.2
 b. Low-frequency wet 		
flashover (Kv)	35	4.3
 c. Critical impulse flashover, 		
positive (Kv)	100	4.7
 d. Critical impulse flashover, 		
negative (Kv)	130	4.7
e. Low-frequency paracture (Kv)	95	4.11
2. Radio-influence voltages (RIV):		
a. Low-frequency test voltage		
(rms-ground) Ky	10	4.9
 b. Maximum RIV • 1.0 Mhz 		
micro-volts	50	4.9
3. Mechanical:		
a. Cantilever strength(ib)	2,500	5.1.3
4. Dimensions:		-
a. Leakage distance (inches)	7	2.5.2
b. Dry arcing distance(inches)	4.5	2.5.3
c. Minimum pin height(inches)	5	

8. DIMENSIONS AND PERMITTED TOLERANCES:

Principal dimensions and permitted tolerances, after galvanizing, are presented in Figures 1 to 6, and are measured in inches. These dimensions (and tolerances) are defined as follows:

Page 5 of 12 TS 200

Insulators, Line (Cont.)

1. Suspension insulator:

a. ANSI type 52-1 - Figure 1

D1 = Maximum insulator skirt diameter
D2 = Diameter of cross section of clevis tongue
D3 = Diameter of hole in clevis tongue
D4 = Diameter of clevis hole in metal cap
D5 = Diameter of clevis pin shank
H1 = Separation between bottom of clevis pin
inserted in cap and bottom of hole in clevis
bongue of the same insulator.
H2 = Minimum separation between bottom of clevis
pin and throat of clevis.
W = Minimum width of clevis opening
T = Thickness of clevis tongue.

2. Spool insulator:

a. ANSI types 53-1, 53-2, 53-4 - Figures 3, 4, & 5:

D1 * Pin hole diameter
D2 * Opening diameter
D3 = Overall diameter
D4 = Laser diameter of side groove horizontal
H1 = Half height of insulator
H2 * Depth of pin hole entrance
R = Radius of side groove, (vertical)

3. Pin Insulator:

a. ANSI types 55-4, Figure 6

D1 = Maximum diameter of insulator skirt
D2 = Maximum diameter of insulator top
D3 = Inner diameter of side groove, horizontal
D4 = Diameter of threads
H1 = Overall height of insulator
H2 = Depth of thread
H3 = Separation between bottom of top groove and center of side groove.
R1 = R...*us of side groove, (vertical)
R2 = Radius of top groove

9. INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the insulators comply with the requirements of this document. Non-conforming insulators are unacceptable. NEA reserves the right to witness inspection and tests and may request test reports for each insulator type.

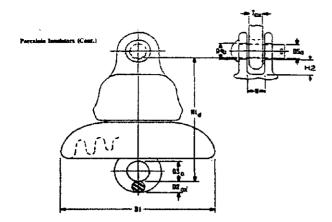
10. PACKAGING:

Overhead distribution line insulators shall be securely packaged for shipping and handling. Each package shall be marked with the number of insulators enclosed, the manufacturer's name, insulator class number and Catalog Number.

The performance and dimensional requirements of overhead distribution line insulators based on other internationally recognized standards are acceptable only if the requirements such standards are equivalent to or exceed the requirements quoted in this document.

12. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ANSI C29,2-1983: American National Standard for Insulators wet-process porce-lain and tougheased glass suspension type.
- 2. ANSI C29.3-1986: American National Standard for wet-process porcelain insulators
- ANSI C29,5-1984: American National Standard for wet-process porceiain insulators (low and medium voltage types). ANSI C29.6-1984: American National Standard for wet-process porcelain insulators (high voltage pin type).
- 5. ANSI/ASTM A5\153-82: Standard specification for zinc coating (hot-dip) on iron
- 6. ANSI C29.1-1982: American National Standard test methods for electrical power
- ANSUASTM B499-75 (1980): Method for measurement of coating thickness by the magnetic method: Non-magnetic coatings on magnetic basis metals.
- 8. IEC 383:1982 Tests on Insulators of ceramic material or glass for overhead lines.



		NON BAAL BENEASTAN (INCHES)								
NEA CODE NO.	Di :	BIZ	13	2	**	Į,	100		3	
3422 31 10	E MAXI	4	ž	4	*	5-1/4	(ultr	1 11/10	¥	

% M. ALONABLE VARIATION | INCHEST

% SINGLE LETTER INDICATE: 2 VARIATION, EXAMPLE # -2% INCL

% EXAMPLE CX = % -0 = %

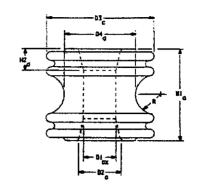
EXAMPLE CX = % -0 = %

THIS IS A CONCEPTUAL DRAWING. THE MANUFACTURER IS RESPONSIBLE FOR THE PREPARATION PROBLEMS AND A BESIGN WHICH MEETS THE DIMENSIONAL, STRENGTH, AND OTHER PERFORMANM RECULTEMENTS OF THIS STANDARD.

FIGURE | SUSPENSION INSULATOR, CLASS 52-1

Page 8 of 12 TS 200

Porcelain Emphesors (Court.)



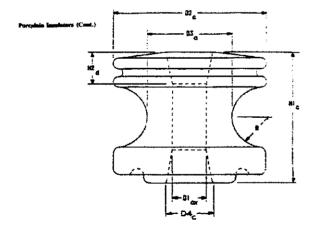
KEA	MUNITAL STABISTON (TAKES)							
CODE NO.	ði	æ	15	34	=	142	2	
3426 10 11	₩.	Ĩ.	74	i- } <u>á</u>	24	₩.	T _a	

G = % ALLOWAGLE VARIATION (INCHES)
D = % SINGLE LETTER INDICATES = VARIATION. EXAMPLE: G = % TWO LETTERS INDICATE +FIRST VARIATION. = SECOND VARIATION.
C = % EXAMPLE: CD = % - 0 = % - 0 = %

THIS IS A CONCEPTUAL DEABLE. THE WAMPACTURED IS RESPONSIBLE FOR THE PREPARATION OF DRAVINGS AND A DESIGN WHICH WEETS THE DIMENSIONAL STRENGTH, AND OTHER PERFORMANCE REQUIREMENTS OF THIS STANDARD.

> FIGURE 3 SPOOL INSULATOR - CLASS 53-1

Page 9 of 12 TS 200



NEA NOW INC. SIMENSTON (INCHES)							
CODE NO.	21	02	R 5	04	HI	H2	R
3426 20 11	%_	3	I- X	%	23	*	%

C = % ALOWABLE VARIATION | INCHES:

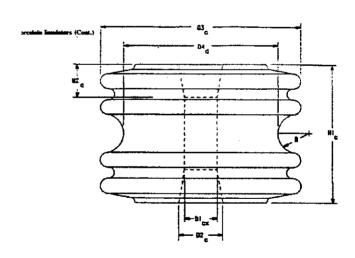
B = % SINGLE LETTER INDICATES 2 VARIATION. EXAMPLE: c = 1% INC

THO LETTERS DIDICATE = FIRST VARIATION. = SECOND VARIATION.

C = % EXAMPLE: CX = % -9 = %

THIS IS A CONCEPTUAL DRAWING. THE MANUFACTURER IS RESPONSIBLE FOR THE PREPARATION DRAWINGS AND A DESIGN WHITE RESTS THE DIMENSIONAL STREAMTH, AND OTHER REPUBLIANAME RECURRIMENTS OF THIS STANDARD.

FIGURE 4.
SPOOL INSULATOR - CLASS 53-2 Page 10.0



	NOMINAL DIMENSION (INCHES)						
MEA CODE NO.	H	02	83	H	HL	102	•
3426 40 11	%	%	+*	3	3	3	*

G = % ALLOWABLE VARIATION (INCHES)

6 = % SIMPLE LETTER INDICATES I VARIATION, EXAMPLE: G = I // INCHES

6 = % FING LETTERS INDICATE = FIRST VARIATION, - SECOND VARIATION,

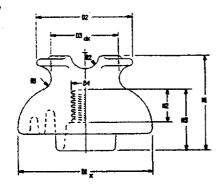
6 = % EXAMPLE: CX = 1/2 - 1/2 - 1/2

X = B

THES IS A CONCEPTUAL BRANTING. THE MANUFACTURER IS RESPONSIBLE FOR THE PREPARATION (
BRANTINGS AND A DESIGN WHICH WEETS THE DIMENSIONAL STRENGTH, AND OTHER PERFORMANCE
REGULIER-MENTS OF THIS STANDARD.

FIGURE 5 SPOOL INSULATOR - CLASS 53-4

Page 11 of 12 TS 200



		HOEM, INDESTOL WIDES									
MEA CODE NO.	04	102	033	D4		₩2	15	W.	22		
3422 31 10	4-3/4	1-1/2	2-1/4	1	4	1-7/8	2-1/2	5/8	1.3/1/6		

CHAIL LETTER BUILDIES TOMATION CHARLES & 2 % INCH TWO LETTERS BUILDIES TOMATION, CHARLES & 2 % INCH EXAMPLE OK 2 * 1/4 * 0 * 1/4 *

THES IS A CONCEPTUAL DRAWING THE MANUFACTURER IS RESPONSIBLE FOR THE PREPARATION OF MARRIESS AND A DESIGN WHICH MEETS THE DIMENSIONAL STRENGTH, AND OTHER PURPORMANEES RECORDENIESTS OF THES STANDARD.

FIGURE 6 13.2 KV PIN INSULATOR, CLASS 55-3
Page 12 of 12
TS 200

PACKAGING:

Support, Groundwire shall be accurely packaged for shipping and handling, each package shall contain One Hundred (100) items and shall be clearly marked with the manufacturer's name and catalog number.

OTHER STANDARDS:

The dissensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

10 . BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A575-73: Standard Specifications for Merchant Quality Hot-Rolled Carbon Steel Bars.
- ANSI/ASTM A153-82: Standard Specification for Zinc Conting (Hot-Dip) on Iron and Steel Hardware.



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This specification establishes the general dimensional and performance requirements of Support, Groundwire for use on coop overhead distribution lines.

GENERAL:

Support, Groundwire furnished shall conform in all respects to the requirements of this specification. The text, figures and references to other standards supplement each other and shall be considered part of this specification.

MATERIAL:

Support, Groundwire shall be made from either iron or steel of a grade and quality to meet the strength requirements required in the normal use of the Support, Groundwire.

FINISH

Support, Groundwire shall be free of rough or uneven surfaces and edges so as to ensure safety in handling and installation.

DIMENSIONS:

Nominal dimensional of the Support, Groundwire are shown in Figure 1,

GALVANIZING:

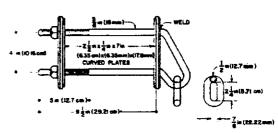
After fabrication, Support, Groundwire shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82 [1].

INSPECTION:

The manufacturer shall conduct the necessary test to determine if the unit complies with the requirements of this document, non-conforming units are unacceptable.

	TECHNICAL SPE	CIFICATION 218	
SUBJECT:		ORIGINAL	AUGUST, 1993
SUPPORT, GROUNDWIRE		Bev. No	-
			PAGE 1 OF 2

SUPPORT, GROUND WIRE



REFERENCE DATA

SMILLAR OF EDUAL	J-6394
NE.A. CODE NO.	6400 GB 00



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This specification establishes the physical and dimensional performance requirement of Tie, Distribution used as the wires to secure conductors and hardware on Coops electric distribution lines.

GENERAL: 2.

Tie, Distribution furnished to NEA shall conform in all respects to the requirements of this specification. The text, figures and references to other standards supplement each other and or considered part of this specification.

Tie, Distribution shall be made from aluminum in accordance with ASTM B686-82.

Tie, Distribution shall be reasonably smooth and free from blemishes and imperfections not consistent with good commercial practice.

DIMENSIONS:

Typical Tie, Distribution is shown in Figure 1.

The manufacturer shall conduct the necessary tests to determine if the \underline{mit} complies with the requirements of this document. Non-conforming units are $\underline{macceptable}$.

Tie, Spool, Preformed shall be securely packaged for shipping and handling. Each package shall contain one hundred (100) items and shall be clearly marked with manufacturer's name and catalog number.

TECHNICAL SPECIFICATION 219			
SURJECT:	ORIGINAL	AUGUST, 1993	
TIE, DISTRIBUTIO	Ray. No.		
		PAGE 1 OF 2	

TIE, DISTRIBUTION



REFERENCE DATA

NEA. CODE NO.	6792 10 23	6792 50 27	6792 59 N
SMELAR OR EQUAL	P-UTC - 1904	P-15TC - #06	P-UTC-108
MAX (MA RANGE In(mm)	367 (0.06)	AGD (II.65)	.058 (14.93)
MINLDIA, IMMITE in (mm)	(\$0.01)	AQ6 (ID.31)	.59: (13.23)
COMPUCTOR SIZE ACSR	2 - 6/1	2/0-6/1	4/0-8/1
APPLIED LENGTH in (cm)	20 (71.12)	25 (63.50)	28 (71.12)

8. OTHER STANDARDS:

The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this standard.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

ASTM A663-82: Standard Specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties.

Page 2 of 2



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

t. SCOPE;

This specification establishes requirements of bare solid hard-drawn aluminum wire for use as grounding wires, jumper and conductors on the Coop electric distribution systems.

2. MATERIAL:

The aluminum wire shall be fabricated from an alloy rod which complies chemically, physically and electrically with the requirements of ASTM B531 [1].

3. STRENGTH:

The tensile strength of aluminum wires shall be in accordance with Section 6 and Table 1 of ΛSTM B396 [2].

4. RESISTIVITY:

The electrical reastivity shall be determined by methods and procedures specified in ASTM B193 [3].

5. DENSITY:

To calculate weights and cross sections, the aluminum alloy density at 20°C (68°F) shall be 2.705 grs/cm 3 (0.0975 %b/in 3).

6. WIRE DATA:

The allowable tolerances of wire diameters shall comply with Section 10 and Table 2 of ASTM B396 [2] and summarized as follows:

	Wire Size (AWG)	Strand Diameter (inch)	Number of Strands	Breaking Strength (lbs)	Weight lbs/1000ft	Resistance at 25°C ohms/1000ft
ı	4	0.2043	ł	754	38.4	0.4073

TECHNICAL SPECIFICATION 220			
SUBJECT:	ORIGINAL	JUNE, 1993	
WIRE, ALUMINUM, GROUND	Rev. No		
		PAGE 1 OF 3	

on, Ground (Cont.)

7. JOINTS:

Unless otherwise specified when ordered, the aluminum wire shall be provided in a continuous length. Joints shall be made in accordance with Sections 12.1 and 12.2 of ASTM B396 [2].

The surface shall be reasonably smooth and free from blemishes and imperfections not consistent with good commercial practice.

9. INSPECTION:

The manufacturer shall test the aluminum wire in order to certify that it meets the requirements of ASTM B396 [2]. NEA reserves the right to witness factory tests and may request test reports.

10. PACKAGING AND SHIPFING:

Bare solid hard-drawn aluminum wire shall be packaged in 1,000 foot coils each consisting of one length of wire. Each coil shall be protected by a heavy plastic wrapper secured by four (4) times of heavy cord or wire. These ties shall be secure enough so that they cannot salide on the package, but not tight enough to damage the contents of the package. Tags attached to the end of the conductor and to the outside of the package shall contain the following information.

- Gross and Net Weight Cable size, number of strands, type.
- 3.
- Length. Catalog number. Manufacturer's r cturer's name and/or identification symbol.
- Shipping data, NEA Code No.

11. OTHER STANDARDS:

The dimensional and performance requirements of bare solid hard-drawn aluminum wire, based on other internationally recognized standards, are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this

Page 2 of 3 T\$ 220

m, Ground (Cont.)

12. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM B 531: American Standard Specification for Aluminum Alloy 5005 H19 Wire for Electrical Purposes.
- ASTM B396: Standard Specification for Aluminum Alloy 5005 H19 Wire for Electrical Purposes (2)
- **[31** ASTM B193: Standard Test Method for Resistivity of Electrical Conductor Materials.

Page 3 of 3 TS 220

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification establishes the physical requirements of bare solid annealed aluminum wire used as the wires to secure conductors and hardware on Coop electric distribution

2. MATERIAL:

The aluminum shall be fabricated from an alloy rod which complies chemically, physically and electrically with the requirements of ASTM Specification B233 [1].

Tensile requirements of the aluminum shall be in accordance with Section 6 and Table 1 of ASTM B609 [2].

4. RESISTIVITY:

The electrical resistivity shall be determined by methods and procedures specified in ASTM B193 [3] and ASTM B609 [2].

In order to calculate weights and cross section, the density of the aluminum alloy shall be 2.705 gm/cm² (0.0975 lb/ln.³) at 20°C (68°F).

6. WIRE DATA:

Wire diameter and allowable tolerances shall comply with ASTM B609 [2]. Wire sizes are summarized below:

The same of the sa	Wine Size (AWG)	Strand Diameter (inch)	Number of Strands	Breaking Strength (lbs)	Weight Lbs/1000ft	Resistance at 25°C ohms/1000ft
1	4	0.2043	1	369	38.4	0,4073

TECHNICAL SPECIFICATION 221			
SUBJECT:	ORIGINAL	JUNE, 1993	
WIRE, ANNEALED ALUMINUM, TIEWIRE	Rev. No.		
		PAGE 1 OF 3	

od Alees um, Tiewice (Cent.)

7. JOINTS:

Unless otherwise specified when ordered, the solid annealed aluminum wire shall be provided in a continuous length. Joints shall be made in accordance with Section 63 of ASTM B609 [2].

The wire shall be reasonably smooth and free from blemishes and imperfections not consistent with good commercial practice.

The tensile strength of the aluminum wire shall be determined by the methods and procedures of ASTM B557 [4].

10. SHIPPING:

Solid annealed aluminum wire shall be packaged in 1,000 foor coils each consisting of one length of wire. Each coil shall be protected by a heavy plastic wrapper, secured by four (4) ties of heavy cord or wire. These ties shall be secure enough so that they cann slide on the package, but not tight enough to damage the contents of the package. Tags attached to the end of the conductor and to the outside of the package shall contain the following information:

- Gross and net weights.
 Cable size, number of strands, type.

- Case size, number or strands, type.
 Case size, number.
 Case of the case of th
- Shipping data.
 NEA code no.

Permissible variation in coil length shall be plus 5% of the nominal shipping length.

11. INSPECTION:

The manufacturer shall conduct inspections and tests on the aluminum wire subject to agreements with the purchaser as listed in Section 10 of ASTM B609 [2]. NEA reserves the right to witness factory tests and may request for test reports.

Wire, Americal Absorburg, Towicz (Cost.)

12. OTHER STANDARDS:

The dimensional and performance requirements of bare solid annealed aluminum wire, based on other internationally recognized standards, are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

13. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM B223: Standard Specification for Aluminum-Alloy 1350 Redraw Rod for Electrical Purposes.
- [2] ASTM B609: Standard Specification for Aluminum 1350 Round Wire, Annealed and Intermediate Tempers, for Electrical Purposes.
- [3] ASTM B15.: Standard Test Method for Resistivity of Electrical Conductor Materials.
- [4] ASTM B557: Standard Methods of Tension Testing Wrought and Cast Aluminum and Magnesium Alloy Products.

Page 3 of 3 TS 221

Tle, Spool, Preformed (Cont.)

8. OTHER STANDARDS:

The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this standard.

9. BIBLIOGRAPHY OF REFERENCE STANDARDS:

 ASTM A663-82: Standard Specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties.



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the general dimensional performance requirements of Tie, Spool, Preformed for used as the wires to secure conductors and hardware on Coops electric distribution lines.

2. GENERAL:

Tie, Spoul, Preformed furnished to NEA shall conform in all respects to the requirements of this specification. The text, figures and references to other standards supplement each other and or considered part of this specification.

3. MATERIAL

Tie, Spool, Preformed shall be made from aluminum in accordance with ASTM B686-82.

4. FINISH:

Tie, Spool, Preformed shall be reasonably smooth and free from blemishes ana imperfections not consistent with good commercial practice.

5. DIMENSIONS:

Typical Tie, Spool, Preformed is shown in Figure 1.

6. INSPECTION:

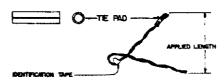
The manufacturer shall conduct the necessary tests to determine if the units complies with the requirements of this document. Non-conforming units are unacceptable.

7. PACKAGING

Tie, Spool, Preformed shall be securely packaged for shipping and handling. Each package shall contain one hundred (100) items and shall be clearly marked with manufacturer's name and catalog number.

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TIE, SPOOL, PREFORMED



REFERENCE DATA

499UED (2007H % (46) 79 (46.26)			
DAMETER RANGE			
MANAGEM (E. (mm)	.365 (@)		
MAXIMUM in (mm)	.307 (0.30)		
SMELAN OR EQUAL	P-975-1312-P		
NEA CODE NO	6790 39 23		



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification covers the physical and electrical requirements of stranded medium-hard-drawn copper wire for use on electric distribution systems.

The copper wire shall be fabricated from an alloy rod that conforms to the requirements of ASTM B2 [1].

RESISTIVITY:

The electrical resistivity shall be determined by the methods and procedures specified in ASTM B193 [2].

WIRE DATA:

Wire Size (
Item	1/0	2/0	4/0
NEA Code No.	1651 10 07	1651 20 01	1651 40 07
Strand Dia (inch)	0.1228	0.1379	0.1739
No. Of strands	7	7	7
Cond dia (inch)	0.368	0.438	0.522
Breaking Strength	3705	4640	7278
Weight, lbs/1000 ft	326	411	541
DC resistance at			
25°C ohms/mile	0.554	0.440	0.267
Package length(ft)	2000	2000	1000

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ur, Baru, Copper (Cent.)

16. DIMENSIONS:

The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements of this document.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM B2: Standard specification for medium-hard-drawn wire.
- ASTM B193: Standard test method for resistivity of electrical conductor
- ASTM BB: Standard specification for concentric-lay-stranded copper conductors hard, medium, or soft drawn.
- ASTM B3: Standard specification for soft annealed copper wire.

tur, Bure, Capper (Cont.)

5. JOINTS:

Joints shall be located in accordance with the minimum separation distances in Table 1 of ASTM B8 [3].

LAY:

The tay of the conductors shall comply with Section 6 of ASTM B8 [3] unless specific lay configurations are required by NEA.

Physical and electrical characteristics of the copper wires shall be determined before standing.

INSPECTION:

The manufacturer shall conduct inspections and tests to verify that the copper wire complies with the requirements of this document.

SHIPPING:

Stranded copper wire shall be packaged in coils as shown in Item 4 above, each coil consisting of one length of wire. Each coil shall be protected by a heavy plastic wrapper, secured by four (4) ties of heavy cord or wire. The ties shall be secure enough so that they cannot slide on the package, but not tight enough to damage the contents of the package. Tags attached to the end of the conductor and to the outside of the package shall contain the following information:

- Net weight Wire size, No. of strands, and type.
- Length Manufacturer's name and/or identification symbol.

Permissible variation in coil length shall be +5% of specified coil lengths.

Page 2 of 3 TS 223



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification establishes the physical and electrical characteristics of preassembled cross-linked polyethylene-insulated aluminum cables supported by a bare ACSR messenger wire. These assemblies shall be used as aerial single-phase and three-phase service drop cables from the overhead distribution system. The insulated aluminum-conductors shall be twisted around the messenger wire which also serves as a neutral conductor. These cable assemblies shall be used in regions which have hot, humid weather and high annual rainfall.

GENERAL:

Preassembled messenger-supported cables provided to NEA specifications shall conform to the physical and electrical requirements of this standard. These assemblies shall be identified as follows:

,	Components		
Assembly	Aluminum Cable	ACSR Messenger	
Duplex	1	1	
Quadruplex	3	1	

MATERIALS:

I. Aluminum Cable

The aluminum cable shall be formed of seven concentric lay stranded wires which meet the chemical requirements of ASTM B231 [1]. The wires shall be either:

1. Annealed, or an intermediate temper which meets the tensile and

TECHNICAL SPECIFICATION 224						
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finish requirements of ASTM B609 [2].

Hard-drawn, meeting the tensile, elongation, brittleness and finish requirements of ASTM B230 [3], or IEC 889 [8].

b. Physical Characteristics

The wires shall be arranged with a right-hand lay. The preferred lay shall be 13.5 times the outside diameter of the wire, but the lay should not exceed 16 times nor be less than 10 times the wire diameter.

* The wires shall have a density of 0.0975 lb/in.3 at 20°C.

c. Electrical Characteristics

The wires shall have a volume resistivity constant of 17.002 ohm.cmil/ft and a minimum volume conductivity of 61.0% IACS at

2. Insulation

a. General

The aluminum cables shall be provided with filled or unfilled cross-linked polyethylene insulation. A filled insulation contains a minimum of ten percent (10%) carbon black and/or mineral fibers by weight. An unfilled insulation contains a maximum of two and one-half percent (2-1/2%) carbon black for cables up to 5.0 KV.

The insulation shall be free from voids, contaminants or por sity detectable with less than five times magnification.

b. Physical and Aging Requirements

The insulation shall meet the requirements of ICEA standards Publication No. S-66-524 (NEMA WC7), [4].

The insulation should exhibit the following performances:

Page 2 of 11 TS 224

ter, Deplex & Quadruplex (Cont.)

e. Performance Requirement

The cable shall be tested to demonstrate compliance with the requirements of Section 6 of ICEA S-66-524 (NEMA WC7), [4].

The tests shall include:

- 1. Wires

 - a. De resistance
 b. Cross sectional area determination
 c. Diameter determination

2. Insulation

- a. Tensile strength
 b. Set test
 c. Elongation test
 d. Oxygen pressure test
 e. Air oven test
 f. Solvent extraction test
 g. Heat distortion
 h. Capacity and power factor tests
 i. Volume resistivity
 i. Ac vollage test

- Volume resistivity
 Ac voltage test
 De voltage test
 Ac spurk test
 De spurk test
 Insulation resistance tests
- o. Permittivity and dielectric strength

The messenger wire shall be a bare ACSR conductor (Class AA) which shall serve as the neutral conductor. This messenger shall have six round aluminum wires wrapped around a central zinc coaled round steel core wire. The ACSR conductor shall conform to the physical requirements of ASTM B232 [5] and NEA Specification Z25 [6].

The steel core wire shall be fabricated from steel obtained by the open-hearth, electric furnace or basic oxygen process and conforms to the chemical composition specified in Section 3 of ASTM B498-74 (1979), [7]

tor, Duplex & Qu ez (Cout.)

1. Unaged Condition

Minimum tensile strength (lb/in.²) Minimum elongation at rupture (%)

2. Aged condition after oven test at 121°C +/-1°C for 168 hours.

Minimum tensile strength at rupture (% of unaged value) 75

Elongation at rupture (% of unaged value) 75

Heat distortion (% of unaged value)

4/0 AWG and smaller (30) Larger than 4/0 AWG (10)

Insulation jacket thickness of preassembled cables are listed in Section 7 of this docu

d. Electrical Properties

1. Insulation Resistance

Cable insulation resistance is the resistance of the insulation to the radial flow of direct current from the conductor to the outer coverings of the cable. The test procedure shall conform to the methods outlined in Section 6.15 of ICEA 5-66-524 (NEMA WCT), [4] at 60°PC[15.6°C). The resistance shall not be less than the value calculated as follows:

R = K log₁₀ D/d

Where: R = Insulation resistance (meg-ohms per 1000 ft)

K = Insulation constant

D = Diameter over insulation

d = Diameter under insulation

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uctor, Duplex & Quadruplex (Cont.)

Composition

Element	Percent (%)
Carbon	0.50 to 0.85
Manganese	0.50 to 1.10
Phosphorus, max.	0.035
Sulfur, max.	0.045
Silicon	0.10 to 0.35

The steel core wire shall be coated with zinc to Class A requesting weight as described in Table 4 of ASTM B498, [7].

This wire shall be tested in accordance with Section 5, 6 and 10 of ASTM B498, [7].

The aluminum wires shall be fabricated from material that conforms to the requirements of Table 2 of ASTM B233 [3].

The aluminum wires shall have tensile strength depending on temper, as shown in Table 1 of ASTM B230 [3]. Diameter sizes and tolerances of the aluminum rods presented in Table 3 of ASTM B230 [3] are as follows:

DIAMETER TOLERANCES						
Specified Diamet	ers (Inclusive)	Permissible Variations of Mean Diameter From Specified Diameter				
Inches	тm	(+)				
0.2600 to 0.1000	6.604 to 2.540	10%				
Under 0.1000 to 0.03600	Under 2.540 to 0.914	0.0010 is. (0.025 mm)				
Under 0.360 to 0.0105	Under 0.914 to 0.267	0.0005 ia. (0.013 mm)				

c. The lay factor of the aluminum wires shall be not less than 12 nor more than 14.5 times the outside diameter of the ACSR conductor. The preferred lay factor is 13 times the diameter, with the lay in the right hand direction.

- d. The rated strength of the conductor shall be the aggregate strength of the steel and aluminum wires determined by the methods described in Section 9.1 of ASTM B232 [5].
- e. Mechanical and electrical tests shall be conducted in accordance with Section 8 of ASTM B232 [5].
- f. In accordance with Section 10 of ASTM B232 the density of aluminum wire is assumed to be 0.6975 lb/in.³ at 20°C on the basis of 99.50 percent purity. The density of galvanized steel wire is assumed to be 0.281 lb/in.³ at 20°C.

The weight and electrical resistance of the stranded conductor shall be determined by methods described in Section 11 of ASTM B232 [5].

ASSEMBLY:

The insulated conductors shall be twisted around the messenger with a lay of 25 to 60 times the diameter of one of the insulated conductors. The direction of lay shall be the same as that of the messenger wire.

MESSENGER SIZING:

The messenger shall be sized in accordance with Table 7-8 of ICEA S-66-524, NEMA WC-7. For the range of conductor sizes used by NEA, the messenger shall be a size (AWG) equal to the size of the insulated conductors.

INFORMATION REQUIRED:

The bidder shall provide the following information with the bid:

- 1. Resistance and density of the aluminum and ACSR conductors.
- 2. Insulation material type, thickness and electrical properties.
- 3. Manufacturer's catalog showing catalog number of proposed conductor assembly.
- 4. Exceptions to this standard should be clearly identified.
- Test report on mechanical and electrical performance of aluminum cable, ACSR conductor and/or conductor assembly.

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Conductor, Dunles & Oundruntes (Cont.)

A typical reel shown in Pigures 1A and 1B shall have dimensions as follows:

		Dimensions (Inches)				
	Reel Capacity	Plange	Width Drum		Width Arbo	
Reci Designations	(In.3)	Diameter	Diameter	Inside	Outside	Diameter
NRX 30-22	9950	30	18	22	25	2-1/4 to 3

Preasembled conductor types are:

Preassembled conductor types are:								
NEA		Aluminum Phase Conductor		Messenger (ACSR)		Nominal Shipping Length	Insulation	
NO.	Conductor Assembly	Size (AWG)	Stranding	AWG	Stranding Al./Steel	(feet) of Assembly	Thickness (mils)	
1612 06 01	Duplex	6	7	6	6/1	2800	45	
1612 06 03	Duplex	2	7	2	6/1	2000	45	
1612 10 03	Duplex	1/0	7	1/0	6/1	1500	60	
1612 20 03	Duplex	2/0	7	2/0	6/1	1200	60	
	Quadruptex	6	7	6	6/1	2000	45	
	Quadroplex	4	7	4	6/1	1500	45	
	Quadruptex	1/0	7	1/0	6/1	1100	60	
	Quadruptex	4/0	7	4/0	6/1	1000	60	

The top layer shall be covered by a sheet of polyethylene or similar plastic material after the preassembled cable is wound on the reel. Paper liners and wrappings are prohibited.

eter, Duğlar & Quadr

7. PACKAGING & SHIPPING:

Conductor shall be shipped on non-returnable reels manufactured from "aluminum", "steel" or export quality preservative treated "wood". All reels shall have preservative treated wood lagging. Wood reels and all lagging shall be constructed from new lumber which shall be square sawn, be of smooth surface, with no splits, warps, crooks, loose fibers, decay or insect infestation. The lumber used for wood reels and all lagging "American Wood Preservers Associates Standards" and as stipulated below:

Description	Requirements/Methods	AWPA Standards
Lumber:	All softwood species	C1-82, C2-83 and C16-82
Prescrvatives: (any one)	Acid Copper Chromate (ACC) Ammoniacal Copper Arsenate (ACA) Chromated Copper Arsenate Type C (CCA-C)	P5-83, C1-82, C2- 83 and C16-82
Treatment:	Pressure Treatment after all carpentry work.	C1-82, C2-83 and C16-82
Results of Trea	atment;	
Penetration:	Minimum 0.4 inches from the surface of any face.	C16-82
Assay Zone:	0-0.6 inch zone	C16-82
Retention:	0.62 pcf for ACC, q.40 pcf for ACA and CCA. Copper shall be calculated as CuO, Chromium as CrO ₃ and Arsenic as AS ₂ O ₃	C1-82, C2-83 and C16-82
Tests:	Wet ash analysis for oxides X-Ray Absorption	A7-75, A2-85 (Section 2, 5, 6) A9-86 A7-75 and A11-83

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eter, Duplex & Quadruplex (Cont.)

The reel shall be prepared for shipping by:

- Naiting one inch (1°) lagging strips to the flanges using two (2) eight-penny (8d)
 nails at each end.
- Binding the lagging strips circumferentially with at least four (4) galvanized steel straps (Figure 1B).

Each reel shall contain one length of preassembled cable. NEA shall permit a variation in length of plus or minus five percent (+/-5%) the nominal shipping

NEA shall also allow an amount of conductor not exceeding ten percent (10%) of the weight of the order to be shipped in random lengths none of which shall be shorter than fifty percent (50%) of the nominal shipping length.

Metal tags shall be attached to the inside and outside of the reel containing the following information:

- Gross and net weights.
 Aluminum conductor size, number of strands, insulation type.
 ACSR conductor size, stranding.
 Length (feet).
 Catalog number.
 Manufacturers name and/or identification symbol.

- 7. Shipping data. 8. NEA Code No.

TESTS & INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the conductor assembly conforms to the requirements of this standard. NEA reserves the right to witness factory tests, and shall request test reports. The manufacturer shall also conduct conductor reel tests and inspections and submit test reports before shipment to verify that the reels and lagging comply with the requirements of this standard. NEA shall also have the prerogative to inspect conductor reels at any time to insure compliance of this standard. Non-conforming neels and lagging are inspectedable.

ctor, Duplex & Quadruplex (Cont.)

9. OTHER STANDARDS:

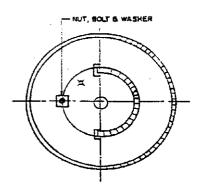
The performance requirements of pressembled aluminum cables, based on other internationally recognized standards, are acceptable only if the requirements of as standards are equivalent to or exceed the requirements quoted in this document.

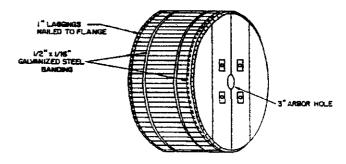
BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM B231: Standard Specification for Concentric-Lay-Stranded Aluminum
- ASTM B609: Standard Specification for Aluminum 1350 Round Wire, Annealed and Intermediate Tampers, for Electrical Purposes.
- ASTM B230: Standard Specification for Aluminum 1350-H-19 Wire for
- ICEA Standards Publication No. S-66-524 (Second Edition): NEMA Standards Publication No. WCT Cross-Linked-Thermosetting Polyethyleno-Insulated Wire and Cable for the Transmission and Distribution of Electrical [4]
- ASTM B232: Standard Specification for Concentric-Lay-Stranded Aluminum Conductors, Coated Steel-Reinforced (ACSR). [5]
- Publication 225: Standard for Bare ACSR Conductors (Class A).
- ASTM 8498: Standard Specification for Zino-Conted (Galvanized) Steel Core Wire for Aluminum Conductors, Steel Reinforce (ACSR).
- IEC 289: Hard-drawn Aluminum Wire for Overhead Line Conductor.

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ciar, Duplex & Quadruplex (Cont.)





REEL READY FOR SHIPPING

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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This standard establishes the dimensional and performance requirements of bare coated steel-reinforced concentric-lay-stranded aluminum conductors (ACSR), to be used on Coop distribution lines. This conductor is made of round aluminum wires wrapped around a central zinc-coated round steel-wire core.

ACSR conductors shall conform in all respects to the dimensional and performance requirements of this document, which covers:

The ACSR conductors shall be classified as Class A as designated in ASTM B232 [1].

The steel wire shall be fabricated from steel obtained by the open-hearth, electric furnace, of basic oxygen process and conforms to the chemical composition specified in Section 3 of ASTM B498 [2] as follows:

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CONDUCTOR, BAR	E ACSR Re	v. Na				
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Plement	Compositions, Percent (%)			
Carbon	0.50 to 0.85			
Manganese	0.50 to 1.10			
Phosphorus, max.	0.035			
Sulphur, max.	0.045			
Siticon	0.10 to 0.35			

The steel wire shall be tested in accordance with Section 5, 6 and 10 of ASTM B498 [2].

3. Corrogion Protection

The steel wire shall be coated with zinc to Class A requirements with coating weight described in Table 4 of ASTM B498 [2].

Additional protection for ACSR conductor against corresion of the seed core shall be provided by use of a suitable corrosion inhibition, grease or oil.

ALUMINUM WIRES:

Materials

The round aluminum size shall be drawn from rods that conform to the chemical requirements of Table 2, ASTM E230 [3].

Testing

The aluminam wire shall have tensile strengths depending on temper as shown in Table 1 of ASTM B233 [4].

Resistivity

The electrical resistivity limits and values of the aluminum rods are presented in Table 4 of ASTM B230 [3].

octor, Bure ACSR (Cant.)

4. General

Aluminum wires used shall meet the requirements of ASTM B230 [3].

5. LAY FACTOR:

The lay factor of the aluminum wire shall be not less than 12 nor more than 14.5 times the outside diameter of the conductor. The preferred lay factor is 13 times the diameter, with the lay is a right hand direction.

6. CONSTRUCTION:

The number and diameter of aluminum and steet wires and the stranding shall conform to the requirements of Table 1, 2 and 3 of ASTM B232 [1].

7. CONDUCTOR STRENGTH:

The rated strength shall be the aggregate strength of the steel and aluminum wires determined by the methods described in Section 9.1 of ASTM B232 [1].

MATERIAL DENSITY:

In accordance with Section 10 of ASTM B232 [1], the density of aluminum wire is assumed to be 2.705 gm/cm³ (0.0975 lb/in.²) at 20°C on the basis of 99.45 percent purity. The density of galvanized wire is assured to be 7.78 gm/cm² (0.281 lb/in.²) at 20 °C.

WEIGHT AND ELECTRICAL RESISTANCE:

The weight and electrical resists The weight and electrical resistance of the stranded conductor shall be determined by the methods described in Section 11 of ASTM B233 [1].

10. VARIATION:

Limits with variation of the cross section of the aluminum wires shall be described in Section 12 of ASTM B232 [1].

11. CHARACTERISTICS:

ACSR conductors shall have the following characteristics:

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Conductor, Bere ACSR (Cont.)

Description	Requirements/Methods	AWPA Standards
Lumber:	All Softwood Species	C1-82, C-2-82 and C16-82
Preservatives: (any one)	Acid copper Chromate (ACC) Ammoniacal Copper Amenate (ACA) Chromated Copper Amenate Type C (CCA-C)	C1-82, C2-83 and C16-82
Treatment:	Pressure treatment after all carpentry works	C1-82, C2-83, and C16-82
Results of Treatm	ent;	
Penetration:	Minimum 0.4 inches from the surface of any face	C16-82
Assay Zone:	0-0.6 inch zone	C16-82
Retention:	0.62 bcf for ACC, 0.40 for ACA and CCA. Copper shall be calculated as CuO, Chromium as CrO ₃ and Arsenic as AS ₂ O ₃	C1-82, C2-83, and C16-82
Tests:	1) Wet ash analysis for oxides	A7-75, A2-85 Section 2, 5,
	X-ray Atomic Absorption	A9-86 A7-75 and A11-83

A typical wooden reel and lagging are shown in Figures 1A and 1B and shall have the following dimensions:

Dimensions (Inches)								
Reel	Flange	Drum	W	Arber				
Designation	Diameter	Diameter	Inside	Outside	Hole Diameter			
NRX-30.22	30	18	22	25.5	3			
NRX-42.25	42	21	28	31.5	3			
NRX 60.28	60	28	28	31.5	3			

Conductor, Bure ACSR (Cost.)

NEA CODE	SIZE AWG	STRA No. & SIZI		OVERALL DIAMETER	DC Resistance	Ultimate Strength
NO.	, or MCM	Aleminum	Steel	(inches)	Ohms/mile	Pounds
	6	6 x .0661	1 x .0661	0.198	3.56	1,170
	4	6 x .0834	1 x .0834	0.250	2.24	1,830
1511 02 61	2	6 x .1092	1 x .1092	0.316	1,41	2,790
1511 10 61	1/0	6 x .1327	1 x .1327	0.398	0.885	4,280
1511 20 61	2/0	6 x ,1490	1 x .1490	0.447	0.702	5,345
1511 30 61	3/0	6 x .1672	1 x .1672	0.502	0.556	6,675
1511 40 61	4/0	6 x .1878	1 x .1878	0.563	0.441	8,420
1511 33 26	336.4	6 x .1137	1 x .1137	0.721	0.278	14,050

12 FINISH

The conductor shall be free of imperfections, sharp protrusions and blemishes not consistent with good commercial practice.

13. TESTS & INSPECTION:

The manufacturer shall conduct conductor tests and inspections in accordance with Section 16 of ASTM R232 [1] or IEC 888, [5], in so far as applicable. NRA reserves the right to wisness factory tests and inspections and shall request test reports. The manufacturer shall also conduct conductor reel tests and inspections and submit test reports before shipment to verify that the reels and lagging comply with the requirements of this Standard. NEA shall also have the prerogative to inspect conductor reels at any time to ensure compliance of this standard. Non-conforming reels and lagging are unaccentable.

14. PACKAGING AND SHIPPING:

Conductor shall be shipped on non-returnable reels manufactured from "aluminum, steel" or export quality preservative treated wood lagging. Wood reels and all lagging shall be constructed from new lamster which shall be square sawn, be of smooth surface, with not splits, warps, crooks, loose fibers, decay or insect infestation. The lamber used for wood reels and all lagging shall be preservative treated in accordance with "American Wood Preservers Associates Standards" and as stipulated below:

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Conductor, Bara ACSR (Cont.)

ACC CONDA AWIR to	CTOR	RERI. SIZE	WEIGHT	NOMINAL LENGTH (FT)	WEIGHT OF NOMINAL LENGTH(LB)
6	6/1	30.22	36.1	13,000	470
4	6/1	30.22	37.4	8,700	500
2	6/1	30.22	91.3	5,900	540
1/0	6.1	30.22	145.2	3,300	480
2/0	6/1	30.22	183.1	3,300	550
3/0	6/1	30.22	230.9	2,300	530
4/0	6/1	30.22	291.1	1,900	550
336.4	6/1	42.28	2,500	2,500	1157

The reel shall be propared for shipping by:

- Nailing one inch (1°) lagging strips to the flanges using two (2) eightpenny (8d) nails at each end.
- Binding the lagging strips circumferentially with at least four (4) galvanized strips (figure IB).

Each real shall contain one length of conductor. NEA permit a variation in length of plats or minus five percent (±5%) of the nominal shipping length.

NEA shall also allow an amount of conductor not exceeding ten percent (10%) of the total weight of the order to be shipped in random lengths none of which shall be shorter than fifty percent (50%) of the nominal shipping length.

Metal tags shall be attached to the inside and outside of the reel containing the following information:

- Gross and not weights. Conductor size, number Length (Feet). Casalog number. Manufacturer's same as ber of strands.

- me and/or identification symbol.
- Shipping data. NEA code no.

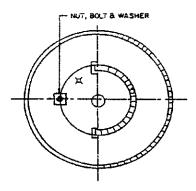
15. OTHER STANDARDS:

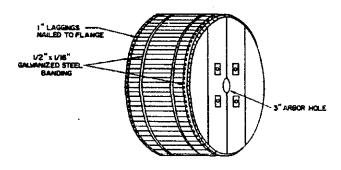
The dimensional and performance requirements of bare ACSR conductors, based on other internationally recognized standards, are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

16. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- [1] ASTM B232: Standard Specification for Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Reinforced (ACSR).
- ASTM B498; Standard Specification for Zinc Coated (Galvanized) Steel Core Wire for Aluminum Conductors, Steel Reinforced (ACSR). [2]
- ASTM B230: Standard Specification for Aluminum 1350-H19 Wire for Electrical Purposes. [3]
- [4] ASTM B233: Standard Specification for Aluminum 1350 Redraw Rod for Electrical Purposes.
- [5] IBC 888: Zinc-coated steel wires for stranded conductor.

ster, Bare ACSE (Cour.)





REEL READY FOR SHIPPING

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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This standard establishes the dimensional and performance requirements of bare coated steel-reinforced concentric-lay-stranded aluminum conductors (ACSR), Crosslinked polyethylene insulated, to be used on Coop distribution lines. This conductor is made of round aluminum wires wrapped around a central zinc-coated round steel-wire core.

ACSR conductors shall conform in all respects to the dimensional and performance requirements of this document, which covers:

The ACSR conductors shall be classified as Class A as designated in ASTM B232 [1].

The steel core shall consist of wires which meet the following requirements:

1. Material

The steel wire shall be fabricated from steel obtained by the open-hearth, electric furnace, of basic oxygen process and conforms to the chemical composition specified in Section 3 of ASTM B498 [2] as follows:

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or, Kandaind (Cont.)

Penet	Composition, Percent (%)			
Carbon	0.50 to 0.85			
Manganese	0.50 to 1.10			
Phosphorus, max.	0.035			
Sulphur, max.	0.045			
Silicon	0.10 to 0.35			

Testing

The steel wire shall be tested in accordance with Sections 5, 6 and 10 of ASTM B498 [2].

The steel wire shall be coated with zinc to Class A requirements with coating weight described in Table 4 of ASTM B498 [2].

Additional protection for ACSR conductor against corrosion of the steel core shall be provided by use of a suitable corrosion inhibition, grease or oil.

ALUMINUM WIRES:

I. Materials

The round aluminum wire shall be drawn from rods that conform to the chemical requirements of Table 2, ASTM B230 [3].

Testing

The aluminum wire shall have tensile strengths depending on temper as shown in Table 1 of ASTM B233 [4].

Resistivity

The electrical resistivity limits and values of the aluminum rods are presented in Table 4 of ASTM B230 [3].

General

Aluminum wires used shall meet the requirements of ASTM B230 [3].

LAY FACTOR:

The lay factor of the aluminum wire shall be not less than 12 nor more than 14.5 times the outside diameter of the conductor. The preferred lay factor is 13 times the diameter, with the lay in a right hand direction.

CONSTRUCTION:

The number and diameter of aluminum and steel wires and the stranding shall conform to the requirements of Table 1, 2 and 3 of ASTM B232 [1].

CONDUCTOR STRENGTH:

The rated strength shall be the aggregate strength of the steel and aluminum wires determined by the methods described in Section 9.1 of ASTM B232 [1].

In accordance with Section 10 of ASTM B232 [1], the density of aluminum wire is assumed to be 2.705 gm/cm¹ (0.0975 lb/in.²) at 20°C on the basis of 99.45 percent purity. The density of galvanized wire is assured to be 7.78 gm/cm³ (0.281 lb/in.³) at 20°C.

9. WEIGHT AND ELECTRICAL RESISTANCE:

The weight and electrical resistance of the stranded conductor shall be determined by the methods described in Section 11 of ASTM B232 [1].

10. VARIATION:

Limits with variation of the cross section of the aluminum wires shall be described in Section 12 of ASTM B232 [1],

11. CHARACTERISTICS:

ACSR conductors shall have the following characteristics:

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Conductor, Insulated (Cont.)

NEA CODE No.	SIZE AWG	STRA No. & SEZE		Before Insulation	DC Resistance	Unimante
		MCM	Aluminum	Steel DIA	OVERALL DIAMETER (inches)	Ohms/mile @ 25 C
	6	6 x .0661	Lx.0661	0.198	3.56	1,170
	4	6 x .0834	l x .834	0.250	2.24	1,830
1511 02 61	2	6 x .1092	l x .1092	0.316	1.41	2,790
1511 10 61	1/0	6 x .1327	1 x .1327	0.398	0.885	4,280
1511 20 61	2/0	6 x .1490	1 x .1490	0.447	0.702	5,345
1511 30 61	3/0	6 x .1672	l x .1672	0.502	0.556	6,675
1511 40 61	4/0	6 x .1878	1 x .1878	0.563	0,441	8,420
1512 33 26	336.4	6 x .1137	1 x .1137	0.721	0.278	14,050

12. FINISH:

The conductor shall be free of imperfections, sharp protrusions and blemishes not consistent with good commercial practice. consistent with good co

13. INSULATION:

General

The aluminum cables shall be provided with filled or unfilled cross-linked polyethylene insulation. A filled insulation contains a minimum of ten percent (10%) carbon black and/or mineral fibers by weight. An unfilled insulation contains a maximum of two and one-half percent (2-1/2%) carbon black for other un to \$0.000. cables up to 5.0 KV.

The insulation shall be free from voids, contaminants or porosity detectable with less than five times magnification.

2. Physical and Aging Requirements

The insulation shall meet the 66-524 (NEMA WC7), [14]. he requirements of ICEA standards Publication No. S-

Page 4 of 11 TS 227

Canductor, Innelsted (Cont.)

The insulation should exhibit the following performances:

1. Unaged Condition

Minimum tensile strength (lb/in.²) Minimum elongation at rupture (%)

Aged condition after oven test at 121°C +/-1°C for 168 hours.

Minimum tensile strength at rupture (% of unaged value) 75

Elongation at rupture (% of unaged value) 75

Heat distortion (% of unaged value)

4/0 AWG and smaller (30) Larger than 4/0 AWG (10)

Insulation Thickness

Insulation jacket thickness of cables are listed below:

Conductor Size AWG	Insulation Thickness (mils)
4	45
2	45
1/0	60
2/0	60
4/0	60

Electrical Properties

Insulation Resistance

Cable insulation resistance is the resistance of the insulation to the radial flow of direct current from the conductor to the outer coverings of the cable. The test procedure shall conform to the methods outlined in Section 6.15 of ICEA 5-66-524 (NEMA WC7), [14] at 60°F(15.6°C). The resistance shall not be less than the value calculated as follows:

R = K log₁₀ D/d

Conductor, Insulated (Cont.)

Where: R = Insulation resistance (meg-ohms per 1000 ft)

K = Insulation constant

D = Diameter over insulation

d = Diameter under insulation

Performance Requires

The cable shall be tested to demonstrate compliance with the requirements of Section 6 of ICEA S-66-524 (NEMA WC7), [14], in so far as applicable.

The insulation tests shall include:

Tensile strength

Set test
Elongation test

Oxygen pressure test

Air oven test Solvent extraction test

Heat distortion

Capacity and power factor tests Volume resistivity

Ac voltage test De voltage test

Ac spark test Dc spark test Insulation resista

Insulation resistance tests
Permittivity and dielectric strength

14. TESTS & INSPECTION:

The manufacturer shall conduct conductor tests and inspections in accordance with Section 16 of ASTM B232 [1] or IEC 888, [13], in so far as applicable. NEA reserves the right to witness factory tests and inspections and will request test reports. The manufacturer shall also conduct conductor red tests and inspections and submit test reports before shipment to verify that the reels and lagging comply with the requirements

of this standard. NEA shall also have the prerogative to inspect conductor reets at any time to ensure complismee of this standard. Non-conforming reets and larging are unacceptable.

15. PACKAGING AND SHIPPING:

Conductor shall be shipped on non-returnable reels manufactured from "alunalnum," steel" or export quality preservative treated wood Lagging. Wood rook and all lagging shall be constructed from new lumber which shall be square sawn, be of smooth surface, with no splits, warps, crooks, loose fibers, decay or insect infestation. The lumber used for wood reels and all lagging shall be preservative treated in accordance with "American Wood Preservers Associates Standards" and as stipulated below:

Description	Requirements/Methods	AWPA Standards	
Lumber:	All softwood species	C1-82, C2-83 and C16-82	
Pressrvatives: (any one)	Acid Copper Chromate (ACC) Ansauquacal Copper Assente (ACA) Chromated Copper Assente Type C (CCA-C)	P5-83, C1-82, C2-83 and C16-82	
Treatment:	Pressure Treatment after all carpentry work.	C1-82, C2-83 and C16-82	
Results of Treatmen	sit:		
Penetration: Minimum 0.4 inches from the section of any face.		C16-82	
Assey Zone:	0-0.6 inch zone	C16-82	
Retention:	0.62 pcf for ACC, o.40 pcf for ACA and CCA. Copper shall be calculated as CuO, Chromium as CrO, and Arsenic as AS 20,	C1-82, C2-85 and C16-82	
Tuota:	Wet ash analysis for exides X-Ray Atomic Almorphism	A7-75, A2-85 (Section 2, 5, 6) A9-86 A7-75 and A11-83	

A typical wooden red and lagging are shown in Pigures 1A and 1B and shall have the following dimension:

	Dimensions (Inches)				
	_	_	Width Arbor		
Reel Designation	Flange Diameter	Drum Diameter	Inside Outside		Hole Diameter

Page 7 of 11 TS 227

ad (Cant.)

- Gross and net weights.
 Conductor size, number of strands.
 Length (Feet).
 Catalog number.
 Manufacturer's name and/or identification symbol.

OTHER STANDARDS:

The dimensional and performance requirements of bare ACSR conductors, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

17. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM B232: Standard Specification for Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Reinforced (ACSR). [1]
- ASTM B498: Standard Specification for Zinc Costed (Galvanized) Steel Core Wire for Aluminum Conductors, Steel Reinforced (ACSR). [2]
- ASTM B230: Standard Specification for Aluminum 1350-H19 Wire for Electrical [3]
- ASTM B233: Standard Specification for Aluminum 1350 Redraw Rod for Electrical Purposes. [4]
- AWPA C1: Standards for Preservatives Treatment by Pressure Process All Timber Products. [5]
- **161** AWPA PS: Standards for Water-Borne Preservatives.
- AWPA A2: Standard Methods for Analysis of Water-Borne Preservatives and Fire Retardant Formulations. [7]
- AWPA A7: Wet Ashing Procedures for Preparing Wood for Chemical Analysis. (8)
- AWPA A9: Standard Method for Analysis of Treated Wood And Treating solutions by X-Ray Emission Spectroscopy. [9]
- AWPA All: Analysis of Treated Wood and Treating solutions by Atomic HOL Absorption Spectroscopy.

uctor, Kamiliani (Care)

NRX-30.22	30	18	22	25.5	3
NRX 42.25	42	21	28	31.5	3
NRX 60.28	60	28	28	31.5	3

	ATED ACSR IDUCTOR	REFIL	NOMINAL	
AWG	AWG STRANDING		LENGTH (FT)	
6	6/1	30.22	7,000	
4	6/1	30.22	4,000	
2	6/1	30.22	3,000	
1/0	6/1	30.22	2,500	
2/0	6/1	30.22	2,000	
4/0	4/0 6/1		1,500	

The reel shall be prepared for shipping by:

- Nailing one inch (1") lagging strips to the flanges using two (2) eight-penny (8d) nails at each end
- ding the langing strips circumferentially with at least four (4) galvanized steel strips (figure 1B).

Each reel shall contain one length of conductor. NEA shall permit a variation in length of plus or minus five percent (+/- 5%) of the nominal shipping length.

NEA shall also allow an amount of conductor not exceeding ten percent (10%) of the total weight of the order to be shipped in random lengths none of which shall be shorter than fifty percent (50%) of the nominal shipping length.

Metal tags shall be attached to the inside and outside of the reel containing the following

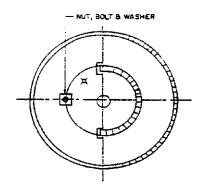
- Gross and net weights.
 Conductor size, number of strands.
 Length (Feet).
 Cotales number

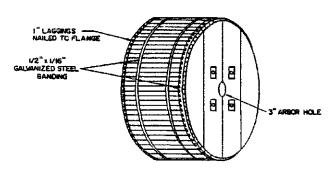
Page 8 of 11 TS 227

et (Cent.)

- [11] AWPA C2: Pressure Treatment by Pressure Process for Lumber, Timber, Bridge Ties and Mine Ties.
- [12] AWPA C16: Preservative Treatment by Pressure Process for Wood Used on
- [13] IEC 888: Zinc-conted steel wires for overhead line conductor.
- [14] ICEA Standards Publication No. S-66-524: NEMA Standard Publication No. WC7 Cross-Linked-Thermosetting Polyethylene Insulated Wire and Cable for transmission and Distribution of Electrical Energy.

Conductor, Sensisted (Cont.)





REEL READY FOR SHIPPING

Page 11 of 11

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This specification establishes the general requirements for aluminum alloy armor tape to be used on Coop overhead distribution lines.

GENERAL:

Armor tape shall consist of a flat aluminum alloy ribbon approximately 0.5 inches wide by 0.03 inches thick. Armor tape will be used to wrap aluminum and ACSR conductors to provide mechanical protection to the conductor from various attachments and connectors.

Armor tape shall be an aluminum alloy suitable for the use as described in 2. above.

FINISH:

Armor tape shall be free of rough or uneven surfaces and edges so as to ensure safety in handling and installation.

PACKAGENG:

Armor tape shall be wrapped on a spool with each spool containing a length of approximately 600 feet. Spools shall be appropriately wrapped for shipping and storage in a tropical climate and each spool shall have the manufacturer's name, Catalog No., and length of tape on the spool.

NEA Code No. for armor tape is 7232 00 20.

OTHER STANDARDS:

The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

TECHNICAL SPECIFICATION 228					
SUBJECT:	ORIGINAL.	JUNE, 1993			
WIRE, ARMOR TAPE, .03 X 0.5	Rev. No				
		PAGE 1 OF 2			

Wire, Anmer Tope, .83 x 9.5 (Cent.)

BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM AS70-75: Specifications for hot-rolled steel sheet and strip, structural 1.
- ANSI/ASTM A153-82: Standard specificatis for zinc coating (hot-dip) on iron

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This specification establishes the physical and electrical characteristics of preformed line guards and armor rods to protect ACSR distribution system phase conductors from damage resulting from bending, compression, and abrasion at support points such as insulators or angle and suspension clevis clamps. Rods are preformed to closely fit the conductor with which they are intended to be used. Examples of rod applications are shown in Figure 1 of this document.

GENERAL:

Preformed rods shall conform to the dimensional and performance requirements of this document. The text, figures and references to other standards supplement each other, and are considered parts of this standard.

Armor rods and line guards shall be made of an aluminum alloy which conforms to the requirements of ASTM B211 Heat Treated Alloy 6061, [1], or equivalent.

DIMENSIONS:

Rods and guards shall be bundled into specific numbers of rods (sets) and each set shall be provided with a tag indicating the size of conductor with which the rods are to be used. Rods shall have the following characteristics.

TECHNICAL SPECIFICATION 240					
SURPECT:	ORIGINAL	JUNE, 1993			
ARMOR AND LINE GUARD, PREFORMED	Rev. No				
		PAGE 1 OF 4			

or and Line Guard, Prefermed (Cont.)

	ARMOR RODS						LINE	GUA	RDS		
Nominal Conductor Size		Leny	Length (m)		Mod 4:	Longth (in)		Rost	Sail	Color	
∆¥¥G	ИСМ	Single	Double	Set	CTN	Code	Single	Double	Sci.	CTN	Code
6	6/1	40	52	7	300	Bius	17	29	7	100	
4	6/1	4	52		100	Stown	19	31		100	
2	6/1	44	56		50	Red	21	33	,	LOC	
1/0	4/1	52	8	,	50	Yellow	25	37	11	100	
2/0	€ /1	54	86	10	50	Blue	27	39	13	50	
3/4	6/1	56	és	31	25	Onings	29	41]4	20	Г
4/0	6/1	60	72	11	25	ited	31	43	15	50	
336.4	26/7	72	\$4	12	18	Green		Use A	Lenne R	ands.	

FINISH:

Preformed armor rods and line guards shall have smooth surfaces and rounded ends, and shall fit the conductor smugly. At the center starting cross-over mark, of each size set of rods, there shall be a color code applied as indicated in the Table under Dimensions of

Preformed armor rods and fine guards shall exhibit strength characteristics equivalent to those of the conductor to which they are applied.

The manufacturer shall make adequate inspection to verify preformed line guards comply with the requirements of this standard. Non-conforming line guards are not acceptable.

PACKAGING:

Preformed rod shall be securely packaged for shipping. Each package shall be clearly marked with the manufacturer's name and catalog number.

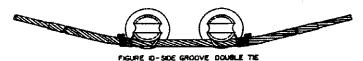
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THIS IS A CONCEPTUAL DRAWING THE MANUFACTURER IS RESPONSIBLE FOR THE PREPARATION OF DRAWINGS AND A DESIGN WHICH MEETS THE DIMENSIONAL, STRENGTH, AND OTHER PERFORMANCE REQUIRMENTS OF THIS STANDARD

> FIGURE I APPLICATIONS OF NEW PREFORMED LINE GUARD AND ARMOR ROOS,

and Line Goard, Profe

9. OTHER STANDARDS:

The dimensional and performance requirements of preformed line guards, based on other internationally recognized standards, are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

10. BIBLIOGRAPHY OF REFERENCE STANDARDS:

[1] ASTM B211: Standard Specification for Aluminam-Alloy Bar, Rod, And Wire.

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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SOMEW

This specification establishes the dimensional and physical requirements of strain relief, preformed service grip deadends to be installed by linemen to fasten the neutral conductor of multipless service drops to spool insulators or drive books in the 240 volt secondary

2. GENERAL:

Preformed type service grips furnished shall conform in all respects to the requirement of this document. The grip shall provide a full gripping surface for the ACSR neutral conductor of the various sizes of service grips.

Right hand say, preformed service grips shall be fabricated from aluminum covered ste and have a printed, corrosion preventive gripping substance applied to the inside of the grip. This gripping substance shall be adhered to the grip in a such manner that it will sustain at least three (3) applications.

4. FINISH:

All surfaces preformed strain relief grips shall be free from blemishes or irregularities. The grip shall be tagged with the manufacturers identification tape and conductor nominal sizes in a manner and location which shall not impair its function. In addition, the grip shall have the following color code identification clearly painted at the installation cross-over starting point of the grip as shown in Figure 1 indicating conductor size and

NBA Code	Color code	Conductor Size
1177 30 19	Blue	# 6 ACSR
1177	Red	# 2 ACSR
1177	Yellow	1/0 ACSR
1177	Rive	2/0 ACSR

TECHNICAL SPECIFICATION 241					
SUBJECTY	ORIGINAL	JUNE, 1993			
DEADEND CRIP, SERVICE, PREFORMED	Rev. No.				
		PAGE 1 OF 3			

Desident Grip, Service, Profermed (Cent.)

5. STRENGTH:

The preformed grip shall have a minimum tensile strength of one thousand (1000) pounds.

6. INSPECTION:

The manufacturer shall conduct inspection and tests to verify that the preformed strain relief grips shall races the dimensional and physical requirements of this standard. NEA reserves the right to witness factory inspection and tests and shall request reports.

7. DIMENSIONS:

Nominal data pertaining to NEA preformed strain relief grips is presented in Figure I of this document.

8. PACKAGING:

Preformed service deadend grips shall be securely packaged for shipping. Each package shall contain the following quantities and be clearly marked with the manufacturer's name and catalog number.

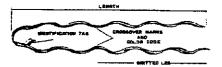
Conductor Size	Quantity Per Carton

# 6 ACSR	300
# 2 ACSR	200
# I/O ACSR	100
# 2/0 ACSR	100

9. OTHER STANDARDS:

The performance and design requirements of preformed type strain relief grips, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this standard.

Page 2 of 3 TS 241 Dandend Grip, Service, Preference (Cont.)





TYPICAL INSTALLATION

CONDUCTOR	LENGTH	COLOUR
SIZE	INCHES	CODE
&ACSA	11	1
4/1		BLUE
ZACSR	15	1
4/ 1		RED
1/0 ACSR	19	1
6/ 1	İ	YELLOW
2/0 ACSH	21	BLUE
6/1		DLUE

FIGURE (

Page 3 of 3

Ø

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE

This specification establishes the dimensional and physical requirements of preformed guy grip deadens to be installed by linemen to fasten guy wires to anchor rods and pole line hardware used in the Coop electrical distribution system.

2. GENERAL:

Preformed type guy wire grips shall conform in all respects to the requirements of this standard. This preform shall provide a full gripping surface for the guy wire.

3. MATERIAL

Left hand lay preformed guy grips shall be fabricated from the same material as the guy strand to which they are to be applied and have a gritted corrosion preventive gripping substance applied to the inside of the grip. This gripping substance shall be adhered to the grip in a such manner that it will sustain at least three (3) installations for the purpose of retensioning of the guy wire.

4. FINISH:

All surfaces of preformed guy grips shall be free from blemishes or irregularities. The grip shall be tagged with the manufacturer's identification tape containing catalog number and guy wire size in a manner and location which shall not impair its function. The short leg and long leg identities the strands belonging to each leg for removal purposes. In addition the grip shall have a coloring code identification clearly painted at two (2) locations on the grip indicating the installation cross-over starting point of the grip for small and large diameter guy fittings as shown in Figure 1.

5. STRENGTH:

The preformed guy grip shall have a minimum holding strength equal to the rated breaking strength of the guy wire to which it is to be applied.

TECHNICAL SPECIFICATION 242					
SUBJECT:	ORIGINAL	JUNE, 1993			
DEADEND, GRIP, GUY	Rev. No.				
		PAGE 1 OF 3			

Deedend, Grip, Guy (Cont.)

6. INSPECTION:

The manufacturer shall conduct inspection and tests to verify that the preformed guy grips shall meet the dimensional and physical requirements of this standard. NEA reserves the right to witness factory inspection and tests, and may request test reports.

7. DIMENSIONS:

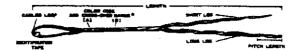
Dimensions of preformed guy grips are presented in Figure 1 of this document.

8. PACKAGING:

Preformed guy grips shall be securely packaged for shipping. Each package shall contain the quantities indicated in Figure 1 and be clearly marked with the manufacturer's name, guy wire size and catalog number.

9. OTHER STANDARDS:

The performance and design requirements of preformed type guy grips, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this standard.



MEA CODE NO.		HOLDING STRENGTH POUNDS	HUMBER OF STRANDS	LENGTH OF GRIP	QUANITY PER CARTON	CROSS OWER MARKS
	1/4"	4,750	7	25"	50	YELLOW
1177 20 86	3/6"	10,600	7	35	50	ORANGE
	7/16"	14,500	7	34	25	GREEN

Gradi-over Starte: (A)-spellettes aturates patrir for application an emitter elemente filtragia.

FIGURE I



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification establishes the physical requirements of heavy and medium steel three-holt parallel-groove guy clamps used in Coop overhead distribution lines.

2. GENERAL:

Three-bolt groove guy clamps furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements of this document. The clamps shall have three (3) bolts with the center bolt reversed to provide wrench clearance, Each bott shall have a shoulder to prevent turning during tightening. The test drawings and references to other standards supplement each other and are considered parts of this

3. MATERIAL:

Three-bolt groove guy clamp components shall be fabricated from steels described in NEMA Pub. No. PH23-1964, [1], as follows:

- I. The clamp plates shall be:

- a. Hot-rolled, open hearth or electric formed steel.
 b. Malleable type ferrous castings.
 c. High strength low alloy structural steel in accordance with ASTM A242-81, [2], if specified.
- 2. Bolts shall be:
 - a. Hot-rolled, open hearth or electric furnace steel. Cold headed bolts must be stress
 - High strength low alloy structural steel in accordance with ASTM A242-81, [2], if execution
- Square auts shall be fabricated in accordance with the requirements of ANSI B18.2.2-1972, [3].

TECHNICAL SPECIFICATION 131					
SUBJBCT:	ORIGINAL JUNE, 1993				
THREE-BOLT GUY CLAMPS	Rev. No				
	PAGE I O	F 4			

internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements of this document.

10. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. NEMA Pub. No. PH23-1964: NEMA Standards for steel and malfeable iron guy
- 2. ASTM A242-81: Standard specification for high strength low-alloy structural steet.
- 3. ANSI B18.2-1972: Square and bex nuts
- 4. ANSI B1.1-1982: Unified inch screw threads (UN and UNR Thread form).
- 5. NEA Tech Spec No. 186: Standard for coarse screw threads

Three-Bolt Guy Clamps (Cont.)

4. DEMENSIONS:

Three-bolt guy clamp dimensions are shown in Figure 1.

5. FINISH:

Clamps plates, bolts and nuts shall be not-dip gaivanized in accordance with ANSI/ASTM A153-82, [4]. These items shall have smooth surfaces and shall not be malformed or otherwise defective. Bolt heads shall bear markings in accordance with Section 10 of NEMA Pub. No. PH23-1964, [1].

4 STRENGTH-

Bolt heads, threads and nuts shall conform to the requirements of Section 7 of NEMA Pub. No. PH23-1964, [1], as follows:

NBA	Bolt	Guy Wire	Minimum Strength (lbs)
Code NO.	Size	Usage	
1173 22 91	1/2*-13	1/4° to 7/16°	18,000

When tested to these lunds, an acceptable bolt failure will occur only in the threaded portion of the bolt. The bolt shall not experience thread stripping or fracture on the junction of the head and neck. Such failures are unacceptable.

The manufacturer shall conduct inspection and tests to verify that three-bolt guy clamps comply with the requirements of this document. Non-conforming clamps are not acceptable. NEA reserves the right to witness factory tests and may request test reports.

8. PACKAGING:

Three-bolt clamps complete with bolts and square nuts shall be securely packaged for shipping. Each package shall contain twesty-five (25) clamps and shall be clearly marked with the manufacturer's name and Catalog No.

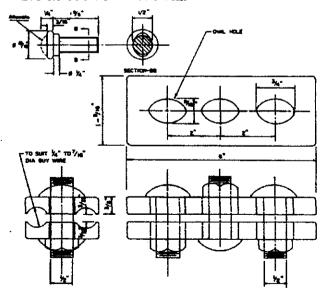
9. OTHER STANDARDS:

The dimensional and performance requirements of NEA guy clamps, based on other

Page 2 of 4 TS 131

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CENTER BOLT IS SHOWN REVERSED AS SHOWN BELOW



THIS IS A CONCEPTUAL DRAWING. THE MANUFACTURER IS RESPONSIBLE FOR THE PREPARATION OF DRAWINGS AND A DESIGN WHICH MEETS THE DIMENSIONAL, STRENGTH, AND OTHER PERFORMANCE REQUIREMENTS OF THIS STRANDARD.

FIGURE 1

3-BOLT TYPE GUY CLAMP (For 1/4" thru 7/16" guy strand)



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the dimensional and performance requirements of soco clevis brackets used on Coop overhead distribution systems. Each bracket shall be provided with a compatible clevis pin and cotter key.

2. GENERAL:

Secondary clevis brackets furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements of this standard. These brackets shall be designed to use 3-inch high spool type insulators, ANSI Classes 53-2 and 53-4. Each bracket shall be provided with a mounting hole for a 5/8 inch machine bolt and two offset holes for 1/2 inch leg screws. The text, figures and references to other standards supplement each other and are considered part of this standard.

3. MATERIAL:

Secondary clevis brackets shall be fabricated from hot-rolled open-hearth steel strip that conforms to ASTM A570-79, [1]. The clevis pin shall be fabricated from hot-rolled steel that conforms to ASTM A675-82, [2]. These materials shall have a grade and quality that meets the strength requirements of this specification. The self-locking cotter key shall be made from a non-ferrous metal.

Dimensions and tolerances of the clavis bracket and pin shall be in accordance with NEMA Pub. No. PH20-1979, [3] and as shown in Figures 1 and 2 of this document.

Clevis bracket dimensions are defined as follows:

- A = Width of clevis bracket opening
 B = Depth of clevis bracket throat
 C = Width of back of bracket
 T = Thickness of clevis bracket
- Depth of clevis bracket three
 Width of back of bracket
 Thickness of clevis bracket

- E = Separation between clevis bracket ends and centers of clevis pin holes
 RI = Radius of clevis pin boles

TECHNICAL SPECIFICATION 133						
SUBJECT:	ORIGINAL.	JUNE, 1993				
SECONDARY CLEVIS BRACKETS FOR SPOOL	Rev. No.					
TYPE INSULATORS		PAGE 1 OF 5				

Secondary Clevic Brackets for Spool type Insulators (Cont.)

INSPECTION:

The manufacturer shall conduct inspections and tests to verify that the secondary deadend elevis compiles with the requirements of this specification. Non-conformin clevis are not acceptable. NEA reserves the right to witness factory tests and reque test reports.

PACKAGING:

Secondary clevis brackets with compatible clevis pin and cotter key shall be securely packaged for shipping. Each package shall contain twenty-five (25) brackets and shall be clearly marked with the manufacturer's name and Catalog No.

OTHER STANDARDS:

The dimensional and performance requirements of secondary clevis brackets based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements of this document.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. ASTM A570-79: Standard specification for hot-rolled carbon steel sheet and strip
- ASTM 675-82: Standard specification for steel bars, carbon, hot wrought, special quality, Mechanical properties.
- 3. NEMA Pub. No. PH20-1979: NEMA Standards for galvanized ferrous insulator
- 4. ANSI C29.3-1986: American National Standard for wet-process porcelain insulators (Spool type).
- 5. ANSI/ASTM A153-82: Standard specification for zinc coating (hot-dip) on iron

othery Clevia Brackets for Spool Type Insul-

R2 = Radius of clevis bracket ends R3 = Radius of back of bracket H1 = Mounting hole dimensions

Dimensions of clevis pins shown in Figure 2 are defined as folio

D1 = Diameter of clevis pin head
D2 = Diameter of clevis pin shank
L1 = Overall length of clevis pin shank
L2 = Distance between end of clevis pin and center of cotter

key hole

5. STRENGTH:

A NEA secondary clevis bracket must be capable of withstanding a side load of 1000 pounds at 90 degrees to the axes of the elevis bolt and mounting bolt without exceeding a test deflection of 3/8 inch and a permanent deflection of 1/4 inch measured at the center

The ultimate strength of NEA secondary clevis bracket shall be equal to the load rating of the spool insulators as follows:

Insulator Class Size(inches) Load rating(ibs)

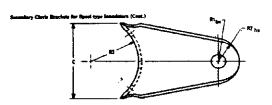
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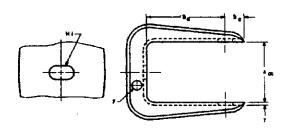
Tests require use of porcelain spool insulators which conform to ANSI C29.3-1980, [4]. The load shall be applied by means of a loop of flexible stranded wire cable whose diameter shall not exceed the radius of the insulator wire grooves. A spool insulator failure shall be regarded as a clevis failure.

7. FINISH:

The clevis bracket and clevis pin shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [5]. All surfaces shall have a smooth finish and be free from blemishes or projections. The manufacturer's symbol or identification mark shall be placed on the clevis and the head of the pin.

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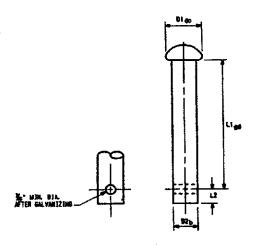


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FIGURE | SECONDARY CLEVIS BRACKET

ary Clevis Brackets for Speel type In



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FIGURE 2 SECONDARY CLEVIS PIN Page 5 of 5 TS 133

Dimensions of clevis pins shown in Figure 2 are defined as follows:

D1 = Diameter of clevis pin head D2 = Diameter of clevis pin shank L1 = Overall length of clevis pin shank

en end of clevis pin and center of cotter key hole

5. STRENGTH:

A secondary swinging clevis must be capable of meeting the following ultimate d load requirements presented in Section 10.1 of NEMA Pub. No. PH20-1979 [3].

Insulator Class	Size (inches)	Ultimate Strength (lbs)
53-2	3	3,000
53-4	3	4 500

6. TESTS:

During tests, the bracket shall be fitted with wet process insulators that are in accordance with ANSI C29.3-1980 [4]. Test procedures described in Section 6 of NEMA Pub. No. PH20-1979 [3] include:

- a. Loads shall be applied by means of a loop of flexible stranded cable of a diameter which shall not exceed the radius of the wire groove of the spool insulator. Failure of the spool insulator shall be regarded as a clevis failure.
- b. During testing, the clevis shall be attached to a steel block.

7. FINISH:

Secondary swinging clevis bracket and clevis pin shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82 [5]. The clevis bracket shall bear the manufacturer's symbol or identification mark. All surfaces must be smooth and free from blemishes or other irregularities not consistent with good commercial practice.

8. INSPECTION:

The manufacturer shall conduct adequate inspection and tests to verify that the secondar swinging clevis comply with the requirements of this document. Non-conforming clevis

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes dimensional and performance requirements of secondary swinging clevis used with 5/8 inch or larger eye bolts or eye nuts to provide a flexible mounting for equalizing strains at corners. Each clevis shall be furnished with a compatible clevis pin and self-locking key.

2. GENERAL:

Secondary swinging clevis furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements of this specification. The swinging clevis shall be designed to use 3-inch spool-type insulators, ANSI Classes 53-2 and 53-4. The text, figures and references to other standards supplement each other and are considered part of this specification.

3. MATERIAL:

Secondary swinging clevis shall be fabricated from hot-rolled open-hearth steel strip that conforms to ASTM A570-79, [1]. The clevis pin shall be fabricated from hot-rolled steel that conforms to ASTM A675-82 [2]. These materials shall have a grade and quality that meets the strength requirements of this specification. The self-locking cotter key shall be made from a non-ferrous metal.

The dimensions and permitted tolerances of socondary swinging clevis brackets and clevis pins shall be in accordance with NEMA Pub. No. PH20-1979 [3] and as shown in Figures 1 and 2, are defined as follows:

- A = Width of clevis opening
 B = Depth of clevis throat
 C = Width of clevis body
 D = Thickness of clevis body
 E = Minimum dimension required for
 R1 = Radius of clevis pin holes
 R2 = Radius of clevis body at opening nired for spool insulators (ANSI Classes 53-2 and 53-4)

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SECONDARY SWINGING CLEVIS	Rev. Nu							
		PAGE LOF 5						

e not acceptable. NEA reserves the right to witness factory tests and to request test

9. PACKAGING:

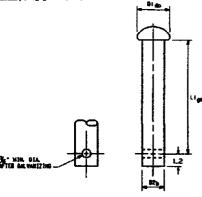
Secondary swinging clevis with compatible clevis pin and cotter key shall be securely packaged for shipping. Each package shall contain fifty (50) units and shall be clearly marked with the manufacturer's Name and Catalog No.

10.OTHER STANDARDS:

The dimensional and performance requirements of NEA secondary swinging clevis, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

11. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. ASTM A570-79: Standard Specification for hot rolled carbon steel sheet and strip, structural quality.
- 2. ASTM A675-82: Standard specification for steel bars, carbon, hot wrought, special
- 3. NEMA Pub. No. PH20-1979; NEMA Standards for galvanized ferrous insulator
- 4. ANSI C29.3-1980: American National Standard for wet-process porcelain insulators
- 5. ANSI/ASTM A153-82: Standard specification for zinc coating (hot-dip) on iron and



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FIGURE 2 SECONDARY SWINGING CLEVIS PIN

Page 5 of 5 TS 134

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the dimensional and performance requirements of service deadend elevises used to support and deadend service conductors on Coop overhead distribution lines. Each clevis shall be provided with a compatible clevis pin and cotter

2. GENERAL:

Service deadead clevines furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements of this specification. These clevines shall be designed to use 2-1/8 inch high spool type insulators, ANSI Classes 53-1 as per ANSI Standard C29.3-1986 [4]. The text, figures and references to other standards supplement each other and are considered part of this standard.

3. MATERIAL:

Service deadend elevises shall be fabricated from hot-rolled open-hearth steel strip that conforms to ASTM A570-79, [1]. The clevis pin shall be fabricated from hot-rolled steel that conforms to ASTM A675-82, [2]. These materials shall have a grade and quality that meets the strength requirements of this specification. The self-locking cotter key shall be made from a non-ferrous metal.

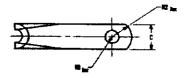
4. DIMENSIONS:

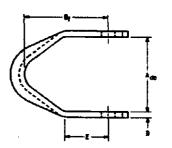
Dimensions and tolerances of service deadend clevis brackets and clevis pins shall be in accordance with NEMA Pub. No. PH20-1979, [3] and as shown in Figures 1 and 2 of this document.

Clevis bracket dimensions are defined as follows:

- A = Width of clevis bracket opening
 B = Depth of clevis bracket throat
 C = Width of back of hracket
 T = Thickness of clevis bracket
 E = Minimum dimension required for ANSI class 53-1 spool insulator

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CLEVIS, SERVICE, DEADENDS, SMALL	Rev. No							
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FIGURE 1 SECONDARY SWINGING CLEVIS

- H = Mounting hole dimensions RI = Radins of clevis pin holes R2 = Radius of clevis bracket ends

Dimensions of clevis pins shown in Figure 2 are defined as follows:

- D1 = Diameter of clevis pin head
 D2 = Diameter of clevis pin shank
 L1 = Overall length of clevis pin shank
 L2 = Distance between end of clevis pin and center of cotter key hole

5. PINISH:

Service deadend clevis bracket and clevis pin shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82 [5]. The clevis bracket shall bear the manufacturer's symbol or identification mark. All surfaces must be smooth and free from blemishes, imperfections or irregularities not consistent with good commercial practice.

6. STRENGTH:

Service deadend clevis must be capable of meeting the ultimate deadend load requirements presented in Section 10.1 of NEMA Pub. No. PH20-1979, [3], which for a Class 53-1, 2 1/8 inch spool insulator is 2,000 lbs.

7. TESTS:

During tests, the bracket shall be fitted with spool-type insulators that are in accordance with ANSI C29,3-1980, [4]. Test procedures described in Section 6 of NEMA Pub. No. PH20-1979, [3], include:

- a. Loads shall be applied by means of a loop of flexible stranded cable of a diameter which shall not exceed the radius of the wire groove of the spool insulator. Pailure of the spool insulator shall be regarded as a clevis failure.
- b. During testing the clevis bracket shall be rigidly attached to a steel block.

8. INSPECTION:

The manufacturer shall conduct inspections and tests to verify that the service deadend

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clevis complies with the requirements of this specification. Non-conforming clevis are not acceptable. NEA reserves the right to witness factory tests and request test reports

9. PACKAGING:

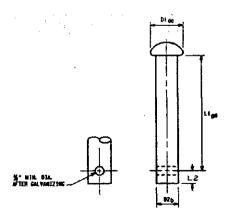
Secondary clevis brackets with compatible clevis pin and conter key shall be securely packaged for shipping. Each package shall contain twenty-five (25) brackets and shall be clearly marked with the manufacturer's name and Catalog No.

10. OTHER STANDARDS:

The dimensional and performance requirements of secondary clevis brackets based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements of this document.

11. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. ASTM A570-79: Standard specification for hot-rolled carbon steel sheet and strip
- ASTM 675-82: Standard specification for steel bars, carbon, hot wrought, special quality, Mechanical properties.
- 3. NEMA Pub. No. PH20-1979: NEMA Standards for galvanized ferrous insulator
- 4. ANSI C29.3-1986: American Natinal Standard for wet-process porcelain issulators (Spool type).
- 5. ANSI/ASTM A153-82: Standard specification for zinc coating (hot-dip) on iron and

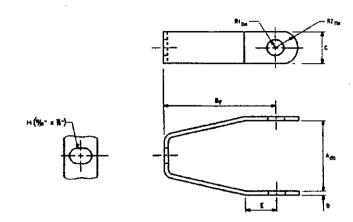


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FIGURE 2 SERVICE DEADEND CLEVIS PIN



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FIGURE I

Page 4 of '



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification establishes the dimensional requirements of service swinging clevises used to support service conductors on overhead distribution lines. Each clevis shall be furnished with a compatible clevis pin and cotter key.

2. GENERAL:

Service swinging clevises furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements of this specification. These clevises shall be designed to use 2-1/8 inch spool insulators, ANSI Class 53-1 and ANSI C29.3-1986 [2]. The text, figures and references to other standards supplement each other and are considered part of this specification.

3. MATERIAL:

NEA service swinging clevises and clevis pins shall be fabricated from open hearth steel strip that conforms to ASTM A570-79, [3]. The clevis pin shall be made from steel that has a grade and quality that meet the strength requirements of ASTM A675-82, [4]. The self-locking cotter key shall be made of a non-ferrous metal such as hard-drawn copper, aluminum, brass or bronze.

4. DIMENSIONS:

The dimensions and permitted tolerances of service swinging clevis brackets and clevis pins shall be in accordance with NEMA Pub. No. PH20-1979, {5}, and as shown in Figures 1 and 2 are defined as follows:

A = Width of clevis opening
B = Depth of clevis throat
C = Width of clevis body
D = Thickness of clevis body
R1 = Radius of clevis pin holes
R2 = Radius of elevis body at opening
E = Minimum dimension for NEA spool insulator ANSI Class 53-1

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SERVICE SWINGING CLEVIS	Rev. No.							
		PAGE 1 OF 5						

ice Swinging Clevis (Cont.)

Dimensions of clevis pins shown in Figure 2 are defined as follows:

- D1 = Diameter of clevis pin head
 D2 = Diameter of clevis pin shank
 L1 = Overall length of clevis pin shank
 L2 = distance between end of clevis pin and center of cotter key hole

5. FINISH:

Service swinging clevis brackets and clevis pins shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [1]. Each clevis bracket shall bear the manufacturer's symbol or identification mark. All surfaces must be smooth and free from blemishes or other irregularities not consistent with good commercial practice.

6. STRENGTH:

Service swinging clevis bracket must be capable of meeting ultimate deadend load requirements of Section 10.1 of NEMA Pub. No. PR20-1979, which for 2 1/8 inch Class 53-1 insulator is 2,000 ibs.

7. TESTS:

During tests, the bracket shall be fitted with a wet process insulator that complies with ANSI C29.3-1986, [2]. Test procedures described in Section 6 of NEMA Pub. No. PH20-1979, [5], include:

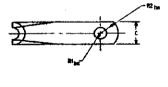
- a. Loads shall be applied by means of a loop of flexible stranded cable of a diameter which shall not exceed the radius of the wire groove of the spool insulator. Pailure of the spool insulator shall be regarded as a clavis failure.
- b. During testing the clevis shall be attached to a steel block.

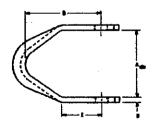
8. INSPECTION:

The manufacturer shall conduct inspection and tests to verify that service swinging clevises comply with the requirements of this specification. Non-conforming clevises are not acceptable. NEA reserves the right to witness factory tests and to require test

Page 2 of 5 TS 136

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FIGURE 1 SERVICE SWINGING CLEVIS

Service Subaging Clevic (Cont.)

9 PACKAGING

Service swinging clevines with compatible clevis pins and cotter keys shall be securely packaged for shipping. Bach package shall contain fifty (50) units and shall be clearly marked with the manufacturer's name and catalog No.

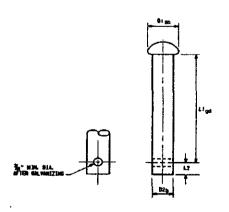
10. OTHER STANDARDS:

Dimensional and performance requirements of NEA service swinging clevises, based on other internationally recognized standards, are acceptable only if the requirements of such standards are equivalent to or exceed the requirements of this document.

11. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. ANSUASTM A153-82: Standard specification for zinc coating (hot-dip) on iron and
- ANSI C29.3-1986: American National Standard for wet-processed porcelain insulators (spool type).
- 3. ANSI AS70-79: Standard specification for hot-rolled carbon steel sheet and strip, structural quality.
- ASTM A675-82: Standard specification for steel bars, carbon, hot wrought, special quality, mechanical properties.
- 5. NEMA Pub. No. PH20-1979: NEMA standards for galvanized ferrous insulator

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FIGURE 2 SERVICE SWINGING CLEVIS PIN



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification establishes the dimensional and physical requirements of saddle type crossarm mounted static-free insulator pins to be used on Coop overhead distribution lines. Each saddle type insulator pin stall be provided with accessories shows and listed in the document. Lead alloy threads at the top of insulator pins shall have one inch (1°) diameters for compatibility with pin-type insulators based on NEA Specification 200 [1].

2. GENERAL:

Saddle type insulator pins furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements stated in this document. The text, figures and references to other standards supplement each other and shall be considered parts of

Drop forged saddle type insulator pins shall be fabricated from steel that conforms with either ASTM AS75-86, [2] or ASTM AS76-86, [3].

Saddle type pin base and strap shall be fabricated from steel which conforms to the chemical and structural specifications of either ASTM AS68-85, [4] or ASTM A570-85, [5]. Strap shall have small projections to bite into crossarm and prevent pin movement.

All insulator threads shall be made of a lead alloy which meets the strength requirements of this document. Dimensions and tolerances are shown in Figure 2.

Carriage bolts and compatible square nuts must be fabricated in accordance with NEA Specification 108, [6], but with dimensions as shown in Figure 3.

Compatible square locknuts shall be fabricated from material that complies requirements of NEA Specification 116, [7], and ANSI C135.1-1979, [8].

4. FINISH:

The saddle type pin and its accessories shall be hot-dip galvanized in accordance with

TECHNICAL SPECIFICATION 137					
SUBJECT:	ORIGINAL	JUNE, 1993			
SADDLE TYPE CROSSARM PIN	Rev. No.				
	1	PAGE 1 OF 7			

Saddle Type Crossers: Pin (Cont.)

9. OTHER STANDARDS:

The dimensional and performance requirements of NEA saddle type insulator pin assemblies based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document and are identical in base design and insulator lead thread design.

10. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. NEA Specification 200: Specification for overhead distribution line porcetain
- 2. ASTM A575-86: Standard specification for steel bars, carbon, merchant quality, M-
- 3. ASTM A576-86: Standard specification for steel bars, carbon, hot wrought, special
- ASTM A568-85: Standard specification for general requirements for steel, carbon, and high-strength, low-alloy, hot-rolled and cold-rolled sheet.
- 5. ASTM A570-85: Standard specification for steel, sheet and strip, carbon, hot-rolled,
- 6. NEA Specification 108: Specification for carriage bolts.
- 7. NEA Specification 116: Specification for locknuts.
- ANSI C135.1-1979: American National Standard for galvanized steel bolts and nuts for overhead line construction.
- 9. ANSI B1.1-1982: Unified inch screw threads (UN and UNR thread form).
- 10. NEA Specification 186: Specification for coarse screw threads.

ANSUASTM A153-82, [9]. The surfaces shall be smooth and free from blemishes and sharp projections. Each insulator pin shall bear the manufacturer's symbol or identification mark in a place and manner which will not adversely affect the integrity or of the place.

5. DIMENSIONS:

The saddle type insulator pin shall be specified on the basis of the dimensions shown in Figure 1.

6. STRENGTH:

Cantilever tests on saddle type insulator pins shall be conducted using the methods illustrated in Figure 4 and shall develop a siximum strength shown in Note 1. Pins shall be fixed on a rigid block and must develop the minimum strengths in any direction without experiencing a deflection greater than ten (10) degrees.

- Torsion tests: After applying 150 inch-pounds of torque to the steel thimble, it should be rotated an additional 180 degrees without stripping the lead thread or breaking the bow between the pist body and the lead thread.
- Tensile tests: After applying 150 inch-pounds of torque to the steel thimble it should be capable of withstanding a minimum tensile load of 3000 pounds without stripping or pulling off the pin.

NEA saddle type insulator pins shall be securely packaged for shipping and handling. Each lead thread shall be protected by a cardboard cover to prevent damage. Each package shall contain ten (10) saddle type insulator pins with all hardware and shall be clearly marked with the manufacturer's name and Catalog number.

8. INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the taddle type insulator pin assemblies comply with the requirements of this document. Non-conforming assemblies are unacceptable. NEA reserves the right to witness factory tests and to request test reports

Page 2 of 7

Saddle Type Cremarus Plu (Cost.)

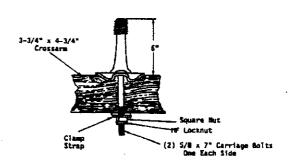
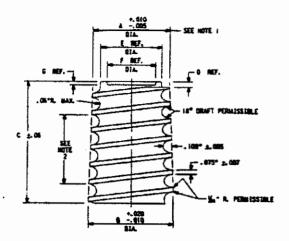


FIGURE 1 SADULE TYPE CROSSARM PIN



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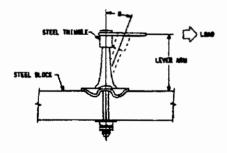
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		1.010	1.113	1. 758	ž	*		*

FIGURE 2
DIMENSIONS FOR 1-INCH LEAD THREADS
(ALL DIMENSIONS IN INCHES)

Page 5 of 7

Saddle Type Crassiem Pin (Cost.



Note 1. Minimum cantilever test load at 100 deflection = 800 counts.

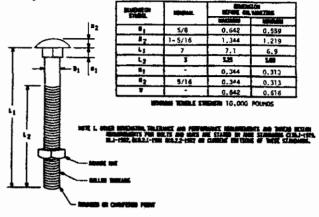
MATE 2. THE MANUE OF REFLECTION & SMALL OF MEASURER AS THE SHIRTHON OF THE STEEL TRIBUNES IN THE PLANE REFINES BY THE ARIS OF THE MANUE AND THE LAND.

NOTE 3. THE LAND SHALL BE APPLIED AT A POINT EBBAL IN NEJBAT TO THE LEVER ARM LPDN NEJBAT ABOVE AND., AT A BASE OF APPROXIMATION OF, A DICH FER NIDATE, THOUSAN A STEEL TRIMBLE SCREWER TO THE LEAD TRIMBAD.

FIGURE 4 CANTILEVER TEST

> Page 7 of 7 TS 137





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FIGURE 3
CARRIAGE BOLT AND SOLIARE AUT ASSEMBLY

Page 6 of



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the dimensional and performance requirements of acrewtype service wireholders used to support deadend service conductors on Coop distribution lines.

2. GENERAL:

Screw-type service wireholders furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements of this specification. The wireholder consists of an insulator reinforced by a one piece preased steel shackle. The insulator and housing are held together by a copper rivet. A No. 22 wood screw firmly fixed into the housing permits the wireholders to be attached to wooden structures. The text, figures and references to other standards supplement each other and shall be considered part of this document.

3. MATERIAL:

A wireholder housing shall be fabricated from sheet steel which conforms to ASTM A109-83, [1] or A570-79, [2].

The No. 22 wood screw shall be fabricated by the cold heading process from carbon steel round wire in accordance with ASTM A549-82, [3]. The round wire shall meet he requirements of ASTM A510-82, [4]. Alternatively, the wood screws can be fabricated by the hot heating process from structural steel made in accordance with A663-82, [5] or A675-82, [6]. The insulator shall be dry process porcelain with brown glaze. The insulator and shackle shall be fastened-together by a solid copper rivet.

4. DIMENSIONS

The service wireholder dimensions are shown in Figure 1.

5. STRENGTH:

NEA wireholders shall be tested in accordance with ANSI C29.1-1982, [7].

TECHNICAL SPECIFICATION 138				
SUBJECT:	ORIGINAL	JUNE, 1993		
SERVICE WIREHOLDER, SCREW TYPE	Rev. No.			
		PAGE 1 OF 4		

Service Wirehelder, Servy Type (Cont.)

6. FINISH:

The wireholder shackle shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [8]. The zinc coating of the No. 22 wood screw can be applied by either the hot-dip process in accordance with ASTM A153-82, [8] or electrodeposited in conformity with ASTM B633-78, [9]. The porcelain shall have a smooth surface with well rounded edges. Wireholders shall bear the manufacturer's symbol or identification mark.

7. INSPECTION:

The manufacturer shall conduct inspections and tests to determine if the wireholders comply with the requirements of this specification. Non-conforming wireholders are not acceptable. NEA reserves the right to witness factory tests and to request test reports.

8. PACKAGING:

Service wireholders shall be securely packaged for shipping. Each package shall contain fifty (50) wireholders and shall be clearly marked with the manufacturer's name and Catalog No.

9. OTHER STANDARDS:

The dimensional and performance requirements of screw-type service wireholders, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

10. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. ASTM A109-83: Standard Specification for steel, carbon cold-rolled strip.
- ASTM A570-79: Standard specification for hot-rolled carbon steel sheet and strip, structural quality.
- ASTM A549-82: Standard specification for steel wire, carbon, cold heating quality, for would screws.
- ASTM A510-82: Standard specification for general requirements for wire rods and coarse round wire, carbon steel.
- ASTM A663-82: Standard specification for steel bars, carbon, merchant quality, mechanical properties.

Page 2 of 4 TS 138

Service Wirehelder, Screw Type (Cent.)

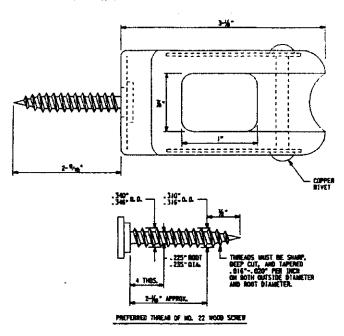


FIGURE 1 SCREW TYPE SERVICE WIRE HOLDER NEA CODE NO. 7510 10 22

Page 4 of 4 TS 138

Service Wireholder, Strew Type (Cent.)

- ASTM A675-82: Standard Specification for steel burs, carbon, but wrought, special quality, mechanical properties.
- ANSI C29.1-1982: American National Standard for test methods for electrical power intelligence.
- 8. ANSI/ASTM A153-82: Standard specification for zinc coating (hot-dip) on iron and
- ASTM B633-78: Standard specification for electro-deposited coating of zinc on iron and steel.

Page 3 of 4 TS 138



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

i. SCOPE:

This specification establishes the general dimensional and performance requirements of Ground wire connector.

2. GENERAL:

Connector Groundline furnished to NEA specifications shall conform in all respect to the specific dimensional and performance requirements stated in this standard. The text, figures and references to other standards supplement each other and shall be considered part of this standard.

3. MATERIĄL:

Connector Groundwire shall be made from either Iron or Steel of a grade and quality to meet the strength requirements required in the normal use of the connector.

4. FINISH:

Groundwire connector shall be free of rough or uneven surfaces so as to ensure safety in handling and installation.

5. DIMENSIONS:

The Groundwire Connector dimensions are shown in Figure 1.

6. GALVANIZING:

After fabrication, groundwire connector shall be hot-dip galvanized in accordance with ANSI/ASTM A[53-82 [1].

7. INSPECTION:

The manufacturer shall conduct the necessary test to determine if the Connector Groundwire complies with the requirements of this document. Non-conforming units are unacceptable. NEA reserves the right to witness factory tests and shall receive

TECHNICAL SPECIFICATION 139				
SURIECT:	ORIGINAL,	AUGUST, 1993		
CONNECTOR GROUNDWIRE	Rev. No.			
	1	PAGE 1 OF 3		

Consector Groundwire (Cont.)

-

8. PACKAGING:

Groundwire Connector shall be securely packaged for shipping and hardling. Each package shall contain one hundred (100) items and shall be clearly marked with the manufacturer's name and catalog number.

9. OTHER STANDARDS:

The dimensional and performance requirements of Connector Groundwire base on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements of this document.

18. BIBLIOGRAPHY OF REFERENCE STANDARDS:

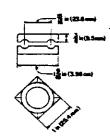
 ANSI/ASTM A153-82: Standards Specification for Zinc Coating (hot-dip) on iron and steel hardware.

> Page 2 of 3 TS 139

Connector Groundwire (Cont.)

CONNECTOR, GROUND WIRE





REFERENCE DATA

GUOTING AGAE SIZE				
DEPRÈCUIS in (com)	4474)	(7.95)		
MANUAL in (see)	T (HLM.)	1 (12.7)		
MELIATING SEST, SEEL (Seen)	₹(16)	1 (##)		
SOULAR OR BOUAL	1-1162	J-1144		
MEA, CODE NO.	1737 00 02	:737 00 03		

Page 3 of

D

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This standard establishes Coop requirements for ground rod clamps used to connect a ground wire to a 5/8 inch galvanized steel ground rod.

2. GENERAL:

Ground rod clamps furnished to NEA specification shall conform in all respects to the requirements of this standard. The text, figures and references to other standards supplement each other and shall be considered part of this standard.

3. MATERIAL

Drop forged ground rod clamp bodies shall be made of malleable steel compatible with ASTM A663-82, [1] or ASTM A675-82, [2]. The retaining screw shall also be made of seel that compiles with ANSI Standard C135.1-1979, [3] and shall have a square or heragonal head. Each material shall have a quality and grade that satisfies the requirements of this standard.

4. FINISH:

A ground clamp body shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [4]. The retaining screw shall be cadmium plated in accordance with ASTM A165-80, [5]. The surfaces of the clamp body and screw should be smooth and free from blemishes.

5. DIMENSIONS:

Dimensions of ground rod clamps shall be specified on the basis of ground rod diameter and NEA ground wire diameters (0.460 inch and 0.128 inch)

The manufacturer is responsible for the design of the clamps in order to meet the requirements of this standard.

Approximate dimensions of a typical NEA ground rod clamp are shown in Figure 1.

TECHNICAL SPECIFICATION 140					
SUBJECT:	ORIGINAL.	ЛЛNE, 1993			
GROUND ROD CLAMP	Rev. No				
		PAGE 1 OF 3			

Graund Red Clamp (Cont.)

6. INSPECTION:

The manufacturer shall perform inspection and tests to determine if ground rod clamps meet the requirements of this standard. Non-conforming bolts are unacceptable. NEA may request test reports.

7. PACKAGING:

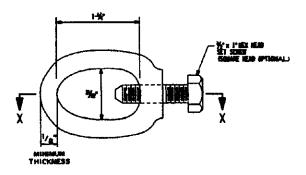
Ground rod clamps shall be securely packages for shipping. Each package shall contain one bandred (100) pieces and shall be clearly marked with the reanufacturer's name and catalog number.

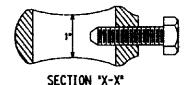
8. OTHER STANDARDS:

The dimensional and performance requirements of NEA ground rod clamps, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

9. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- [1] ASTM A663-82 : Standard Specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties.
- ASTM A675-82: Standard Specification for Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties.
- ANSI C135.1-1979: American National Standard for Galvanized Steel Bolts and Nuts for Overhead Line Construction.
- [4] ANSI/ASTM A153-82: Same as Others
- [5] ASTM A165-80: Standard Specification for Electro-Deposited Coatings of Cadmium on Steel.





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NEA CODE NO. 1731 00 30

FIGURE 1 CLAMP FOR A % INCH GROUNG ROD

Page 3 of 3 TS 140

Compatible hex nuts shall be fabricated from hot-rolled steel produced by the open-hearth, electric-furnace or basic-oxygen process and shall be of a quality and grade suitable to meet the requirements of this document. Washers shall comply with the requirements of NEMA PH10-1977 [3], NEA Specification 112 [4] and lock washers with ANSI B18.21.1-1983 [6]. All clamp components shall be hot-dip galvanized in accordance with ASTM A153-82 [5].

DIMENSIONS:

The following dimensional requirements of the clamp shall be met:

- The cable seat shall be designed to accept a range of conductors fitted with annor rods.
- The clamp must clear the insulator by sufficient distance so that the wet arcing distance will not be reduced.

The dimensions shown in Figure 1 are defined as follows:

- Diameter of clevis head Separation between back of clevis and center-line of clevis pin Separation between center of conductor and centerline of clevis pin Length of clamp body

THREADS:

The threaded portion of the carriage bolt or T-bolt keeper shall, after galvanizing, permit the compatible hex nots to be run the entire length of the thread without the aid of sools. The threads of bolts and compatible nots shall be made in accordance with the requirements of ANSI Standard C133.1-1979 [1].

The clamp shall have smooth surfaces without blemishes, malformations or other defects. The clamp body shall bear the manufacturer's symbol or identification mark and the clamp Catalog No. in a manner and location which shall not impair the function of the clamp. The manufacturer's symbol or identification mark shall also be located on the head of each bolt.



REPUBLIC OF THE PHILIPPINES **National Electrification Administration (NEA)**

SCOPE:

This specification establishes the physical and dimensional requirements of angle suspension clamps used on Coop overhead electric distribution lines.

GENERAL:

Angle suspension clamps shall conform in all respects to the physical and dimensional requirements of this specification. The clamps shall be suitable for corner construction up to 90 degrees and shall be used on ACSR conductors fitted with armor rods.

The champ components shall include the clamp body, keeper, carriage bolt and compatible hax an with washer, clevis pin and non-ferrous clevis key. An allernative acceptable design shall include the use of a T-bolt keeper instead of a separate keeper and carriage bolt. The text, figures and references to other standards supplement each other and are considered part of this document.

MATERIAL:

The clamp body and keeper shall be either cast in malleable iron in accordance with ASTM A47-77 $\{i\}$ or forged from C1038 SBQ steel.

Carriage bolts, if needed and compatible hex nuts, shall be fabricated from the following materials in accordance with ANSI C135.1-1979 [2].

- Hot-headed bolts shall be made from hot-rolled steel produced by the open-hearth, electric-furnace or basic-oxygen process and shall be of a quality and grade suitable to meet the requirements of this document.
- Cold-headed bolts shall be made from steel cold-heading wire produced by the open-hearth, electric-furnace or basic-oxygen process and shall be of a quality and grade suitable to meet the requirements of this document. Reheading after forming is permitted if necessary to comply with the requirements of this

TECHNICAL SPECIFICATION 141					
SURJECT:	ORIGINAL	JUNE, 1993			
CLAMP, ANGLE SUSPENSION	Rev. No.				
		PAGE 1 OF 4			

Clamp, Angle Suspen in (Cont.)

7. INSPECTION:

The manufacturer shall conduct adequate inspection and tests to verify that NEA angle suspension classic complies with the requirements of this document. Non-conforming clamps are not acceptable. NEA shall reserves the right to witness factory tests and may request test reports.

PACKAGING:

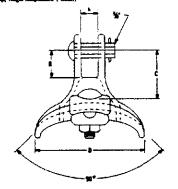
Angle suspension clamps shall be securely packaged for shipping. Each package shall contain twenty-five (25) pieces and shall be clearly marked with the manufacturer's name and Catalog No.

OTHER STANDARDS:

The dimensional and performance requirements of NEA angle suspension clamps, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements of this document.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A47-77: Standard specification for malieable non-castings.
- ANSI C135.1-1979: American National Standard for galvenized seed bolts and nuts for overhead line construction. 2.
- NEMA PH10-1977: NEMA Standards for galvanized ferrous washers. 3.
- 4. NEA Specification 112: Specification for ferrous washers.
- AMSI B18.21.1-1983: American National Standard for lock washers.
- ANSI B1.1-1982: Unified inch screw threads (UN and UNR thread form).
- NEA Specification 186: Specification for coarse serew threads.





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FIGURE 1 ANGLE SUSPENSION CLAMP

7. PACKAGING:

Clamp, Suspension, Groundwire shall be securely packaged for shipping. Each package shall contain twenty five (25) clamps and shall be clearly marked with the manufacturer's name and catalog number.

OTHER STANDARDS:

The dimensional and performance requirements of NEA Clamp, Suspension, Groundwire based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

ASTM A663-82: Standard Specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties.



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification establishes the physical and dimensional requirements of Groundwire, Suspension Clamps used on coop overhead electric distribution lines.

GENERAL:

The Clamp, Suspension Groundwire shall conform in all respects to the physical and dimensional requirements of this specification. The text, figures and references to other standards supplement each other and shall be considered part of this standard.

Clamp suspension shall be made of iron or steel, said material shall have a quality and grade that satisfies the requirements of this standard.

FINISH:

The clamp shall have smooth surfaces without blemishes, malformations or other defects. The clamp body shall bear the manufacturer's symbol or identification mark and clamp catalog number.

DIMENSIONS:

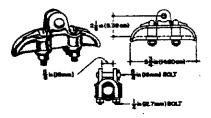
Clamp, Suspension, Groundwire dimensions shown in Figure 1 are specified on the basis of the size of the conductor with which it is to be used.

INSPECTION:

The manufacturer shall perform inspection and test to determine if Clamp, Suspension, Groundwire meet the requirements of this standard. Non-conforming bolts are unacceptable. NEA may request test reports.

TECHNICAL SPECIFICATION 142				
SÜBJECT:	ORIGINAL AUGUST, 199			
CLAMP, SUSPENSION, OROUNDWIRE	Rev. No.			
		PAGE 1 OF 3		

CLAMP, SUSPENSION, GROUND WIRE



REFURENCE DATA

CONDUCTOR SMALETER					
(ma)	Q12 -(8.04)				
	0.44 -(0.47)				
VETRALITE STRENGTH (he)	M,000 (1,272)				
SENTAN ON SOURL	OR - ESQ44				
NEA CODE NO.	874 25 8 7				



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This standard establishes the physical and performance requirements for a transformer pole band, and adapter, to be used by the Coops in the operation of the electric distribution system.

GENERAL:

The transformer pole band, furnished to NEA specification shall conform in all respects to the physical and performance requirements of this standard. The text, figures and reference to other standards supplement each other and or considered part of this standard.

The universal pole band bracket, to be used when hanging transformers on non-wood poles, that do not have bolt holes in the desired places, shall have three component parts namely: a transformer mounting bracket, cluster mount segment and a vertical adapter plate, and the necessary bolts.

To be shaped for hanging one, two, or three transformers on a pole with 6 1/2 to 11-inch diameter. To have adequate strength for safely hanging up to three 167 kVA transformers on a top and bottom band.

Each transformer mounting bracket and each vertical adapter plate to be complete with two 5/8 x 1 3/4"-inch machine bolts for attaching the transformers to the plate and the plate to the bracket.

A 5/8°x6° machine bolt shall also be provided for each transformer mounting bracket and each cluster mount segment. (see figure1).

INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the goods complies with the specification. Non-conforming units are unacceptable. NEA reserves the right to witness factory tests and shall receive test reports.

PACKAGING:

The goods shall be individually packaged in a suitable container for a tropical climate. Each comminer shall be clearly labeled with the manufacturer's name and catalog information.

TECHNICAL SPECIFICATION 144					
SUBJECT:	ORIGINAL	JUNE, 1993			
BRACKET, POLE BAND, TRANSFORMER	Rev. No.				
		PAGE I OF 2			



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This standard establishes the physical performance requirements for a Hangur, Transformer, Cluster Mount to be used by the Coops in the operation of the electric distribution system.

GENERAL:

The Hanger, Transformers furnished to NEA specifications shall conform in all respects to the physical and performance requirements of this standard. The text, figures and reference to other standards supplement each other and or considered part of this standard.

MATERIAL:

The Hanger body shall be fabricated from high strength iron or steel to meet the strength requirements in the normal use of the switches.

FINISH:

The Hanger body shall be hot-dip <u>galvanized</u> in accordance with ANSI/ASTM A153-82. The unit shall have smooth surfaces without blemishes, malformations or other defects to ensure safety in handling and installation.

DIMENSIONS:

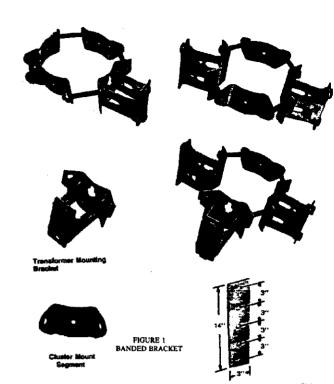
Typical Hanger, Transformer, Cluster Mount for 3-50 KVA is shown in Figure 1.

STRENGTH:

The hanger should carry the load of the transformer to be installed.

TECHNICAL SPECIFICATION 145					
SURJECT:	ORIGINAL	AUGUST, 1993			
HANGER, TRANSPORMER, CLUSTER MOUNTING	Rev. No				
	1	PAGE I OF 3			

et. Pair Band, Trans ners (Cont.)



7. INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the goods complies with the specification. Non-conforming units are unacceptable. NEA reserves the right to witness factory tests and shall receive tests reports.

PACKAGING:

The goods shall be individually packaged in a suitable container for a typical climate. Each container shall be clearly labeled with manufacturer's name and catalog information.

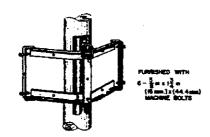
OTHER STANDARDS:

The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this standard.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

1. ASTI A663-82: Standard Specification for Steel Bars, Carbon, Merchant Quality,

HANGER, TRANSFORMER, CLUSTER MOUNT, FOR 3-50 KVA



REFERENCE DATA

SHIELAR OR	ECUAL	J- 6865	:
MEA. CODE	NO.	3100 24 41	•

Page 3 of 3 TS 145

Loop Deadend Clamp (Cont.)

4. DIMENSIONS:

Loop deadend clamp dimensions shown in Figure 1 are specified on the basis of the size of the conductor with which it is to be used.

S. FINISH:

The steel U-bolts and nuts shall be hot-dip galvanized in accordance with ASTM A153-82 [6]. The surfaces of the clamp shall be smooth and free from blemishes, irregularities and other imperfections which are inconsistent normal commercial practice. The manufacturer's identification mark or symbol shall be located on each part of the clamp body and on each U-bolt, in a manner and location which does not impair the function of the clamp.

6. STRENGTH:

Two loop deadend clamps must be used if the holding value of the connection is to develop 95% or more of the conductor's rated strength. Connections using one loop deadend clamp will develop holding values equivalent to:

- a. 80% of rated strength of ACSR
- b. 90% of rated strength of stranded all aluminum conductor

7. INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the loop deadend clamp complies with the requirements of this document. Non-conforming clamps are unacceptable. NEA reserves the right to witness factory inspection and tests and may request test reports.

8. PACKAGING

Loop deadend clamps shall be securely packaged for shipping. Each package shall contain twenty five (25) clamps and shall be clearly marked with the manufacturer's name and Catalog No.

9. OTHER STANDARDS:

The dimensional and performance requirements of loop deadend clamps, base on other internationally recognized standards are acceptable only if the requirements of such

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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the physical and performance characteristics of loop deadend clamps. These clamps shall be used with all aluminum or ACSR conductors on Coop distribution lines.

2. GENERAL:

Loop deadend clamps shall conform in all respects to the dimensional and performance requirements of this document. The text, figures and references to other standards supplement each other and are considered part of this specification.

3. MATERIAL:

A loop deadend clamp shall have a body made of three parts using U-boits and nuts as clamping hardware.

The top and bottom pressure pads shall be castings of high strength aluminum alloy 356 in accordance with ASTM B686-82 [1] and heat treated to T6 temper in accordance with ASTM B597-83 [2]. The top pressure pad shall be attached to the U-bolt.

The spacer shall be made of highly conductive aluminum, be designed to interlock with the U-bolts and be provided with guide fingers to ensure alignment of the conductors. The spacer shall be designed so that it cannot be removed without removing the nuts and lower pressure pad.

The clamp shall also provide optimum contact areas for conductor contact, with flared ends to reduce conductor stresses.

The U-bolts shall be made of steel which conforms to the physical requirements of ASTM specifications A663-82 [3] or A675-82 [4]. The steel hex nuts shall meet the requirements of ANSI B18.2.2-1972 [5].

Lock washers shall comply with the requirements of ANSI B18.21.1-1983 [7].

	TECHNICAL SE	ECIFICATION 146	
SUBÍECT:		OREGINAL.	JUNE, 1993
	LOOP DEADEND CLAMP	Rev. No	
L			PAGE 1 OF 4

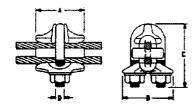
Loop Deadens Clamp (Cont.)

standards are equivalent to or exceed the requirements of this document.

19. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. ASTM B686-82: Standard specification for aluminum alloy castings, high strength.
- 2. ASTM B597-83: Standard practice for heat treatment of aluminum alloys.
- ASTM A663-82: Standard specification for seed bars, carbon, merchant quality, mechanical presenties.
- ASTM A675-82: Standard specification for steel bars, carbon, hot wrought, special quality, mechanical properties.
- 5. ANSI B18.2.2-1972: Square and hex nuts
- 6. ANSI B18.21.1-1983: American National Standard for lock washers.
- 7. ANSI B1.1-1982: Unified inch screw threads (UN and UNR thread form).
- 8. NEA Specification 186: Specification for coarse screw threads.

Loop Dendend Clamp (Cont.)



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> FIGURE : LOOP DEADEND CLAMP

Page 4 of 4

. Augla Saspension Bracket (Cont.)

brackets are unacceptable. NEA reserves the right to witness factory tests and may request test reports.

7. PACKAGING:

Angle suspension brackets shall be securely packaged for shipping. Each package shall contain ten (10) brackets and shall be clearly marked with the manufacturer's name and Catalog No.

8. OTHER STANDARDS:

The dimensional and performance requirements of NEA angle suspension brackets, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements of this document.

9. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A575-81: Standard specification for steel bars, carbon, merchant quality, M-Grade
- ASTM A576-81: Standard specification for steel bars, carbon, hot wrought, special quality.



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification covers drop forged steel angle suspension brackets used to provide additional clearance for suspension hardware on angle structures of Coop distribution lines.

2. GENERAL:

Angle suspension brackets shall conform in all respects to the dimensional and performance requirements of this document. The text, figures and references to other standards supplement each other and are considered part of this specification.

3 MATERIAL.

The suspension bracket shall be made from steel conforming to the requirements of ASTM A575-81 [1] or ASTM A576-81 [2]. The brackets shall not be welded. The material shall be of a quality and grade suitable to meet the requirements of this document.

4. FINISH:

NEA angle suspension brackets shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82 [3]. The surfaces shall be smooth and free from sharp projections or blemishes. The brackets shall be embossed with the manufacturer's symbol or identification mark in a location which does not impair the bracket's function.

5. DUMENSIONS

Angle bracket dimensions are shown on Figure 1. If brackets with different dimensions are required, such dimensions will be included in the specification. In any case, the material quality and grade requirements of this document will still apply.

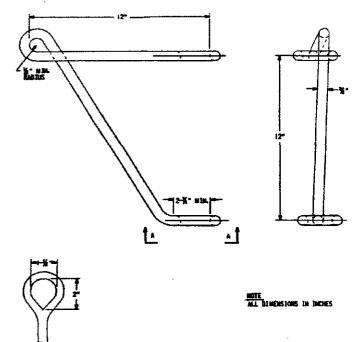
6. INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if NEA suspension brackets comply with the requirements of this specification. Non-conformin

TECHNICAL SPECIFICATION 147				
SUBJECT:	ORIGINAL	JUNE, 1993		
ANGLE SUSPENSION BRACKET	Rev. No.			
		PAGE 1 OF		

Angle Suspension Bracket (Cont.)

SECTION "A-A"



THIS IS A CONCEPTUAL ORABING. THE MANUFACTURER IS RESPONSIBLE FOR THE PREPARATION OF DRAWINGS AND A DESIGN WHICH WEETS THE DIMENSIONAL, STRENGTH, AND STHER PERFORMANCE REQUIREMENTS OF THIS STANDARD.



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the physical and dimensional requirements of Bolt for used as the wires to secure conductors and hardware on Coop electric distribution lines.

2. GENERAL:

Bolt, Shoulder Eye, 3/4° firmished to NEA specifications shall conform in all respects to the specific dimensional and performance requirements stated in this standard. The text, figures and references to other standards supplement each other and considered part of this standard.

3. MATERIAL:

Bolts shall be made from either iron or steel of a grade and quality to meet the strength requirements required in the normal use of the item.

4. FINISH:

Bolts shall be free from imperfections or blemishes so as to ensure safety in bandling and installation

5. DIMENSIONS:

The Bolt, Shoulder Eye, 3/4" shall be specified on the basis of the dimensions shown in Figure 1.

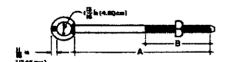
6. GALVANIZING:

After fabrication, Bolts shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82 [1].

TECHNICAL SPECIFICATION 148					
SUBJECT:	ORIGINAL.	AUGUST, 1993			
BOLT, SHOULDER BYE, 3/4"	Rev. No.				
		PAGE 1 OF 3			

Bok, Stepiler Bys, 3/4" (Cont.)

BOLT, SHOULDER EYE, 3 IN (19 mm) DIA.



- REFERENCE DATA

COMENSTAN A in (cm)	14 (36.96)	M (40.64)
DOMENTICH B 10 (cm)	6 (85.24)	# (10.84)
SHALAR OR BOULL	J-9634	J 16536
NEA CODE NO.	0636 36 14	OE36 36 16

MRRAUM SIJEMATE STREETH = 18,000 No. (8,015)

Bell, Shoulder Eye, 3/4" (Cont.)

7. INSPECTION:

The manufacturer shall conduct the necessary tests to determine if the Bolts, Shoulder Eye, 3/4" complies with the requirements of this document. Non-conforming units are unacceptable. NEA reserves the right to witness factory tests and shall request tests reports.

8. PACKAGING:

The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

9 OTHER STANDARDS:

The dimensional and performance requirements of Bolt, Shoulder Eye, 3/4* based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

10. BIBLIOGRAPHY OF REFERENCE STANDARDS:

 ANSI/ASTM A153-82: Standard Specification for Zinc Coating (hot-dip) on Iron and Secol Hardware.

> Page 2 of 3 TS 148



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the dissensional and physical requirements of clevis bolts which attach insulator strings to the crossarus of distribution poles and structures. Clevis bolts shall be provided with a machine bolt and cotter key. The clevis bolt and the machine bolt shall each be fitted with one compatible square nut.

2. GENERAL:

Clevis bolts, machine bolts and square nuts furnished to NEA specifications shall conform in all respects to the dimensional and physical requirements of this standard. The text, figures and references to the standards supplement each other and are considered parts of this standard.

3. MATERIAL:

Drop forged clevis bolts shall be made from steel that conforms to either ASTM AS75-81, [1] or ASTM AS76-81, [2]. The machine bolt and square not shall be fabricated in accordance with the requirements of ANSI Standard C135.1-1979, [3]. The bolt shall be drilled to accept a non-ferrous cotter key. All materials shall be of quality and grade which satisfy the requirements of this standard.

4. FINISH:

The clevis bolt, machine bolt and square nuts shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [4]. All surfaces shall be smooth and free from blemishes or imperfections not consistent with good commercial practice.

5. DIMENSIONS:

The dimensions of clevis bolts are shown in figure 1.

TECHNICAL SPECIFICATION 149				
SUMPCT:	ORIGINAL.	JUNE, 1993		
CLEVIS BOL	Rev. No.			
i		PAGE I OF 4		

Clevis Bult (Cont.)

6. THREADS:

The threaded portion of the clevis bolt and the machine bolt shall be provided with machine rolled thread, and before galvanizing must comply with Class 2 of the ANSI standard for unified threads, ANSI B1.1-1982, [5].

After galvanizing, the bolt threads shall permit compatible nuts to be run the entire thread length without the aid of tools.

7. STRENGTH:

- Clevis bolts shall meet the strength requirements listed in Table 10 of ANSI C135-1979, [3].
- A cold test shall be conducted in accordance with Section 6.2 of ANSI C135.1-1979, [3].

8. INSPECTION:

The manufacturer shall perform the necessary tests to determine if the clevis boits compiles with the requirements of this standard. Non-conforming clevis bolts are unacceptable. NEA reserves the right to witness factory tests and may request test reports.

9. PACKAGING:

Clevis bolts shall be securely packaged for shipping. Each package shall contain twenty-five (25) clevis bolts, and shall be clearly marked with the manufacturer's name and catalog number.

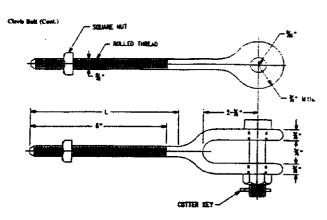
10. OTHER STANDARDS:

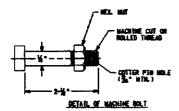
The dimensional and performance requirements of NEA clevis bolts, based on other internationally recognized standards, are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

11. BIBLIOGRAPHY OF REFERENCE STANDARD:

 ASTM A575-81: Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.

> Page 2 of 4 TS 149





NEA CODE NO.	(miches)
0632 05 08 0632 05 10 0632 05 12 0632 05 14	16 12 14

THIS IS A CONCEPTUAL DRAWING. THE MANUFACTURER IS RESPONSIBLE FOR THE PREPARATION OF DRAWINGS AND A DESIGN WHICH MEETS THE DIMENSIONAL, STRENGTH, AND OTHER PERFORMANCE REQUIREMENTS OF THIS STANDARD.

FIGURE 1 CLEVIS BOLTS

Page 4 of 4

Clevia Balt (Cont.)

- [2] ASTM A576-81: Standard Specification for Steel Bars, Carbon, Hot Wrought, Special Quality.
- [3] ANSI C135.1-1979: American National Standard for Galvanized Steel Bolts and Nuts for Overhead Line Construction.
- [4] ANSI/ASTM A153-82: Same as others.
- [5] ANSI Bi.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form).

Page 3 of 4 TS 149



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the physical and dimensional requirements of two-bolt clevis suspension clamps used to stach conductors to suspension insulators on the Coop electrical distribution system.

2. GENERAL:

Two-bolt clevis suspension champs shall conform in all respects to the physical an dimensional requirements of the standard. These clamps shall be used on ACSR and all-aluminum conductors fitted with armor rods.

The clamp components shall include the clamp body, keeper, two U-bolts with compatible hex auts, washers and clevis pin with a non-ferrous key. The text, figures and references to other standards supplement each other and are considered part of this

3. MATERIAL:

The clamp body and keeper shall be cast from a high strength aluminum alloy which complies with ASTM B686-82, [1].

U-bolts and compatible hex nuts shall be made from hot-rolled steel produced by the open-hearth, electric-furnace or basic-oxygen process and shall be of a quality and grade to meet the requirements of ANSI C135.1-1979, [2] and ANSI B18.2.2-1972, [3].

Washers shall comply with the requirements of NEMA PH10-1977, [4] and NEA Specification 112 [5].

Lock washers shall comply with the requirements of ANSI B18.21.1-1983, [7].

All clamp components are not-dip galvanized in accordance with ANSI/ASTM A153-82, [6].

TECHNICAL SPECIFICATION 153				
SURJECT:	ORIGINAL	JUNE, 1993		
CLAMP, SUSPENSION, 2-BOLT	Rev. No.			

Clamp, Suspension, 2-Bolt (Coat.)

4. DIMENSIONS:

The following dimensional requirements of the two-bolt clamp shall be met:

- The cable shall be designed to accept a range of conductors fitted with armor
 rods.
- The clamp must clear the insulator by sufficient distance so that the wet arcing distance will not be reduced.

The dimensions shown in Figure 1 are defined as follows:

- A = Length of suspensions clevis
- B = Separation between conductor seat and centerline of clevis pin
- C = Separation between clevis ears
- D = Diameter of threaded portion of U-hoits

5. THREADS:

The threaded portion of the U-holts shall, after galvanizing, permit the compatible hex nots to be run the entire length of the thread without the aid of tools.

The threads of the U-bolts and compatible nuts shall be made in accordance with the requirements of ANSI Standard C135,1-1979, [2].

6. FINISH:

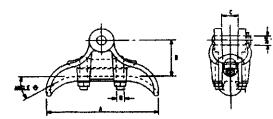
The two-bolt clamp shall have smooth surfaces without blemishes, malformation, or other defects. The clamp body shall bear the manufacturer's symbol or identification make in a manner and location which does not impair the function of the clamp.

7. INSPECTION:

The manufacturer shall conduct adequate inspection and tests to verify that the two-bolt clevis suspension clamp complies with the requirements of this specification. Non-conforming clamps are unacceptable. NEA reserves the right to witness factory inspection and tests and may request test reports.

Page 2 of 4

Clama, Supramon, 2-Bolt (Cont.)



USA.	FITTING	COMPLETON		(CL)	CLAST DISCRIPTION (SIGNER)		400.0	USWIT THEODY	SMEAKING STREAMING	
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1174 23 35	CTUMB	.85	1.04		H/E	H4/100		349*	3.0	£25, 0000
	CLEVE	L06	1.30	7-3/4	5V9	H-9/16	A3	22.5*	\$.3	25,000
	CLEV4S	129	1.60	10	3-3/4	1-15/46	1/2	=	6.2	2±.000
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THIS IS A CONCEPTUAL DRAWLING. THE MANUFACTUREN IS RESPONSIBLE FOR THE PREPARATION OF BRANDINGS AND A DESIGN WHICH WEETS THE DIMERSIEMAL, STRENGTH, AND OTHER PERFORMANCE ROUNDINGSTOR OF THIS STANDARD.

FIGURE 1
TWO-BOLT CLEVIS SUSPENSION CLAMP

Page 4 of 4 TS 153 Clemp, Suspension, 2-Bok (Cost.)

4. PACKAGING:

Two-holt clevis clamps shall be securely packaged for shipping. Each package shall contain twenty (20) clamps and shall be clearly marked with the manufacturer's name and catalog number.

9. OTHER STANDARDS:

The physical and dimensional characteristics of NEA two-bolt clevis suspension clamps, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this standards.

10. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM B686-82: Standard Specification for High Strength Aluminum Alloy Castings.
- ANSI C135.1-1979: American National Standard for Galvanized Steel Bolts and Nuts for Overhead Line Construction.
- [3] ANSI B18.2.2-1972: Square and Hex Nuts.
- [4] NEMA PH10-1977: NEMA Standards for Galvanized Ferrous Washers.
- [5] NEA Specification 112: Specification for ferrous Washers.
- [6] ANSI B18.21.1-1983: American National Standard for Lock Washers.
- [7] ANSI B1.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form).
- [8] REB Publication 186-1988: Standard for coarse screw threads.

Page 3 of 4 TS 153



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE

This standard covers boiled deadend clamps used with ACSR and stranded aluminum conductors on Coop overhead electrical distribution circuits. Each clamp shall be fitted with a clevis pin and cotter key.

2. GENERAL:

Aluminum deadend clamps furnished to NEA specifications, shall conform in all respects to the dissensional and performance requirements of this standard. The text, figures and references to other standards supplement each other and are considered part of this standard.

3. MATERIAL:

The clamp body shall be fabricated from high-strength aluminum alloy in accordance with ASTM B686-82, [1]. The cotter pin shall be made of stainless steel and the self-locking cotter key of hardened aluminum or brass. The U-bolts shall be captured to the top pressure pad and made of steel which conforms to the requirements of ASTM standards A663-85, [2] or A675-85, [3]. The steel nuts shall meet the requirements of ANSI B18.2.2-1972, [4]. These materials shall be of quality and grade which satisfy the requirements of this standard.

4. DIMENSIONS:

Dimensions of conductor deadend clamps shall be based on the minimum and maximum conductor size with which use is intended. A typical conductor dead-end clamp is shown in Figure 1.

5. STRENGTH:

Conductor deadend clamps shall have a holding capability as shown in Figure 1 of this document.

TECHNICAL SPECIFICATION 154					
SUBJECT:		ORIGINAL	JUNE, 1993		
CLAMP, DEADEND STRAIN		Rev. No			
	PAGE 1 OF 1				

end Strain (Cont.)

FINISH:

The components of the clamp shall have smooth surfaces, free from blemishes, sharp projections and other imperfections which can affect serviceability. The manufacturer's identification mark or symbol shall be located on the clamp body or on each U-bott, in a location and manner which shall not impair the function of the clamp.

INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the clamp complies with the requirements of this standard. Non-conforming clamps are unacceptable. NEA reserves the right to witness any factory tests

PACKAGING:

Conductor deadend clamps with clevis pins and cotter keys shall be accurely packaged for shipping. Each package shall contain twenty five (25) units and shall be clearly marked with the manufacturer's name and catalog data.

The dimensional and performance requirements of conductor deadend clamps, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

10. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM B686-85: Standard Specification for Aluminum Alloy Castings, High Strength.
- ASTM A663-85: Standard Specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties. [2]
- ASTM A675-85: Standard Specification for Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties.
- ANSI BI.1-1982: Unified Inch Screw Threads (UN and UNR [4]
- NEA SPECIFICATION 186: Standard for Coarse Screw Threads. [5]

Page 2 of 3 TS 154



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification establishes the physical and dimensional requirements of Clamp, Conductor, Deadend, Aluminum Alloy. These clamps shall be used with aluminum or ACSR conductors on coop distribution lines.

Clamp, Conductor, Deadead, Al. Alloy shall conform in all respects to the specific dimensional and performance requirements stated in this standards supplement each other and shall be considered part of this standard.

The clamp body shall be fabricated from high-strength aluminum alloy in accordance with ASTM B686-82.

The clamp shall have smooth surfaces without blemishes, malformations or other defects. The clamp body shall bear the manufacturer's symbol or identification mark and catalog number.

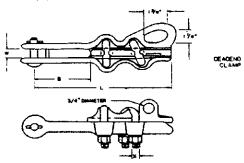
DIMENSIONS:

Dimensions of conductor deadend clamps shall be based on the minimum and maximum conductor size with which use is intended. A typical conductor deactamp is shown in Figure 1. Conductor deadend clamps shall have a holding capability as shown in Figure 1 of this document.

INSPECTION:

The manufacturer shall conduct the necessary test to determine if the Clamps, Conductor, Deadend, Al. Alloy complies with the requirements of this document. Non-conforming clamps are unacceptable. NEA reserves the right to witness factory tests and to request test reports.

TECHNICAL SPECIFICATION 156			
SUBJECT:	ORIGINAL	AUGUST, 1993	
CLAMP, CONDUCTOR, DEADEND, ALLIMINUM ALLOY	Rev. No	PAGE LOF 3	



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drawses, the mampriturer is responsible for the preparation for mach meets the desdesomals, strength and other performance transars

PIGURE (CONDUCTOR DEADEND CLAMP

Page 3 of 3 TS 154

ctor, Dondond, Al. Allny (Cost.)

7. PACKAGING:

Clamps, Conductor, Deadend, Al. Alloy shall be securely packaged for shipping. Each package shall contain twenty five (25) clamps and shall be clearly marked with the manufacturer's name and catalog number.

OTHER STANDARDS:

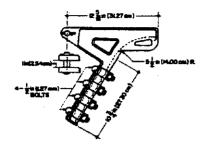
The dimensional and performance requirements of Clamps, Conductor, Deadend, Al. Alloy based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A663-82: Standard Specification for Steel Bars, Carton, Merchant Quality, Mechanical Properties,
- ASTM B686-85: Standard Specification for Aluminum Alloy Castings, High Strength

Page 2 of 3 TS 156

CLAMP, CONDUCTOR, DEADEND, AL. ALLOY



REFERENCE DATA

GLAMPOIS RANGE (SM)	.475886 (22.06)-(22.46)		
ACER (MCNI)	2/0 - 556.5		
CATHWEE STREETS (ME)	23,000 (10,464)		
SHALAR OR ESUAL	9N-ADE-231		
MEA CODE NO.	H72 57 33		

Page 3 of 3 TS 156

Clamp, Groundwire, Dondend (Cost.)

Clamp, Groundwire, Deadend shall be securely packaged for shipping. Each package shall contain one hundred (100) pieces and shall marked with the manufacturer's name and catalog

The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

10 BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTMA663-82: Standard specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties.
- ANSI C135.2-1979: American National for Galvanized Steel Bars, and Nuts for Overhead Line Construction.



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the physical and dimensional requirements of Clamp, Groundwire, Deadend shall be used with aluminum or ACSR conductors on Coop distribution lines.

2. GENERAL:

Clamp, Groundwire, Deadend furnished to NEA specifications shall conform in all respects to the requirements of this standard. The text, figures and references to other standards supplement each other and or considered part of this standard.

The clamp body shall be fabricated from high strength iron or steel to meet the strength requirements in the normal use of the switches.

The Clamp, Groundwire, Deadend shall have smooth surfaces without blomishes, malformations or other defects to easure safety in handling and installation. The clamp body shall be hot-dip galvanized in accordance with ANSI/ASTM A153-83.

Typical Clamp, Groundwire, Deadend dimensions shown in Figure 1 are specified on the basis of the size of the conductor with which it is to be used.

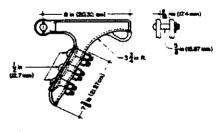
4. INSPECTION:

The summacurer shall perform inspection and tests to determine if the Classp, Groundwize, Deadond meet the requirements of this standard. Non-conforming units are unacceptable. NEA request tests reports.

TECHNICAL SPECIFICATION 157					
SUBJECT:	ORIGINAL	AUGUST, 1993			
CLAMP, GROUNDWIRE, DEADEND	Rov. No.				
	<u> </u>	PAGE I of 3			

Chang, Groundwire, Deadand (Cont.)

CLAMP, GROUND WIRE, DEADEND



REFERENCE DATA

CONDUCTOR DUMETER	-
SANSALINA in (mm)	020 (5.04)
1880kkal is (mm)	0.00 (14.0)
ULTRACE STRENGTH (mg)	6,000 (6,818)
STATE AND CONTROL	08 - 80437
NEA CODE NO.	1172 48 87



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1 SCORE

This specification establishes the general dimensional and performance requirements of Ball Hooks.

2. GENERAL:

Ball Hooks furnished shall conform in all respects to the requirements of this specifications. The text, figures and references to other standards supplement each other and shall be considered part of this specification.

1. MATERIAL.

Ball Hooks shall be made from either iron or steel of a grade and quality to meet the strength requirements required in the normal use of the hooks.

4 MATERIAL

Ball Hooks shall be free of rough or uneven surfaces and edges so as to ensure safety in handling & installation.

5. DIMENSIONS:

A typical Ball Hook is shown in Figure 1.

6. GALVANIZING:

After fabrication, ball holds shall be hot-dip galvanized in accordance with ANSI/ASTM A153-62 (1).

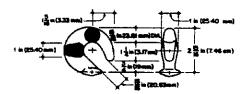
7. PACKAGING:

Ball Hook shall be securely packaged for shipping & handling. Each package shall contain One Hundred (100) items & shall be clearly marked with the manufacturer name & catalog no.

TECHNICAL SPECIFICATION 158					
SUBJECT: ORIGINAL AUGUST, 19					
Hoo	K, BALL	Rev. No.	•		
			PAGE 1 OF 3		

Hook, Rall (Cont.)

HOOK, BALL



REFERENCE DATA

STREET STREETH (he)	30,000 (13,636)
STATE OR BOUAL	BH-BH - 5
NEA CODE NO.	3460 #0 00

Healt, Ruli (Cant.)

8. OTHER STANDARDS:

The dimensional & performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

9. BIBLIOGRAPHY OF REFERENCE STANDARDS:

 ANSI/ASTM A153-82: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

> Page 2 of 3 TS 158



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

i. SCOPE:

This specification establishes the dimensional and performance requirements of Plate, Reinforcement, Crossarm to support coop overhead electric distribution lines.

2. GENERAL:

Plats, Reinforcement, Crossarm furnished shall conform in all respects to the requirements of this specification. The text, figures and references to other standards supplement each other and shall be considered part of this specification.

3. MATERIAL:

Plate, Reinforcement, Crossarm shall be made from either iron or steel of a grade and quality to meet the strength requirements required in the normal use of the plate.

4. FINISH:

Plate, Reinforcement, Crossarm shall be free of rough or uneven surfaces and edges so as to ensure safety in handling and installation.

5. DIMENSIONS:

Nomical dimensions of the Plate, Reinforcement, Crossurm is shown in Figure 1.

6. GALVANIZING:

After fabrication, Plate, Reinforcement, Crossarm shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82 [1].

7. PACKAGING:

Plate, Reinforcement, Crossarm shall be securely packaged for shipping and handling. Each package shall contain One Hundred (100) items and shall be clearly marked with the manufacturer's name and catalog number.

TECHNICAL SPECIFICATION 159					
SURFECT:	ORIGINAL	AUGUST, 1993			
PLATE, REINFORCEMENT, CROSSARM	Rev. No.				
		PAGE 1 OF 3			

OTHER STANDARDS:

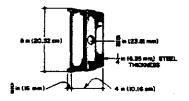
The dimensional and performance requirements of NEA Plate, Reinforcement, Crossarm based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirement quotion this document.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

ANSI/ASTM A153-82: Standards Specification for Zinc Coating (hot-dip) on Iron and Steel Hardware.

Plate, Rainforcement, Cremera (Cant.)

PLATE, REINFORCEMENT, CROSSARM



REFERENCE DATA

BMILAR OF EQUAL	J-22672.5
N.E.A. CODE NO.	4680 0884

New: POR 6X8 in CROSSAMM SIZE

Page 3 of 3 TS 159

Page 2 of 3 TS 159

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the physical requirements, sizes and tolerances of course acrew threads for bolts, anchor rods and auta used on the Coop electric distribution systems.

2. GENERAL:

This specification shall define the parameters of the coarse screw thread form which is consistent with current engineering practice and dimensional acceptability. Dimensions stated in this document are in inches.

Screw threads on NEA fasteners shall comply with the requirements of ANSI B1.1-1982, [1] and shall be described by:

- Thread profile
 Thread series
 Thread class
 Allowance and tolerance
 Designation

3.1 Thread Profile

The basic profile for screw threads is shown in Figure 1. The design profile, described from the basic profile, defines the maximum design diameters for internal and external threads, shown in Figures 2 and 3.

In these diagrams, the following symbols represent the primary dimessions of the screw thread.

- D1 = Nominal (Major) diameter
 D2 = Minor Diameter
 D3 = Pitch Diameter
 H = Height of Fundamental triangle

TECHNICAL SPECIFICATION 186					
SUMECT:	ORKINAL.	JUNE, 1993			
COARSE SCREW THREADS	Rev. No.				
		PAGE 1 OF 6			

Host, Guy (Cost.)

name and Catalog No.

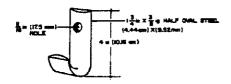
8. OTHER STANDARDS:

The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

9. BIBLIOGRAPHY OF REFERENCE STANDARDS:

ANSI/ASTM A153-82: Standard specification for zinc coating (hot-dlp) on iron and steel hardware.

HOOK, GUY



M.E.A. CODE NO. 3160 20 00

FIGURE 1

Page 3 of 3 T\$ 160

Place, Guy (Cant.)

contain one hundred (100) items and shall be clearly marked with the manufacturer's name and Catalog No.

8. OTHER STANDARDS:

The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

9. BIBLIOGRAPHY OF REFERENCE STANDARDS:

 ANSI/ASTM A153-82: Standard specification for zinc coating (hot-dip) on iron and steel hardware.

Ø

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

I. SCOPE:

This specification establishes the general dimensional and performance requirements of Guy Plates for use on Coop overhead distribution lines.

2. GENERAL:

Guy places furnished shall conform in all respects to the requirements of this specification. The text, figures and references to other standards supplement each other and shall be considered parts of this specification.

3. MATERIAL:

Guy plates shall be made from either iron or steel of a grade and quality to meet the strength requirements required in the normal use of the plates to prevent pole from being damaged by guy wire.

4. DIMENSIONS:

Nominal dimensions of the standard Guy Plate is 4° X 8° X 14 gauge. The plates are formed to a 5° radius and $3/16^{\circ}$ nail holes are located in the four corners. A typical guy plate is as shown in Figure 1.

5. GALVANIZING:

After fabrication, guy plates shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82 [1].

6. FINISH:

Guy plates shall be free of rough or uneven surfaces and edges so as to ensure safety in bandling and installation.

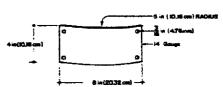
7. PACKAGING:

Guy plates shall be securely packaged for shipping and handling. Each package shall

TECHNICAL SPECIFICATION 161						
SUBJECT:	ORIGINAL.	JUNE, 1993				
PLATE, GUY	Rev. No.					
		PAGE LOF 3				

Plate, Guy (Cost.)

PLATE, GUY



REA COOK NO. 4690 06 19

FIGURE 1



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1 500000

This specification establishes the general dimensional and performance requirements of Groundwire clips for use on Coop overhead distribution lines.

2 GENERAL:

Groundwire clips furnished shall conform in all respects to the requirements of this specification. The text, figures and references to other standards supplement each other and shall be considered parts of this specification.

3. MATERIAL:

Clips shall be made from either iron or steel of a grade and quality to meet the strength requirements required in the normal use of the clips to securely fasten ground wires to wood poles. Material used in the fabrication of the clips shall be in accordance with ASTM A575-73 [1].

4. DIMENSIONS:

Nominal dimensions of the groundwire clip are as shown in Figure 1.

5. GALVANIZING:

After fabrication, groundwire clips shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82 [1].

A ETMICH-

Clips shall be free of rough or uneven surfaces and edges so as to ensure safety in handling and installation.

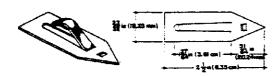
7. PACKAGING:

Groundwire clips shall be securely packaged for shipping and handling. Each package shall contain one hundred (100) items and shall be clearly marked with the

TECHNICAL SPECIFICATION 162					
SUBJECT:		ORIGINAL	IUNE, 1993		
CLIP.	GROUND WIRE	Rev. No.			
		· I	PAGE 1 OF 3		

Clin. Ground Wire (Cant.)

CLIP GROUND WIRE



NULLA COORE MG. IRRO NO GO

FIGURE 1

Page 3 of 3 TS 162

Clip, Greenst Wire (Cont.)

manufacturer's name and Catalog No.

8. OTHER STANDARDS:

The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

9. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM AS75-73: Standard specifications for merchant quality hot-rolled carbon ment have
- ANSI/ASTM A153-82: Standard specification for zinc coating (hot-dip) on iron

Page 2 of 3 TS 162



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the general dimensional and performance requirements of Pipe Spacers for use on Coop overhead distribution lines.

2. GENERAL:

Spacers furnished shall conform in all respects to the requirements of this specification. The text, figures and references to other standards supplement each other and shall be considered parts of this specification.

MATERIAL;

Pipe Spacers shall be made from steel, Grade 1019, and in accordance with ASTM A570-75 [1].

4. DIMENSIONS:

Nominal dimensions of the pipe spacer are 1 1/2" long by 1/4" thick steel with the inside diameter of the pipe equal to 3/4". A sketch of a typical spacer is shown in Figure 1.

5. GALVANIZING:

After fabrication, spacers shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82 [2].

6. FINESH:

Pipe spacers shall be free of rough or uneven surfaces and edges so as to ensure safety in handling and installation.

7. PACKAGING:

Pipe spacers shall be securely packaged for shipping and handling. Each package shall contain one hundred (100) items and shall be clearly marked with the manufacturer's name and Catalog No.

TECHNICAL SPECIFICATION 163					
SUBJECT:	ORIGINAL	FUNE, 1993			
SPACER, PIPE	Rev. No.				
		PAGE I OF 3			

Spacer, Phys (Cont.)

8. OTHER STANDARDS:

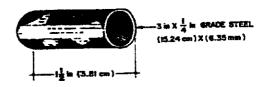
The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

9. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A570-75: Specifications for hot-rolled steel sheet and strip, structural quality.
- ANSUASTM A153-82: Standard specification for zinc coating (bot-dip) on iron and steel hardware.

Specier, Pipe (Cont.)

SPACER, PIPE, 34 IN (19mm) DIA.



NEA CODE NO. 6000 75 01

FIGURE 1

Page 2 of 3 TS 163

Page 3 of 3 TS 163



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

i. SCOPE:

This specification establishes the general dimensional and performance requirements of Anchor Rod Bonding Clamps for use on Coop overhead distribution lines.

2. GENERAL

Bonding clamps are used with forged-eye anchor rods to maintain a firm contact between the guy strand and the anchor rod. Clamps furnished shall conform in all respects to the requirements of this specification. The text, figures and references to other standards supplement each other and shall be considered parts of this specification.

3. MATERIAL:

Bonding clamps shall be fabricated in accordance with NEMA PH-23 [1].

4. DIMENSIONS

Nominal dimensions of a typical bonding clamps are shown in Figure 1. for $5/8^{\circ}$ single-eye rod.

5. GALVANIZING:

After fabrication, clamps shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82 [2], as needed.

6. FINISH:

Clamps shall be free of rough or uneven surfaces and edges so as to ensure safety in handling and installation.

7. PACKAGING:

Clamps shall be securely packaged for shipping and handling. Each package shall contain one hundred (100) items and shall be clearly marked with the manufacturer's name and Catalog No.

TECHNICAL SPECIFICATION 164				
SUBJECT:	ORIGINAL	JUNE, 1993		
CLAMP, ANCHOR ROD, BONDING	Rev. No.			
		PAGE 1 OF 3		

Champ, Ancher Red, Bonding (Cost.)

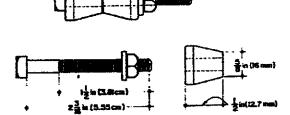
8. OTHER STANDARDS:

The dimensional and performance requirements based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

9. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. NEMA PH-23: NEMA Standards for Steel and malleable iron guy clamps.
- ANSI/ASTM A153-82: Standard specification for zinc coating (hot-dip) on iron and steel hardware.

CLAMP, ANCHOR ROD, BONDING



NEA CODE NO.	1171 11 10	SINGLE-EYE
NEA CODE NO.	1171 11 20	TWIN-EYE

FIGURE 1

Page 3 of 3 TS 164

Course Screw Throads (Cont.)

P = Pitch

3.2 Thread Series

Thread series defines diameter-pitch combinations identified by the number of threads per inch associated with specific diameters as follows:

Nominal Diameter (Inches)	Number Threads per inch
3/8	16
1/2	13
5/8	11
3/4	10

3.3 Thread Class

Thread class defines the amount of tolerance and allowance specified for threads. The allowance for NEA external course threads shall be used to accommodate a zinc or tin coating.

3.4 Allowances and Tolerances

a. The allowance of a coarse thread shall be the difference between the design diameter and the basic diameter. Figures 4 and 5 present the allowance of external and internal threads respectively. The dimension symbols represent

D1 = Nominal (Major) Diameter
D1A = Actual Diameter
E/2 = Allowance
D2 = Nominal Pitch Diameter
D2A = Actual Pitch Diameter
D3 = Minor Diameter
D3A = Actual Minor Diameter

Tolerances and allowances of coarse thread forms are presented in Tables 1

b. Pitch diameter tolerances shall be based on a length of engagement equal to the

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the physical requirements, sizes and tolerances of coarse screw threads for bolts, anchor rods and nuts used on the Coop electric distribution systems.

2. GENERAL:

This specification shall define the parameters of the coarse screw thread form which is consistent with current engineering practice and dimensional acceptability. Dimensions stated in this document are in inches.

Screw threads on NEA fasteners shall comply with the requirements of ANSI B1.1-1982, [1] and shall be described by:

- a. Thread profileb. Thread seriesc. Thread classd. Allowance and tolerance

The basic profile for screw threads is shown in Figure 1. The design profile, described from the basic profile, defines the maximum design diameters for internal and external threads, shown in Figures 2 and 3.

In these diagrams, the following symbols represent the primary dimensions of the screw thread.

D1 = Nominal (Major) diameter
D2 = Minor Diameter
D3 = Pitch Diameter
H = Height of Fundamental triangle

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COARSE SCREW THREADS	Rev. No.			
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basic major diameter (nominal) and are applicable for lengths of engagem from five (5) pitches up to one and one-half (1 1/2)-diameters (Figure 6).

- c. Major diameter tolerance for external threads shall be based on pitch only and shall be applicable for all lengths of engagement.
- Minor diameter tolerance for external threads shall be for reference only since the minimum minor diameter of external threads is not specified.
- f. Minor diameter tolerance for internal threads shall be based on a length of engagement up to one and one-half (1 1/2) diameters.

4. BIBLIOGRAPHY OF REFERENCE STANDARDS:

1. ANSI B1.1-1982: Unified inch screw threads (UN and UNR thread forms).

				Table i				
	To	derance a	nd Allowan	ces Of Exte	mai Coars	c Threads		
				1	Diameter (I	nches)		
				Majo	эт (D _i)		Pitch (I	אָי
Nominal Size and Thread	ANSI Series	Class	Allow- ance (E/2)	Max.	MinTol.		Max.	Min
1/2-13	UNC	2A	0.0015	0.4985	0.4876	0.0050	0.4485	0.44 35
5/8-11	UNC	2A	0.0016	0.6234	0.6113	0.0055	0.5644	0.53 87
3/4-10	UNC	2A	8100.0	0.7482	0.7353	.00059	0.6832	0.6°

Course Server Throads (Care

1 1

				Table 2	<u> </u>				
		Tole	rances o	(Internal	Coarse Ti	hreads			
				Diameter (Inches)					
				Major (D ₁) P				Pitch (D _s)	
Nominal Size and Thread	ANSI Series	Class	Major (D _t)	Max. Min Tol.			Max.	Min.	
1/2-13	UNC	2A	0.500	0,4340	0.4170	0.0065	0.4565	0.4500	
5/8-11	UNC	2A	0.625	0.5460	0.5270	0.0072	0.5732	0.5660	
3/4-10	UNC	2A	6.750	0.6420	0.6420	0.0077	0.6927	0.6850	

PLANES TO BE STRANGET BESTON THREAD

ALTS OF SCHEME THREAD

Page 4 of 6 TS 186

Cause Screw Threads (Cont.)

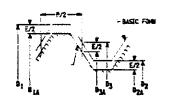


FIGURE 4 LLOBANCE FOR EXTERNAL COMES THREADS

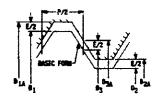


FIGURE 5 LLDWANCE FOR HOTERUN COMPSE THREADS

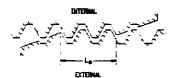


FIGURE & LENGTH OF THREA ENGINEER

Page 6 of 6

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the dimensional and performance requirements of jumper stand-off pins with 1 inch and 1-3/8 inch diameter lead threads for use on overhead electric distribution lines.

2. GENERAL:

The jumper stand-off pin is designed for primary voltage jumper support. Lead alloy threads at one end of the stand-off pin shall have diameters of either one (1) inch or one and three eights (1-3/8) inch for compatibility with pin-type issulators. A standard 5/8* square must shall be securely frastened (crimpled) to the stand-off pin thimble and to prevent the loss of the nut. Jumper stand-off pins furnished to NEA specifications shall conform in all respects to the requirements of this standard. The text, figures and references to other standards supplement each other and shall be considered parts of this standard.

3. MATERIAL:

- Jumper stand-off pins shall be made from a minimum of one inch (1") wide, 12-gauge hot dipped galvanized flat steel of a grade and quality to meet the strength and performance requirements of this standard.
- Lead threads shall be made of a lead alloy of a grade and quality suitable to meet the strength and performance requirements specified in this standard.
- Square nets shall be fabricated from material that complies with the requirements of ANSI C135,1-1979, [1] and in accordance with the requirements of ANSI B18.2.2-1972, [2].

4. DIMENSIONS:

Jumper stand-off pins shall conform to the dimensions presented in Figure 1. Lead threads shall conform to the dimensions presented in Figure 2.

TECHNICAL SPECIFICATION 190						
SUBJECT:		ORIGINAL	JUNE, 1993			
į .	SUMPER STAND-OFF PIN	Rev. No.				
].	PAGE 1 OF 5			

Jumper Stand-Off Plu (Cont.)

5. STRENGTH:

- The jumper stand-off pin shall be capable of supporting 100 pounds without buckling. There should be no permanent deformation after the 100 pound load is removed.
- Lead alloy threads shall develop the strengths specified in the torsion and tensile tests specified below.

After an initial application of 50 inch-pounds of torque to the steel jumper stand-off pin, the lead threads shall withstand an additional 180 degrees of tightening rotation without damage to the thread by stripping or breaking of the bond between the pin body and the thread.

b. Tensile Test

After installing a steel thimble on the lead thread with a torque of 50 inch-pounds, the lead thread shall withstand a minimum load of 1,000 pounds in tension without stripping or pulling off the pin. The load shall be applied to the thimble while the pin is restrained by the square nut.

6. GALVANIZING:

After fabrication and prior to casting of the lead threads, the steel jumper stand-off pins shall be hot dip galvanized in accordance with ANSI/ASTM A153-82, [3].

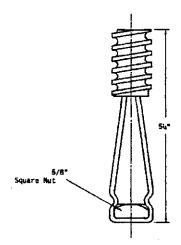
Jumper stand-off pins shall be free of rough or uneven surfaces and edges so as to ensu-safety in handling and installation. Each jumper stand-off pin shall bear the manufacturer's symbol or identification mark in a location and manner which shall not impair its function.

8. INSPECTION:

The manufacturer shall make adequate tests to determine whether the jumper stand-off pins manufactured conform in every respect with all requirements of this standard. Non-conforming pins are unacceptable. NEA reserves the right to witness factory test and may request test reports.

Page 2 of 5 TS 190

per Stand-Off Pin (Cost.)



Note 1: Refer to Figure 2 for lead thread dimension.

This is a conceptual drawing. The manufacturer is responsible for the preparation of drawings and design which meets the dimensional, strength and other performance requirements of this standard.

FIGURE 1

DIMENSIONS OF JUMPER STAND-OFF PIN WITH 1 INCH OR 1-3/E INCH DIAMETER LEAD THREADS

Page 4 of 5 TS 190

Jumper Stand-Off Pln (Cont.)

9. PACKAGING:

Jumper stand-off pins shall be securely packaged for shipping and handling. Each lead thread shall also be protected by a cardboard cover to prevent damage. Each package shall contain fifty (50) jumper stand-off pins, and shall be clearly marked with the manufacturen's same and catalog number.

10.OTHER STANDARDS:

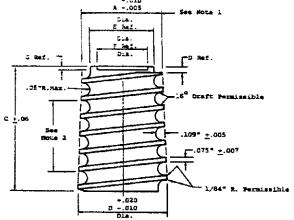
The dimensional and performance requirements of NEA jumper stand-off pins, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

11.BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ANSI C135.1-1979: American National Standard for Galvanized Steel Bolts and Nuts for Overhead Line Construction.
- [2] ANSI B18.2.2-1972: Square and Hex Nuts.
- [3] ANSI/ASTM A153-82: Standard Specification for Zinc Coating (hot-Dip) on Iron and Steel Hardware.

Page 3 of 5 TS 190

er Stand-Off Pin (Cont.)



To 1. This is the dismeter measured between the tapered lines projected along the outside surface of the threads at the top extensity of the lead head. Taper equals 1/16 inch in dismeter per inch in length.

Note 2. Four (4) threads per inch.

		DINERSION OF LEAD THREADS IN INCHES						
MEA CODE NO.	HEAD	A.	3	c	D	Z	Į.	G
	1	1.510	1.119	1.750	5/84	13/15	5/6	3/04
-	1. 3/8	1.385	1.518	2.130	9/84	1-1/8	3/4	7/84

NATIONAL ELECTRIFICATION ADMINISTRATION

NEA ENGINEERING BULLETIN DX2250	SEPTEMBER 1993
SUBJECT: NEA POLE LINE HARDWARE SPECIFICATIONS	
GENERAL:	*********

Line materials furnished to NEA specifications shall conform in all respects to the performance requirements of these standards. The text, figures and references to other standards supplement each other and shall be considered part of this standard. This bulletin covers the following NEA Technical Specifications:

SPECIFICATION NUMBER	DESCRIPTION
101	Pin, Cro arm, Long Shank
102	Pin, Pole Top
1 03	Bolt, Machine
104	Bolt, Oval Eye
105	Bolt, Thimble Eye
196	Bol. Double Arming
107	Wedge Type 't ain Relief Clamps
108	Bolt, Carriage
109	Bolt, Single and I subte Upset
110	Screw, Lag
111	5)cel Crossarm Braces
112	Washer
113	Nut, Square Steel
115	Wood Crossarm Braces
116	Nut, Locknut
117	Nut, Eye
118	Nut, Thimble Eye
119	Snackle, Anchor
121	Gray Straps (Attachments)
123	Attachment, Guy, Two Bolt
124	Attachment, Guy
125	Anchor, Expanding, 8 Way
126	Rod, Anchor, Threaded
128	Rod, Ground Steel
129	Plate, Grounding
130	Staple
131	Clamp, Guy Straigh!
133	Bracket, Clevis Deadend, W/O Spool
134	Clevis, Secondary, Swing W/O Spool

DX2250 1

135	Clevis, Service, Deadend W/O Spool
136	Clevis, Service, Swing W/O Spool
137	Pin, Crossarm, Clamp Type
138	Wire, Holder
139	Connector, Groundwire
146	Connector, Ground Rod (Clamp)
141	Clamp, Suspension Angle
142	Clamp, Suspension, Groundwire
144	Bracket, Transformer, Pole Band
145	Hanger, Transformer, Cluster Mounting
146	Clamp, Loop Deadend
147	Bracket, Angle Suspension
148	Bolt, Shoulder Eve
149	Bolt, Clevis
153	Clamp, Suspension
154	Clamp, Deadend Strain
156	Clamp, Conductor, Deadend, Al. Alloy
157	Clamp, Groundwire, Deadend
158	Hook, Bali
159	Plate, Reinforcement, Crossarm
160	Hook, Guy
161	Plate, Guy
162	Clip, Groundwire
163	Spacer
164	Clamp, Anchor Rod Bonding
186	Coarse Screw Threads
190	lumner Stand Off Dia

The above materials were included in the World Bank IFB 72 and have been used as a basis for this Engir cering Bulletin.

DX2250.2

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the dimensional and physical requirements of crossarm mounted static-free insulator pins to be used on Coop overhead distribution lines. Each insulator pin shall be provided with accessories shown and listed in this standard. Lead alloy threads at the top of insulator pins shall have diameters of either one inch (1°) or one and three-eights inch (1-3/8°) for compatibility with pin-type insulators. Insulator pins described in this standard are the long-shall type for wood crossarm mounting, and the short-shank type for steel crossarm mounting.

2. GENERAL:

Insulator pins furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements stated in this standard. The text, figures, and references to other standards supplement each other, and shall be considered parts of this

3. MATERIAL:

Drop forged insulator pins shall be fabricated from steel that conforms with either ASTM A575-81, (1) or ASTM A576-81, (2).

Compatible square nuts shall be fabricated from materials that comply with requirements of ANSI C135.1-1979, (3).

All one inch (1") and one and three-eights inch (1-3/8") insulator threads shall be made of a lead alloy which meets the strength requirements of this standard.

Square washers shall be fabricated from materials that comply with the requirements of NEMA PH10-1977, Part 3.1.1, (4).

Lock washers shall be fabricated from materials that comply with the requirements of ANSI B18.21.1-1983 and NEA Tech. Standard 116 (5).

Compatible square locknuts shall be fabricated from material that complies requirements of NEA and ANSI C135.1-1979, (3), Specification 116, (5).

TECHNICAL SPECIFICATION 101						
SUBJECT:	ORIGINAL	JUNE, 1993				
SPECIFICATION FOR INSULATOR PINS FOR WOODEN & STEEL CROSSARMS	Rev. No.	PAGE LOF 9				

cification for Insulator Plan for Wooden & Stock Cressurins (Cont.)

4. FINISH:

The pin and its accessories shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, (6). The surfaces shall be smooth and free from blemishes and sharp projections. Each insulator pin shall bear the manufacturer's symbol or identification mark in a place and manner which will not adversely affect the integrity or utilization of

5. DIMENSIONS:

Insulator pin assembly dimensions shown in Figures 1 and 2 are listed in Table A using the information and symbols defined as follows:

- A = Height above crossarm
 B = Length of shank
 C = Diameter of shank
 D = Diameter of base
 E Diameter of shaft
 P = Thread length
 G = Wrenching square size
 H = Insulator lead thread diameter

The insulator pins shall comply with dimensions and tolerance of applicable pins of ANSI C135.17-1979, (7).

Dimensions of compatible square auts before galvanizing shall be in accordance with ANSI B18.2.2-1972, (8) and conform to ANSI C135.1-1979, (3).

Dimensions of square washers shall comply with NEMA PH10-1977, (4). Dimensions of compatible square locknuts shall comply with NEA specification 116, (5).

The threaded portion of the insulator pin shank shall be provided with machine rolled threads and before galvanizing, must comply with class 2 of the ANSI standard for unified screw threads, ANSI B1.1-1982, (10) and conform to ANSI C135.1-1979, (3). After galvanizing, the thread shall permit compatible nuts to be run its entire length without the aid of tools.

Nuts shall be tapped in accordance with ANSI C135.1-1979, Table 8, (3).

Page 2 of 9 TS 101

Specification for Invalutor Plus for Wooden & Steel Crosswan (Cook.)

The lead thread shall conform to the dimensions and tolerances of Figure 3.

7. STRENGTH:

Cantilever test on long and short shank pins shall be conducted using the methods demonstrated in Figure 4 and shall develop the minimum strengths shown in Table B, Figure 4 and listed in ANSI C135.17-1979, (7). Fins shall be fixed on a rigid block and must develop the minimum strengths in any direction without experiencing a deflection greater than 10 degrees.

Torsion and tension tests shall be performed using the following procedure

- Torsion tests: After applying 150 inch-pounds of torque to the steel thimble, it should be rotated an additional 180 degrees without stripping the lead thread or breaking the bond between the pin body and the lead thread.
- Tensile tests: After applying 150 inch-pounds of torque to the steel thimble it should be capable of withstanding a minimum tensile load of 3000 pounds without slipping or pulling off the pin.

The locknuts shall meet the test and strength requirements of NEA specification 116

8. SHIPPING:

NEA insulator pins shall be securely packaged for shipping and handling. Each lead thread shall also be protected by a cardboard cover to prevent damage. Each package shall contain fifty (50) insulator pins and shall be clearly marked with the manufacturer's name and catalog number.

A INCORPORTOR

The manufacturer shall perform the necessary inspection and tests to determine if the insulator pin assemblies comply with the requirements of this standard. Non-conforming insulator pin assemblies are unacceptable. NEA reserves the right to witness the factory tests and to request test reports.

10.OTHER STANDARDS:

The dimensional and performance requirements of NEA insulator pin assemblies based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document and are

Page 3 of 9 TS 101

Specification for Insulator Pins for Wooden & Steel Cramarum (Coct.)

	TABLE A											
	DIM	ENSION	IS OF IN CR	SULATO ROSSARI			000	R STEE	L			
	A Huight Altero Assa		٠ [1]	°	Distriction of Back	F Longto of Thread	Ç Spano Sim	G Disease Local Threat	Consum Type	Pie Pier		
Code He.												
45612151	5	5-344	5/6	2		3-344	3.44	ı	Wand			
	1	1/1/2	Set	1		1-144	3M	-	Stead			
	и	7	3.44	3-1/2	1-179		N/A	1-344	W			
	50	1-344	344	3-1/2	1-1/8	1-1/2	N/A	134	-			

Specification for Instalator Pins for Wooden & Steel Cresourus (Cont.)

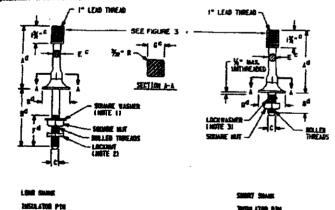
identical in shank thread design and lead insulator thread design.

11.BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A575-81: Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grade.
- ASTM AS76-81: Standard Specification for Steel Bars, Carbon, Hot Wrought, Special Quality.
- (3) ANSI C135.1-1979: American National Standard for Galvanized Steel Bolts and Nats for Overhead Line Construction.
- (4) NEMA PH10-1977: NEMA Standard for Galvanized Ferrous Washers.
- (5) NEA Technical Standard 116: Standard for Luckmes.
- (6) ANSI/ASTM A153-82: Standard Specification for Zinc COating (Hot-Dip) on Iron and Steel Hardware.
- (7) ANSI C135.17-1979: American National Standard for Galvanized Ferrous Bolt-Type Insulator Pins with Lead Threads for Overhead Line Construction.
- (8) ANSI B18.2.2-1972: Square and Hex Nuts
- (9) ANSI B1.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form).
- (10) ANSI B18.21.1-1983 : American National Standard for Lock Was

Page 4 of 9 TS 101

nerillentian for Insulator Plan for Wooden & Steel Crossurum (Cont.)



RETE 1. 2 X 2 X % INCH SCHARE WASHER WITH % DOCK HOLE CONFORMING TO REMAINSMENTS OF REMAINING PROPERTY.

NOTE 2. SOMELE CONCAVE OF LOCKING CONFORMING TO REMAINSMEMBLES OF NEW PURE SCATTON

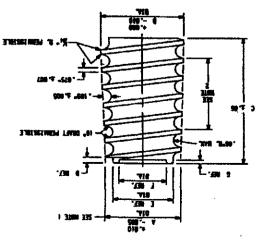
NOTE 3. GALVANIZZO EXTRA BUTT NELICAL CAMBON STEEL SPRING LOCK MASHED CONFERNING TO REGULERICHES OF MES! BIG. 21, 1.

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FIGURE |
GALVANIZED FERROUS BOLT-TYPE INSULATOR PIN ASSEMBLIES
WITH I-INCH-DIAMETER LEAD THREADS
(ALL DIMENSIONS IN INCHES)



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10) S.L 10) S.L

I. SCOPE.

This specification establishes the dimensional and performance requirements of pole-top plus with one tool (1°) and one and three-eights inch $(1^{\circ}3/8^{\circ})$ diameter lead threads for use on Coop overhead electric distribution lines.

Pole-top pins furnished shall conform in all respects to the requirements of this specification. The text, figures and references to other standards supplement each other and shall be considered parts of this specification.

3. MATERIAL:

Pole-top pins shall be made from either from or steel of a grade and quality to Pole-top pins shall be made from either from or steel of a grade and quality to

Lead threats shall be made of a lead alloy of a grade and quality suitable to me the strongth and performance requirements specified in this standard.

OM .vsA

ORGGINAL

A — Severall longial of pin

B — Separation between centers of upper mouting hole and bottom slot

C — Diameter of load thread

D — Diameter of upper mouting hole

E — Diameter of upper mouting hole

E — Diameter of upper mouting alot

F — Overall length of bottom slot

F — Overall length of bottom slot

F — Separation between center of bottom slot and bottom of pin

G — Separation between center of bottom slot and bottom of pin

H — Separation between pin shoulder and center of upper mounting hole Pin dimensions shown in Figure 1 are defined as follows:

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SUBJECT:

LECHNICYT SPECIFICATION 102

resq Threads

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7. CEMERAL:



REPUBLIC OF THE PHILIPPINES

National Electrification Administration (NEA)

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Pale-Top Pins (Cont.)

- I = Width of pin body
- J = Height of pin body
 K = Thickness of material

Lead threads shall conform to the dimensions presented in Figure 2.

5. STRENGTH:

Tests described in ANSI C135.22-1979 (1) shall determine the performance criteria of NEA pole-top pins. These tests include:

Cantilever Tests

These tests, illustrated in Figure 3, determine the minimum transverse and longitudinal loads that the pin can carry to obtain a 10 degree deflection. The pin shall recover to its original state when the loads are removed. The minimum necessary loading is presented in Table 1 (page 6).

Lead Thread Test

Lead alloy threads shall develop the strength specified in the torsion and tensile tests specified below.

- a. Torsion Test: After an initial application of 150 inch-pounds of torque to the steel thimble, the lead threads shall withstand an additional 180 degrees of tightening rotation without damage to the thread by stripping or breaking of the bond between the pin body and the thread.
- b. Tensile Test: After installing the steel thimble on the lead thread with a torque of 150 inch-pounds, the lead thread shall withstand a minimum load of 3,000 pounds in tension without stripping or pulling off the pin. The load shall be applied to the thimble while the pin is restrained by the shank.

6. GALVANIZING:

After fabrication and prior to casting of the lead threads, iron and steet pole-top pins shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [2].

7. FINISH:

NEA pole-top pins shall be free of rough or uneven surfaces and edges so as to e

Page 2 of 6 TS 102

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4561 21 20	×	1		1	IVH	11/16	1-M	-	WITE.	1-3V8	¥~	7
	14.	*	٠	1-378	1016	iV#	3+1/4	1	HOUTE.	1-3/8	HEFE.	mark 5
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- NOTE I CHANGEL LERS MAY DE PLANNEN ON OTHERWISE PARAGO TO MEET STO NOTE 2 THIS DIMENSION MAY DE MARIED TO PROVINE REMARKO STRENGTO.
- MOTE 3 THIS DIMENSION SHALL HAT BE LESS THAN 4 DECKES.
- THIS IS A CONCENTUAL GRANTING. THE NAME ACCORDED IS RESPONSIBLE FOR THE PROPRIATION OF GRANTING AND A DESIGN WRIGH WESTS THE BIBBIGGROUPS, STRENGTH, AND COPEN PERFORMANCE REMISSERATOR TO THIS STRAMAN.

FIGURE

DIMENSIONS OF POLE TOP PINS WITH I INCH AND I-% INCH DIAMETER LEAD THREADS

Pole-Too Pine (Cont.)

y in brandling and installation. Each pole-top pin shall bear the manufacturer of or identification mark in a location and manner which shall not impair its

8. INSPECTION:

The manufacturer shall make adequate tests to determine whether the pole-top pins manufactured for NEA conform in every respect with all requirements of this specification. NEA reserves the right to witness factory tests and may request test

9. PACKAGING:

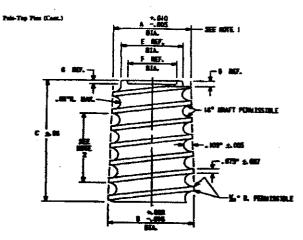
NEA pole top-pins shall be securely packaged for shipping and handling. Each lead thread shall also be protected by a cardboard cover to prevent damage. Each package shall contain fifteen (15) insulator pins and shall be clearly marked with the manufacturer's name and catalog number.

The dimensional and performance requirements of NEA pole-top pins, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

11. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ANSI C135.22-1979: American National Standard for Galvanized Ferrous Pole-Top Immitator Pins with Lead Threads for Overhead Line Construction.
- 2. ANSI/ASTM A153-82: Standard specification for zinc coating (hot-dip) on iron and

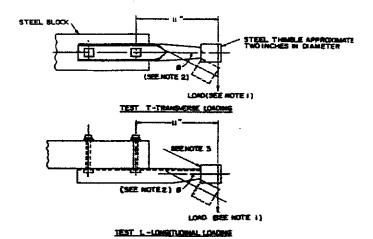
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		Ţ	1.385	1510	2 (35	T.	1	¥	3.			

FIGURE 2 DIMENSIONS FOR I-INCH AND I-% INCH LEAD THREADS



NOTE I. APPLICATION OF LONG MUST COINCIDE WITH CENTERLINE OF TESTING MACHINE NOTE 2. THE MALE OF DEPLECTION (ANGLED) SHALL BE DETERMINED BY THE INTERSECTION OF THE CENTERLINE AXES OF THE STEEL THANGLE IN IT'S INITIAL POSITION WITH THE CENTERLINE AXES OF THE STEEL CHANGLE IN IT'S INITIAL POSITION WITH THE CENTERLINE AXES OF THIS THANGLE OBTAINED BY A MAY DEPLETED POSITION OF THE PIN

NOTE 3 THIS SHO OF THE STEEL THIMBLE SHOULD NOT EXTEND BEYOND LEAD THREAD.

TABLE I						
TEST NO.	SIZE OF PIN	LEVER ARM	MIN. REQUIRED LOAD GASED NA MAX DEFLECTION OF TO			
T	20"	11.**	2500L85			
L	50.	11"	1200 L95.			

FIGURE 3 POLE TOP PINS WITH I INCH DIAMETER LEAD THREADS

Page 6 of 6 TS 102

Bolt dimensions with applicable tolerances shall conform to the requirements of ANSI C135.1-1979, [1] and bolt head shall conform to the requirements of ANSI B18.2.1-1981, [3]. Bolts with diameter 1/2 inch, 5/8 inch and 3/4 inch and 8 inches or longer, shall be fitted with a semi-cone point as stated and tabulated in ANSI C135.1-1979, [1].

Dimensions of compatible square suts before galvanizing shall be in accorda ANSI B18.2.2-1972, [4] and conform C135.1-1979, [1].

6. THREADS:

- The threaded portion of machine bolts shall be provided with machine rolled the and before galvanizing, must comply with class 2 of the ANSI standard for unith acrew threads, ANSI B1.1-1982, [5] and conform to ANSI C135.1-1979, (1).
- After galvanizing, the bolt thread shall permit compatible nuts to be run the entire length of the thread without the aid of tools.
- 3. Nuts shall be tapped in accordance with ANSI C135.1-1979, TAble 8, (1).

7. STRENGTH:

1. Tennile Strength

Machine boits with note installed shall meet the tensile strength requirements Table 10 of ANSI C135.1-1979, [1]. Above the specified ministram tensile machine bott shall fail only in the shauk or threaded section and not at the in head and shank. Threads shall not strip below the specified ministrum tensile

2. Bending Strength

A cold bend test shall be conducted in accordance with Section 6.2 of ANSI C135.1-1979, $\{1\}$.

8. INSPECTION:

The manufacturer shall perform the necessary tests to determine if the bolt complies will the requirements of this specification. Non-conforming machine bolts are unacceptable.



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the dimensional and performance requirements of steel machine bolts with square heads for use on Coop overhead distribution lines. Unless otherwise specified, each machine bolt shall be fitted with a compatible square nut.

2. GENERAL:

Machine bolts furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements stated in this standards. The text, figures and references to other standards supplement each other and shall be considered parts of this

Drop forged machine boils and compatible square nuts must be fabricated from steel that complies with the requirements of ANSI Standard C135.1-1979, [1].

4. FINISH:

The machine bolt and square nut described in this specification shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [2]. Each bolt shall bear a permanent symbol or identification mark of the manufacturer in a place and manner which will not adversely affect the integrity or utilization of the bolt. The bolt and nut shall have smooth surfaces free from blemishes and imperfections after galvanization.

5. DIMENSIONS:

NEA machine bolt dimensions listed in Table A and identified in Figure 1 are defined as

- L1 = Length from underside of head to last thread at end of boit on semi-come pointed boits and at boit on other boits.
 L2 \approx Length from top thread to last thread at end of boit.
 D = Diameter of shank.

TECHNICAL SPECIFICATION 103							
SUBJECT:	ORIGINAL	JUNE, 1993					
MACHINE BOLTS	Rev. No						
		PAGE t OF 6					

9. PACKAGING:

NEA machine bolts shall be securely packaged for shipping. Package quantitie in Table A. Each package shall be clearly marked with the manufacturer's name

10.OTHER STANDARDS:

The dimensional and performance requirements of machine bolts, based on a internationally recognized standards are acceptable only if the requirements standards are equivalent to or exceed the requirements quoted in this docume

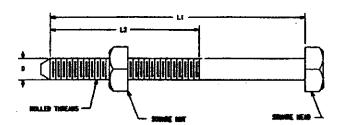
11.BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ANSI C135.1-1979: American National Standard for GAlvanized Steel Bolts and Nuts for Overhead Line Construction.
- ANSI/ASTM A153-82: Standard Specification for Zinc Coating on Iron and Steel Hardware. [2]
- ANSI B18.2.2-1981: Square and Hex Bolts and Screws Including a Square Head Bolts, Hex Cap Screws, and Lag Screws. [3]
- ANS) B18,2,2-1972 : Square and Hex Nuts.
- ANSI B1.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form) (5)
- ស្រ NEA Tech, Standard 186: Standard for Course Screw Threads.
- NEA Tech. Standard 113: Standard for Square Steel Nuts.

				TABLE A				
In Inch Units								
Code No.	ם	Li	12	Ultimate Tensile Strength in Pounds	Number of Threads Per Inch	Quantity per Package		
0638 04 06	1/2	6	3	7,900	13	200		
0638 04 10	1/2	10	4	7,800	13	100		
0638 04 12	1/2	12	6	7,800	13	100		
0638 05 05	5/8	5	3	12,400	11	100		
0638 05 08	5/8	8	4	12,400	11	100		
0638 05 09	5/8	9	4	12,400	11	100		
0638 05 10	5/8	10	4	12,400	11	50		
0638 05 12	5/8	12	6	12,400	11	50		
0638 05 14	5/8	14	6	12,400	1t	50		
0638 05 16	5/8	16	6	12,400	11	50		
0638 05 18	5/8	18	6	12,400	11	50		
0638 05 20	5/8	20	6	12,400	LI	50		

Tolerances Before Galvanization						
Dimension Symbol	Diameter Nominal	Diameter Maximum	Diameter Minimum			
D	1/2 - 0.500	0.515	0.482			
D	5/8 - 0.625	0.642	0.605			
D	3/4 - 0.750	0.768	0.729			

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S A CONCEPTION, DAVIDOR. THE MANUFACTURES IS DESPRINGIBLE FOR THE PREPARATION OF IS AND A DESIAN WRICH WRETS THE NUMBERSONN., STRENGTH, AND ORDER PROPROMINE TRIBETS OF THES STANDARD.

FIGURE 1 MACHINE BOLT AND SOLIARE NUT ASSEMBLY

Page 6 of 6 TS 103.

Dimension Symbol	Longth	Diameter	Tolerance Positive	Tolerance Negative
Ll	1-1/2	1/2	0.04	0.06
ĽI	1-1/2	5/8	0.06	9.06
LI	6 thru B	1/2	0.12	0.18
LI	6 thru 20	5/8	0.14	0.18
L1	8 thru 16	3/4	0.14	0.18
1.2	1 thru 1-1/2	1/2 thru 3/4	1/16	1/32
12	3 thuru 6	1/2 thru 3/4	1/8	1/16

Other dimension, tolerance and performance requirements and thread design requirements and thread design requirements and note are stated in ANSI Standards C135.1-1979, (1), B1.1-1982. (5), B18.2.1-1981, (3), B18.2.2-1972, (4) or current editions of these standards.

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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This standard establishes the dimensional and performance requirements of drop forged steel oval-eyed bolts used in the construction of Coop overhead rural distribution systems. Unless otherwise specified, a Coop oval-eye bolt shall have a semi-come point and shall be provided with a compatible square nut.

Oval-eye bolts furnished to NEA specifications shall conform in all respects to the specific dimensional and performance requirements stated in this standard. The text, figures and reference to other standards supplement each other and shall be considered part of this standard.

Oval-eye bolts and compatible square nuts shall be fabricated from material that complies with the requirements of ANSI C135.4-1979, [1].

4. FINISH:

Oval-eye bolt and square nut described in this standard shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [2].

Each oval-eye bolt shall bear a permanent symbol or identification mark of the manufacturer in a place and manner which will not adversely affect either integrity or utilization of the bolt. Oval-eye bolts and nuts shall have smooth surfaces, free from blemishes and imperfections. The eyes of the bolts shall be well shaped, with no irregularities, malformations or cracks and the inner surface shall be free from projections or other sharp edges.

DIMENSIONS:

Oval-eye bolt dimensions are shown in figure 1 and presented in Table A (Page 4) using symbols defined as follows:

TECHNICAL SPECIFICATION 104						
SUBJECT:	ORIGINAL JUNE, 1993					
OVAL-EYE BOLTS	Rev. No.					
<u> </u>	PAGE OF	4				

Ovel Rec Balls (Cont.)

- D = Diameter

 L1 = Length from below the eye to the last thread

 L2 = Thread length

 L3 = Length of eye

 W = Width of eye

Oval-eye bolt dimensions with applicable tolerances shall conform to requirements of ANSI C135.4-1979, [1].

The dimensions of the compatible auts before galvanizing shall be in ANSI B18.2.2-1972, [3] and conform with ANSI C135.1-1979, [4].

THREADS:

Rolled threads must be provided on the threaded portion of the oval-eye bolt. Before galvanizing, the threads must comply with class 2 of ANSI B1.1-1982, [5] and conform to ANSI C135.1-1979, [4].

After galvanizing, the threads shall permit compatible square nuts to be run the entire length of the thread without the aid of tools.

Square nuts shall be tapped in accordance with ANSI C135.1-1979, Table 8, [4].

STRENGTH:

- Oval-eye bolts with nuts installed shall meet the tensile strength requirements listed in Section 6 of ANSI C135.4-1979, [1]. Above the specified minimum tensile loads, the oval-eye bolt shall fail only in the shank or threaded section and not at the junction of head and shank. Threads shall not strip below the specified minimum tensile loads.
- cold bend test shall be conducted in accordance with Section 6.2 of ANSI A cold bend test si C135.4-1979, [1].

INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the oval-eye bolt complies with the requirements of this standard. Non-conforming oval-eye bolts are unacceptable. NEA reserves the right to witness factory inspection and

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Ovel-Eve Subs (Cont.)

NEA oval-eye bolts and compatible square auts shall be securely packaged for shipping. Each package shall contain fifth (50) sets and shall be clearly marked with the manufacturer's name and catalog number.

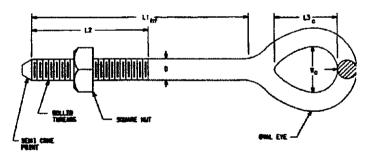
The dimensional and performance requirements of NEA oval-eye bolts, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivelent to or exceed the requirements quoted in this document and are identical in thread design.

11. BIBLIOGRAPHY OF REPERINCE STANDARDS:

- ANSI C135.4-1979: American National Standard for Galvanized Perrous Eye Bolts and Nats for Overland Line Construction.
- ANSI/ASTM A153-82: Standard Specification for Zinc Coating (Hot-Dip) on Iron or Seci Hurdware.
- [3] ANSI B18.2,2-1972 : Square and Hex Nuts.
- [4] ANSI C135.1-1979: American National Standard for Galvanized Steel Bolts and Nuts for Overhead Line Construction.
- ANSI B1.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form).
- NEA Standard 186: Standard for Coarse Screw Threads.

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Oval-Eve Boits (Cost.)



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FIGURE 1 OVAL EYE BOLT AND SQUARE NUT ASSEMBLY

TABLE A

						-			
V8+ 0.625			34	MEDIS NON	ULTIMATE	THEFANK			
K DIA.B LIANEZIN . D.G-12		CODE NO.	•	LI	L2	1		TENSILE STRENETH (LBS)	THREADS PÉI DICH
0.409	0636	15 08	3		4	2	1-14	12, 400	11
	0636	15 10	Š	10	4	1	1-16	12, 400	- 13
	0636	15 12	¥	12	6	2	1-1/4	12, 400	E\$
	0636	15 14	3	14		2	1-1/4	12,400	11
	0636	15 18	*	10	6	Z	1-14	12,400	=

OTHER DIMENSION, TOLERANCE AND PERSONNANCE REDUREMENTS AND THREAD DESIGN MEDIJIERNAMITS AND STATED IN AND STANDARDS CLYS. 1-1975. CLSS. 4-1979. Bit. 1-1972 ON DIMENSION FOR THE STANDARDS CLYS. 1-1975. CLASS. 4-1979.

0-U64" d-U6" g-3/8" k-i* b-U32" d-3/16" fb-U2" x-0* b-U16" f-U4" [-3/4"

Page 4 of 4 TS 104

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This standard establishes the dimensional and performance requirements of drop forged steel thimble-eye bolts used on overhead Coop electric rural distribution systems. Unless otherwise specified, a Coop thimble-eye bolt shall have a semi-cone point and be provided with a compatible square nat.

2. GENERAL:

Thimble-eye bolts described in this standard are called strand type eye bolt in ANSI C133.4-1979, (1). Thimble-eye bolts furnished to NEA specifications shall conform in all respects to the specific dimensional and performance requirements stated in this standard. The text, figures and references to other standards supplement each other and shall be considered part of this standard.

Thirable eye bolts and compatible square nuts shall be fabricated from material that complies with the requirements of ANSI C135.4-1979, [1].

The thimble-eye bolt and square nut described in this standard shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [2].

Each thimble-eye bolt shall bear a permanent symbol or identification mark of the manufactures in a place and manner which will not adversely affect either integrity or utilization of the bolt. Thimble-eye bolts shall have smooth surfaces, free from blemishes and imperfections. The eyes of the bolts shall be well shaped, with no irregularities, malfunctions or cracks and the inner surface shall be free from projections or other sharp edges.

5. DEMENSIONS:

The thimbie-eye bolt dimensions are shown in figure 1 and presented in Table A (Page 4) using information and symbols defined as follows:

TECHNICAL SPECIFICATION 105						
SUBJECT:	ORIGINAL	JUNE, 1993				
THIMBLE-EYE BOLTS	Rev. No.					
		PAGE 1 OF 4				

-Eve Balls (Cont.)

- L1 = Length from below eye to Last thread at end of bolt.

 1.2 = Length from top thread to Last thread at end of bolt.

 D = Diameter of sharik

D = Distinct of States

L3 = Length of eye.

R1 = Radius of lower portion of eye.

R2 = Radius of upper portion of eye.

The thimble-eye both dispositions with applicable tole requirements of ANEI C135.4-1979, [1]. rances shall conform to the

The dimensions of the compatible nats before galvanizing, shall be in accordance with ANSI B18.2.2-1972 [3] and conform with ANSI C135.1-1979, [4].

6. THREADS:

Rolled threads must be provided on the threaded portion of the thimble-eye boit. Before galvanizing, the threads must comply with class 2 of ANSI B1.1-1982, [5]. The thread shall conform to ANSI C135.1-1979, [4].

After galvarizing, the thread shall permit compatible square ness to be run the entire length of the thread without the sid of tools.

Square nuts shall be tapped in eccoulance with ANSI C135.1-1979, Table 8, [4].

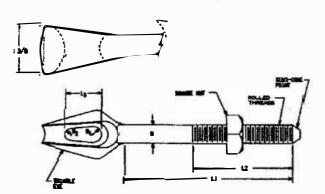
7. STRENGTH:

- Thimble-eye bolts with auts installed shall meet the tensile strength enquirement-listed in Section 6 of ANSI C136.4-1979, [1]. Above the specified minimum tensile loads, the thimble-eye bolt shall fail only in the shark or threaded section and not at the junction of head and shank. Threads shall not strip below the specified minimum tensile tends.
- old bend test shall be conducted in accordance with Section 6.2 of ANSI A cold bend test st C135.4-1979, [1].

8. INSPECTION:

The manufacturer shall perform the occusions inspection and tests to destruction if the thimble-eye bolt complies with the requirements of this standard. Non-conforming thimble-eye bolts are unacceptable. NEA reserves the right to witness factory inspection and tests and may request test reports.

Page 2 of 4 TS 105



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THIMBLE EYE BOLT AND SOUNDE MIT ASSEMBLY

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MAN . C. COS	0636 55 12	4	12				X	12, 486	1 11	STRANSI

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9. PACKAGING:

NEA thimble-eye bolts and compatible square nuts shall be securely packaged for shipping. Each puckage shall contain fifty (50) sets and shall be clearly marked with the manufacturer's easine and catalog number.

18. OTHER STANDARDS:

The dimensional and performance requirements of NEA thireble-eye holts, based on oth interestionally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document and are identical in thread design.

11. HIRLIDGRAPHY OF REFERENCE STANDARDS:

- ANSI C135.4-1979: American National Standard for Galvanized Perrous Eye Bolts and Nuts for Overhead Line Construction.
- ANSI/ASTM A153-82 Standard Specification for Zinc Custing (Hot-Din) on Iron 121
- [3] ANSI B18.2.2-1972: Square and Hex Nose.
- ANSI C135.1-1979: American National Standard for Galvanized Steel Bolts and Note for Overhead Line Construction. [4]
- [2] ANSI B1.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form)
- NEA Technical Standard 186: Standard for course scars three

Page 3 of 4 TS 105



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This standard establishes the dimensional and performance requirements of double-armin, bolts for use on overhead distribution systems. Unless otherwise specified, Coop double arming bolts shall be threaded over their entire length and each shall be provided with four (4) compatible square ents.

Double-arraing botts furnished to NEA specifications, shall conform in all respects to the specific dimensional and performance requirements stated in this standard. The text, figures and references to other standards supplement each other and shall be considered part of this standard.

3. MATERIAL:

Double-arring bolts and compatible square nuts must be fabricated from materials that comply with the requirements of ANSI Standard C135.1-1979, [1].

4. FINISH:

The double-arming bolts and square nuts described in this s galvanized in accordance with ANSIVASTM A153-80, [2].

Double-arming bolts shall have surfaces free from irregularities, blemishes, seams, laps or other imperfections that can affect serviceability.

5. DIMENSIONS:

Dimensional characteristics of NEA double-arming bolts are listed in Table 11 of ANSI Standard C135.1-1979 [1]. A typical NEA double-arming bolt is shown in Figure 1.

The dimensions of compatible nuts before galvanizing, shall be in accordance with ANSI B18.2.2-1972, [3] and shall conform with ANSI C135.1-1979, [1].

Double-arming bolts with diameters 5/8 inch or 3/4 inch and minimum length 8 inches

TECHNICAL SPECIFICATION 106						
SUMPRCT:	ORIGINAL	JUNE, 1993				
DOUBLE-ARMING BOLTS	Rev. No.	100				
		PACE 1 OF 4				

Double-Arming Bolts (Cont.)

shall be provided with semi-cone points at each end. Double-arming bolts used by NEA are listed in Table A (page 4).

6. THREADS:

The threads shall be machine rolled and before galvanizing must comply with Class 2 of the ANSI standard for unified screw threads, ANSI B1.1-1982, [4]. After galvanizing, the bolt thread shall permit compatible nuts to be run the entire bolt length without the aid of tools. The threads shall conform to the requirements of ANSI C135.1-1979, [1].

The nuts shall be tapped in accordance with ANSI C135.1-1979, Table 8, [1].

7. STRENGTH:

- Double-arming boits with nuts shall meet the tensile strength requirements listed in Table 10 of ANSI Standard C135.1-1979, [1]. Threads shall not strip below the minimum specified tensile loads.
- With all threads removed from the bolt, a cold bend test shall be performed in accordance with Section 6.2 of ANSI C135.1-1979, [1].

8. INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the double-arming complies with the requirements of the specification. Non-conforming double-arming bolts are unacceptable. NEA reserves the right to witness factory tests and to request test reports.

9. PACKAGING

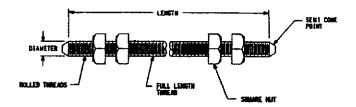
NEA double-arming bolts and compatible square nuts shall be securely peckaged for shipping. Each package shall contain twenty-five (25) sets and shall be clearly marked with the manufacturer's name and catalog number.

10. OTHER STANDARDS:

The dimensional and performance requirements of the double-arming bolt, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document and are identical in thread design.

Page 2 of 4 TS 106

Double-crucing Bolts (Cont.)



THIS IS A CONCEPTUM, MEMBER. THE MANUFACTURER IS RESPONSIBLE FOR THE PREPARATION OF CHARLES AND THESE RESIDEN WILCH WEETS THE BINERSSORM, STRENGTH, AND BINER PERFORMANCE REMAINMENERS OF THIS STANDARD.

FIGURE 1
DOUBLE-ARMING BOLT AND SQUARE NUTS

TARLE A

INDLE N								
	01MB#\$10M5 (ULTIMATE	THREE AGE					
NEA CODE NO	LEMSTH	BIAMETER	TENSILE STREMETH (LIES)	THE ADS PER MICH				
0633 05 16	16	\$	12, 400	- 11				
0633 05 18	11	*	12,409	- 11				
0633 05 20	26	*	12, 409	11				
0633 05 22	22	<u> </u>	12, 400	11				
0633 05 24	24	5/8	12,400	11				
0633 05 26	26	5/8	12,400	- 11				

OTHER DIMENSION, TOLERANCE AND PERFORMANCE RECURREMENTS AND THREAD DESIGN REQUIREMENTS ARE STATED IN ANSI STANDARDS C175, 1-1979, BI. I-1982 AND BIR. 2, 2-1972 OR CURRENT EDITION OF THESE STANDARDS Broking and British Cons.

11. BEBLIOGRAPHY OF REFERENCE STANDARD

- ANSI C135.1-1979: American National Standard for Galvanized Steel Bolts and Nuts for Overhead Line Construction.
- 2 ANSI/ASTM A153-80: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- 3. ANSI B18.2.2-1972: Square and Hex Nuts.
- 4. ANSIB1.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form).
- 5. NEA Technical Standard 186: Standard for Coarse Screw Threads.

Page 3 of 4 TS 106



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the dimensional and physical requirements of wedge-type strain relief clamps used to fasten the neutral conductor of service drops from the 240 volt distribution system.

2. GENERAL:

Wedge-type service clamps furnished to NEA specifications shall conform in all respects to the requirements of this document. The clamp shall provide a full gripping surface for the conductor.

3. MATERIAL:

Wedge-type strain relief clamps shall be fabricated from the following material:

NEA Code No.	Component	Material	Applicable Standard
1178 00 21	Wedge Outer sieeve	Stainless steel Aleminum	ASTM A705-80 B317-83
	Bail	Stainless steel	ASTM B498-74

4. FINISH

All surfaces of NEA wedge-type strain relief clamps shall be free from blemishes or irregularities. The clamp shall bear the manufacturer's identification mark or symbol and Catalog No. in a manner and location which shall not impair its function.

5. STRENGTH:

The wedge-type clamp shall have a minimum tensile strength of one thousand (1000) normals

TECHNICAL SPECIFICATION 107				
SUBJECT:	ORIGINAL	TUNE, 1993		
WEDGE-TYPE STRAIN RELIEF CLAMPS	Rev. No.			
	1	PAGE I OF 3		

Wedge-Type Strain Balinf Clamps (Cont.)

DIMENSIONS:

Dimensions of NEA wedge-type strain relief clamps are presented in Figure 1 of this

INSPECTION:

The manufacturer shall conduct inspection and test to verify that the NEA wedge-type strain relief clamps shall meet the dimensional and physical requirements of this standard. NEA reserves the right to witness factory inspection and tests and may request test

OTHER STANDARDS:

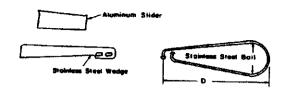
The performance and design requirements of NEA wedge-type strain relief clamps, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

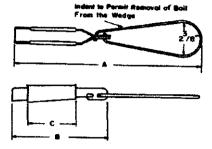
BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A564-81: Standard specification for hot-rolled and cold-finished age-hardening stainless and heat-rending steel bus, wire and shapes.
- ASTM A705-80: Standard specification for age-hardening and heat resistant steel forgings.
- ASTM B498-74 (1979): Standard specification for zinc-coated (galvanized) steel core wire for Aluminum Conductors, Steel Reinforced (ACSR).
- ASTM B317-83: Standard specification for aluminum-alloy extruded bar, rod, pipe, and structural shapes for electrical purposes (bus conductor).

Page 2 of 3 TS 107

Wedge-Type Strain Relief Clarges (Coat.)





MEA	RANGE (ANG)		0		BION (INCHES)	
WO.	MAX	MIN	A	0	C	BAIL	STREMETH (L8S)
1178 0021	# 6	# 3	12	•	3	6/2	1000
	Ь—		Ь	1			·

THIS IS A CONCEPTUAL DRAWING. THE MANUFACTURER IS RESPOSIBLE FOR THE PREPARATION OF DRAWINGS AND A DESIGN WHICH MEETS THE DIMENSIONAL, STRENGTH, AND OTHER PERFORMANCE REQUIREMENTS OF THIS STANDARD.

FIGURE I STRAIN RELIEF CLAMP, WEDGE TYPE STAINLESS STEEL BAIL

Page 3 of 3 TS 107

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCYOPE:

This standard establishes the dimensional and performance requirements of steel carriage bolts with square shoulders for use on Coop overhead distribution line structures. Unless otherwise specified, each carriage bolt shall be furnished with a compatible square nut.

Carriage bolts furnished to NEA specifications shall conform in all respects to the specific dimensional and performance requirements stated in this standard. The text, figures and references to other standards supplement each other and shall be considered part of this standard.

Drop forged carriage bolts and compatible aquare nuts must be fabricated from mazerials that comply with the requirements of ANSI Standards C135.1-1979, [1], ASTM A663-81, [2] and ASTM A675-82, [3].

FINISH:

The carriage bolts and square sut described in this standard shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [4].

Each carriage bolt head shall bear a permanent symbol or identification mark of the manufacturez in a place which will not adversely affect either its integrity or utilization. Carriage bolts shall have surfaces free from irregularities, blemishes, seams, laps or other imperfection that can affect serviceability.

DIMENSIONS:

Carriage bolt dimensions are shown in Fig. 1, using symbols, defined as follows:

- L1 = Length from underside of head to the end of the bolt L2 = Length from top thread to last thread at the end of the bolt

TECHNICAL SPECIFICATION 108			
SUBJECT:	ORIGINAL	JUNE, 1993	
CARRIAGE BOLTS	Rev. No		
		PAGE 1 OF 4	

D = Diameter of shank

Bolt dimensions with applicable tolerances shall conform to the requirements of ANSI C135.1-1979, [1] and carriage bolt heads shall conform to the requirements of ANSI

Dimensions of compatible nuts before galvanizing, shall be in accordance with ANSI B18.2.2-1972, [6] and conform to ANSI C135.1-1979, [1].

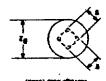
THREADS

- The threaded portion of carriage bolts shall be provided with machine rolled threads and before galvanizing, must comply with Class 2 of the ANSI standard for unified screw threads, ANSI Bl.1-1982, [7] and conform to ANSI
- After galvanizing, the bolt thread shall permit compatible nuts to be run the entire length of the thread without the aid of tools.
- Nots shall be tapped in accordance with ANSI C135.1-1979, Table 8, [1]

- Carriage bolt with auts installed shall meet the minimum tensile strength requirements listed in Table 10 of ANSI C135.1-1979, [1] and stated in Figure 1 of this standard. Above of the specified minimum tensile loads, the carriage bolt shall fail only in the shank or threaded section and not at the junction of head and shank. Threads shall not strip below the specified minimum tensile loads.
- A cold bend test shall be conducted in accordance with Section 6.7 of ANSI C135.1-1979, [1].

INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the bolt complies with the requirements of this standard. Non-conforming bolts are unacceptable. NEA reserves the right to witness factory inspection and tests to request test reports.



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MAN GELAND III &

Page 4 of 4

CYRRIP YEE BOLT AND SOUME HELL ASSEMBLY

FEB Publication 116-1988 [7].

The threaded portions of single and double uper boits shall before galvanizing, comply with clees 2 of the AMSI G135.1-1979, [S], and shall conform to AMSI G135.1-1979, [S].

Nutz shall be supped in accordance with ANSI C135.1-1979, Table 8 [5].

Lockaut thread shall conform to the requirements of NEA specification No. 116.

SIMMCLH:

Based on a minimum of any 6 consecutive ical samples the upset spool bolt shall develop an average strength of 2000 pounds for single upset type and 900 pounds for the double described herein and in Section 7 of ANSI C135.31-1980 [1].

Individually a single upoet spool bolt shall develop a minimum of 1900 pounds and a double upoet spool bolt shall develop a minimum of 800 pounds without deflecting more than 10 degrees when treated by procedures described herein in section 7 of ANSI CR3.31-1980 [1] and demonstrated in Figure 2 of this document.

Single and double upost spool bolts described herein with nuts isstalled shall meet the minimum tensile load or 12,400 pounds. Above the specified minimum tensile load or 12,400 pounds. Above the specified minimum tensile of the upoet and shall fail only in the theat's titreaded sections and not at the junction of the upoet and shalls. Threads shall not strip below the specified minimum sensile of the upoet and shalls.

NOUNCEMENT

multiciturer shall perform the deflection test to determine if the bolts meet the news of this document. Non-conforming bolts are unacceptable. MEA reserves it to wirness factory test and may request test reports.

PACKAGING:

(Cont.)

PACKAGING: 6

NEA carriage bolts and companible square may also be accurely packaged for analyse. Each packaged with the manufacturer's name and catalog number.

OTHER STANDARDS: 10.

The dimensional and performance requirements of NEA carriage boils, based on a internationally recognized standards are acceptable only if the requirements of suc standards are equivement in our exceed the requirements quoted in thread design, are identical in thread design. Name of such

BIBTIOCHYLLA OF REFERENCE STANDARDS:

- and Nuts for Overhead Line Construction ANSI C135.1-1979: American National Standard for Galvanized Steel Boits -1
- ASTM A663-82: Standard Specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties.
- ASTM A675-82: Standard Specification for Steel Bars, Carbon, Hot Wrost Special Quality, Mechanical Properties. Έ
- AMSI/ASTM AL53-82: Standard Specification for Zinc Coating (Hot Dip) on
- THUR SUD 2000 HERIDASIC
- AMSI B18.5-1978; Round Head Boils. ٦.
- ANSI BIS.2.2-1972: Square and Hex Nuts.
- ANSI BL. 1-1982: Unified Inch Screw Threads (UN and UNR Thread Form).
- NEA Technical Standard 186; Standard for Coarse Screw Threads.

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KEPUBLIC OF THE PHILIPPINES

National Electrification Administration (NEA)



This specification establishes the dimensional and performance requirements of single and doubte upper apost insulatur bolts for use on overlaced distribution lines. Unless otherwise stated, upper bolts for use the insulation of the comparible enters out the comparible enters out in one touch executes of the enters of the

CENERAL.

SCOME:

Upper bolts furnished to NEA specifications shall conform in all respects to the discussions and performance requirements stated in this standard. The text, drawings and references to other standards supplement each other and shall be considered part of this standard.

MATERIAL

(2) 'LL61-16H4 VWBN NEA drop forged upset holt assemblies shall be labricated from materials that comply in the requirements of Section 3 of ANSI Standard C135.31-1980, [1], or NEAS PULLI-1977 (2)

:HSINLI

A WEA upset boit and its accessories shall each be lost-tip galvanised in accordance with MEA Upset boit and its accessories shall be a fact and bear a permanent symbol or identification mark of the manufacturer in a place and manner which will not adversely affect its integrity or utilization. WEA upset boits shall have smooth surfaces, free from blemishes and imperfections.

DINIENZIONZ: .č

MEA upset bolt dimensions with applicable obstances shall meet the requirements of ANSI C135.31-1980 (1) and are shown in Figure 1 and Table A of this document. The specified bolt length shall not include the semi-cone points.

PAGE 1 OF	1	
	Sev. No.	SENGER AND DOUBLE UPSET BOLT
100E; 1993	ORIGINAL	SUBJECT
	FICATION 109	LECHNICYT 25ECII

Single and D white Uppet Bolt (Cont.)

NEA single and double upset bolts and accessories shall be securely packaged for shipping. Each package shall contain fifty (50) sets and shall be clearly marked with the manufacturer's name and catalog number.

10.OTHER STANDARDS:

The dimensional and performance requirements of NEA upset bolts, based on other internationally recognized standards are acceptable only if the requirements of such standard are equivalent to or exceed the requirements quoted in this document and are identical in thread design.

11.BIBLIOGRAPHY OF REFERENCE STANDARDS:

- [1] ANSI C135.31-1980: American National Standard for Galvanized Ferrous Single and Double Upset Spool Insulator Bolts for Overhead Line Construction.
- NEMA PH31-1977: NEMA Standard for Galvanized Ferrous Single and Double (2) Upset Spool Insulator Bolts.
- ANSI/ASTM A153-82:
- [4] ANSI B18.2.2-1972: Square and Hex Nuts.
- [5] ANSI C135.1-1979; American National Standard for Steel Boltz and Nuts for Overhead Line Construction.
- NEMA Pub. No. PH10-1977: NEMA Standards for Galvanized Perrous
- [7] NEA specification 116: NEA spec, for Square Locknuts.
- ANSI B1.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form)
- NEA specification 186: Spec. for Coarse Screw Threads.

Page 3 of 6 TS 109

Single and Double Uppet Bult (Coal.)

			TABLE A		
		NEA Upset	Spool Insulator	Bolt Data	
NEA Code No.	Length (Inches)	Туре	Number of Threads Per Inch	Length of Threads (Inches)	Minimum Tensile Strength (Pounds)
0639 05 09	9	Single	11	4	12400
0639 05 10	10	Single	11.	4	12400
0639 05 12	12	Single	11	6	12400
0639 05 14	14	Single	11	6	12400
0635 05 10	10	Double	11	4	12400
0635 05 12	12	Double	11	6	12400
0635 05 14	14	Double	11	6	12400

er of shank before galv. NOM.5/8=0.625, Max. 0.642, Min 0.605.

Other dimension, tolerance and performance requirements and thread design requirements are stated in ANSI Standard C135.31-1980, B1.1-1982, B18.2.2-1972, C135.1-1979 and NEMA PH 31-1977 or current edition of these standards.

Page 4 of 6 TS 109

Single and Double Upnet Bolt (Cout.)

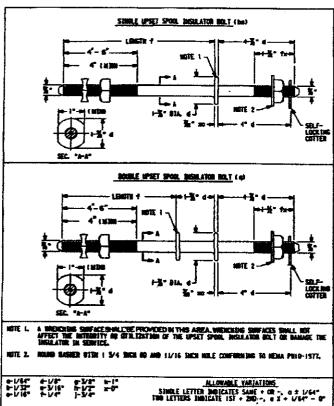
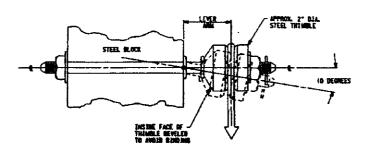


FIGURE 1 SINGLE AND DOUBLE UPSET SPOOL INSULATOR BOLT ASSEMBLIES TS 109

ed Double Unset Bolt (Cont.)



TYPE OF INSULATOR BOLT	LEVER ARM	MINL LOAD AT TEN DEGREES DEFLECTION
SINGLE UPSET BOLT	1-%*	.2#j 0001
DOUBLE UPSET BOLT	3"	800 LIES

FIGURE 2 TEST PROCEDURE FOR UPSET BOLTS



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCYOPE:

This specification establishes the dimensional and performance requirements of twist drive lag screws for use in Coop overhead distribution line construction. These lag screws shall have square heads.

2. GENERAL:

Lag screws furnished to NEA specifications shall conform in all responses to the dimensional and performance requirements stated in this standard. The text, figures and other standards references supplement each other and shall be considered as parts of this standard.

3. MATERIAL:

Drop forged lag acrews shall be fabricated from material that conforms to ASTM A663-82, [1] or ASTM A675-82, [2] with a grade and quality which shall meet the strength and performance requirements of this standard and is compatible with the heading process used in fabrication.

4. FINISH:

NEA lag screws shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [3]. Each lag screw shall bear a permanent symbol or identification mark of the manufacturer in a place and manner which will not adversely affect the integrity or utilization of the lag screw. A lag screw shall have smooth surfaces free from blemishe

5. DIMENSIONS:

- Lag screw heads shall conform to the requirements of ANSI B18.2.1-1981, [4] and NEMA Pub. No. PH 3-1977, [5].
- 2. Lag screw dimensions and tolerances are shown in Pigure 1 of this document.

TECHNICAL SPECIFICATION 110				
SUBJECT:		ORIGINAL	JUNE_1993	
LAG SCR	EWS	Rev. No	,	
!		L	PAGE 1 OF 4	

11. BIRLIOGRAPHY OF REFERENCE STANDARD:

- 1. ASTM A663-82: Standard Specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties.
- ASTM A675-82: Standard Specification for Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties.
- ANSI/ASTM A153-82: Standard Specification for Zinc Coating (Hot-Dip) on Iron or Steel Hardware.
- 4. ANSI B18.2.1-1981: Square and Hex Bolts and Screws.
- 5. NEMA Pub. No. Ph 3-1977: Standards for Galvanized Ferrous Lag Screws

Los Screen (Cont.)

6. THREADS:

The threaded portion of NEA lag acrews shall be provided with a minimum of six (6) up to a maximum of seven (7) machine rolled or cut threads per inch.

7. STRENGTH:

Lag screw heads shall be capable of sustaining the following minimum tensile forces.

Nominal Diameter of Screw (Inches)	Minimum Strength (Pounds)
	
1/2	6 500

Lag screws shall be capable of being bent at room temperature at any point, through an angle of 45 degrees, about a diameter equal to its diameter with developing cracks on the outside of the bent portion.

8. INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the lag screw complies with the requirements of this standard. Nonconforming lag screws are unacceptable. NEA reserves the right to witness factory inspection and tests and may

NEA lag screws shall be securely packaged for shipment. Each package shall contain two hundred and fifty (250) pieces and shall be clearly marked with the manufacturer's name and catalog number.

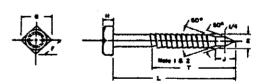
10. OTHER STANDARDS:

The dimensional and performance requirements of lag screws, based on other internationally recognized standards are acceptable only if the requirements of a standards are equivalent to or exceed the requirements quoted in this document. nents of such

Page 2 of 4 TS 110

Lag Serous (Cont.)

FETER DRIVE LAG SCREW WITH PILOT DRIVE POINT



LAB SCREW DIMENSIONS

REF.	DESCRIPTION	DIMED INCH (
E	DIAMETER	1 84	(I2.T)
F	WIDTH ACROSS PLAT	3/4	(9)
•	WIOTH ACROSS POINTS	ŀ	(25)
н	HEIGHT OF HEAD	21/54	(8.3)
J	PILOT DRIVE POINT LENGTH	NS	(12.7)
L	MINIMUM LAG LENGTH	4	(101)
т	MINIMUM THREAD LENGTH	2 ½	(63.5)

FIGURE :

- 1. Bis or seven threads per lach, 1/16" deep.
- 2. A plight toper is permitted in three



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the dimensional and performance requirements of steel crossarm braces to support Coop overhead electric distribution lines.

2. GENERAL:

Steel crossarm braces furnished to NEA specifications shall conform in all respects to the specific dimensional and performance requirements stated in this standard. The text, figures and references to other standards supplement each other and shall be considered parts of this standard.

3. MATERIAL:

The crossum braces shall be fabricated from structural quality hot-rolled steel which conforms to ASTM A570-79, [1] and NEMA Pub. No. PH6-1970 [2].

4. FINISH-

The crossarm braces shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [3]. Each brace shall bear a permanent symbol or identification mark of the manufacturer in a place and manner which will not adversely affect the integrity or utilization of the brace. The finish shall be smooth, free from blemishes and other imperfections which are inconsistent with commercial practice.

5. DIMENSIONS:

Figures 1, 2, 3 and 4 depict the flat brace, double-span brace, side arm brace and vertical sidearm brace respectively. Indicated dimensions are defined as follows:

a. Figure 1 - Flat Brace:

All dimensions are depicted on drawing.

b. Figure 2 - Double-Span Crossarm Brace:

TECHNICAL SPECIFICATION 111				
SUBJECT:		ORIGINAL	JUNE, 1993	
l	STEEL CROSSARM BRACES	Rev. No.		
			PAGE 1 OF 7	

rnt Breces (Cont.)

NEA steel crossarm braces shall be securely packaged for shipment. The number of items in a package shall be:

Quantity Per Package (bdl)
20
5
10
10

Each package shall be clearly marked with the manufacturers name and catalog number.

9. OTHER STANDARDS:

The dimensional and performance requirements of NEA steel crossarm braces, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

10. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A570-79: Standard Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality.
- 2. NEMA Pub. No. PH6-1970; EEI-NEMA Standards for Metal Crossarius Braces.
- 3. ANSI/ASTM A153-82: Standard Specifications for Zinc Coating (Hot Dip) on Iron

rm Reseas (Cont.)

I.1 = Overall span of brace

1.2 = Separation of crossarm mounting holes from center of pole

II = Drop of brace

DI = Diameter of pole mounting hole 02

DIameter of crossarm mounting holes

T = Thickness of angle steel

Height of cross section
 W2 = Width of cross section
 Length of horizontal portions of brace
 Separation of mounting holes from flange

c. Figure 3 - Side-Arm Brace

1.1 = 1.0 Length of brace 1.2 = 0 Distance from crosssorm mounting hole to upper end of riveted step

d. Figure 4 - Vertical Side Arm Brace Dimensions Depicted on Drawing

The braces shall conform to the dimension and tolerance requirements of Figure 1, 2, 3 and 4 NEMA PH6-1970, [2] or current edition thereof.

6. STRENGTH:

Flat braces shall have a minimum tensile strength of 7,000 pounds at the bolt holes. They shall be capable of being bent 10 degrees at bolt holes and 140 degrees at any point between holes without cracking of the base metal on the outside of the bent portion. A 9/16' diameter mandrel shall be used for bending. The brace shall be clamped so that radius of bend will be the same as the mandrel.

The steps on side arm braces shall be capable of supporting 250 pounds without buckling. There should be no permanent deformation after the 250 pound load is removed.

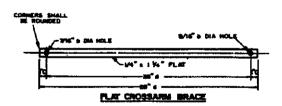
7. INSPECTION:

The manufacturer shall conduct factory tests to verify that the crossarm braces comply with the requirements of this standard. Non-conforming braces are unacceptable. NEA reserves the right to witness factory tests and to request test reports.

8. PACKAGING:

Page 2 of 7

ni Cromerus Braces (Cont.)

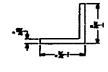


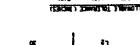
ALLOWABLE VARIATIONS
SHOLE LETTER HORCATES BAME + OR -,s = ± 1/64"
TWO LETTERS SHOREME, FRET + \$50000-, as = + 1/64"-0"

THIS IS A CONCEPTUAL DRAWING. THE IMMUNICITIES IS RESPONDED FOR THE PREPARATION OF DRAWING AND DESIGN WHICH MICETS THE SIMPLECOME, STREETH, AND OTHER PERFORMANCE REQUIREMENTS OF THIS STREETH.

FIGURE I MEA STEEL FLAT BRACE

(TER) - # # . %-





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Dimensions of weaters specified by NEA shall conform to NEMA Pub. No. PHIO-1977, Typical weaters used by NEA are shown in Figure 1 with dimensions before galvanizing defined as follows:

3. Ductile type washers shall be made from a grade specified in ASTM A536-80, [6]. 2. Malteable type washers shall be made from malleable iron specified in ASTM A197-79, [5].

Hot or oold rolled steel produced in accordance with citier ASTM ASG9-72 (R-1979), [1], ASTM ASS7-81, [3], or ASTM ASS7-81, [6].

Wathers furnished to MEA specifications shall conform in all respects to the specific dimensional and material requirements stated in this standard. The text, figures and estimates to other standards supplement each other and shall be considered as parts of

This specification covers the dimensional and material requirements of galvanized ferrous weathers used with other hardware on Coop overhead electric distribution lines.

National Electrification Administration (NEA) **SEPURIC OF THE PHILIPPINES**

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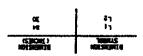
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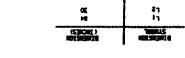
A = Diameter of central hole B = Outside diameter of wash<math>T = Thickness of washer

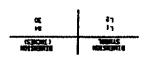
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3. MATERIAL:







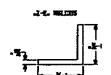


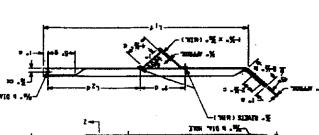


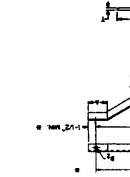


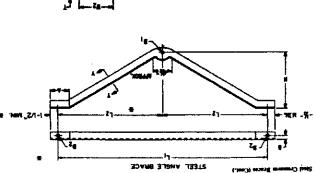












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0122 35 20

BRACE, SIDEARM, STEEL, 60 IN (1.27m)

NEA STEEL MIGLE BRACE

FIGURE 2

NEV CODE NO

131 ST 131 ST

FIGURE 4

VERTICAL SIDEARM BRACE

Forcess Washers (Cost.)

- 2. Flat square ferrous washer:
 - A = Diameter of central hole
 B = Length of side
 T = Thickness of washer

3. Curved square ferrous washer:

- A = Diameter of central hole
 B = Length = 1 B = Length of side
 T = Thickness of washer
 R = Radius of curvature

- NEA washers shall be defined by the above dimensions and the bolt size.

5. FINESH:

Washers shall be hot-dip galvanized after fabrication in accordance with ANSI/ASTM A153-82, [8]. All surfaces and edges shall be smooth and free from blemishes and irregularities not consistent with good commercial practice.

6. INSPECTION:

The manufacturer shall determine if the washers comply with the material and distensional requirements of this standard. Non-conforming washers are mancoptable.

7 PACKAGING

NBA ferrous washers shall be securely packaged for shipment. The contents of each package shall be as follows:

Code No.	Quantity
7103 59 31	250
7102 04 51	250
7102 28 51	50
7102 35 81	50
7101 30 71	250
7107 17 41	100

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Each package shall be clearly marked with the manufacturer's name and catalog number.

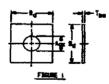
8. OTHER STANDARDS:

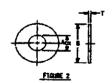
The dimensional and performance requirements of ferrous washers, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

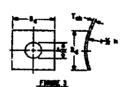
9. BIBLIOGRAPHY OF REFERENCE STANDARDS:

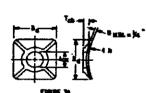
- ASTM A569-72 (R-1979): Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality.
- ASTM AS70-79: Standard Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality.
- ASTM A575-81: Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grade.
- ASTM A635-81: Standard Specification for Hot-Rolled Carbon Sizel Sheet and Strip, Commercial Quality, Heavy Thickness Coils (Formerly Plate).
- 5. ASTM A197-79: Standard Specification for Cupola Maileable Iron.
- 6. ASTM A536-80: Standard Specification for Ductile Iron Castings.
- 7. NEMA Pub. No. PH10-1977: NEMA Standards for Galvanized Ferrous Washers.
- ANSI/ASTM A153-82: Standard Specification for Zinc Coating (Hot-Dip) on Iron or Steel Hardware.

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MEA COOE NO.	PML MO.	TYPE	WOLT SIZE	^	B	Ť
7103,59 21	2	ROUND	1/2	9/ ₁₆ ex	1³/ ₀ ⊯	12 pa
7102 04 \$1	1	BOUARE (PLAT)	5/.	11/ _{16 GA}	21/4 d	*/10
7102 28 81	1	SQUARE (PLAT)	3/4	13/ ₁₆ ex	4 4	3/16
7102 35 61	1	SQUARE (RAT)	3/4	13/ ₁₆ ex	4 a	1/2
7101 30 71	3	SOLIARE (CURVED)	7/.	16/ _{16 ex}	4 e	1/4
7107 17 41	3	SQUARE (CURVED)	5/-	11/10 01	3 4	1/4

e-1/64" b-1/32" c-1/16"

o-3/8° h-1/2°

ALLOWARE YAMATIONS
SINGLE LETTER INDICATES SAME + OR -, a ± 1/84"
TWO LETTERS INDICATE IST + 2ND -, a X = 1/84" - 0"

FIGURE I NEA FERROUS WASHERS

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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the dimensional and performance requirements of galvanized square steel nuts for use on Coop overhead distribution lines.

2. GENERAL:

Square galvanized steel nuts shall conform in all respects to the dimensional and performance requirements stated in this document. The text, figures and references to other standards supplement each other and shall be considered parts of this document.

3. MATERIAL:

Nuts shall be made from hot-rolled steel which has been produced by the open hearth, basic-oxygen or electric furnace process in accordance with the requirements of ANSI Standard C135.1-1979 [1].

The nut described in this standard shall be hot-dip galvanized in accordance with ANSI/ASTM A153-73 [2]. Each nut shall bear a permanent symbol or identification mark of the manufacturer in a place and manner which will not adversely affect the integrity or utilization of the nut. The nut shall have smooth surfaces free from blemishes and imperfections after galvanization.

5. DIMENSIONS:

NEA galvanized square nut dimensions shall conform to Table A and B of this document and as illestrated in ANSI Standard C135.1-1979 [1] and ASME/ANSI B18.2.2-1978 [3].

6. THREADS:

The internally threaded parts shall be tapped in accordance with ANSI C135.1-1979, Table 8 [1].

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NUTS SQUARE STEEL	Rev. No.					
PAGE 1 OF 4						

Threads shall be Unified Standard, Class 2B, of the series specified in the notes on respective dimensional tables in accordance with Unified Inch Screw Threads (UN and UNR Thread form), ANSI Bi.1-1982 [4].

Threads of the nut shall not strip below the specified minimum tensile strength of the bolts on which the nuts are to be threaded as listed in Table 10 of ANSI C135.1-1979 [1].

8. INSPECTION:

The manufacturer shall perform the necessary tests to determine if the galvanized steel nut complies with the requirements of this document. Non-conforming steel nuts are unacceptable.

9. PACKAGING:

Galvanized steel nuts shall be securely packaged for shipping. Each package shall contain twenty-five hundred (2500) nuts and be clearly marked with the manufacturer's name and Catalog No.

10. OTHER STANDARDS:

The dimensional and performance requirements of galvanized steel nuts, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document and are identical in thread design.

11. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. ANSI C135.1-1979: American National Standard for galvanized steel bolts and nuts
- ASME/ANSI A153-82: American National Standard specifications for zinc coating (hot-dip) on iron and steel hardware.
- 3. ANSI B18.2.2-1987: Square and Hex nuts
- 4. ANSI B1.1-1982: Unified inch screw threads (UN and UNR thread form).

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ts, Square Shell (Cont.)

Table A											
Dimensions of Square Nuts in Inches *											
Nominal Bolt	Corners			With Across Flats		fife Across Flats Across				Thickness Of Nuts	•
Size	Banic	Miximum	Minimum	Maximum	Minimum	Bestic	Maximum	Minimum			
3/8	5/8	.625	0.606	0.551	0.832	21/64	0.246	0.310			
1/2	13/16	.812	0.788	1.149	1.082	7/16	0.458	0.418			
5/8	1	1.00	0.969	1.414	1.330	35/64	0.569	0.525			
3/4	1-1/8	1.125	1.088	1.591	1.494	21/32	0.600	0.632			

Table B								
Dimensions for Nuts and Tapered Parts in Inches								
Nominal	Internal Threads							
Bolt Size	Per Inch	Pitch Diameter		Minor Diameter		Major Diameter Minimum	Nominal Tap Size OD	
3/8	16	0.350	0.356	0.323	0.377	0.039	0.390-16	
1/2	13	0.470	0.476	0.437	0.454	0.520	0.520-13	
5/8	11	0.587	0.594	0.548	0.567	0.646	0.646-11	
3/4	10	0.706	0.714	0.663	0.684	0.771	0.771-10	

NOTE:

- The maximum width across flats applies at all points. No transverse section through the nuts between 25% and 75% of the nut thickness as measured from the bearing face shall be less than the minimum width across flats. The tops of the nuts shall be flat and chamfered or washer crowned. The diameter of the chamfer circle shall be equal to the maximum across flats within a tolorance [1]
- [2]
- of -15%. The bearing surface shall be at right angles to the axis of the threaded hole within a tolerance of three (3) degrees for size one (1) inch nuts or smaller and two (2) degrees for nuts larger than one (1) inch.

 The axis of the tapped hole shall be concentric with the axis of the nut body within a tolerance qual to 5% (10% FIR) of the maximum width across flats. Threads shall be unified coarse thread series (UNC Series) class 28. [3]

- ANSI B18.2.1-1961: Square and hex bolts and screws including square head bolts, hex cap acrows, and lag acrows.
- 6. NEA Specification 186: Specification for coarse screw threads.
- 7. NEA Specification 103: Specification for machine bolts.

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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This standard establishes the dimensional and performance requirements of wooden crossarm braces which shall support Coop overhead electric distribution lines.

GENERAL:

Wooden crossarm furnished to NEA specifications shall conform in all respects to the specific requirements stated in this standard. The text, tables, figures and references to other standards supplement each other and shall be considered parts of this standard.

All crossarm braces shall be warranted to conform with this standard. In any crossarm brace is to be defective or non-conforming with this standard in any detail except for the preservative retention within one year from the date of shipment from the supplier's (manufacturer's) plant, it shall be replaced as promptly as possible by the supplier. If replacement is not practical, the cost in U.S. dollars of such braces at the port of entry in Bangladesh shall be recoverable for crossarm braces as specified in Section 4. MATERIAL, is the minimum allowable at the time of shipment. A reduction in preservative retention of not more than ten percent will be acceptable within thirty days from the date of delivery at the port of entry in the Philippines.

MATERIAL:

NEA crossarm braces shall be made of preservative treated wood having adequate strength, e.g., gar jun (Dipterocarpus spp.), to pass tests specified in Section 7. Treatment shall be carried out with any of these preservatives; Acid Copper Chromate (ACC), Ammoniacal Copper Borate (ACB), or Chromated Copper Arsenate(CCA), And Chromated Copper Borate (CCB), or Boron Zinc Chromate (CB2C) also may be used for treatment with the prior permission of the

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		PAGE 1 OF 9			

Weoden Cressarts Braces (Cent.)

purchaser. Only pressure treatment processes shall be used to treat the material. Penetration shall be complete, as possible and a minimum of .2 inches from the surface of any face. Reteation shall be .4 pounds per cubic foot for CCA, ACA, ACB, ACC and .5 for CCB and CBZC. Copper shall be calculated as CuO, Chromium as CrO₃, Arsenic As₂O₃ and Zinc as ZarO and borron as B₂O₃. 0.0 to 0.25 inches shall be easy zone.

Retestion of preservative is crossarms braces shall be determined in accordance with recognized standard test methods listed in AWPA standards as follows:

Preservative		Method	AWPA Standard
ACC, ACA, ACB, CCA, CCB, and CBZC	1)	Wet Ash Analysis for Oxides	A7-75 A2-85 Sections 2, 3, 5, 8 and 12.
	2)	Х-тау	A9-86
	3)	Atomic Absorption	A11-83

Braces shall be square sawn and be of smooth surface and free of knot, split, warp and crook, decay and insert infestation and there shall be no loose fibers or splinters. Moisture content shall not exceed 19 percent.

Ead fittings shall be fabricated from structural quality hot-rolled carbon steel which conforms to ASTM A570-79, [1].

Braces normally are procured in matched pairs (right and left) because of the asymmetry of the fitting of the pole mounting end. In figure 2 and 3, pole mounting and fittings of reversible braces are shown. These fittings eliminate the requirement for identification or right-hand and left-hand braces.

Static-proof accessories shall conform to the following standards:

<u>Item</u>	Applicable
Steel Bolts	ANSI C135.1-1979 [2]
Steel Nuts	ANSI B18.2.2-1972 [3]
Steel Washers	NEMA PH10-1977 [4]
Strei Lockwashers	ANSI B18.21.1-1983 [7]

Page 2 of 9 TS 115

Wooden Cramerus Braces (Cont.)

8. INSPECTION:

The manufacturer shall conduct tests to verify that crossarm braces comply with the requirements of the standard. Non-conforming braces are not acceptable. NEA reserves the right to witness factory test and shall request test reports.

The detailed requirements cited in this specification to for all material shipped to NEA. NEA shall have the prerogative to inspect material at destination. All provisions of this specification shall apply to material inspected at destination except preservative retention cited in section 3 WARRANTY and storage and handling damage which has occurred after loading the crossarm braces at the port of exportation.

9. PACKAGING:

NEA wooden crossarm braces shall be securely packaged for shipping. The contents of each package shall be as follows:

CODE No.	Quantity per Package
?	Ten (10) Pain
?	Two (2) Pairs
?	Two (2) Pairs

Each package shall be clearly marked with the manufacturer's name and catalog

10. OTHER STANDARDS:

The dimensional and performance requirements of wooden crosserm braces, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

11. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A570-79: Standard Specification for Hot Rolled Carbon Steel Sheet And Strip, Structural Quality.
- [2] ANSI C135.1-1979: American National Standard for Galvanized

Weeden Crameron Braces (Cont.)

5. FINISH:

All steel end filtings and accessories shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [5]. The end fittings shall be smooth and free from blemithes and other imperfections not consistent with commercial practice. Wooden crossarm braces shall be free of rough or uneven surfaces and each edge shall be 1/8 inch eased to ensure safety in handling and installation. Each brace shall be branded with the manufacturer's symbol or identification mark, preservative type, supplier and year of treatment.

6. DIMENSIONS:

Preferred dimensions of NEA Wooden Crossarm braces with static proof end fittings for 36 inch and 60 inch crossarm spans are:

	D	imensions	£		
۵	Span (nches)		Min. Cross Section (Inches - W x H)	Max L	
	38	17-3/4	1-3/4 x 13-16	20-1/2	
	60	18	$1 \cdot 1/2 \times 2 \cdot 1/2$	30-1/4	
	60	30	1-1/2 x 2-1/2	38-1/4	

These dimensions are defined in Figures 1, 2 and 3.

7. STRENGTH:

Wooden crossarm braces shall be capable off sustaining the following minimum loads without fracture or bending. Testing may be carried out with the apparatus shown in Figure 4.

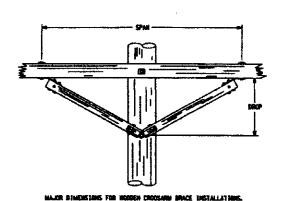
	Minimum Strength Criteria (lbs)						
Spac_	Standard	Compression	Tension				
38	900	1,850	2,200				
60	3,250	4,650	3,420				
60	3,250	4,650	3,420				

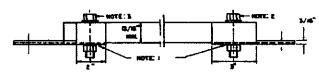
Page 3 of 9 TS 115

Wooden Crosserse Braces (Cost.)

Steel Bults and Nuts for Overhead Line Construction.

- [3] ANSI B18.2.2-1972: Square and Hex Nuts.
- [4] NEMA Pub. No. PH10-1977: NEMA Standards for Galvanized Ferrous Washers.
- ANSI/ASTM A153-82: Standard Specification for Zinc Coating (hot dip) on Iron and Steel Hardware.
- [6] AWPA-86: American Wood-Preserver's Association Standards.
- [7] ANSI B18.21.1-1983: American National Standard for Lock Washers.
- AWPA M2-63: Standard Instructions for the Inspection of Preservative Treatment of Wood.
- [9] AWPA A9-86: Standard Method for Analysis of Treased Wood and Treating Solutions by X-ray.
- [10] AWPA A7-75: Standard Wet Ashing Procedures for Preparing Wood for Chemical Analysis.
- [11] AWPA AZ-85:Standard Method for Analysis of Water-borne Preservatives and fire retardent formulations.
- [12] AWPA A11-83: Analysis of Treated Wood and Solutions by Atomic Absorption spectros-copy.
- [13] AWPA C1-82: "Standards for Preservative Treatment by Pressure Process - - All Timber Products.)
- [14] AWPA M2-83: "Standard Instructions for the Inspection of Preservative Treatment of Wood."





- 2-ALL BOLTS 2/8" DIA WITH HEX HEAD & MITS 3-ALL BOLTS ON WOOD BIDE TO HAVE RONGO W

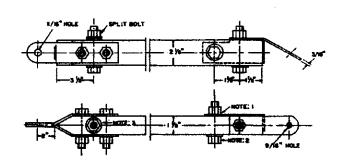
FIGURE 1 WOOD CROSSARM BRACE

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FIGURE 2 WOOD CROSSARM BRACE

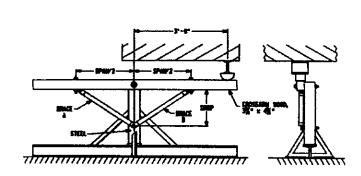
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on Crosserus Braces (Cont.)



BLE WOED BRACE BID PITTING DIMENSIONS

2-ALL BOUS E/8" DIA WITH HEX HEAD & METS. 3-ALL BOLTS ON WOOD THE TO HAME ROUND W



- 1. STANDARD TESTA CONCES A NO E AS S 2. CONTRESEDU TESTA CONCE A REMOVED. 3. TENESCO TESTA CONCE O REMOVED.

FIGURE 3

WOOD CROSSARM BRACE

FIGURE 4
PROPOSED TESTING APPARATUS

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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification covers dimensional and performance requirements of square lockmuts for use on Coop electric distribution lines. These locknuts must be compatible with machine bolts, carriage bolts, upset bolts, double arming bolts and clevis bolts.

Square locknuts furnished to NEA specifications shall conform to the performance requirements stated in this standard. The locknut shall start from either side and be easily spun with the fingers. It shall be securely locked by turning it approximately one full turn with a wrench. When the curved surface contacts the upper surface of the nut or bearing surface, further turning flattens the curved surface, causing the nut threads to grip the bolt threads tightly. Further movement shall require use of a wrench.

Square locknuts must be fabricated from hot-rolled steel processed in an open hearth or electric furnace and has a carbon grade and quality which meets the requirements of ANSI C135.1-1979, [1].

After threading, the locknut shall be hot-dip galvanized in accordance with ANSU/ASTM A153-82, [2]. The surfaces must be smooth and free from blemishes, irregularities and other imperfections that can affect service ability. The lockmut shall bear the manufacturer's identification mark or symbol, in a location and manner which shall not impair its function.

DIMENSIONS:

Dimensions of NEA square locknuts tabulated in Figure 1, are defined as follows:

Length of locksut edge
Thickness at edge
Thickness at center

TECHNICAL SPECIFICATION 116					
SUMBCT:	ORIGINAL	JUNE, 1993			
SQUARE LOCKNUTS	Rev. No				
		PAGE LOF 4			

- [3] ANSI B1.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form).
- [4] NEA Standard 186-1988: Standard for course screw threads.

Square Lockstate (Cont.)

D Faulvalent bolt size

The top and bottom of the locknut shall be visibly and symmetrically concave in order to match the bearing surface or the chamfered upper surfaces of the nut. The axis of the tapped hole shall be concentric with the axis of the body of the mst, within a tolerance of 3% of the maximum width across flats. The dimension across flats shall be approximately the sames as that of an equivalent square mu.

THREADS:

The locknuts shall have unified coarse threads, Class 2, in accordance with ANSI B1.1-1982, [3].

INSPECTION:

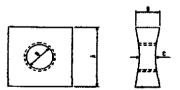
The manufacturer shall perform the necessary inspection and tests to determine if the locknut complies with the requirements of this standard. Non-conforming locknuts are unacceptable. NEA reserves the right to witness factory tests and may request test

NEA locknuts shall be securely packaged for shipping. Package quantities are shown on page 3. Each package shall be clearly marked with the manufacturer's name and catalog number.

The dimensional and functional requirements of NEA MF locknuts, based on other internationally recognized standards are acceptable only if the requirements standards are equivalent to or exceed the requirements quoted in this document

10. BIBLIOGRAPHY REFERENCE OF STANDARDS:

- [1] ANSI C135.1-1979: American National Standard for Galvanized Steel Bolts and Nots for Overhead Line Construction.
- [2] ANSI/ASTM A153-82: Standard Specification for Zinc Coating (Hot-Dip) on from and Steel Hardware.



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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This specification establishes the performance requirements of drop forged steel oval-eye nuts used on Coop overhead electric distribution lines. These nuts shall be used on machine bolts or double arming bolts for attaching clevis and strain insulators to structures and poles.

CENERAL:

Oval-eye nuts furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements stated in this standard. The text, figures and references to other standards supplement each other and shall be considered parts of this standard.

MATERIAL:

Oval-eye nuts shall be fabricated from materials that comply with ASTM A663-82-(1). The materials shall be of a grade and quality which can meet the requirements of ANSI C135.5-1979, (2).

FINISH-

Oval-eye nuts shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, (3). All surfaces shall be smooth and free from irregularities. All oval-eye nuts shall bear the manufacturer's symbol or identification mark in a location that will not impair its function.

DIMENSIONS:

Oval-eye nuts shall conform to the dimensions shown in Figure 1 and defined as

- A = Height of oval-eye nut
 B = Base diameter
 C = Width of crown
 D = Width of oval-eye nut

TECHNICAL SPECIFICATION 117										
SUBJECT:	ORIGINAL	JUNE, 1993								
OVAL-EYE NUTS	Rev. No.									
		PAGE 1 OF 3								

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FIGURE 1 DVAL-EYE MUTS

Oval-Eye Nots (Cont.)

E = Maximum width of eye F = Height of eyu

After galvanizing, the oval-eye shall be tapped oversize for compatibility with 3/4 inch or 5/8 inch bolts as specified. The oval-eye nut shall be provided with unified coarse threads, class 2, in accordance with ANSI B1.1-1982, (4).

The manufacturer shall perform the necessary inspection and tests to determine if the oval-eye nut complies with the requirements of this standard. Non-conforming oval-eye nuts are unacceptable. NEA reserves the right to witness factory tests and shall request less reports.

NEA oval-eye nuts shall be securely packaged for shipment. Each package shall contain one hundred (100) oval-eye nuts and shall be clearly marked with the manufacturer's name and catalog number.

OTHER STANDARDS:

The dimensional and performance requirements of the oval-eye nuts, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A663-82: Standard Specification for Steel Bars, Carbons, Merchant Quality, Mechanical Properties. [1]
- ANSI C135,5-1979: American National Standard for Galvanized Ferrous Eye Nuts and Eyelets for Overhead Line Construction.
- ANSI/ASTM A153-82: Standard Specification for Zinc Coating (Hot-Dip) on Imp and Steel Hardware.
- ANSI B1.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form).
- NEA Standard 186: Standard for coarse screw threads.

Page 2 of 3 TS 117



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE-

This specification establishes the performance requirements of drop forged steel thimble-eye nats used on Coop overhead distribution lines. These nats shall be used to attach guys to through-bolts or to the threaded end of straight or angle thimble-eye bolts.

Taimble-eye muts furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements stated in this specification. The text, figures and references to other standards supplement each other and shall be considered parts of this specification.

MATERIAL:

NEA thimble-eye nuts shall be fabricated from materials that comply with ASTM A663-82, [1] and ASTM A673-82, [2]. The materials shall be of a grade and quality which can meet the requirements of ANSI C135.5-1979, [3].

FINISH-

NEA thimble-eye nuts shall be hot-dip galvanized in accordance with ANSI/ASTM A153-B2, [4]. All surfaces shall be smooth and free from irregularities. Each thimble-eye nut shall bear the manufacturer's symbol or identification mark in a location and manner which shall not impair its function.

DIMENSIONS:

Thimble-eye nots shall conform to the dimensions shown in Figure 1 and defined as

A = Height of thimble-eye not B = Base diameter C = Width of crown D = Width of thimble-eye not

E	=	Maximum	width	o f	eye

TECHNICAL SPECIFICATION 118									
SUBJECT:	ORIGINAL	JUNE, 1993							
THOMBLE-EYE NUTS	Rev. No.								
		PAGE 1 OF 3							

Thamble-Eye Nuts (Cent.)

F = Height of eye R = Radius of top of eye

After galvanizing, the thimble-eye nuts shall be tapped oversize for compatibility with 3/4 inch or 5/8 inch diameter bolts as specified. The thimble-eye nut shall be provided with unified coarse threads Class 2, in accordance with ANSI B1.1-1982, [5].

INSPECTION:

The manufacturer shall perform the necessary inspection and tests to determine if the thimble-eye nut complies with the requirements of this standard. Non-conforming thimble-eye nuts are unacceptable. NEA reserves the right to witness factory tests and to request test reports.

PACKAGING:

NEA thimble-eye nuts shall be securely packaged for shipment. Each package shall contain fifly (50) thimble-eye nuts and shall be clearly marked with the manufacturer's name and Catalog number.

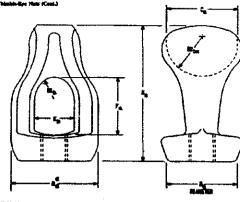
OTHER STANDARDS:

The dimensional and performance requirements of the thimble-eye auts, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A663-82: Standard Specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties. 1.
- ASTM A675-82: Standard Specification for Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties.
- ANSI C135.5-1979: American National Standard for Galvanized Perrous Eye Nuts and Eyelets for Overhead Line Construction.
- ANSI/ASTM A153-82: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- ANSI B1.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form).
- NEA Standard 186; Standard for Coarse Screw Threads.

Page 2 of 3



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FIGURE 1 THEMBLE-EYE HUT

Page 3 of 3 TS 118

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification establishes the performance requirements of drop forged steel anchor shackles used for attaching suspension insulators to oval eye holts and eye nuts on Coop overhead electric distribution poles and crussarms. Unless otherwise specified, Coop anchor shackles shall be furnished with a cotter bolt and cotter key.

Anchor shackles furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements stated in this standard. The text, figures and references to other standards supplement each other and shall be considered parts of this standard.

An anchor shackle furnished to NEA specifications shall be fabricated from materials that comply with the requirements of ASTM A668-83, [1]. The corter bolt shall be in accordance with ANSI C135.1-1979, [2]. The self-locking cotter key shall be made from good commercial grade brass, stainless steel, bronze, hard drawn aluminum or hard drawn copper.

The anchor shackle shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [3]. All anchor shackles shall bear the manufacturer's symbol or identification mark in a location which will not impair its function.

All surfaces shall be smooth, free from blemishes and other imperfections not consistent with commercial practice.

5. DIMENSIONS:

NEA anchor shackles shall have dimensions shown in Figure 1, as follows:

A = Diameter of cross section 1

TECHNICAL SPECIFICATION 119									
SUBJECT:	ORIGINAL.	JUNB, 1993							
ANCHOR SHACKLES	Rev. No.								
		PAGE I OF 3							

Ancher Shackles (Cout.)

- B = Minimum height of shackle
 C = Maximum width of eye
 D = Minimum width of opening
 E = Bot diameter
 F = Minimum diameter of shackle base

6. INSPECTION:

The manufacturer shall conduct inspections and test to verify that the anchor shackles comply with the requirements of this standard. Non-conforming shackles are unacceptable. NEA reserves the right to witness factory inspections and tests and may request test reports.

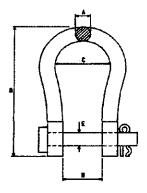
NEA anchor shackles with accessories shall be securely packaged for shipping. Each package shall contain one hundred (100) anchor shackles and shall be marked with the manufacturer's name and catalog number.

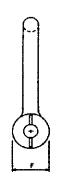
8. OTHER STANDARDS:

The dimensional and performance requirements of anchor shackles, based on other internationally recognizes standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

9. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A668-83: Standard Specification for Steel forging, Carbon and Alloy, for General Industrial Use.
- ANSI C135.1-1979: American National Standard for GAlvanized Steel Bolts for Overhead Line Construction.
- ANSI/ASTM A153-82 : Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.





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FIGURE ! ANCHOR SHACKLE Page 3 of 3 TS 119

Guy Strage (Attachments) (Cont.)

L = Separation between top of strap and center of mounting bole R2 = Outer radius of strap

6. STRENGTH:

Guy attachments shall exceed the minimum strength at 45° as defined in NEMA Pub. No. PH11-1979, [3] and included in Figure 1, when tested by the method illustrated in Figure

7. TESTS:

Formed guy attachments shall be tested in accordance with the method described in NEMA Pub. No. PH11-1979, [3] and shown in Figure 2.

8. INSPECTION:

The manufacturer shall perform the necessary inspection and tests proposed in NEMA Pub. No. PH11-1979, [3] to determine if the guy attachments comply with the performance requirements of this standard. Non-conforming guy attachments are unacceptable. NEA reserves the right to witness factory tests and may request test

9. PACKAGING:

Formed guy attachments shall be securely packaged for shipment. Each package shall contain one hundred (100) attachments and shall be clearly marked with the manufacturer's name and catalog number.

10. OTHER STANDARDS:

The dimensional and performance requirements of guy attachments, based on the other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

11. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- [1] ASTM AS70-79: Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality.
- ANSI/ASTM A153-82: Standard Specification for Zinc Conting (Hot-Dip) on Iron and Steel Hardware.
- NEMA Pub. No. PH11-1979: NEMA Standards for Galvanized Ferrous Guy Attachments, Wrap and Formed Guy Hooks, Guy Strain Plates and Pole Eye Plates.



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the physical requirements of ferrous formed guy attachments to fasten guy wires to overhead electric distribution poles.

2. GENERAL:

Guy attachments furnished to NEA specifications shall conform in all respects to the dimensional and perforance requirements stated in this standard. The text, figures and references to other standards supplement each other and shall be considered parts of this standard.

Guy attrachments shall be made of hot-rolled steel which complies with ASTM A570-79,
[1]. The material shall be of a grade and quality which can meet the requirements of this

4. FINISH:

Guy attachment described in this standard shall be hot-dip galvanized in accordance with ANSU/ASTM A153-82, [2]. The surfaces shall be smooth and free from blemishes.

Guy attachments shall bear the manufacturer's symbol or identification mark in a location and manner which will not impair its function.

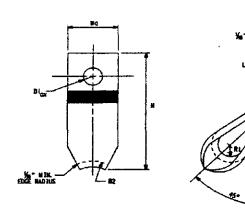
5. DIMENSIONS:

Dimensions (and tolerances) of guy attachments shall be in accordance with NEMA Pub. No. PH11-1979, [3]. Dimensions shown in Figure 1 are defined as follows:

H = Height of guy strap
W = Width of guy strap
DI = Diameter of mounting hole
T = Thickness of strap
RI = Inner radius of strap

TECHNICAL SPECIFICATION 121									
SUBJECT:	ORIGINAL	JUNE, 1993							
GUY STRAPS (ATTACHMENTS)	Rev. No								
		PAGE 1 OF 4							

Guy Straps (Attuch



		DIMENSIONS (ZNCHES)										
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FIGURE 1

Page 3 of 4 TS 121

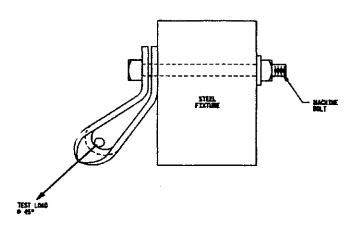


FIGURE 2 TESTING APPARATUS

Page 4 of 4 TS 121

Two Bolt Guy Attack main (Comt.)

6. STRENGTH:

NEA guy attachments shall be capable of meeting the minimum performance requirements listed in Figure 1, when tested by the method illustrated in Figure 2.

The manufacturer shall perform the necessary inspection and tests to determine if the guy attachments comply with the performance requirements of this specification. Non-conforming guy hooks are unacceptable. NEA reserves the right to witness factory tests and shall request test reports.

8. PACKAGING:

Two bolt guy attachments shall be securely packaged for shipping. Each package will contain fifty (50) pieces and shall be clearly marked with the manufacturer's name and catalog number.

9. OTHER STANDARDS:

The dimensional and performance requirements of guy attachments, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this document.

10. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- [1] ASTM A197-79: Standard Specification for Cupola Malleable Iron.
- [2] NEMA Pub. No. PH11-1979; NEMA Standards for Galvanized Ferrous Guy Attachments, Wrap and Formed Guy Hooks, Guy Strain Plates and Pole Eye Plates.
- ANSI/ASTM A153-82: Standard Specification for Zinc Conting (Hot-Dip) on Iron and Steel Hardware.

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the physical characteristic and performance requirements of ferrous two-bolt guy attachments used on overhead distribution lines.

2. GENERAL:

Guy attachments furnished to NEA specifications shall conform in all respects to the performance requirements of this standard. The text, figures and references to other standards supplement each other and shall be considered parts of this standard.

3. MATERIAL:

Drop forged guy attachments shall be made of malleable iron produced in accordance with ASTM A197-79, [1]. The material shall be of a grade and quality which meet the requirements of NEMA Pub. No. PH11-1979, [2].

4. FINISH:

Guy attachments described in this standard shall be hot-dip galvanized in accordance with ANSUASTM A153-82, [3]. The surfaces shall be smooth and free from irregularities, blemisthes and other imperfections which can affect service ability. Each guy attachment shall bear the manufacturer's symbol or identification mark in a location and manner that will not impair its function.

5. DIMENSIONS:

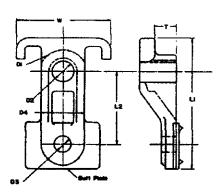
Dimensions of the guy attachment shown in Figure 1 are defined as follows:

1.1 = Minimum overall height
1.2 = Minimum mounting hole spacing
W = Minimum width of attachment

- LI L2 W T D1
- Minimum clearance for guy wire
- Diameter of upper mounting hole Diameter of lower mounting hole

	TECHNICAL SPECIFICATION 123									
SUBJECT:	·	ORIGINAL	JUNE, 1993							
1	TWO-BOLT GUY ATTACHMENTS	Rev. No.								
		}	PAGE 1 OF 4							

Two-Bolt Guy Attachments (Cont.)



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FIGURE I TWO-BOLT GUY ATTACHMENT

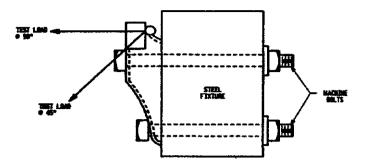


FIGURE 2 TESTING APPARATUS

Page 4 of 4 TS 123

Attackment, Guy (Cont.)

B. PACKAGING:

Attachment, Guy shall be securely packaged for shipping and handling. Each package shall contain one hundred (100) items and shall be clearly marked with the manufacturer's name and catalog number.

The dimensional and performance requirements of Attachment, Guy based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this documents.

10. BIBLIOGRAPHY OF REFERENCE STANDARDS:

ANSUASTM A153-82: Standard Specification for Zinc Coating (hot-dip) on Iron and Steel Hardware.



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the general dimensional and performance requirements of Attachment, Guy.

2. GENERAL:

Attachment, Guy furnished to NEA specifications shall conform in all respects to the specific dimensional and performance requirements stated in this standard. The text, figures and references to other standards supplement each other and shall be considered part of this standard.

3. MATERIAL:

Attachment, Guy shall be made from either iron or steet of a grade quality to meet the strength requirements required in the normal in the normal use of Guy.

Attachment, Guy shall be free of rough or uneven surfaces and edges so as to ensure safety in handling and installation.

5. DIMENSIONS:

The Attachment, Guy dimensions are shown in figure 1.

6. GALVANIZING:

After fabrication, Atfachment, Guy shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82 [1].

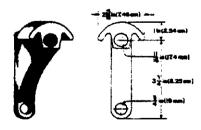
7. INSPECTION:

The manufacturer shall conduct the necessary tests to determine if the Attachment, Guy complies with the requirements of this document. Non-conforming Attachment, Guy are unacceptable.

TECHNICAL SPECIFICATION 124							
SUBJECT:		ORIGINAL	AUGUST, 1993				
	ATTACHMENT, GUY	Ray, No.					
			PAGE 6 of 3				

neut, Guy (Cont.)

ATTACHMENT, GUY



REFERENCE DATA

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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This specification establishes the dimensional physical performance requirements of Anchor, Expanding, 8 way used of Coop.

Anchor, Expanding, 8 way furnished to NEA specifications shall conform in all respects to the specific dimensional and performance requirements stated in this standard. The text, figures and references to other standards supplement each other and or considered part of this standard.

MATERIAL:

The Anchor body shall be fabricated from high strength iron or steel to meet the strength requirements in the normal use of the item.

FINISH:

The Anchor body shall be hot-dip <u>salvanized</u> in accordance with ANSI/ASTM A153-82. The unit shall have smooth surfaces without blemishes, malformations or other defects to ensure safety in handling and installation.

DIMENSIONS:

The Anchor, Expanding, 8 way dimensions are shown in Figure 1.

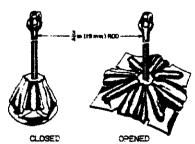
INSPECTION:

The manufacturer shall conduct the necessary tests to determine if the Anchor, Expanding, 8 way complies with the requirements of this document. Non-conforming Anchor, Expanding, 8 way are unacceptable. NEA reserves the right to witness factory tests and shall receive tests reports.

TECHNICAL SPECIFICATION 125								
SUBJECT:	ORIGINAL	AUGUST, 1993						
ANCHOR, EXPANDING, 8 WAY	Rev. No.							
		PAGE 1 OF 3						

Anchor, Expanding, 5 Way (Cant.)

ANCHOR, EXPANDING, 8 WAY



REFERENCE DATA

HOLDING STRENGTH	
SOIL CLASS 5 Box (log)	ME,50C (8,409)
SOL CLASS & Be (tig)	15,000 (6,818)
SOL GLASS 7 Be (hg.)	(80,000 (4545)
SME, AR OR EQUAL	J- ₩35- 6
N.E.A. CODE NO.	0085 38 K

ncher, Expanding, \$ Way (Cont.)

7. PACKAGING

Anchor, Expanding, 8 way shall be securely packaged for shipping. Each package shall contain one hundred (100) pieces and shall be clearly marked with the manufacturer's name and catalog number.

OTHER STANDARDS:

The dimeasional and performance requirements of Anchor, Expanding, 8 way, based on other internationally recognized standards are acceptable only if the requirements are equivalent to or exceed the requirements quoted in this document.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. ASTM A663-82: Standard Specification for Steel Bars, Carbon, Merchant Quality,
- ANSI C135.1-1979: American National Standard for Galvanized Steel Bars and Nuts for Overhead Line Construction.

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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This specification establishes the physical characteristics of drop forged steel anchor rods and beavy square muts which can be used to anchor guy wires on overhead electric distribution poles and other structures.

GENERAL:

Anchor rods and heavy square suts furnished to specifications shall conform in all respects to the dimensional and performance requirements stated in this standard. The text, tables, figures and references to other standards supplement each other and shall be considered parts of this standard.

MATERIAL:

Anchor rods and heavy square muts shall be made of hot-rolled steel that complies with ASTM A663-82, [1] or ASTM A675-82, [2]. The material shall be of a grade and quality which is suitable to meet the requirements of this standard.

DIMENSIONS:

Dimensions and tolerances of anchor rods and heavy square nuts shall be in accordance with ANSI C135.2-1979, [3] and as listed in Figure 1.

Anchor rods and heavy nuts shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [4]. The finish must be smooth and free from blemishes. Each anchor rod and nut shall be provided with the manufacturer's mark or identification symbol and the rod length in feet. These marks should be permanent and located near the eye.

THREADS:

Thread details of eye anchor rods and compatible nuts shall be in accordance with ANSI C135.2-1979. [3] as listed in Tables 1 and 2.

TECHNICAL SPECIFICATION 126							
SUBJECT:	ORIGINAL	JUNB, 1993					
ANCHOR RODS	Rev. No.						
		PAGE 1 OF 5					

The anchor rod threads shall be concentric with the rod axis and shall be machine rolled to dimensions listed in Table 1.

After galvanizing, the mus shall be tapped oversize to dimensions fisted in Table 2.

The threaded portion of the anchor rods shall permit the nuts to be turned by hand over the entire threaded length without the aid of tools.

7. STRENGTH:

Anchor rods shall be capable of withstanding tensile stresses specified in ANSI C135.2-1979, [3]. The rods shall fail only in the threaded portion or in the shaak. Threads shall not fail at stress levels below the listed aluminum.

Rod Size (Inches)	Minimum Load (Pounds)
5/8	16,000
3/4	25,000

All cold bend test at room temperature shall permit the untirended portion of the rod to be bent through a 90 degree angle on a radius equal to the rod diameter without breaking the rod.

The manufacturer shall make the necessary inspection and tests to verify that the eye anchor rods comply with the requirements of the standard. Non-conforming anchor rods are not acceptable. NEA reserves the right to witness factory tests and may request test reports.

PACKAGING:

Anchor rods shall be securely packaged for shipping in bundles of ten (10). Each package shall be clearly marked with the manufacturer's name and catalog number.

Page 2 of 5

cher Role (Cont.)

TABLE 1 ANCHOR ROD THREAD DIMENSIONS ROLLED THREADS										
			Pitch		Minor		Major			
	Nominal			Diameter (Inches)		Diameter (laches)		Diameter (Inches)		
Code No.	Rod Size (Inches)	Per Inch	Min.	Mex.	Mia.	Mas.	Mis.	Max.		
5361 25 07	5/8	11	0.6354	0.6426	0.5964	0.6154	0.6944	0,695-11		
5361 43 06	3/4	10	0.7613	0.7690	0.7183	0.7393	.042363	0.826-10		

			TAR	LE 2					
		HEAVY N	IUT THE	EAD DI	MENSION	3			
	Rod Major Pitch								
Nominal		Thread	Diameter (Inches)		Diameter (laches)		Dissetor (Inches)		
Rod Size (Inches)	Thread Type	Series and Class	Mâs.	Max.	Min.	Max.	Mia.	Max.	
5/8	Rolled	11-UNS-2A	0.602	9.616	0.6536	0.6718	0.605€	0.6113	
3/4	Rolled	16-UNS-2A	9,726	0.741	0.7841	6.9034	0.7305	0.7364	

10. OTHER STANDARDS:

The dimensional and performance requirements of eye anchor rods, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this

11. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A663-82: Standard Specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties.
- ASTM A675-82: Standard Specification for Steel Bars, Carbon Hot Wrought, Special Quality, Mechanical Properties.
- [3] ANSI C135.2-1979: American National Standard for Threaded Galvanized Ferrous Strand-Eye Anchor Rods and Nuts for Overhead Line Construction.
- ANSI/ASTM A153-82: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware. [4]
- ANSI B1.1-1982: Unified Inch Screw Threads (UN and UNR Thread Form), [5]
- [6] NEA STANDARD 186: Standard for Course Screw Threads.

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ROD, ANCHOR, SINGLE EYE



REFERENCE DATA

COMEDMON A # (m)	7 (2.134)	8 (2.436)
Constitution # in (mm)	\$ (M.)	· (18)
ULTRACTE STREETS (hg)	16,000 (7272)	25,000 {10,464}
BUMLAR OR EQUAL	J-7417	J-7428
MEA. CODE NO.	5361 65 07	5261 43 00



REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

This specification covers solid one-piece ferrous ground rods intended for use on electrical distribution systems. These ground rods shall be equipped with a cone point on one end and a flat surface on the other end to permit the rod to be driven into the

GENERAL:

Ferrous ground rods furnished to NEA specifications shall conform in all respects to the dimensional and performance requirements of this specification. These ground rods shall be used with the clamp described in NEA Specification 140 [1].

Ferrous ground rods shall be fabricated from one of the materials listed below.

The material shall have a quality and grade which satisfies the performance requirements of this specification.

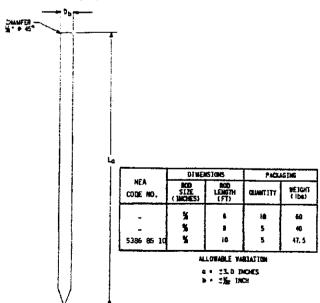
- Hot rolled high carbon steel produced by the open-hearth, basic oxygen or electric-furnace process in accordance with ASTM A663-82 [2] or ASTM A675-
- b. Malieable iron castings in conformity with ASTM A47-77 [4].

NEA ground rods shall be hot-dip galvanized in accordance with ANSI/ASTM A153-82, [5]. The ground rods shall have smooth surfaces free from blemishes, sharp projections and other irregularities which can be hazardous to personnel and are inconsistent with normal commercial practice. The manufacturer's identification mark or symbol and rod length (in feet) shall be located on each ground rod.

If ferrous castings are specified, embrittlement of the zinc conting must be avoided by either selecting a suitable material composition or by cooling the castings from the

TECHNICAL SPECIFICATION 128								
SUBJECT:	ORIGINAL	JUNE, 1993						
SCLID FERROUS GROUND RODS	Rev. No.							
		PAGE 1 OF 2						

Solid Ferrous Ground Stade (Cont.)



THIS IS A CONCEPTUAL DRAWING. THE MANUFACTURER IS RESPONSIBLE FOR THE PREPARATION OF BRAFINGS AND A DESIGN WHICH MEETS THE BIMENSIONAL, STRENGTH, AND OTHER PERFORMANCE REQUIREMENTS OF THIS STANDARD.

FIGURE PLAIN FERROUS GROUND ROD

annealing process.

Ground rod di us shown in Figure 1 are defined as follows:

L = Length of rod
D = Diameter of rod

The ground rod shall be of sufficient strength and rigidity to resist bending and excessive mushrooming of the top.

INSPECTION:

The manufacturer shall perform the necessary tests and inspection to determine if ferrous ground rods comply with the requirements of this specification. Non-conforming ground rods are unacceptable.

Ground rods shall be securely packaged for shipping. Each bundle shall contain ten (10) ground rods and shall be clearly marked with the manufacturer's name and catalog no.

OTHER STANDARDS.

The dimensional and performance requirements of solid ferrous ground rods based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this specification.

16. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- NEA Specification 140: Specification for ground red clamps.
- ASTM A663-82: Standard Specification for steel bars, carbon, merchant quality, mechanical properties.
- ASTM A675-82: Standard specification for steel bars, carbon, hot wrought, special quality, mechanical properties.
- ASTM Ad47-77: Standard specification for malleable iron castings.
- ANSI/ASTM A153-82: Standard specification for zinc coating (hot-dip) on iron and steel hardware.

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REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

SCOPE:

This specification establishes the dimensional requirements of steel ground plates to be affixed to the base of wood poles in Coop distribution systems. These plates are used to provide good contact with the earth.

Ground plates provided to NEA specifications shall conform in all respects to the requirements of this specification. The text, figures and other references to other standards supplement each other and shall be considered parts of this specification.

MATERIAL:

Ground plates shall be made from bot-rolled steel in accordance with ASTM ASTM 70-79 [1] with grade and carbon content suitable for the requirements of this specification. The plates shall be provided with a galvanized steel parallel groove clamp to accommodate three (3) strand 5/16 inch galvanized iron ground wire and have four (4) symmetrically placed nail holes for fastening the plate to the butt of the pole.

DIMENSIONS:

Dimensions shown in Figure 1 are defined as follows:

L = Length of ground plate
W = Width of ground plate
R1 = Inner radius of embossed ring
R2 = Outer radius of embossed ring
T = Thickness of material

Specific dimensions of NEA pole ground plates shall be stated in bid documents or purchase orders.

FINISH:

NEA pole ground plates shall be hot-dip galvanized in accordance with ANSI/ASTM

TECHNICAL SPECIFICATION 129						
suriecy.	ORIGINAL	JUNE, 1993				
STEEL GROUND PLATES FOR WOOD POLES	Rev. No					
<u> </u>		PAGE 1 OF 3				

Stort Ground Plates for Wood Poles (Cont.)

A153-82 [2]. Surfaces shall be smooth and free from blemister, irregularities, malformations and other imperfections not in accordance with good commercial practice. Each pole ground plate shall bear the manufacturer's identification mark or symbol in a location and manner which shall not impair its performance.

INSPECTION:

The manufacturer shall ascertain that NEA ground plates comply with the requirements of this specification. Non-conforming plates shall be unacceptable.

Pole ground places shall be securely packaged for shipping. Each package shall contain thirty-five (35) plates and shall be clearly marked with the manufacturer's name and catalog no.

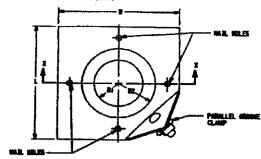
OTHER STANDARDS:

The dimensional and quality requirements of NEA pole ground plates based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements quoted in this specification.

BIBLIOGRAPHY OF REFERENCE STANDARDS:

- ASTM A570-79: Standard Specification for Hot-Rolled Steel Strip of Structural Quality.
- ANSI/ASTM A153-82; Standard Specification for Zinc Coating (Hot-Dip) on Iron or Steel Hardware.

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COOK	ADVENTURE (DATAS)						PACKAGING	
#0.	-			#1	44	PIECES	er cuso	
4680 0427	7	7#	li ga	;-¥	2	35	145	

FIGURE I **GROUND PLATE FOR WOOD POLES**

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Tay Feligible (Co. 20)

REPUBLIC OF THE PHILIPPINES National Electrification Administration (NEA)

1. SCOPE:

This specification establishes the dimensional and physical requirements of staples used in overhead distribution line construction.

2. GENERAL:

Staples furnished to NEA specifications shall conform in all respects to the dimensional requirements of this specification. These staples shall have rolled or cut points as shown in Figure 1.

Staples shall be fabricated from hot-rolled open-hearth or electric furnace steel in accordance with ASTM AS70-79, [1]. The material shall be of a quality and grade that will satisfy the physical requirements of the standard.

4. DIMENSIONS:

Staple dimensions shall be in accordance with the dimensions and tolerances listed in ANSI C135.14-1979, [2]. Dimensions shown in Figure 1 are defined as follows:

- i. = Overall length of staple (inches)
 P = Length of point (inches)
 A = Width of staple (inches)
 D = Wire size (inches or AWG)

5. FINISH:

Staples shall be hot-dip galvarnized in accordance with ASTM A153-82, [3]. The finish shall be smooth and free from blemishes.

6. STRENGTH:

Staples shall have sufficient strength and rigidity to resist bending and distortion beyond usability while being driven into wooden poles and crossarms.

TECHNICAL SPECIFICATION 130				
SURJECT:	ORIGINAL.	JUNE, 1993		
STAPLES	Rev. No			
		PAGE 1 OF 3		

Strate (Cont.)

The manufacturer shall make adequate inspection to verify that staples comply with the requirements of this specification. Non-conforming staples are unacceptable.

7. INSPECTION:

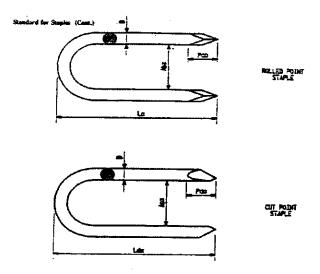
Staples shall be securely packaged for shipping. Each package shall contain the quantities specified in Figure 1 and shall be clearly marked with the manufacturer's name and Catalog No.

9. OTHER STANDARDS:

The dimensional and performance requirements of the staples, based on other internationally recognized standards are acceptable only if the requirements of such standards are equivalent to or exceed the requirements of this document.

10. BIBLIOGRAPHY OF REFERENCE STANDARDS:

- 1. ASTM A570-79: Standard Specification for hot-rolled carbon steel sheet and strip,
- ANSI C135.14-1979: American National Standard for staples with rolled or stash points for overhead line construction.
- 3. ANSI/ASTM 153-82: Standard specification for zine coating (hot-dip) on iron and



NEA CODE NO.	BIMENSIONS (BRCNES)			POTAT	PACKAGING	
THE CODE NO.	L		Ð		POINT	GUART STY
	1—14	¥	9 GA.	¥	CLIT	
6180 29 10	2	ig.	8 GA.	3/8	CUT	25 lbs/ctn

SINGLE LETTER INDICATES TWANTATION (INCHES) C - 1% TWO LETTERS INDICATES TWANTATION. EXAMPLE C - 1% TWO LETTERS INDICATE + THET VARIATION. - SECTION VARIAT EXAMPLE CX + +//2 - 0 + +//2

FIGURE I STAPLES

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"ANNEX A-2"

Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected

Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected			
SPECIFICATION			
Description	:	Highly accurate load performance and the use of a field- proven Digital Multiplication Measurement Technique ensure reliability and dependability for all customer loads up to 60 Amperes. Electronic single phase kWH meter, outdoor installation	
Quantity	:	408 pcs	
Rating	:	10(60)A	
Phase/Forms/ Wire	:	Single Phase/ 1A /2W	
Operating Temperature	:	-20 C to +85C under cover	
Nominal Voltage	:	240V	
Operating Voltage	:	80% to 120% of Vn	
Frequency	:	60Hz +/- 5%	
Humidity	:	5% to 95% relative humidity, non condensing	
Load performance Accuracy	:	Accuracy Class 0.5% - typical accuracy 0.2%	
Starting Current	:	Equal or less than 20mA	
Internal Meter Loss	:	Equal or less than 0.3Watts	
LCD Display	:	Liquid Crystal Display / 6-digitwhole number plus 1 Decimal With backup Industrial Grade lithium battery supply. Minimum of 0.75-inch size display	
Measuring Display	:	Active Energy (kWh) with instantaneous reading of Voltage, Current, Frequency, Power and Power Factor.	
Meter Face Cover	:	Glass or Hard Plastic (Polycarbonate)	
Body Enclosure Material		Hard Plastic (Polycarbonate) or Aluminum Alloy	
Terminal Block Assembly		Fibra or Hard Plastic (Polycarbonate)	
Terminal Cover		Transparent polycarbonate terminal with emboss wiring diagram and with provision of sealing through sealing stainless screw.	
Connection Terminals and bolts	:	Copper Brass or Stainless	
Line and load conductor terminal.		Shall accommodate minimum size of stranded #6 AWG of Aluminum or Copper conductor	
Ingress Protection	:	IP 54	
Meter/Serial No.	:	At least with 0.25-inch in height with barcode and printed CASURECO II name.	
Certification	:	ERC Meter Approved with ERC seal and stickers with test report	
Applicable Standards	:	IEC 62052-11 IEC 62053-22	
Others		Preferably equipped with Anti-theft features	

Circuit Breaker

TECHNICAL SPECIFICATION		
Automatic/Manual	Manual	
Electrical Product Type	Safety Switch	
Maximum Amperage (amps)	15A	
Casing Materials	Metallic/PVC	
Color/Finish Family	Gray/White	
Phase Type	Single Phase 240V	

Receptacle

TECHNICAL SPECIFICATION		
Input Voltage	600 Volts	
Working Current	4A	
Materials	Porcelain/Ceramic/Bakelite	
Туре	Screw & Receptacle	
Metal Materials	Iron, Aluminum, Iron Copper Plating	
Color	White	

LED Bulb

TECHNICAL SPECIFICATION			
Light Emitting Diode (LED) Bulb			
Light Output	1521 Lumens		
Power Consumption	15 Watts		
Efficacy	101 Lumens per Watts		
Average Life	15000 Hours		
Color	Daylight		

Tumbler Switch

TECHNICAL SPECIFICATION			
Туре	Surface Type Mounted Switch		
Color	White		
Materials	Bakelite		
Rated Voltage	240		

Convenience Outlet (2 Gang)

TECHNICAL SPECIFICATION		
2 Gang Outlet Surface		
No. of Socket	2	
Rated Current	10 A	
Rated Voltage	240 V	

Junction Box with Screw and Cover

TECHNICAL SPECIFICATION		
Part of electrical conduit wi	ring system used for joining wires/container for electrical connection.	
Insulation Characteristic	Good Insulation property high anti current punctures strength.	
Impact Resistance	can be buried in concrete resist different compression impact.	
Fire Resistance high oxygen value good combustion resistance and self-extinguishing.		
	Waterproof and fire retardant.	
Color	Orange	
Biotic Resistance	no smell attracting rodent and should not suffer from any biotic attack.	
Junction Box Materials	PVC or ABS.	

Non-Metallic Sheathed Wire 2.6 mm Solid NM, #10 AWG

TECHNICAL SPECIFICATION			
Voltage Rating	600 Volts		
Temperature Rating	60°C in wet & dry locations		
Conductor Diameter, mm	2.6		
Insulation Thickness, mm	1		
Diameter over Insulation, mm	4.6		
Jacket Thickness, mm	0.76		
PVC Filler Diameter, mm	1.18		
Cable Dimension, mm	width 6.12 & thickness 11.90		

Non-Metallic Sheathed Wire 2.6 mm Solid NM, #12 AWG

TECHNICAL SPECIFICATION		
Voltage Rating	600 Volts	
Temperature Rating	60°C in wet & dry locations	
Conductor Diameter, mm	2	
Insulation Thickness, mm	0.8	
Diameter over Insulation, mm	3.6	
Jacket Thickness, mm	0.76	
PVC Filler Diameter, mm	1.58	
Cable Dimension, mm	width 5.12 & thickness 10.30	

Non-Metallic Sheathed Wire 2.6 mm Solid NM, #14 AWG

TECHNICAL SPECIFICATION		
Voltage Rating	600 Volts	
Temperature Rating	60°C in wet & dry locations	
Conductor Diameter, mm	1.6	
Insulation Thickness, mm	0.8	
Diameter over Insulation, mm	3.2	
Jacket Thickness, mm	0.76	
PVC Filler Diameter, mm	1.58	
Cable Dimension, mm	width 4.72 & thickness 9.50	

Electrical Tape

TECHNICAL SPECIFICATION

PSA approved electrical tape. Popular for shop, maintenance and home use.

Extreme flexibility and conformability with a special adhesive to assure safe and long-lasting protection.

Colors Available: Black, Blue, Green, Yellow, White and Red.

Staple Wire (Insulated)

TECHNICAL SPECIFICATION		
Main Body	Iron	
Coated	Unichrome Plating	
Insulating	Polyvinyl Chloride	
Size	1	

EMT Entrance Cap, 3/4"

TECHNICAL SPECIFICATION	
For use in an overhead service entrance	
Copper-free die-cast aluminum construction	
Can be used indoors and outdoors	
Suitable for use with EMT, rigid and IMC conduit	
For use in an overhead service entrance	
Copper-free die-cast aluminum construction	

EMT LB Conduit, 3/4"

Copper-free die-cast aluminum

Threaded, Supplied with steel cover and gasket

To join EMT, RSC, or IMC and provide access to the interior of the raceway for wire pulling, inspection, maintenance, or splicing.

EMT Pipe, 3/4"

TECHNICAL SPECIFICATION

Electrical metallic tubing, EMT, is used as a raceway for electrical wiring

For thin wall applications

Easy to cut and bend reducing waste and installation time

Non-combustible and easily adaptable to future wiring changes

A proven equipment grounding conductor and can reduce electromagnetic fields by up to 95%

Made out of coated steel and aluminum

EMT Elbow, 3/4"

TECHNICAL SPECIFICATION

To make a 90 degree turn on an EMT raceway and to help in wire pulling

It is made of zinc alloy and includes a zinc die-cast locknut

The 3/4" pull elbow has an EMT to EMT design and comes complete with cover

To make a 90 degree turn on an EMT raceway and to help in wire pulling

EMT Reducer, 1" X 3/4"

TECHNICAL SPECIFICATION

This adapter connects 1" Threadless Rigid Conduit to 3/4"

Die-cast Zinc

EMT Connector, 3/4"

TECHNICAL SPECIFICATION

Used to secure EMT conduits to an electrical metallic box

Die-cast Zinc

EMT Coupling, 3/4"

TECHNICAL SPECIFICATION

Used to secure EMT conduits

Die-cast Zinc

PVC C-Clamp

TECHNICAL SPECIFICATION

Used to secure conduits on walls, ceilings, etc.

PVC with concrete nail

Rod, Ground Steel, Galvanized, 5/8" X 10"

TECHNICAL SPECIFICATION

Made of high-carbon, open-hearth steel for maximum strength. Hot dip galvanized.

Bolt-Type Drive Head Ground Rods have surfaces of head and integral clamp tinned.

Non-ferrous bolt with lock washer accommodates No. 3 to No. 8 stranded wire.

Does not bend when driven into hard soils. The electro-brazed pigtail is No. 6 tinned copper on 5/8" and 3/4" rod

Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG

TECHNICAL SPECIFICATION	
Material	Aluminum Alloy
Size	#6
Туре	Stranded or Solid (preferably Stranded)

Clamp, Ground Rod For 5/8" Steel Rod Tamperproof

TECHNICAL SPECIFICATION	
Used for connecting conductors to ground rods or rebar	
This copper alloy clamp is suitable for direct burial	

Conductor, Duplex, #6, Awg

TECHNICAL SPECIFICATION		
For Phase Conductor:		
Size AWG	6	
No. of Wires	7	
Material	Aluminum	
Insulation Thickness	:0.045"- 0.06"	
Insulation	600 Volts	
For Neutral Conductor:		
Size AWG	6	
No. of Wires	7	
Material	Aluminum	

Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2

TECHNICAL SPECIFICATION	
Type	Crimp Connector
Model	YHO-100
Material	Aluminum Alloy



"ANNEX B-1"

Construction Specification for Construction of Primary and Secondary Distribution Line for Lot 1 & Lot 2

a. General

- 1) All construction work shall be done in a thorough and workmanlike manner in accordance with the staking sheet, plans, and specifications, and the construction drawing indicated in "Specifications and Drawings for 7.62/13.2kV Line" by the National Electrification Administration.
- 2) The latest edition of the Philippine Electrical Code shall be followed except where local regulations are more stringent in which case local regulations shall govern.

b. Pole Setting

1) The minimum depth for setting poles shall be as follows:

Setting in All
in Soil
Solid Rock
eet) (Feet)
1= 101/
.0 3.5
.5 3.5
.0 4.0

- 2) Setting in soil specification shall apply:
 - i. Where poles are to be set in soil.
 - ii. Where there is a layer of soil of more the two (2) feet in depth over solid rock.
- iii. Where the hole in solid rock is not substantially vertical or the diameter of the hole at the surface of the rock exceeds approximately twice the diameter of the pole at the same level.
- 3) "Setting in All Solid Rock" specifications shall apply where poles are to be set in solid rock and where the hole is substantially vertical approximately uniform in diameter and large enough to permit the use of tamping bars the full depth of the pole.
- 4) Where there is a layer of soil two (2) feet or less in depth over solid rock, the depth of the hole shall be the depth of the soil in addition to the depth specified under "Setting in Soil".
- 5) On sloping ground, the depth of the hole always shall be measured from the low side of the hole.
- 6) Pole backfills must be thoroughly tamped the full depth. Excess dirt must be banked around the pole.
- c. Guys and Anchors

- 1) Guys shall be placed before the conductors are strung and shall be attached to the poles as shown in the Construction Drawings.
- 2) All anchors and rods shall be in line with the strain and shall be so installed that approximately six inches of the rod remain out of the ground. In cultivated fields or other locations, as deemed necessary, the projection of the anchor rod above earth may be increased to a maximum of 12 inches to prevent burial of the rod eye. The backfill of all anchor holes must be thoroughly tamped the full depth.
- 3) When a cone anchor is used, the hole, after the anchor has been set in place shall be backfilled with coarse crushed rock for two feet above the anchor, tamping during the filling with the remainder of the hole to be backfilled and tamped with dirt.

d. Locknuts

A locknut shall be installed with each nut, eye nut or other fastener on all bolts or threaded hardware such as insulator pins, upset bolt, double arming bolts etc.

e. Conductors

- Conductors must be handled with care. Conductors shall not be tramp on nor run over by vehicles. Each reel shall be examined and the wire shall be inspected for cuts, kinks or other injuries. Injured portions shall be cut out and the conductors spliced. The conductors shall be pulled over suitable rollers or stringing blocks properly mounted on pole or cross arm if necessary to prevent binding while stringing.
- 2) The neutral conductor should be maintained on one side of the pole (preferably the road side) for tangent construction and for angles not exceeding 30 degrees.
- 3) With pin-type insulators the conductors shall be tied in the top groove of the insulator on tangent poles and on the side of the insulator away from the strain at angles. Pin-type insulator shall be tight on the pins and on tangent construction, the top groove must be in line with conductor after tying in.
- 4) For neutral and secondary conductor on poles, insulated brackets may be substituted for the single and double upset bolts on angles of 0° to 5° in locations known to be subject to considerable conductor vibration.
- 5) All conductors shall be cleaned thoroughly by wire brushing before splicing or the installation of a connector or clamp. A suitable inhibitor shall be used before splicing or applying connectors over aluminum conductor.

f. Splices and Dead ends

Conductors shall be spliced and dead ended as shown on the Construction Drawings. There shall be not more than one splice per conductor in any span and splicing sleeves shall be located at least ten feet from the conductor support. No splices shall be located in Grade B crossing spans and preferably not in the adjacent spans.

g. Taps and Jumpers

- 1) Jumpers and other leads connected to line conductors shall have sufficient slack to allow free movement of the conductors. Where slack is not shown on the Construction Drawings it will be provided by at least two bends in a vertical plane, or one in a horizontal plane, or the equivalent. In areas where aeolian vibration occurs, special measures to minimize the effects of jumper breaks shall be used as specified.
- 2) All leads on equipment such as transformers, shall be a minimum of #6 copper conductivity. Where aluminum jumpers are used, a connection to an un-plated bronze terminal shall be made by splicing a short stub of copper to the aluminum jumper using a suitable aluminum compression sleeve.

h. Hot-line clamps and Connectors

Connectors and hot-line clamps suitable for the purpose shall be installed as shown on Guide Drawings. On all hot-line clamp installations, the clamp and jumper shall be so installed so that they are permanently bonded to the load side of the line, allowing the jumper to be de-energized when the clamp is disconnected. This applies in all cases, even where the line layout is such that the tap line is in actuality the main back to the power source.

i. Lightning Arrester Gap Settings

The external gap electrodes of lightning arresters, combination of arrestercutout units, and transformer mounted arresters shall be adjusted to the manufacturers' recommended spacing. Care shall be taken that the adjusted gap is not disturbed when the equipment is installed.

j. Conductor Ties

Hand-formed ties shall be in accordance with construction drawings. Factory-formed ties shall be installed in accordance with the manufacturer's recommendations.

k. Sagging of Conductors

- 1) Conductors shall be sagged in accordance with the conductor manufacturers' recommendations. All conductors shall be sagged evenly. The air temperature at the time and place of sagging shall be determined by a certified etched glass thermometer.
- 2) The sag of all conductors after stringing shall be in accordance with the conductor manufacturers' recommendations, except that a maximum increase of three inches of the specified sag in any span will be acceptable. However, under no circumstances will a decrease in the specified sag be allowed.

1. Secondary

1) Secondary conductors may be bare or insulated wires. The conductors shall be sagged in accordance with the manufacturers' recommendations.

2) Secondary shall be so installed as not to obstruct climbing space. There shall not be more than one splice per conductor in any span, and splicing sleeves shall be located at least ten feet from the conductor support. Where the same covered conductors or service cables are to be used, they may be installed in one continuous run.

m. Grounds

- 1) Ground rods shall be driven in undistributed earth in accordance with the Construction Drawings. Where aluminum ground wire is used, it must be terminated aboveground at a galvanized ground rod or spliced by a compression connector to a copper or steel ground wire extension to the ground rod, the top of which shall be at least 12 inches below the surface of the earth. The ground wire shall be attached to the rod with a clamp and secured to the pole with staples. The staples on the ground wire shall be spaced two feet apart except for a distance of eight feet above the ground rod and eight feet down from the top of the pole where they shall be six inches apart.
- 2) All equipment shall have at least connections from the frame, case or tank to the multi-grounded neutral conductor.
- 3) The equipment ground, neutral wires, and lightning-protective equipment shall be interconnected and attached to a common ground wire.

n. Clearing Right-of-Way

- 1) Clearing Right-of-Way shall be in accordance with the RA-11361 Anti-Obstruction on Power Lines Act.
- 2) In preparing the right-of-way, trees shall be removed, underbrush cleared and trees trimmed so that the right-of-way shall be clear from the ground up and of the width required. Trees fronting each side of right-of-way shall be trimmed symmetrically unless otherwise specified. Dead trees beyond the right-of-way which would strike the line in falling shall be removed. Leaning trees beyond the right-of- way which would strike the line in falling and which would require topping if not removed shall either be removed or topped except that shade fruit, or ornamental trees shall be trimmed and not removed unless otherwise authorized.

"ANNEX B-2"

Construction Specification for House Wiring Installation for Lot 3

a. General

- 1) All construction work shall be done in a thorough and workmanlike manner in accordance with the plans, and specifications.
- 2) The latest edition of the Philippine Electrical Code shall be followed except where local regulations are more stringent in which case local regulations shall govern.

b. Service Drops

1) Service drop wires shall be so installed as not to obstruct climbing space. There shall not be more than one splice per conductor in any span, and splicing sleeves shall be located at least ten feet from the conductor support. Where the same covered conductors or service cables are to be used, they may be installed in one continuous run.

c. Clearing Right-of-Way

- 1) Clearing Right-of-Way shall be in accordance with the RA-11361 Anti-Obstruction on Power Lines Act.
- 2) In preparing the right-of-way, trees shall be removed, underbrush cleared and trees trimmed so that the right-of-way shall be clear from the ground up and of the width required. Trees fronting each side of right-of-way shall be trimmed symmetrically unless otherwise specified. Dead trees beyond the right-of-way which would strike the line in falling shall be removed. Leaning trees beyond the right-of- way which would strike the line in falling and which would require topping if not removed shall either be removed or topped except that shade fruit, or ornamental trees shall be trimmed and not removed unless otherwise authorized.

Section VII. Drawings

EXTENSION OF DISTRIBUTION LINES



Technical Planning & Design Section - Line Operation Division Engineering Department

	Project Name:
	Substation:
ı	Feeder No:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 7, BURABOD, CALABANGA, CAMARINES SUR	

Primary Conductor:	INS#1/0 (TW)
Neutral Conductor:	BARE#1/0
Ruling Span:	51.9
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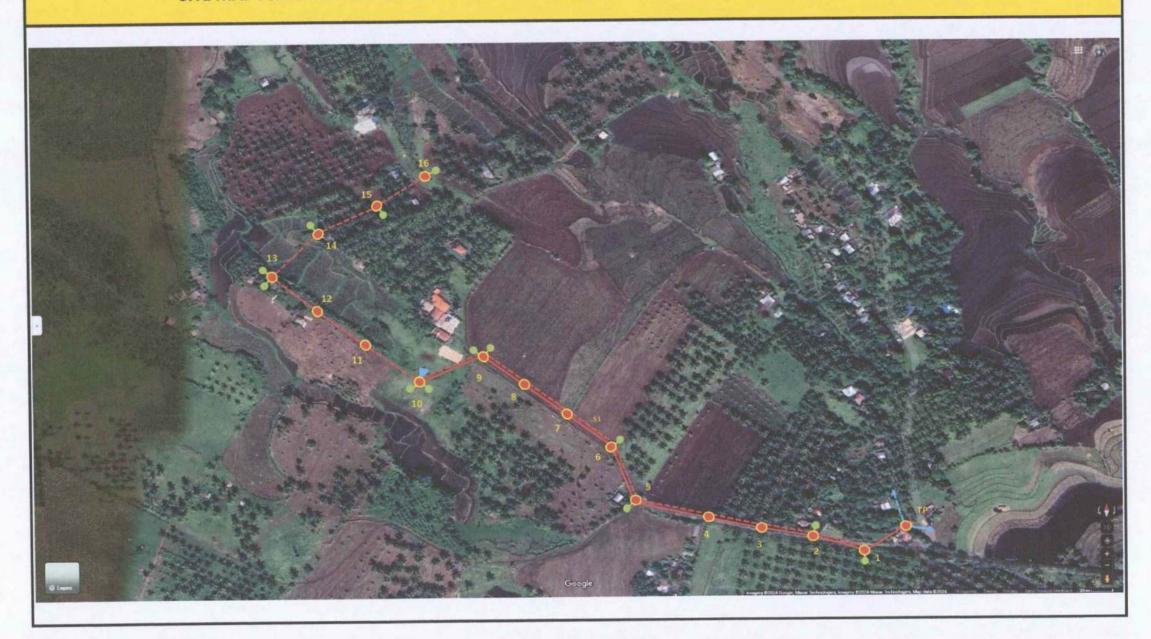
PAGE NO.1 O

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Project Engineer

Engr. Richard Preconcillo Tech'l Plan, Sec Head Engr. Wendyl P. Borromeo

Recommending Approval: Engr. Alexander M. Cruz Engineering Manager

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 7, BURABOD, CALABANGA, CAMARINES SUR





CASURECO II Del Rosario, Nega City

Technical Planning & Design Section - Line Operation Division Engineering Department

Project Name:
Substation:
Feeder No:
CityiMunicipali
Remarks:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 4, LUGSAD, CALABANGA, CAMARINES SUR	
SALADANDA	

SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Neutral Ruling:	Conductor: Span:	BARE#1/0 111.0
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Prepared By:

Engr. Dan warre Garcia Project Engineer Checked By:

Engr. Richard L. Preconcillo Tech'i Plan, Sec Head Engr. Wenayl P. Borromeo LCD, Supervisor Engr. Alexander M. Cruz Engineering Manager



CASURECO II Del Rosario, Naga City

Technical Planning & Design Section - Line Operation Division Engineering Department

ŀ	Project Name:
ŀ	Substation:
ŀ	Feeder No:
ı	City/Municipalit

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 4, LUGSAD, CALABANGA, CAMARINES SUR	
CALABANGA	
SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

Neut	ral Conductor:	BARE#1/0
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Prepared By: Engr. Dan van B. Garcia Project Engineer Engr. Richard - Preconcillo Tech'l Plan, Sec Heati

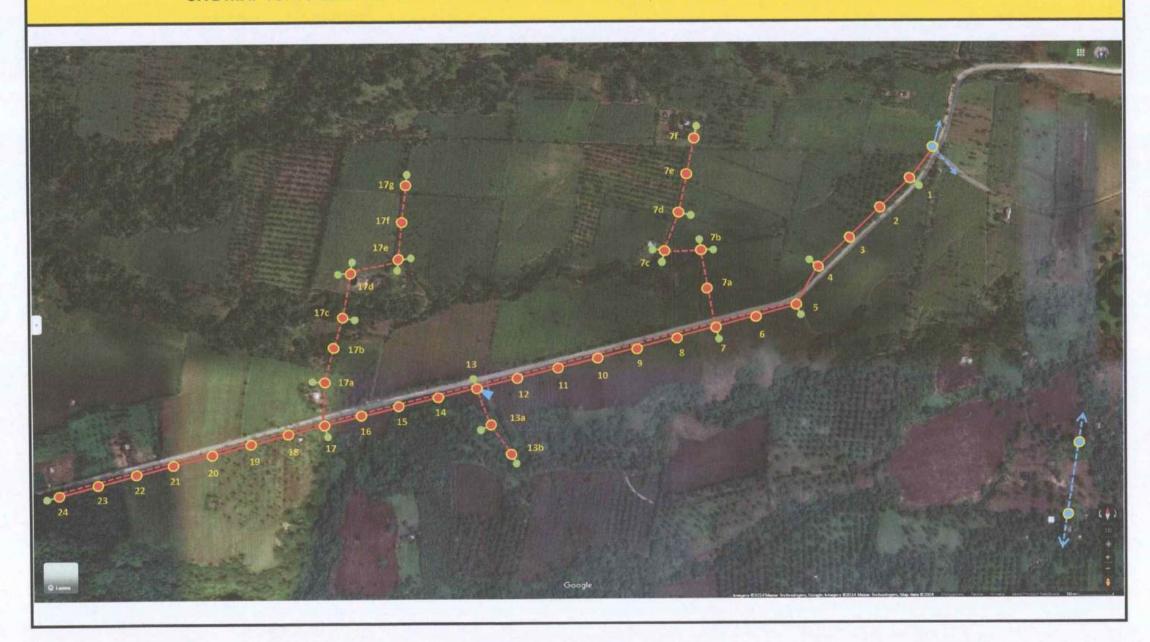
ever. Wandyl P. Borromeo

Recommending Approval:

Engr. Alexander M. Cruz
Engineering Manager

Approved By:

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 4, LUGSAD, CALABANGA, CAMARINES SUR





Technical Planning & Design Section - Line Operation Division Engineering Department

Substation: Feeder No: City/Municipelity: Remarks:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO MAYTAGAS, QUINALE, CALABANGA, CAMARINES SUR

CALABANGA SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor:	INS#1/0 (1
Neutral Conductor:	BARE#1
Ruling Span:	61.1

As-Pian

As-Built

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Prepared By:

Engr. Dan van 8. Garcia Project Engineer Checked By

Engr. Richard L. Preconcillo Tech'i Plan, Sec Head Vertried by:
Engr. Wendyl P. Borromeo
LOG Supervisor

Engr. Alexander M. Cruz Engineering Manager



Technical Planning & Design Section - Line Operation Division Engineering Department

1	Project Name:
ı	Substation:
1	Feeder No:
i	City/Municipality:
	Remarks:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO MAYTAGAS, QUI	NALE, CALABANGA, CAMARINES SUR
CALABANGA	
SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

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Neutz	al Conductor:	BARE#1/0
Rulin	g Span:	60.0
	As-Plan	1
	As-Built	

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Prepared By:

Engr. Dan Nan B. Garcia Project Engineer

Checked By:

Engr. Richard L. Preconcillo Tech'i Plan, Sec Head

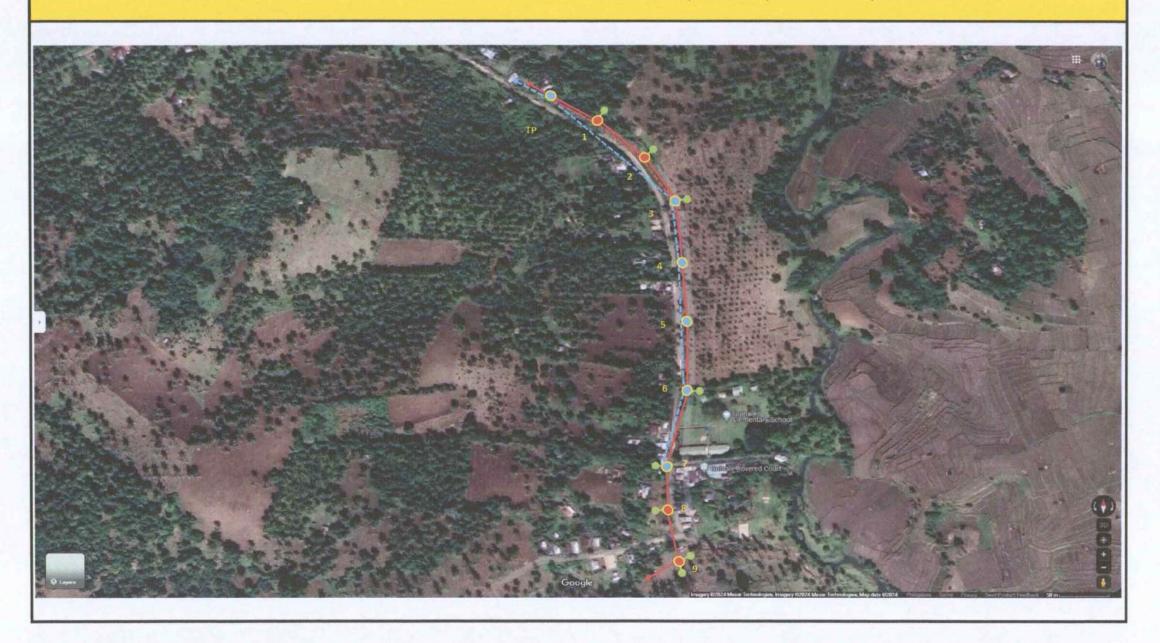
Verified by: Engr. Wendyl P, Borromeo LOD, Supervisor

Recommending Approval:

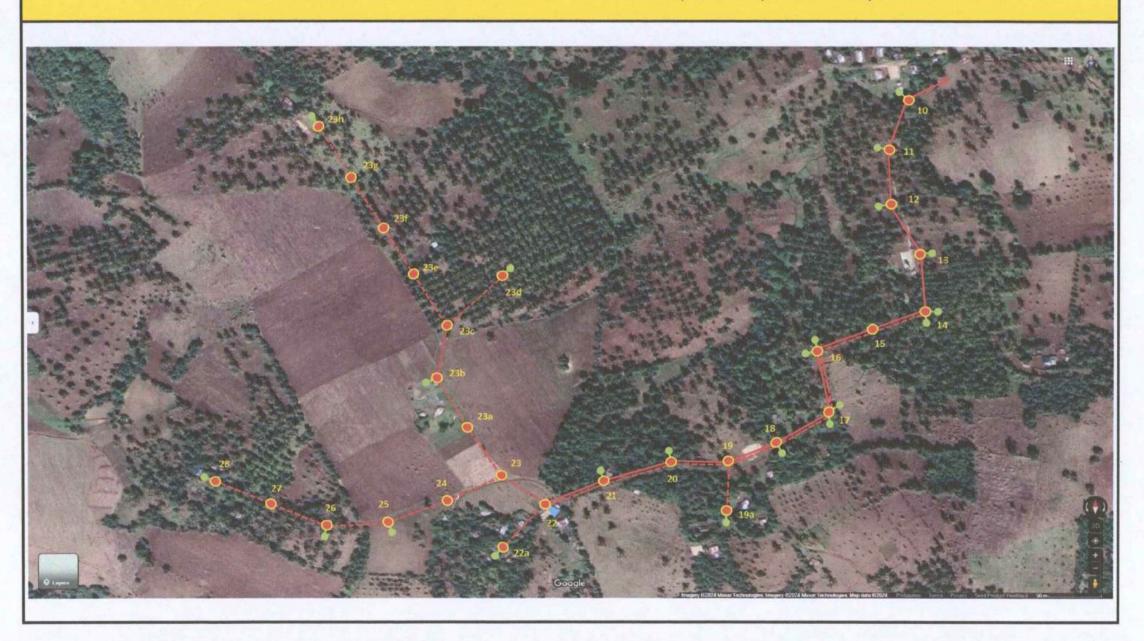
Engr. Alexander M. Cruz Engineering Manager

Engr Engazdo Camonte Acting General Manager

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - SITIO MAYTAGAS, QUINALE, CALABANGA, CAMARINES SUR



SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - SITIO MAYTAGAS, QUINALE, CALABANGA, CAMARINES SUR



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Technical Planning - Line Operation Division Engineering Department

roject Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 4, BRGY. CABUGAO, MILAOR,
The second second	

CAMARINES SUR

Feeder No: MILAOR City/Municipality:

Substation:

Remarks: SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor: Neutral Conductor: Ruling Span:

s-plan	X
s-Built	

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STAKING SHEET

Designed By:

Engr. Bernadette/f. Sarte

Checked By:

Engr. Richard L. Preconcillo TPDS Sec. Head

Verified By:

Engr. Wendyl P. Borromeo LOD Supervisor,Eng'g

Recommending Approval:

Engr. Alexander M. Cruz Engineering Manager

Engr. Edgardo R. Piamonte

Acting General Manager

			200
	-	=	254
-	=		251
	-		500
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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 4, BRGY. CABUGAO, MILAOR,	
Project Name.	CAMARINES SUR	
a section	CAMARINES SOR	
Substation:		
Feeder No:		
City/Municipality:	MILAOR	
Remarks :	SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

Primary Conductor: Neutral Conductor: Ruling Span: As-plan As-Built

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Designed By:

Engr. Bernadette . Sarte Staker

Engr. Richard Preconcillo TPDS Sec. Head

Engr. Wendyl P. Borromeo LOD Supervisor,Eng'g

Engr. Alexander M. Cruz Engineering Manager

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<u>Technical Planning - Line Operation Division</u> <u>Engineering Department</u>

roject Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 4, BRGY. CABUGAO, MILAOR,
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CAMARINES SUR
Substation:

Feeder No:
City/Municipality: MILAOR

Remarks : SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor:
Neutral Conductor:
Ruling Span:

As-plan X
As-Built

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Designed By:

Engr. Bernadette T. Sarte

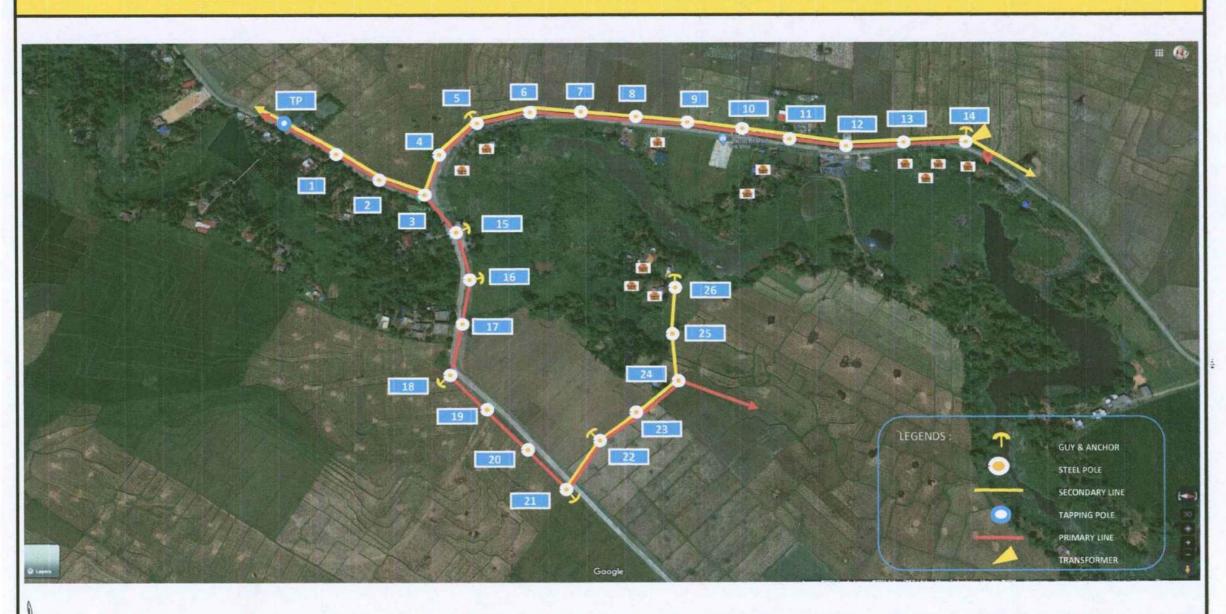
Checked By:

Engr. Richard L. Preconcillo TPDS Sec.Head Verified By:

Engr. Wendyl P. Borromeo LOD Supervisor, Eng'g Recommending Approval:

Engr. Alexander M. Cruz Engineering Manager Approved By:

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 4, BRGY. CABUGAO, MILAOR, CAMARINES SUR CAMARINES SUR



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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 6, BRGY. DEL SOCORRO, MINALABAC,	
	CAMARINES SUR	
Substation:		
Feeder No:		
City/Municipality:	MINALABAC	
Remarks :	SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

Primary Conductor: Neutral Conductor: Ruling Span: As-plan As-Built

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Engr. Bernadette T. Sarte Staker

Engr. Richard L. Preconcillo TPDS Sec.Head

Engr. Wendyl P. Borromeo LOD Supervisor Eng'g

Engr. Alexander M. Cruz Engineering Manager

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Technical Planning - Line Operation Division **Engineering Department**

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 6, BRGY. DEL SOCORRO, MINALABAC,
	CAMARINES SUR
Substation:	
Feeder No:	
City/Municipality:	MINALABAC
Romarks :	SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor: Neutral Conductor: Ruling Span: As-plan As-Built

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Engr. Bernadette T. Sarte Staker

Engr. Richard L. Preconcillo TPDS Sec.Head

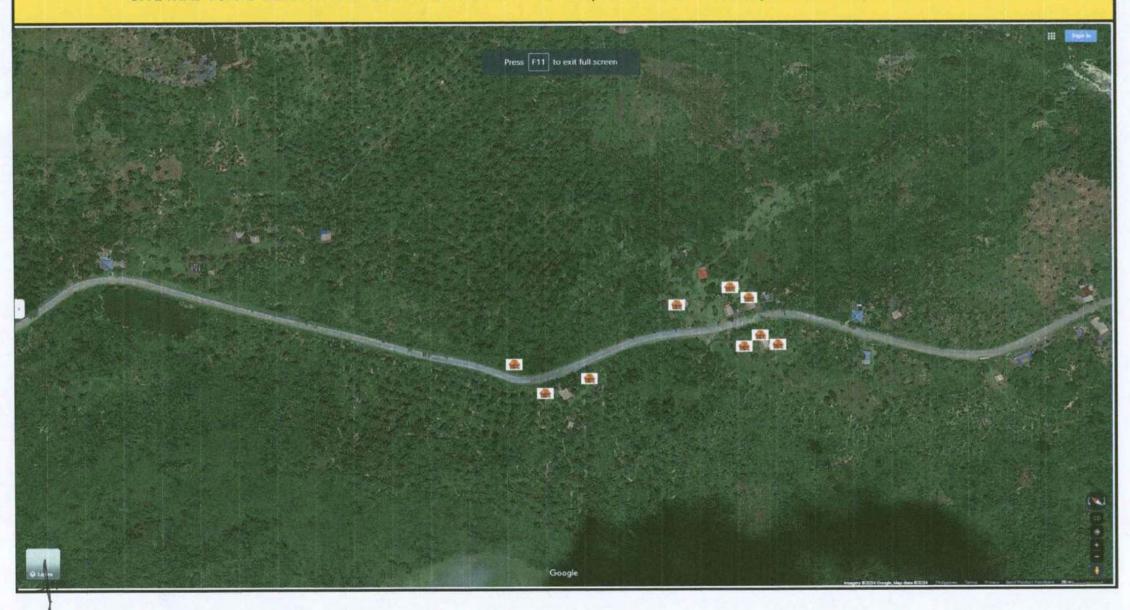
Engr. Wendyl P. Borromeo LOD Supervisor, Eng'g

Engr. Alexander M. Cruz Engineering Manager

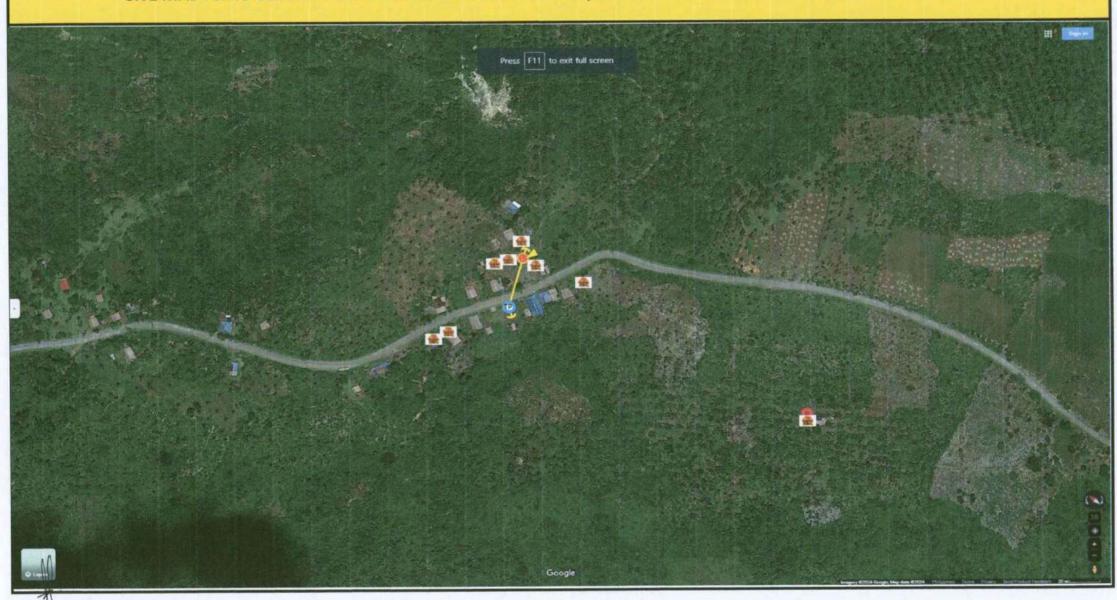
SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 6, BRGY. DEL SOCORRO, MINALABAC, CAMARINES SUR



SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 6, BRGY. DEL SOCORRO, MINALABAC, CAMARINES SUR



SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 6, BRGY. DEL SOCORRO, MINALABAC, CAMARINES SUR



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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 3, BRGY. TIMBANG, MINALABAC,
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CAMARINES SUR Substation:

Feeder No:
City/Municipality: MINALABAC

Remarks : SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor:
Neutral Conductor:
Ruling Span:

As-plan	X
As-Built	

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Designed By:

Engr. Bernadette T. Sarte Staker Checked By:

Engr. Richard L. Preconcillo TPDS Sec.Head Verified By:

Engr. Wendyl P. Borromeo LOD \$upervisor Eng'g Recommending Approval:

Engr. Alexander M. Cruz Engineering Manager Approved By:

Technical Planning - Line Operation Division Engineering Department

roject Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 3, BRGY. TIMBANG, MINALABAC,
	CAMADINECCID

Substation: Feeder No:

City/Municipality: MINALABAC SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024 Remarks:

	Conductor:	-	-
Ruling 5	ipan:		
	As-plan	X]
	As-Built		

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Designed By:

Engr. Bernadette T. Sarte Staker

Engr. Richard L. Preconcillo TPDS Sec. Head

Engr. Wendyl P. Borromeo LOD Supervisor,Eng'g

Engr. Alexander M. Cruz

Engineering Manager

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 3, BRGY. TIMBANG, MINALABAC CAMARINES SUR



Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 1, BRGY. BINOBONG, PILI,	
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Feeder No:		
City/Municipality:	PILI	
Remarks:	SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

Conductor: Conductor: pan:		
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As-Built		

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Designed By:

Engr. Bernadetta T. Sarte Staker 1

Checked By:

Engr. Richard L. Preconcillo TPDS Sec.Head erified By:

Engr. Wendyl P. Borromeo LOD Supervisor, Eng'g Recommending Approval:

Engr. Alexander M. Cruz Engineering Manager Approved By:

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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 1, BRGY. BINOBONG, PILI,	
	CAMARINES SUR	
Substation:	Assistance and a facilities and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and	
Feeder No:		
City/Municipality:	PILI	
Remarks :	SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

STAKING SHEET

Primary Conductor: Neutral Conductor:	
Ruling Span:	
As-plan	X

R/W

Secondary Pri. Back Pri. Pole Line Dist. Trans Ground. Guy Lead Anc

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Designed By

Engr. Bernadette T. Sarte Staker

Engr. Richard L. Preconcillo TPDS Sec. Head

Engr. Wendyl P. Borromeo LOD Supervisor, Eng'g

Recommending Approval:

Service

Engr. Alexander M. Cruz-Engineering Manager /

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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 1, BRGY. BINOBONG, PILI,	
	CAMARINES SUR	
Substation:		
Feeder No:		
City/Municipality:	PILI	
Remarks :	SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

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Designed By:

Engr. Bernadetta T. Sarte Staker Engr. Richard L. Preconcillo TPDS Sec.Head Verified By

Engr. Wendyl P. Borromeo LOD Supervisor,Eng'g Recommending Approv

Engr. Alexander M. Croz Engineering Manager pproved By:

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 1, BRGY. BINOBONG, PILI, CAMARINES SUR



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Technical Planning - Line Operation Division Engineering Department

roject Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 6, BRGY. BINOBONG, PILI,	
	CAMARINES SUR	
ubstation:		
eeder No:		
ity/Municipality:	PILI	
omarks ·	SITIO ELECTRIFICATION PROGRAM (SER) PROJECT - 2024	

	Conductor: Conductor:		
uling S			
	As-Plan	X	
	As-Built		

STAKING SHEET

Pole	Pri. Ba	ack		Pole		Pri. Pole	Li	ne	Dist.	Trans	0	iround.		Guy	Lead		Anc		5	econdary			Maria Na	5	ervice				Misc		R/W		Cons			
No.	Span			the Laboratory Street	C	Top Uni	t An	igle	"	G"	MA	"M2"		"E"	M		"F"	Span	5 or UB	Wire	NO.	","	Drop Mtrs	NO.	Size	NO.	"K"	-	Units		RI		200		Remarks	
	QUAN	Ø	Q	Code		Q Cod	e	-	Q	Code	Q	Code	Q	Code		Q	Code	Quan	Code	Size	Q	Code	Quan	C		Q	Code	Q	Code	Q	Code	Q	Code			Alfa
9			1	30	SP							10000	1	E1-2		1	F2-1	60	S	INS#1/0	2	J6			(Asset 1)				-		1					
																											7 1						- 15			
8			1	30	SP			-			1	M2-9						62	5	INS#1/0	1,1	J5,J8														
7			1	30	SP						1	M2-9						50	S	INS#1/0	1,1	J5,J8														
6			1	30	SP	+	+				1	M2-9				\vdash		55	S	INS#1/0	1,1	15,18						\vdash								
5			1	30	SP						1	M2-9						62	5	INS#1/0	1,1	J5,J8														
4			1	30	SP	-	-				1	M2-9						53	S	INS#1/0	1,1	15,18														32
3		-	1	30	SP	-	+	-	-	_	1	M2-9						55	5	INS#1/0	1,1	15,18	-									+			-	
2			1	30	5P						1	M2-9						50	s	INS#1/0	1,1	17,18														
1		-	1	30	SP		-				1	M2-9						52	s	INS#1/0	1,1	15,18		-				H						775		
TP		\vdash		-	+	+	+	+			H										2	16														
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															10111		Miss			THE RES	4	J6		N3		-11					Mala			549	NEUTRAL	BARE
															8 11 1		1				8	18												549	SEC.LIVE	INS#1
Euri I																		- Same	Variation of	Carry Control	1	17	1 4 10	1 718							1000		Eigen.			

Designed By:

Engr. Bernadette T. Sarte Staker / //

Checked By:

Engr. Richard L. Preconcillo TPDS Sec.Head Verified By:

Engr. Wendyl P. Borromeo LOD Supervisor, Eng'g Recommending Approval:

Engr. Alexander M. Cruz Engineering Manager Approved By:

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 6, BRGY. BINOBONG, PILI, CAMARINES SUR



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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 2, BRGY, DEL ROSARIO, PILI,	
	CAMARINES SUR	
Substation:		
Feeder No:		
City/Municipality:	PILI	
Ramarks ·	SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

Primary Conductor: Neutral Conductor: Ruling Span: As-Plan As-Built

e	Pri. Ba	ck		Pole		Pri. Po	ole	Line	Dist.	Trans	G	iround.		Guy	Lead	11-1	Anc		5	econdary			100	Se Se	rvice	Value of		100	Misc		R/W		Cons			
).	Span			н	c	Top U	nit	Angle	*	G"	100	"M2"		"E"	M	DE S	"F"	Span	5 or UB	Wire	NO.	"J"	Drop Mtrs	NO.	Size -	NO.	"K"		Units		RI		77117		Remarks	
	QUAN		Q	Cod	e (2 0	ode		Q	Code	Q	Code	Q	Code		Q	Code	Quan	Code	Size	Q	Code	Quan	c	SILE	Q	Code	Q	Code	Q	Code	Q	Code			
1 BOY	Wester		5												1	100		17	A LOCATION							-							Marine.			1
																								111851												
					1																															
					1																															
											\Box																		8				Y			
	13.00		1	30	SP						1	M2-11A	1	E1-2		1	F2-1	52	5	INS#1/0	2	16														
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2			1	30	SP								1	E1-2		1	F2-1	46	5	INS#1/0	1,1	J7,J8					1									
				-							\Box																									
			1	30	SP								1	E1-2		1	F2-1	45	5	INS#1/0	1,1	17,18														
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P																					2	16										-				
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don		-		30		-	-		-	-	1	M2-11A	3			3		143	5	INS#1/0	4	16		1000		18	11 = 1		1	1		1		Water State of	PRIMARY	
			3	20	31						-				100		1			11,544,5	2	17	9.01				-							157	NEUTRAL	BA
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		-							-						1										02.5							100		DOSEDLE !	USEAR DE	
100	-	-				-			-						-			5	-						0 - 0 0											

Designed B

Engr. Bernadette T. Sarte Staker

Engr. Richard L. Preconcillo TPDS Sec.Head

Engr. Wendyl P. Borromeo LOD Supervisor,Eng'g

Engr. Alexander M. Cruz Engineering Manager

SITE MAP : SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 2, BRGY. DEL ROSARIO, CAMARINES SUR CAMARINES SUR



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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 7, BRGY. PAWILI, PILI,	
	CAMARINES SUR	

STAKING SHEET

Substation: Feeder No:

City/Municipality: PIL

Remarks: SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor:
Neutral Conductor:
Ruling Span:

As-Plan X
As-Built

Pole	Pri. B	ack		Pole		Pri.	Pole	Line	Dis	t. Trans		Ground.	Gu	y	Lead	1	Anc	1000	5	econdary				Se	ervice				Misc		R/W		Cons			
No.	Spa	n		н	C	Top	Unit	Angle		"G"		"M2"	"E	PA III	M		"F"	Span	S or UB	Wire	NO.	"J"	Drop Mtrs	NO.	Size	NO.		4	Units		RI				Remarks	
	QUAN	0	Q	Co	-	Q	Code		Q	Cod	e Q	Code	Q (Code	200	Q	Code	Quan	Code	Size	Q	Code	Quan	С	Size	Q	Code	Q	Code	Q	Code	Q	Code			
9	51	10	1	35	SP	1	A3	Total L					1 E1	1-2		1	F2-1	51	UB	INS#1/0	1	17	B16-78-10													
8		10											1 E1	1-2		1	F2-1	56	UB	INS#1/0	1	J5														
0	36	140	1	33	Jr.		ria.																													
7	56	1Ø	1	35	SP	1	A1				1	M2-9						56	UB	INS#1/0	1	J5								H		+				
6	60	1Ø	1	35	SP	1	A1				1	M2-9						60	UB	INS#1/0	1	15														
5	57	1Ø	1	35	SP	1	АЗ						1 E1	1-2		1	F2-1	57	UB	INS#1/0	1	J6														
4	55	1Ø	1	35	SP	1	A2		-				1 E1	1-2		1	F2-1	55	UB	INS#1/0	1	17														
3		10											1 E:	1-2		1	F2-1	60	UB	INS#1/0	1	J10														
												142.0							un	INS#1/0	1	J5								-					-	-
2	60	10	1	35	SP	1	Al			+	1	M2-9						60	UB	1145#1/0	1	15														
1	60	1Ø	1	35	SP	1	A1				1	M2-9						60	UB	INS#1/0	1	J5								-						
TP						1	A5-1				+																	1	M5-10							
							ALC:								100												coor		CODE		CODE		QC	QUAN	CODE	
QU/		_	-		_	_	CODE A1		a	COL		CODE M2-9	-	CODE E1-2	-	Q 5	F2-1	QUAN 515	CODE	INS#1/0	Q 5	CODE	QUAN	С		q	CODE	1	-	u	CODE		- QC	567	PRIMARY	INS#1/
31		10	9	35	3P	1	AZ					1412-3			133	-		725	00	III.	1	16									and the		000	567	NEUTRAL	BARER
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FLUE						1	A5-1							12831			1				1	J10					-		15000	-	77	-				

Designed By

Engr. Bernadette T. Sarte Staker Checked-By:

Engr. Richard L. Preconcillo TPDS Sec Head Verified By:

Engr. Wendyl P. Borromeo LOD Supervisor, Eng'g Recommending Approval:

Engr. Alexander M. Cruz Engineering Manager Approved By:

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- P	

Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 7, BRGY. PAWILI, PILI,	
	CAMARINES SUR	
Substation:		
Feeder No:		
City/Municipality:	PILI	
Remarks :	SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

Primary Conductor: **Neutral Conductor:** Ruling Span: As-Plan As-Built

S	T	A	K	1	N	G	S	H	E	E	T	

ole	Pri. B	lack		Pole		Pr	i. Pole	Line	Dis	t. Tran	5	Groun	nd.	G	uy	Lead		Anc		5	econdary				S	ervice		A.S.		Misc		R/W		Cons			
No.	Spa	in		н	C	To	p Unit	Angle		"G"		"M2		"[E"	M		'F"	Span	5 or UB	Wire	NO.	"J"	Drop Mtrs	NO.	Size	NO.	"K"	-	Units		RI				Remarks	
	QUAN	Ø	Q	Co	de	Q	Code		Q	Cod	ie 0	Co	ode	Q	Code		Q	Code	Quan	Code	Size	Q	Code	Quan	С	5111	Q	Code	Q	Code	Q	Code	Q	Code			
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19	60	10	1	35	SP	1	A1	-	-	-	1	M	2-9	+					60	UB	INS#1/0	1	15								+						
18	51	1Ø	1	35	SP	1	A1				1	M	2-9						51	UB	INS#1/0	1	J5														
17	50	1Ø	1	25	SP	1	A2		-		-	-		1	E1-2		1	F2-1	50	UB	INS#1/0	1	J10						H		+						
11	30	140	1	33	31	1	FAE								-																						
16	60	1Ø	1	35	SP	1	A1				1	M	2-9						60	UB	INS#1/0	1	15						H		+		-				
15	55	1Ø	1	35	SP	1	A1				1	M	2-9						55	UB	INS#1/0	1	J5														
14	52	10	1	35	SP	1	A1			-	1	M	2-9						52	UB	INS#1/0	1	15														
13	51	10	1	35	SP	1	A1		-		1	L M	2-9						51	UB	INS#1/0	1	J5														
	34	120																																			
2	55	10	1	35	5P	1	A1	-	+	+	1	I M	12-9						55	UB	INS#1/0	1	15								+		-				
11	60	10	1	35	SP	1	A1				1	ı M	2-9						60	UB	INS#1/0	1	35														
10	60	10	1	35	SP	1	A1				1	ı M	12-9						60	UB	INS#1/0	1	15														
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QUA 554		C	Q 10	-	-	-	CODE		Q	co	DE (1	DDE 12-9	-	CODE E1-2	100	1	CODE F-1	QUAN 554	CODE	INS#1/0	9	CODE	QUAN	C		ч	CODE	u	CODE	u	CODE		- Lie	609	PRIMARY	INS#1
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				-	-	-		1	-									1														100					

Designed By

Engr. Bernadette T. Sarte Staker

Engr. Richard L. Preconcillo TPDS Sec.Head

Engr. Wendyl P. Borromeo LOD Supervisor,Eng'g

Engr. Alexander M. Cruz Engineering Manager

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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 7, BRGY. PAWILI, PILI,
	CAMARINES SUR

Substation:
Feeder No:

City/Municipality: PILI
Remarks: SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor:
Neutral Conductor:
Ruling Span:

s-Plan	X
\s-Built	

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Remarks		Cons		RI RI		Misc Units	_	****		rvice			-		condary	-		Anc	-	_	Guy	round.		Trans		Line	i. Pole		Pole		Pri. Ba	Pole
Remarks		Code	0.1	330			-	"K"	NO.	Size	-	Drop Mtrs	"}"	NO.	Wire	S or UB	-	"F"			"E"	"M2"	-	G"		Angle	p Unit		100000		Span	No.
		Code	Q	Code	Q	Code	Q	Code	Q	47/4/2	C	Quan	Code	Q	Size	Code	Quan	Code	Q	9	Q Cod	Code	Q	Code	Q	4	Code	Q	Code	ØQ	QUAN	
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																				+	10.7		+				- AA	-	33 .	1	- 00	21
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PRIMARY INS	578											N. C. C.	15	1	INS#1/0	UB	233	F-1	7	-2	7 E1	M2-9	4				A1	SP 6	35	9		525
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Designed By:

Engr. Bernadette T. Sarte Staker Checked By:

Engr. Richard L. Preconcillo TPDS Sec. Head erified By:

Engr. Wendyl P. Borromeo LOD Supervisor,Eng'g Recommending Approval:

Engr. Alexander M. Chiz Engineering Manager Approved By

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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 7, BRGY. PAWILI, PILI,	5-
	CAMARINES SUR	
Substation:		
Feeder No:		
City/Municipality:	PILI	
Remarks :	SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

STAKING SHEET

Primary Conductor:
Neutral Conductor:
Ruling Span:

As-Plan	X
As-Built	

Pole	Pri. Ba	ck		Pole		Pri. Pol		Line	Dist.	Trans	G	round.	Gu	y	Lead		Anc		5	econdary				S	ervice				Misc		R/W		Cons	E SET EN		
No.	Span		T	н	c	Top Un	t A	ingle		G"		"M2"	#E'		м		"F"	Span	5 or UB	Wire	NO.	"]"	Drop Mtrs	-	Size	NO.	"K"	-	Units		RI				Remarks	
	QUAN	ø	Q	Cod	e 1	Q Cod	ie		Q	Code	Q	Code	Q (ode		Q	Code	Quan	Code	Size	Q	Code	Quan	C	A Prince	Q	Code	Q	Code	Q	Code	Q	Code			
35	1 100		1	30	SP				4				1 E1	-2		1	F2-1	47	S	INS#1/0	2	16														
33				-	-					-																										
34A			1	30	SP						П		1 E1	-2		1	F2-1	45	S	INS#1/0	2	16		-				Н		-						
34			1	30	SP	-	+	-	-		H		1 E1	-2		1	F2-1	40	S	INS#1/0	1,1	15,18														
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33			1	30	SP						П		1 E1	-2		1	F2-1	52	S	INS#1/0	2	J10				-		H		+		-				
32A			1	30	SP								1 E1	-2		1	F2-1	60	5	INS#1/0	2	16								F		-				
32	55	1Ø	1	35	SP	1 A	5	-	1	G10-25	1	M2-11A	1 E1	-2		1	F2-1	55	UB	INS#1/0	3,2	J6,J15						1	M5-1							
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30	60	10	1	35	SP	1 A	2						1 E	1-2		1	F2-1	60	UB	INS#1/0	1	J10														
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29	60	10	1	35	SP	1 A	3						1 E	1-2		1	F2-1	60	UB	INS#1/0	1	J6					-				-	1			A	
QUAN		-	0	CO	DE	Q CO	DE		0	CODE	0	CODE	Q	CODE		0	CODE	QUAN	CODE		Q	CODE	QUAN	C		Q	CODE	Q	CODE	Q	COD	E	QC	QUAN	CODE	
235	-					1 1				-	-	100000	-	E1-2	TE S	9	-	291	S	INS#1/0	-	35		The second				1	M5-6					259	PRIMARY	INS#
233		10				1 4					1	The second second	-		1		1	235	UB	INS#1/0		16											WY W	579	NEUTRAL	BARE
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REAL PROPERTY.					_	1 1	_	1						81-1							3	J10		1000					HISH	4	1000				SPAN P.	
		1					15						100	200	1		1	The same		P. LOBS	4	J15			1	1	7		TO B	I F	10000	100		0		

Designed By:

Engr. Bernadette T. Sarte Staker Checked By:

Engr. Richard L. Preconcillo TPDS Sec.Head Verified By:

Engr. Wendyl P. Borromeo LOD Supervisor, Eng'g Recommending Approval:

Engr. Alexander M. Gruz Engineering Manager Approved By:

SITE MAP : SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 7, BRGY. PAWILI, PILI, CAMARINES SUR



SITE MAP : SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 7, BRGY. PAWILI, PILI, CAMARINES SUR

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 7, BRGY. PAWILI, PILI, CAMARINES SUR 11

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 7, BRGY. PAWILI, PILI, CAMARINES SUR

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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG SITIO KALEBHOK, BRGY. CABUGAO, SIRUMA,
evin illigary accentent nue-	CAMARINES SUR
Substation:	
Feeder No:	
City/Municipality:	SIRUMA
Remarks :	SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor: Neutral Conductor: Ruling Span: As-Plan As-Built

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Designed By

Engr. Bernadette T. Sarte Staker

Engr. Richard L. Rreconcillo TPDS Sec.Head

Checked By:

Engr. Wendyl P. Borromeo LOD Supervisor,Eng'g

Recommending Approval:

Engr. Alexander M. Cruz Engineering Manager

Engr. Edgardo R. Piamonte Acting General Manager

- 24	Bh.
	1

Technical Planning - Line Operation Division Engineering Department

Pole

Pri. Back

Pole

Pri. Pole

Line

roject Name:	EXTENSION OF DISTRIBUTION LINE ALONG SITIO KALEBHOK, BRGY. CABUGAO, SIRUMA,
CONTRACTOR OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE	

STAKING SHEET

Secondary

CAMARINES SUR

Substation: Feeder No:

Ground.

Q CODE Q CODE Q CODE

2 M2-11A 4

E1-2

Dist. Trans

City/Municipality:

Guy

SIRUMA

Lead

Anc

SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024 Remarks:

Primary Conductor: **Neutral Conductor:** Ruling Span:

Cons

R/W

As-Plan As-Built

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Q CODE

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QUAN

C

Designed By:

Engr. Bernadette T. Sarte Staker

QUAN

Checked By:

C Q CODE Q CODE

6 30 WP

Engr. Richard L. Preconcillo TPDS Sec.Head

Verified By:

Q CODE

F-1

Engr. Wendyl P. Borromeo LOD Supervisor, Eng'g

QUAN

311

CODE

5

INS#1/0

Recommending Approval:

Q CODE Q CODE Q CODE

Service

Engr. Alexander M. Cruz

Engineering Manager

Approved By:

QC

Engr. Edgardo R. Piamonte Acting General Manager

QUAN

342

342

CODE

PRIMARY

NEUTRAL

SEC.LIVE

INS#1/0

INS#1/0

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - SITIO KALEBHOK, BRGY. CABUGAO, SIRUMA, CAMARINES SUR





Engr. Dan Ivan ByGarcia Project Engineer

CAMARINES SUR II ELECTRIC COOPERATIVE, INC. CASURECO II Del Rosario, Naga City

Technical Planning & Design Section - Line Operation Division Engineering Department

Engr. Richard & Preconcilio Tech'l Plan, Sec Bead

Project Name:
Substation:
Feeder No:
City/Municipality:
Remarks:

Engl Wendyl P. Borromeo LOD Supervisor

EXTENSION OF DISTRIBUTION LINE ALONG PROPER, BRGY, PAMINTAN, SIRUMA, CAMARINES SUR	
SIRUMA	
SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

Primary	Conductor	INS#1/0 (TW)
Neutral	Conductor:	BARE#1/0
Ruling	Span:	42.0
	As-Plan	1
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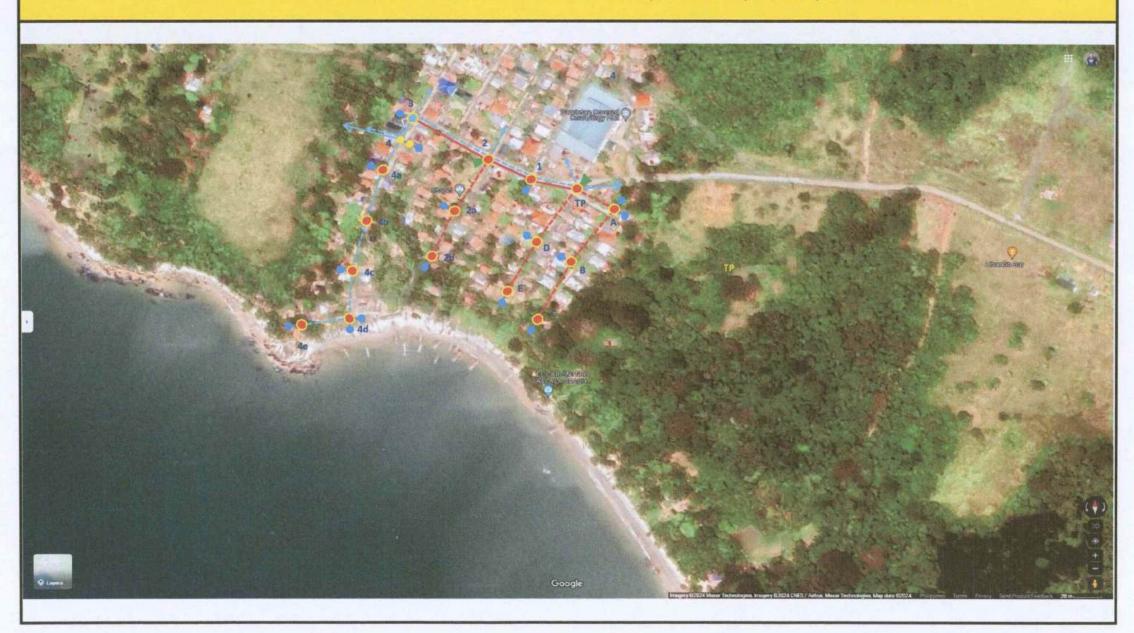
Acting General Manager

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OF		П	L			1				Verifie	1					1	1/	Approval		1					-			_	SL	Approved By:)	

Engr. Alexander M. Cruz

Engineering Manager

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - PROPER, PAMINTAN, SIRUMA, CAMARINES SUR





Technical Planning & Design Section - Line Operation Division Engineering Department

Ì	Project Name:
1	Substation:
1	Feeder No:
Ì	City/Municipality:
Ì	Remarks:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO PUNTA, PINITAN, SIRUMA, CAMARINES SUR	
SIRUMA	
SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

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	As-Plan	1

SKETCH	1	NEG.	780	9 8	1000	Sec.	51350	983	1000			5 15 4 5	No.	5000	70.00	S	TA	KI	NG	SHEE	367	STATE OF	NEWS PROPERTY.	1000	1030	SUMS.	Name of	CONTROL OF THE PERSON NAMED IN	NAME OF TAXABLE PARTY.	100	SEC		Constitution of the last	
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Prepared By:

Engr. Dan/yan 8. Garcia Project Engineer Checked By:

Engr. Richard L. Preconcillo Tech'l Pian, Sec Head Engr. Wendyl P. Borromeo LOD, Supervisor Recommending Approval:
Engr. Alexander M. Cruz
Engineering Manager

Engr. Edgardo R. Plamonte Acting General Manager

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - SITIO PUNTA, PINITAN, SIRUMA, CAMARINES SUR





Technical Planning & Design Section - Line Operation Division Engineering Department

1	Project Name:
	Substation:
1	Feeder No:
	City/Municipality:
1	Remarks:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO GOROYAN, BROY, SAN RAMON, SIRUMA, CAMARINES SUR	
PARTY CO.	

SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary	/ Conductor:	INS#1/0 (TW)
Neutral	Conductor:	BARE#1/0
Ruling	Span:	53.4
	As-Plan	1
	As Built	

SKETCH																TA	KI	NG	SHEE	ET													
See Sheet No.1 to	Pole No.	Pri.	Back en		Pole		Pri Pole Top Unit	Line	Dist Trans	-	Ground. "M2"	-	Guy E	ben.i M		And P	Span	SarUB	Secondary	NO.	12	Drop Mirs	NO. I	Service	NO. I	6	Minc Units	R/V Ri	N	Cons		Remarks	
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Prepared By:

Engr. Dan Van B. Garcia Project Engineer Engr. Richard L Preconcillo Tech'i Plan, SecHead

Engr. Weni LQD, Super

Engr. Wendyl P. Borromeo LQD, Supervisor Recommending Approval:
Engr. Alexander M. Cruz
Engineering Manager

Engr, Edgardo R. Plamonte Acting General Manager



Technical Planning & Design Section - Line Operation Division Engineering Department

1	Project Name:
	Substation:
	Feeder No:
١	City/Municipality:
	Remarks:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO GOROYAN, BRGY, SAN RAMON, SIRUMA, CAMARINES SUR	
SIRUMA	
SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

Primary Conductor:	INS#1/0 (TW)
Neutral Conductor:	BARE#1/0
Ruling Span:	52.9
As-Plan	1
As-Built	

SKETCH							70-12-	Janes Land						Service 1				KI	NG	SHEE	314				P150721									
See Sheet No.2 to	Pole No.		Back		Pole		Pri. Pole Top Unit	Line		Dist Trans		Ground.		Guy *E*	Lead	A	90	Suan	Swill	Secondary	I NO	**	Dose Mire	NO I	Service	NO 5		Moe	R/V	V	Cons		Remarks	
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Prepared By:

Engr. Dam van B. Darcia Project Eggineen Engr. Richard L Precencil

Verified by

Engr. Wendyl P. Borromeo
LOD Supervisor

Engr. Alexander M. Cruz Engineering Manager

Engr Edgardo R. Plamonte Acting General Manager



Technical Planning & Design Section - Line Operation Division Engineering Department

1	Project Name:
1	Substation:
	Feeder No:
١	City/Municipality
	Remarks:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO GOROYAN, BRGY, SAN RAMON, SIRUMA, CAMARINES SUR	
SIRUMA	
SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

Neutro	ry Conductor: al Conductor: a Span:	INS#1/0 (TW) BARE#1/0 55.1
	As-Plan	1
1	As-Built	

SKETCH	No.																	KI	NG	SHE	ET														
See Sheet No.1 to		Ph. Sp	NIT		Pola	-	Top Unit	Line Angle	-	Oret Trans		Ground. "M2"			M		Anc sps	Span	SorUB	Secondary Wire	NO.	25	Drop Mbs		Sine	NO.	70	Misc Units Code		R/W RI		Com		Remarks	
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Prepared By:

Engr. Day Trag B. Garcia Project prignaer

Engr. Richard Preconcillo Tech'l Plan, Sec Head

Eegr. Wendyl P. Borromeo LOD, Supervisor

Recommending Approvat: Engr. Alexander M. Cruz Engineering Manager

Approved By:

Engr. Edgardo R. Plamonte Acting General Manager



Technical Planning & Design Section - Line Operation Division Engineering Department

roi			

Substation: Feeder No: City/Municipality: Remarks:

SIRUMA

SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

XTENSION OF DISTRIBL	UTION LINE ALONG SIT	O GOROYAN, BRGY	SAN RAMON, S	SIRUMA, CAMARINE	S SUR
					ATTAINS .

Primary Conductor: Neutral Conductor: Ruling Span:

INS#1/0 (TW) BARE#1/0 53.5

As-Plan As-Built

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Prepared By: Engr. Dan Ivan B. Garcia Project Engineer

Engr. Richard L. Preconcilio Tech'l Plan, Sec Head

Engr. Wendyl P. Borromeo LOG. Supervisor

Recommending Approval: Engr. Alexander M. Cruz Engineering Manager

Eng Edgardo R. Plamonte Acting General Manager



Technical Planning & Design Section - Line Operation Division Engineering Department

1	Project Name:
1	Substation:
- 1	Feeder No:
	City/Municipality:
	Remarks:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO GOROYAN, BRGY, SAN RAMON, SIRUMA, CAMARINES SUR	
SIRUMA	
SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

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Engr. Dan Tran B. Garcia Project Engineer

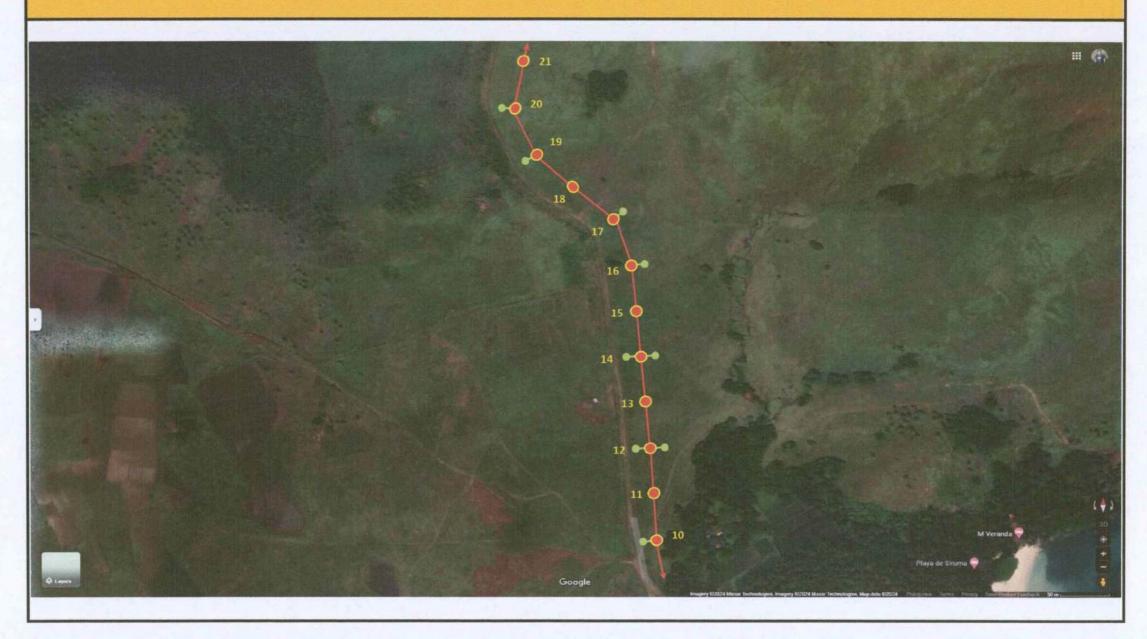
Engr. Richard L. Preconcillo Tech'l Plan, Sec Head

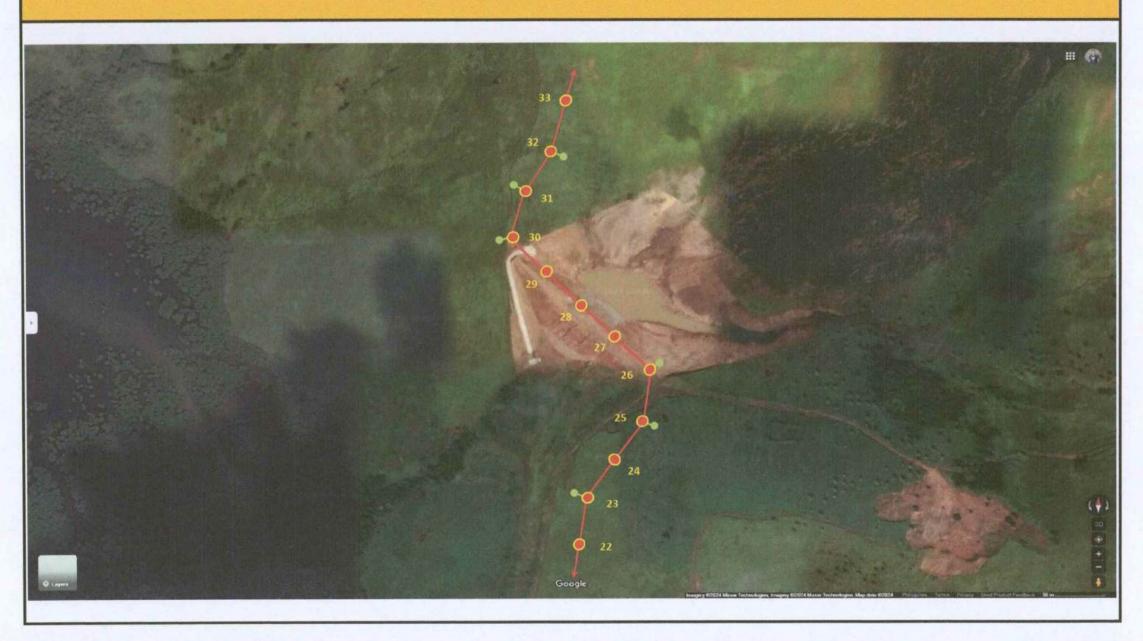
Verified by:
N | |
Engr. Wendyl P. Borromeo
LDD, Supervisor

Engr. Alexander M. Cruz Engineering Manager

Engr. Edgerdo R. Plamonte Acting General Manager









Google



Technical Planning &	Design	Section	- Line	Operation	Division
En	dneerin	g Depart	tment		

Substation: Feeder No: City/Municipality; Remarks :

EXTENSION OF DISTRIBUTION LINE ALONG SITIO LEMONSITOHAN, BRGY, SAN RANGN, SIRUMA, CAMARINES SUR

SIRUMA

SITIO ELECTRIFICATION PROGRAM	(SEP)	PROJECT	- 2024

	Conductor:	INS#1/0 (TW) BARE#1/0
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Prepared By

Engr. Dan Ivan B. Gardia Project Engineer

Engr. Richard L. Preconcillo Techri Plan, Sec Head

Engr. Wendyl P. Borromeo LOD Supervisor

Recommending Approval

Engr. Alexander M. Cruz Engineering Manager

Engr. Edgardo R. Piamonte Acting General Manager



Technical Planning & Design Section - Line Operation Division Engineering Department

	Project Name:
	Substation:
1	Feeder No:
1	City/Municipality:
1	Remarks:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO LEMONSITOHAN, BRGY, SAN RAMON, SIRUMA, CAMARINES SUR	
CIDIIMA	

Primar	y Conductor:	INS#1/0 (TW)
Neutra	Conductor:	BARE#10
Ruling	Span:	54.5
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Prepared By:

Engr. Den Ivan 6. Oarcla Project Engineer

Engr. Richard L. Preconcilio Tech1 Plan, Sec Head

Checkett By:

Verified by:

Engr. Wendyl P. Borromeo
LOD, Supervisor

Recommending Approval: Engr. Alexander M. Cruz Engineering Manager

Engr. Edgardo R. Piamonte Acting General Manager









CAMARINES SUR II ELECTRIC COOPERATIVE, INC. CASURECO II

Del Rosario, Naga City

Technical Planning & Design Section - Line Operation Division Engineering Department

	ect		

Substation: Feeder No: City/Municipality: Remarks:

XTENSION	OF DISTRIBUTION	LINE ALONG SITIO	KINASTELOHAN	BROY, SAN RAN	ION, SIRUMA,	CAMARINES SUR	
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Primary Conductor: Neutral Conductor: Ruling Span:

INS#1/0 (TW) BARE#1/0 53.8

As-Plan As-Built

SKETCH STAKING SHEET See Sheet No.1 to Line Guy Land R/W Pole
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SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Prepared By: Engr. Dag Ivan B. Garcia Project Engineer

Checked By:

Engr. Richard L Preconcillo Tech'i Plan, Sec Head

Engl. Wendyl P. Borromeo LOD Supervisor

Recommending Approval:

1

Engr. Alexander M. Cruz Engineering Manager

Engr. Edgardo R. Plamonte Acting General Manager



Technical Planning & Design Section - Line Operation Division

	Project Name:
	Substation:
ì	Feeder No:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO KINASTILLOHAN, BRGY, SAN RAMON, SIRUMA, CAMARINES SUR	
SIRUMA	

Primary Conductor:	INS#1/0 (TW)
Neutral Conductor:	BARE#1/0
Ruling Span:	56.1
1 1 2 2 1	

City/Municipality: **Engineering Department** Remarks: SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024 As-Buitt SKETCH STAKING SHEET See Sheet No.1 to R/W Cons Pole No. Top Unit Angle Remarks QUAN B Quan H Code (30|SP 39 M2-11A 1 E1-2 1 F2-1 62 S INS#1/0 2 J6 1 30|SP 38 1 E1-2 1 F2-1 55 S INS#1/0 2 37 37 1 30|SP M2-9 56 S INS#1/0 1 J8 1 J5 36 30|SP 2 E1-2 2 F2-1 51 S INS#1/0 2 36 35 53 1Ø 1 35|SP 1 A5 G10-15 M2-11A S INS#1/0 1 36 M5-1 PROPOSED LOCATION OF XFORMER 1 M5-10 2 M5-29 34 55 1Ø 1 35|SP 1 E1-2 1 F2-1 33 56 10 1 35|SP 1 A2 1 E1-2 1 F2-1 32 57 1Ø 1 35|SP 1 F2-1 1 A3 1 E1-2 31 54 10 1 35|SP A3 1 E1-2 1 F2-1 30 54 10 1 35 SP 1 A1 1 M2-9 29 56 10 1 35|SP 1 E1-2 1 F2-1 1 A2 35|SP 28 55 10 1 A6 M2-11A 1 E1-2 1 F2-1 27 57 10 1 35|SP A2 1 E1-2 1 F2-1 1 E1-2 1 F2-1 26 55 10 1 35|SP 1 A2 35|SP 25 54 10 1 A1 M2-9 24 56 10 1 35|SP 1 A1 1 M2-9 23 60 10 1 35|SP 1 E1-2 1 A2 1 F2-1 22 59 10 1 35|SP A1 M2-9 21 57 10 1 35|SP 1 A2 1 E1-2 1 F2-1 35|SP 20 60 10 1 M2-9 1 AI c a CODE CODE 0 CODE 0 CODE a cone G CODE QUAN CODE WIRESIZE Q CODE QUAN C SIZE Q CODE G G CODE contr OC. QUAN 2000 SIZE 30(SP 1PH 4 30|SP 5 35|SP 7 Af M2-9 14 E1-2 14 F2-1 224 S M5-1 PRIMARY INS#1/0 (TW) 1 J5 2PH 16 A2 M2-11A RI-3 M5-10 988 NEUTRAL BARE#1/0 RI- PB 3PH 2 A3 4 2 J7 M5-27 246 SECONDARY INS#1/0 A5 LP 1 J8

Prepared By:

Engr. Dan Ivan B. Garcia Project Engineer

PAGE NO.1 OF

TTL

Checked By: Engr. Richard E. Areconcillo Tech'l Plan, Sec Head

Verified by: Wendy P. Borromeo LOD, Supervisor

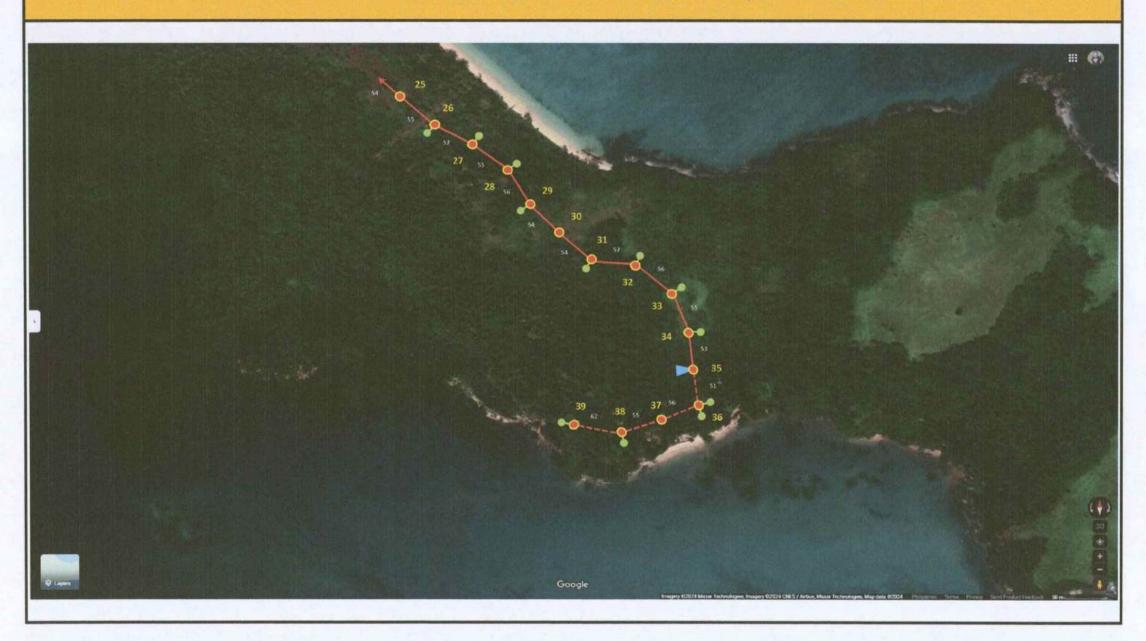
Recommending Approval: Engr. Alexander M. Cruz Engineering Manager

Approved By: Eng. Edgardo R/ Plamonte Acting General Manager

SITE MAP: SITIO KINASTILLOHAN, BRGY. SAN RAMON, SIRUMA, CAMARINES SUR



SITE MAP: SITIO KINASTILLOHAN, BRGY. SAN RAMON, SIRUMA, CAMARINES SUR





Technical Planning & Design Section - Line Operation Division Engineering Department

		me:	

Substation: Feeder No: City/Municipality: Remarks:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO SAN IS	SIDRO, BRGY	BATAAN,	TINAMBAC,	CAMARINES SUR	
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TINAMBAC SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor: Neutral Conductor; Ruling Span: INS#1/0 (TW) BARE#1/0 55.3

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Prepared By: Engr. Dan Ivan B. Garcia Project/Engineer

Engr. Richard L. Preconcillo Tech'i Plan, Sec Head

Verified by: Engr Wendyl P. Borromeo LOD, Supervisor

Engr. Alexander M. Cruz Engineering Manager

Engr Edgardo R. Plamonte Acting General Manager



Technical Planning & Design Section - Line Operation Division Engineering Department

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Substation: Feeder No: City/Municipality: Ramarks:

EXTENSION	OF DISTI	RIBUTION	INE ALON	AG SITTIO SA	AN ISIDRO	BRGY.	BATAAN	TINAMBAC,	CAMARINES SUR	

TINAMBAC
SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

 Primary Conductor:
 INS#1/0 (TW)

 Neutral Conductor:
 BARE#1/0

 Ruling Span:
 54.0

As-Plan
As-Built

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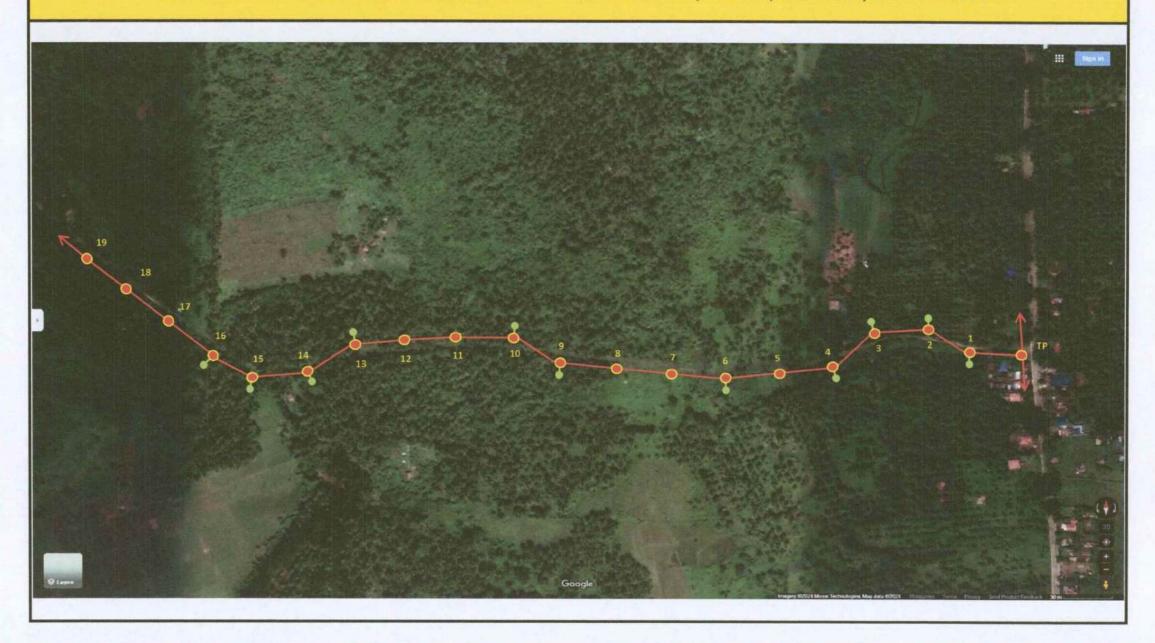
Engr. Dan Ivan B. Garcia Project Engineer Engr. Richard E Preconcilio Tech'l Plan, Sec Head Vertied by: Brigr, Wendyl P. Borromeo LDD, Supervisor Recommending Approval

Engr. Alexander M. Cruz

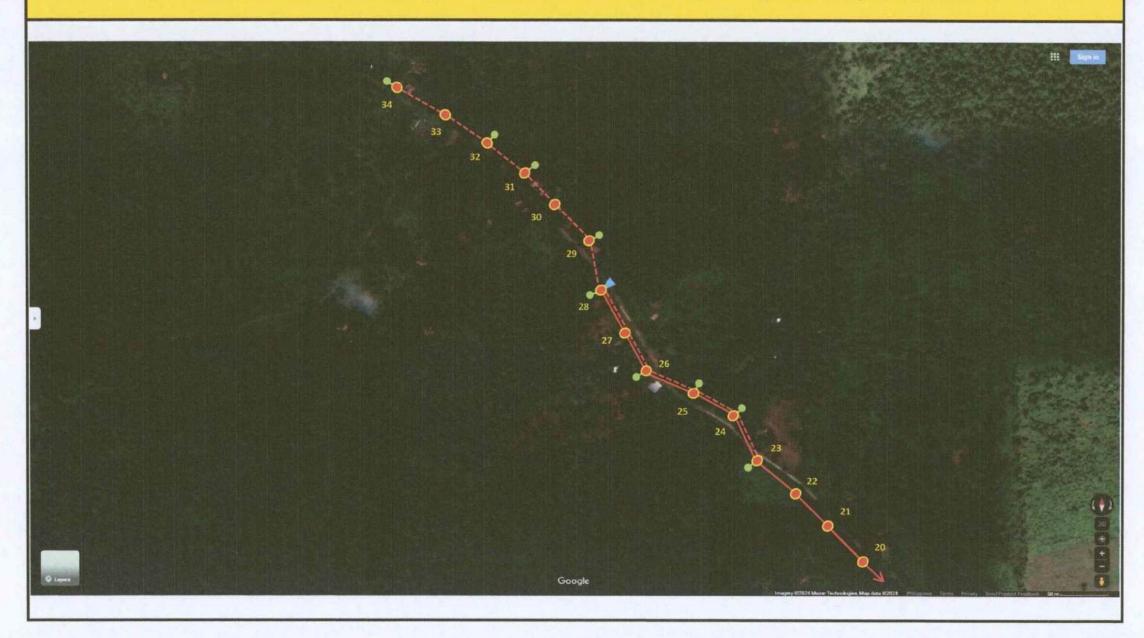
Engineering Manager

Engr. Edgardo R. Plamonte Acting General Manager

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - SITIO SAN ISIDRO, BATAAN, TINAMBAC, CAMARINES SUR



SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - SITIO SAN ISIDRO, BATAAN, TINAMBAC, CAMARINES SUR



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Technical Planning - Line Operation Division Engineering Department

roject Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 4, BRGY. BATAAN, TINAMBAC,

CAMARINES SUR Substation:

Feeder No:
City/Municipality: TINAMBAC

Remarks : SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor:
Neutral Conductor:
Ruling Span:

As-Plan

X

As-Built

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Designed By

Engr. Bernadette T. Sarte Staker / /

Checked By:

Engr. Richard D Preconcillo TPDS Sec Head Verified By:

Engr. Wendyl P. Borromeo LOD Supervisor, Eng'g Recommending Approval:

Engr. Alexander M. Cruz Engineering Manager Approved By:

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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG ZONE 4, BRGY. BATAAN, TINAMBAC,

CAMARINES SUR

Substation: Feeder No:

City/Municipality: Remarks:

TINAMBAC

SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor: Neutral Conductor:

Ruling Span:

As-plan As-Built

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Designed By:

Engr. Bernadette T. Sarte Staker

Checked By:

Engr. Richard L. Preconcillo TPDS Sec. Head

Erigr. Wendyl P. Borromeo LOD Supervisor, Eng'g

Engr. Alexander M. Cruz Engineering Manager

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - ZONE 4, BRGY. BATAAN, TINAMBAC



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Technical Planning - Line Operation Division Engineering Department

oject Name:	EXTENSION OF DISTRIBUTION LINE ALONG SITIO BARIES, BRGY. MANANAO, TINAMBAC,

CAMARINES SUR

Substation: Feeder No:

City/Municipality: TINAMBAC
Remarks: SITIO ELECTI

SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor: Neutral Conductor: Ruling Span:

> As-Plan X As-Built

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Designed By:

Engr. Bernadette T. Sarte Staker Checked By:

Engr. Richard Preconcillo TPDS Sec. Head Verified By:

Engr. Wendyl P. Borromeo LOD Supervisor, Eng'g Recommending Approval:

Engr. Alexander M. Cruz Engineering Manager Approved By:

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Technical Planning - Line Operation Division Engineering Department

Remarks:

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG SITIO BARIES, BRGY. MANANAO, TINAMBAC,	
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Substation:		
Feeder No:		
City/Municipality:	TINAMBAC	
Remarks :	SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024	

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Designed By

Engr. Bernadette T. Sarte Staker

Engr. Richard L. Preconcillo TPDS Sec. Head

Checked By:

Verified By:

Engr. Wendyl P. Borromeo LOD Supervisor,Eng'g

Recommending Approval:

Engr. Alexander M. Cruz Engineering Manager

Approved By:

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Technical Planning - Line Operation Division Engineering Department

Project Name:	EXTENSION OF DISTRIBUTION LINE ALONG SITIO BARIES, BRGY. MANANAO, TINAMBAC,

CAMARINES SUR

Substation: Feeder No:

City/Municipality: T

Remarks : TINAMB

TINAMBAC
SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor: Neutral Conductor:

Ruling Span:

As-Plan X As-Built

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Designed By:

Engr. Bernade te T. Sarte Staker Checked By:

Engr. Richard L. Preconcillo TPDS Sec Head Verified By:

Engr. Wendyl P. Borromeo LCD Supervisor, Eng'g Recommending Approval:

Engr. Alexander M. Cruz Engineering Manager Approved By:

SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 - BRGY. MANANAO, TINAMBAC CAMARINES SUR



Del Rosario, Naga City

Technical Planning - Line Operation Division **Engineering Department**

Project Name:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO LAMING, BRGY. PANTAT, TINAMBAC,

CAMARINES SUR

Substation: Feeder No: City/Municipality:

Remarks:

TINAMBAC

SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor: Neutral Conductor: Ruling Span:

As-Plan	X
As-Built	

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Prepared By:

Engr. Dan Ivan B. Garcia Project Engineer

Engr. Bernadette T. Sarte Staker

Checked By:

Engr. Richard L. Preconcillo

Sec. Head, TPD\$

Verified by:

Engr. Wendyl P. Borromeo

LOD, Supervisor

Recommending Approval:

Engr. Alexander M. Cruz **Engineering Manager**

Approved By:

Del Rosario, Naga City

Technical Planning - Line Operation Division Engineering Department

Project	Mama	

EXTENSION OF DISTRIBUTION LINE ALONG SITIO LAMING, BRGY. PANTAT, TINAMBAC,

CAMARINES SUR

Substation:

Feeder No:

City/Municipality: Remarks:

TINAMBAC

SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor: Neutral Conductor: Ruling Span:

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Prepared By:

Engr. Dan Ivan B. Garcia Project Engineer

Engr. Bernadette T. Sarte Staker

Checked By:

Engr. Richard L. Preconcillo

Sec. Head, TPDS

Verified by:

Engr. Wendyl P. Borromeo

LOD, Supervisor

Recommending Approval:

Engr. Alexander M. Oruz Engineering Manager

Approved By:

Del Rosario, Naga City

Technical Planning - Line Operation Division Engineering Department

ject Name:	EXTENSION OF DISTRIBUTION LIN
	CAMADINES SUD

Substation: Feeder No:

Remarks :

City/Municipality:

NE ALONG SITIO LAMING, BRGY. PANTAT, TINAMBAC,

TINAMBAC

SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

Primary Conductor: Neutral Conductor: Ruling Span:

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Prepared By:

Engr. Dan van B. Garcia Project Engineer

Engr. Bernadette T. Sarte Staker

Checked By:

Engr. Richard L. Preconcillo

Sec. Head, TPDS

Verified by:

Engr. Wendyl P. Borromeo LOD, Supervisor

Recommending Approval:

Engr. Alexander M. Cruz **Engineering Manager**

Approved By:

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	N.

Del Rosario, Naga City

Technical Planning - Line Operation Division Engineering Department

ject	Name:	EXTENSION OF DISTRIBUTION	LIN
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E ALONG SITIO LAMING, BRGY, PANTAT, TINAMBAC,

CAMARINES SUR

Substation: Feeder No:

City/Municipality:

Remarks:

TINAMBAC

SITIO ELECTRIFICATION PROGRAM (SEP) PROJECT - 2024

STAKING SHEET

Primary Conductor: Neutral Conductor: Ruling Span:

> X As-Plan As-Built

SKETCH

SEE SHEET NO.

R/W Line Dist Trans Pri. Back Pole Pri. Pole Ground. Guy Lead Secondary Span Sor UB Wire NO. "J" Drop Mtrs NO. NO. "K" Cons Remarks HC Top Unit "G" Q Code Q Code Q Code Quan Code a Size Q Code Quan Q Code Q Code Code O Code O Code SECONDARY LINE DEADEND 1 F2-1 50 S INS#1/0 2 1 30 SP 1 M2-11A 1 E1-2 39 50 INS#1/0 1,1 J7,J8 M2-9 E1-2 1 F2-1 50 38 50 1 30 SP INS#1/0 1,1 J5, J8 50 5 37 50 1 30 SP M2-9 INS#1/0 1,1 J7,J8 M2-9 E1-2 1 F2-1 50 1 30 SP 36 50 1 M5-1 PRIMARY LINE DEADEND INS#1/0 1,1 J7,J8 1 F2-1 50 10 1 35 SP 1 1 G10-25 1 M2-11A 1 50 1 M5-10 2 M5-29 10 1 35 SP 1 1 F2-1 50 UB INS#1/0 1,1 J7,J8 M2-9 E1-2 50 50 INS#1/0 1,1 J5, J8 10 1 35 SP 1 M2-9 33 50 INS#1/0 1,1 J5, J8 1 1 F2-1 50 M2-9 E1-2 50 10 1 35 SP 1 UB INS#1/0 1,1 J5, J8 1 M2-9 50 10 1 35 SP 1 31 50 Q CODE Q CODE Q CODE Q CODE QUAN C QUAN CODE Q CODE Q CODE Q CODE Q CODE QUAN CODE C Q CODE Q CODE INS#1/0 6 F2-1 PRIMARY G10-25 2 M2-11A 6 E1-2 250 UB INS#1/0 10 5 35 SP 3 BARE #1/0 NEUTRAL 4 30 SP 16 1 M5-10 A2 M2-9 200 SECONDARY INS#1/0 37 A5 J8

Prepared By:

Engr. Dan Ivan B. Garcia

SEE SHEET NO.

Project Engineer

Checked By:

Engr. Richard L. Preconcillo

Sec. Head, TPDS

Verified by:

Engr. Wendyl P. Borromeo

LOD Supervisor

Recommending Approval:

Engr. Alexander M. Cruz

Engineering Manager

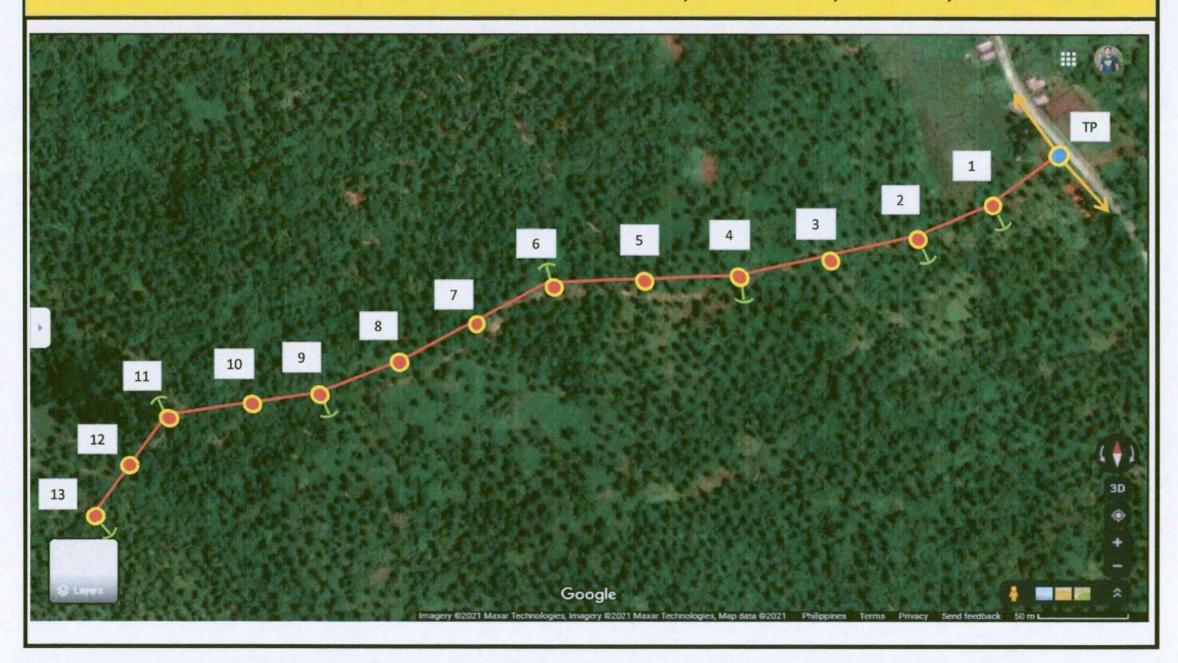
Approved By:

Engr. Edgardo R. Piamonte Acting General Manager

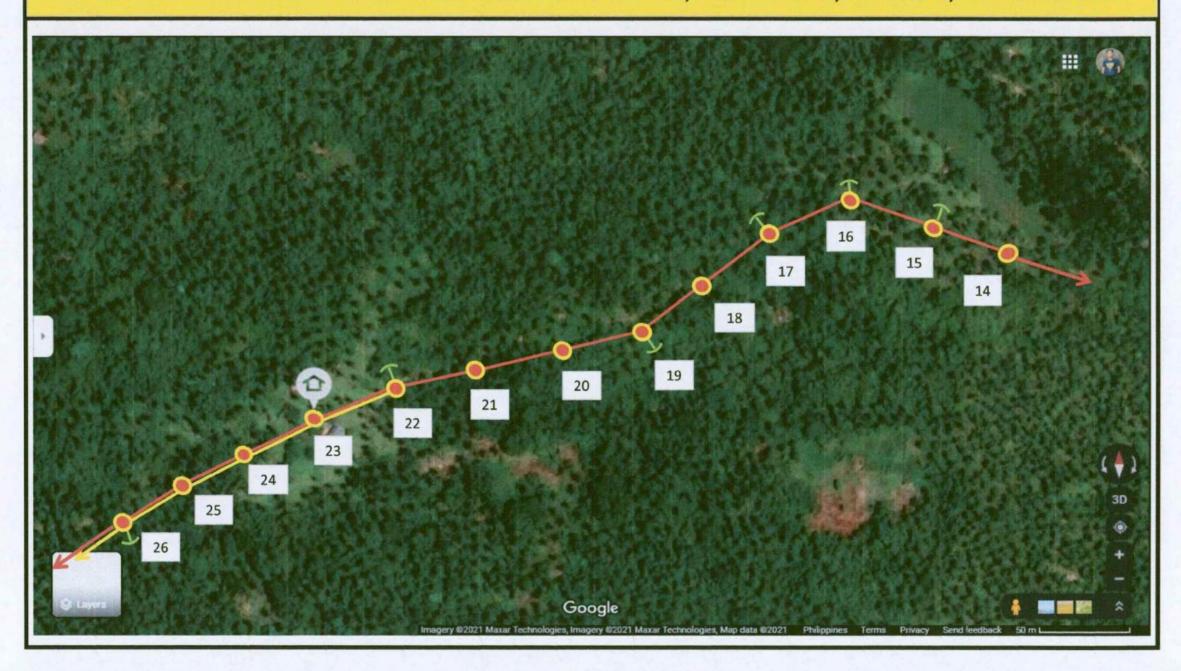
Engr. Bernadette T. Sarte

Staker

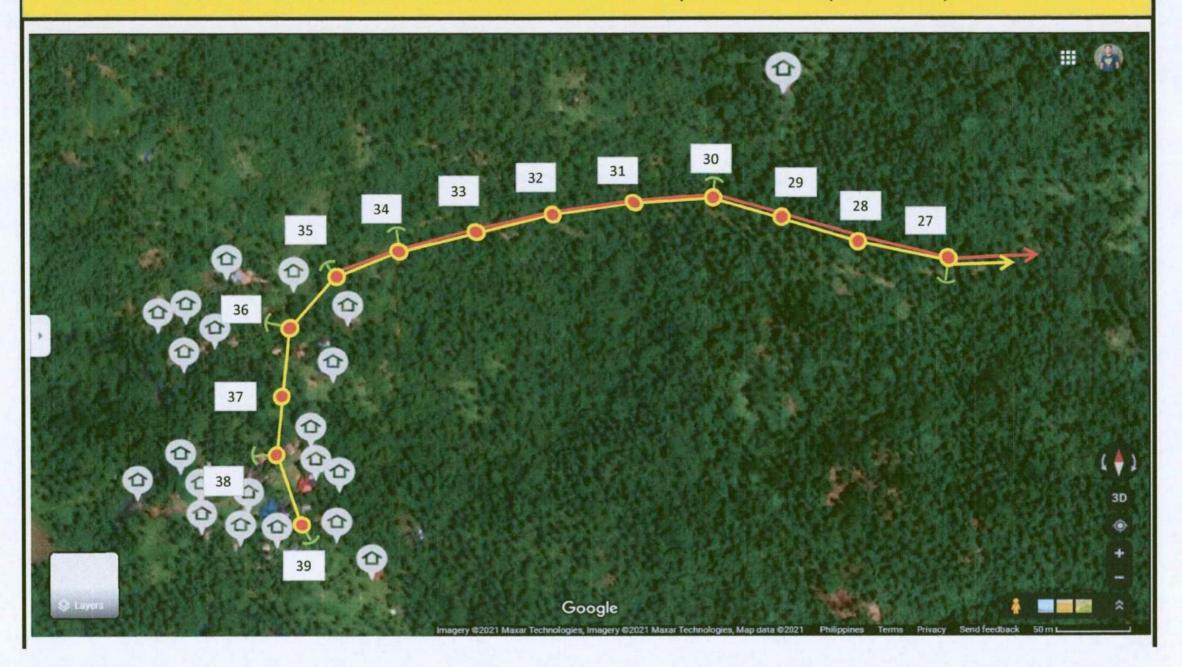
SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 -SITIO LAMING, BRGY. PANTAT, TINAMBAC, CAMARINES SUR



SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 -SITIO LAMING, BRGY. PANTAT, TINAMBAC, CAMARINES SUR



SITE MAP: SITIO ELECTRIFICATION PROGRAM 2024 -SITIO LAMING, BRGY. PANTAT, TINAMBAC, CAMARINES SUR



HOUSE WIRING INSTALLATION



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 7, BRGY. BURABOD, CALABANGA, CAMARINES SUR

BENIFICIARIES						
COUNT	NAME OF BENIFICIARIES	ADDRESS				
1	Fortunato Sales	Zone 7, Brgy. Burabod				
2	Doris Villaraza	Zone 7, Brgy. Burabod				
3	Edwin Echipare	Zone 7, Brgy. Burabod				
4	Shierley Niebiar	Zone 7, Brgy. Burabod				
5	Noel Moreno	Zone 7, Brgy. Burabod				
6	Rysie Echipare	Zone 7, Brgy. Burabod				
7	Edgar Lozano	Zone 7, Brgy. Burabod				
8	Jose Amador Jr.	Zone 7, Brgy. Burabod				
9	Fernando Bernando Jr.	Zone 7, Brgy. Burabod				
10	Ryan Calalo	Zone 7, Brgy. Burabod				
11	Sergio Sales	Zone 7, Brgy. Burabod				
12	Leffrey Rios	Zone Z. Brgv. Burabod				



Del Rosario, Naga City

TECHNICAL PLANNING SECTION
LINE OPERATION DIVISION
ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 4, BRGY. LUGSAD, CALABANGA, CAMARINES SUR

COUNT	NAME OF BENIFICIARIES	ADDRESS
The second second	Allan Martinez	
1		Zone 4, Brgy. Lugsad
2	Leon Florendo	Zone 4, Brgy. Lugsad
3	Alfredo Vergara Jr.	Zone 4, Brgy. Lugsad
4	Sheryl Carera	Zone 4, Brgy. Lugsad
5	Raul Adolfo	Zone 4, Brgy. Lugsad
6	Eddie Florendo	Zone 4, Brgy. Lugsad
7	Joseph Ate	Zone 4, Brgy. Lugsad
8	Zacarias Perez	Zone 4, Brgy. Lugsad
9	Ronie Nevero	Zone 4, Brgy. Lugsad
10	Joel Mendoza	Zone 4, Brgy. Lugsad
11	Alfredo Vergara Sr.	Zone 4, Brgy. Lugsad
12	Aquilino Rosales	Zone 4, Brgy. Lugsad
13	Eden Correa	Zone 4, Brgy. Lugsad
14	Gina Navora	Zone 4, Brgy. Lugsad
15	Ruby Real	Zone 4, Brgy. Lugsad
16	Jonel Calalo	Zone 4, Brgy. Lugsad
17	Christian Calalo	Zone 4, Brgy. Lugsad
18	Michelle Calalo	Zone 4, Brgy. Lugsad
19	Gloria Mirabueno	Zone 4, Brgy. Lugsad
20	Augusto Salcedo	Zone 4, Brgy. Lugsad



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO MAYTAGAS, QUINALE, CALABANGA, CAMARINES SUR

BENIFICIARIES					
COUNT	NAME OF BENIFICIARIES	ADDRESS			
1	Joseph Casaul	Sitio Maytagas, Quinal			
2	Arman Llanas	Sitio Maytagas, Quinal			
3	Teody Llanas	Sitio Maytagas, Quinal			
4	Aljhon Favorito	Sitio Maytagas, Quinal			
5	Nestor Llanas	Sitio Maytagas, Quinal			
6	Jesus Llanas	Sitio Maytagas, Quinal			
7	Randy Calleja	Sitio Maytagas, Quinal			
8	Juan Llanas	Sitio Maytagas, Quinal			
9	Marilou Llanas	Sitio Maytagas, Quinal			
10	Michael Camu	Sitio Maytagas, Quinal			
11	Genelito Llanas	Sitio Maytagas, Quinal			
12	Rolando Llanas	Sitio Maytagas, Quinal			
13	Pedro Buison	Sitio Maytagas, Quinal			
14	Michael Pastor	Sitio Maytagas, Quinal			
15	Joey Taghoy	Sitio Maytagas, Quina			
16	Marvin Buison	Sitio Maytagas, Quinal			
17	Randy Ballaran	Sitio Maytagas, Quinal			
18	Rey Rodriguez	Sitio Maytagas, Quinal			
19	Sonny Llanas	Sitio Maytagas, Quinal			
20	Domingo Llanas Jr.	Sitio Maytagas, Quina			
21	Jomar Llanas	Sitio Maytagas, Quina			
22	Rita Cada	Sitio Maytagas, Quina			
23	Jaime San Joaquin	Sitio Maytagas, Quina			
24	Alvin Vale	Sitio Maytagas, Quina			
25	Raymart Garchitorena	Sitio Maytagas, Quina			
26	Juan Llanas	Sitio Maytagas, Quinal			
27	Marlon Mendes	Sitio Maytagas, Quina			
28	Ginalyn Buban	Sitio Maytagas, Quina			
29	Rodel Delos Santos	Sitio Maytagas, Quina			
30	Jeffrey Llanas	Sitio Maytagas, Quina			
31	Erwin Agapan	Sitio Maytagas, Quina			
32	Roberto Llanas Sr.	Sitio Maytagas, Quina			
33	Roberto Llanas Jr.	Sitio Maytagas, Quina			
34	Gimarie Llanas	Sitio Maytagas, Quina			
35	Eustaquio Dumalasa III Sr.	Sitio Maytagas, Quina			



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 4, BRGY. CABUGAO, MILAOR, CAMARINES SUR

BENIFICIARIES						
COUNT	NAME OF BENIFICIARIES	ADDRESS				
1	Jaime Bermudo	Zone 4, Brgy. Cabugao				
2	Nicanor Bermudo	Zone 4, Brgy. Cabugao				
3	Jenica Bermudo	Zone 4, Brgy. Cabugao				
4	Mae Plaza	Zone 4, Brgy. Cabugao				
5	Christopher Tinoy	Zone 4, Brgy. Cabugao				
6	Romy Tinoy	Zone 4, Brgy. Cabugao				
7	Mary Anne Pabrobaysa	Zone 4, Brgy. Cabugao				
8	Maribel Albo Viola	Zone 4, Brgy. Cabugao				
9	Beverly Albo Januario	Zone 4, Brgy. Cabugao				
10	Ricardo Simplecio	Zone 4, Brgy. Cabugao				
11	Eloisa Narco	Zone 4, Brgy. Cabugao				



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 6, BRGY. DEL SOCCORO, MINALABAC, CAMARINES SUR

	BENIFICIARIES	
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Rosie Alongongan	Zone 6, Brgy. Del Soccord
2	Alex Sabido	Zone 6, Brgy. Del Soccord
3	Rommel Teliy	Zone 6, Brgy. Del Soccord
4	Marites Panon	Zone 6, Brgy. Del Soccord
5	Cristopher Ramos	Zone 6, Brgy. Del Soccord
6	Rochel Ramos	Zone 6, Brgy. Del Soccord
7	Alex Ramos	Zone 6, Brgy. Del Soccord
8	Willy Dela Cruz	Zone 6, Brgy. Del Soccord
9	Edguardo Dela Cruz	Zone 6, Brgy. Del Soccord
10	Mercy Dela Cruz	Zone 6, Brgy. Del Soccord
11	Hilbert Sabido	Zone 6, Brgy. Del Soccord
12	Ramon Lozales	Zone 6, Brgy. Del Soccord
13	Joven Bañega	Zone 6, Brgy. Del Soccord
14	Ramon Nezortado	Zone 6, Brgy. Del Soccord
15	Mark Rosales	Zone 6, Brgy. Del Soccord
16	Jeneleta Almejere	Zone 6, Brgy. Del Soccord
17	Ramil Almediere	Zone 6, Brgy. Del Soccord
18	Alex San Jose	Zone 6, Brgy. Del Soccord
19	Eriberto Bandavia	Zone 6, Brgy. Del Soccord
20	Ruto Almediere Jr.	Zone 6, Brgy. Del Soccord
21	Anita Alano	Zone 6, Brgy. Del Soccord
22	Gilbert Datu	Zone 6, Brgy. Del Soccord
23	Erlyn Delenia	Zone 6, Brgy. Del Soccord
24	Caroline Bandavia	Zone 6, Brgy. Del Soccord
25	Irene Villanueva	Zone 6, Brgy. Del Soccord
26	Aldrib Teliy	Zone 6, Brgy. Del Soccord
27	Ana Rose Bermedo	Zone 6, Brgy. Del Soccord



Del Rosario, Naga City

TECHNICAL PLANNING SECTION
LINE OPERATION DIVISION
ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 3, BRGY. TIMBANG, MINALABAC, CAMARINES SUR

	BENIFICIARIES						
COUNT	NAME OF BENIFICIARIES	ADDRESS					
1	Brehida Aye	Zone 3, Brgy. Timbang					
2	Nenita Vergara	Zone 3, Brgy. Timbang					
3	Elizabeth Alvis	Zone 3, Brgy. Timbang					
4	Lolita Herman	Zone 3, Brgy. Timbang					
5	Richard Herman	Zone 3, Brgy. Timbang					
6	Gretchen De Cena	Zone 3, Brgy. Timbang					
7	Joel Tarin	Zone 3, Brgy. Timbang					
8	Ronald Javier	Zone 3, Brgy. Timbang					
9	Brian Dueña	Zone 3, Brgy. Timbang					
10	Efren Viñas	Zone 3, Brgy. Timbang					
11	Herman Viñas	Zone 3, Brgy. Timbang					
12	Elma Delos Santos	Zone 3, Brgy. Timbang					
13	William Delos Santos	Zone 3, Brgy. Timbang					
14	Hermy Viñas	Zone 3, Brgy. Timbang					
15	Liesel Arroyo	Zone 3, Brgy. Timbang					
16	Nieves Arroyo	Zone 3, Brgy. Timbang					
17	Victor Arroyo	Zone 3, Brgy. Timbang					
18	Joanna Rizza Casilao	Zone 3, Brgy. Timbang					
19	Jines Alson	Zone 3, Brgy. Timbang					
20	Ernesto Delloro	Zone 3, Brgy. Timbang					



CASURECO II

Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 1, BRGY. BINOBONG, PILI, CAMARINES SUR

BENIFICIARIES						
COUNT	NAME OF BENIFICIARIES	ADDRESS				
1	Ronald Satimbre	Zone 1, Brgy. Binobong				
2	Niño Cabaltera	Zone 1, Brgy. Binobong				
3	Bobby Bernardo	Zone 1, Brgy. Binobong				
4	Jesus Langcawon	Zone 1, Brgy. Binobong				
5	Jessa Bondad	Zone 1, Brgy. Binobong				
6	Elizabeth Pamplona	Zone 1, Brgy. Binobong				
7	Cristina Cabaltera	Zone 1, Brgy. Binobong				
8	Marlou V. Felismino	Zone 1, Brgy. Binobong				
9	Maria Gregorio	Zone 1, Brgy. Binobong				
10	Corazon Sagrado	Zone 1, Brgy. Binobong				
11	Jayson Guevara	Zone 1, Brgy. Binobong				
12	Felix Langcawon	Zone 1, Brgy. Binobong				
13	Morio Langcawon	Zone 1, Brgy. Binobong				



CASURECO II

Del Rosario, Naga City

TECHNICAL PLANNING SECTION
LINE OPERATION DIVISION
ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 6, BRGY. BINOBONG, PILI, CAMARINES SUR

	BENIFICIARIES						
COUNT	NAME OF BENIFICIARIES	ADDRESS					
1	Susan Dela Vega	Zone 6, Brgy. Binobong					
2	Vincent Regullano	Zone 6, Brgy. Binobon					
3	Joseph Dela Vega	Zone 6, Brgy. Binobon					
4	Gilbert Cornelio	Zone 6, Brgy. Binobon					
5	Paterno Nelles	Zone 6, Brgy. Binobon					
6	Janeth Carpo	Zone 6, Brgy. Binobon					
7	Cezar Sibulo	Zone 6, Brgy. Binobon					
8	Ruben Sabaybay	Zone 6, Brgy. Binobon					
9	Charlie Cabaliera	Zone 6, Brgy. Binobon					
10	Richard Dela Vega	Zone 6, Brgy. Binobon					
11	Julie Alarcio	Zone 6, Brgy. Binobon					
12	Jennifer Alrcio	Zone 6, Brgy. Binobon					
13	Elizabeth Pamplona	Zone 6, Brgy. Binobon					
14	Jenelyn San Juan	Zone 6, Brgy. Binobon					
15	Dolores Laterna	Zone 6, Brgy. Binobon					
16	Joeji Cornelio	Zone 6, Brgy. Binobon					
17	Melba Valenzuela	Zone 6, Brgy. Binobon					
18	Richard Caballera	Zone 6, Brgy. Binobons					
19	Mariscal Dela Vega	Zone 6, Brgy. Binobons					



Del Rosario, Naga City

TECHNICAL PLANNING SECTION
LINE OPERATION DIVISION
ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 2, BRGY. DEL ROSARIO, PILI, CAMARINES SUR

BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Marilyn Dacleson	Zone 2, Brgy. Del Rosario
2	Jessa Daclison	Zone 2, Brgy. Del Rosario
3	Joel Sanches	Zone 2, Brgy. Del Rosario
4	Honora Saldivar	Zone 2, Brgy. Del Rosario
5	Erick Mansira	Zone 2, Brgy. Del Rosario
6	Theresita Mansira	Zone 2, Brgy. Del Rosario
7	Joy Mansira	Zone 2, Brgy. Del Rosario
8	Sheryl Nagal	Zone 2, Brgy. Del Rosario
9	Geralyn Pañares	Zone 2, Brgy. Del Rosario
10	Mary rose Hernandez	Zone 2, Brgy. Del Rosario



CASURECO II

Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 7, BRGY. PAWILI, PILI,
CAMARINES SUR

BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Salvador De Lima	Zone 7, Brgy. Pawili
2	Gregorio De lima	Zone 7, Brgy. Pawili
3	Edwin Oyardo	Zone 7, Brgy. Pawili
4	Sanny Balvidina	Zone 7, Brgy. Pawili
5	Loreta Borromeo	Zone 7, Brgy. Pawili
6	Denis Beroin	Zone 7, Brgy. Pawili
7	Kennie Oraiz	Zone 7, Brgy. Pawili
8	Marilou Marasigan	Zone 7, Brgy. Pawili
9	Dilla Marasigan	Zone 7, Brgy. Pawili
10	Arlene Villarin	Zone 7, Brgy. Pawili
11	Manuel Borromeo	Zone 7, Brgy. Pawili
12	Avelita Beroin	Zone 7, Brgy. Pawili
13	Henry Laynesa	Zone 7, Brgy. Pawili



Del Rosario, Naga City

TECHNICAL PLANNING SECTION
LINE OPERATION DIVISION
ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO KALEBHOK, BRGY. CABUGAO, SIRUMA, CAMARINES SUR

BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Telma Landyahal	Sitio Kalebhok, Brgy. Cabugao
2	Juniur Barba	Sitio Kalebhok, Brgy. Cabugao
3	Joey Alano	Sitio Kalebhok, Brgy. Cabugao
4	Nestor Alano	Sitio Kalebhok, Brgy. Cabugao
5	Anabelle Bandola	Sitio Kalebhok, Brgy. Cabugao
6	Adella Ella	Sitio Kalebhok, Brgy. Cabugao
7	May Bermejo	Sitio Kalebhok, Brgy. Cabugao
8	Jovito Cabesereno	Sitio Kalebhok, Brgy. Cabugao
9	Ronel San Pascual	Sitio Kalebhok, Brgy. Cabugao
10	Regino Maravilla	Sitio Kalebhok, Brgy. Cabugao
11	Jerryboy Rocas	Sitio Kalebhok, Brgy. Cabugao
12	Shella Agapan	Sitio Kalebhok, Brgy. Cabugao
13	Jun Cornel	Sitio Kalebhok, Brgy. Cabugao
14	Marianito Graspilla	Sitio Kalebhok, Brgy. Cabugao
15	Emmalyn Agapan	Sitio Kalebhok, Brgy. Cabugao
16	Franco Valencia	Sitio Kalebhok, Brgy. Cabugao
17	Edwin Bermejo Jr.	Sitio Kalebhok, Brgy. Cabugao
18	Jone Maravilla	Sitio Kalebhok, Brgy. Cabugao
19	Romeo Maravilla	Sitio Kalebhok, Brgy. Cabugao
20	Edwin Dela Cruz	Sitio Kalebhok, Brgy. Cabugao
21	Nestor Bercacio	Sitio Kalebhok, Brgy. Cabugao
22	Howard San Pascual	Sitio Kalebhok, Brgy. Cabugao
23	lopito Somalde	Sitio Kalebhok, Brgy. Cabugao
24	Merlyn San Pascual	Sitio Kalebhok, Brgy. Cabugao
25	Elisa Jamito	Sitio Kalebhok, Brgy. Cabugao
26	Jerico Delos Reyes	Sitio Kalebhok, Brgy. Cabugao
27	Mario Torcuator	Sitio Kalebhok, Brgy. Cabugao



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG PROPER, BRGY. PAMINTAN-BANTILAN, SIRUMA CAMARINES SUR

BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Mary Joy Bejerano	Proper, Pamintan
2	Elena Verdad	Proper, Pamintan
3	Jenelyn Verdad	Proper, Pamintan
4	Antonio Ramos	Proper, Pamintan
5	Maricar Villarey	Proper, Pamintan
6	Anna Clorita Sison	Proper, Pamintan
7	Eddie Bago	Proper, Pamintan
8	Mary France Ramos	Proper, Pamintan
9	Jubert Alano	Proper, Pamintan
10	Arman Ramos	Proper, Pamintan
11	Macky Ivanes	Proper, Pamintan
12	Adrian Buendia	Proper, Pamintan
13	Israel Alano	Proper, Pamintan
14	Jay Alano	Proper, Pamintan
15	Manilyn Cristobal	Proper, Pamintan
16	Fernando Abrantes	Proper, Pamintan
17	Beata Verdad	Proper, Pamintan
18	Angelina Balanay	Proper, Pamintan
19	Edna Transona	Proper, Pamintan
20	Jeriel Regidor	Proper, Pamintan
21	Genivev Samoy Alano	Proper, Pamintan
22	Ferlan Abad	Proper, Pamintan
23	Diana Lucio	Proper, Pamintan
24	Atanacio Abad	Proper, Pamintan
25	Dolores Abit	Proper, Pamintan
26	Genly Meraña	Proper, Pamintan
27	Rosy Tabilos	Proper, Pamintan
28	Annabelle Bueza Abit	Proper, Pamintan
29	Mariano Abit	Proper, Pamintan
30	Melody Calinao	Proper, Pamintan
31	Nestor Bien	Proper, Pamintan
32	Jerick Narido	Proper, Pamintan
33	Melchor Veldad	Proper, Pamintan
34	Vilma Vergara	Proper, Pamintan
35	John Paul Sarsuela	Proper, Pamintan
36	Jose Delos Santos	Proper, Pamintan
37	Gloria Delos Santos	Proper, Pamintan
38	Rodolfo Simon	Proper, Pamintan



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG PROPER, BRGY. PAMINTAN-BANTILAN, SIRUMA CAMARINES SUR

BENIFICIARIES		
COUNT NAME OF BENIFICIARIES		ADDRESS
39	Eva Magat	Proper, Pamintan
40	Ma. Christina Syching	Proper, Pamintan
41	Annaliza Argente	Proper, Pamintan
42	Sylvia Nase	Proper, Pamintan
43	Marlon Arcilla	Proper, Pamintan



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO PUNTA, PINITAN, SIRUMA
CAMARINES SUR

BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Pia Balingbing	Punta, Pinitan
2	Jose Balingbing	Punta, Pinitan
3	Lisa Balingbing	Punta, Pinitan
4	Larry Belasa	Punta, Pinitan
5	Nida Amto	Punta, Pinitan
6	Edwardo Amto	Punta, Pinitan
7	Manuel Matera Jr.	Punta, Pinitan
8	Noel Alvaro	Punta, Pinitan
9	Kevin Opresco	Punta, Pinitan
10	Joey Soriano	Punta, Pinitan
11	Alberto Calderon	Punta, Pinitan
12	Marlon Saquido	Punta, Pinitan
13	Marivic Benitez	Punta, Pinitan
14	Heart Eden Bañarez	Punta, Pinitan
15	Marivic Soriano	Punta, Pinitan
16	Rachel Bonto	Punta, Pinitan
17	Policarpio Elazar	Punta, Pinitan
18	Joven Santa Rosa	Punta, Pinitan
19	Mariel Bombita	Punta, Pinitan
20	Marvin Valmadrid	Punta, Pinitan
21	Emelina Arevalo	Punta, Pinitan
22	Erol Matero	Punta, Pinitan
23	Richard Matera	Punta, Pinitan
24	Patricio Benetiz Jr.	Punta, Pinitan
25	Miguel Tugenio	Punta, Pinitan
26	Basilio Panwilos	Punta, Pinitan
27	Jason Bonto	Punta, Pinitan
28	Norlito Sta. Ana	Punta, Pinitan
29	Leni Bonto	Punta, Pinitan
30	Josephine Del Rosario	Punta, Pinitan
31	Marilou Aciebar	Punta, Pinitan



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO GOROYAN, SAN RAMON, SIRUMA

CAMARINES SUR

BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Renante Aguado	Sitio Goroyan, San Ramon
2	Oscar Arevalo Jr.	Sitio Goroyan, San Ramon
3	Oscar Arevalo Sr.	Sitio Goroyan, San Ramon
4	Emma Mortallia	Sitio Goroyan, San Ramon
5	Sarlis Ebatuan	Sitio Goroyan, San Ramon
6	Edgard Belga	Sitio Goroyan, San Ramon
7	Josie Ebatuan	Sitio Goroyan, San Ramon
8	Joselito Ebatuan	Sitio Goroyan, San Ramon
9	Joward Mortallia	Sitio Goroyan, San Ramon
10	Richardo Arevalo	Sitio Goroyan, San Ramon
11	Jobert Mortallia	Sitio Goroyan, San Ramon
12	Daisy Belga	Sitio Goroyan, San Ramon
13	Efren Belga Jr.	Sitio Goroyan, San Ramon
14	Nicasio Regencia	Sitio Goroyan, San Ramon
15	Beth Ebatuan	Sitio Goroyan, San Ramon
16	Sorayda Belga	Sitio Goroyan, San Ramon
17	Angelica Arevalo	Sitio Goroyan, San Ramon
18	John Ronald Ebatuan	Sitio Goroyan, San Ramon
19	Manuel Arevalo	Sitio Goroyan, San Ramon
20	Rodolfo Abokui	Sitio Goroyan, San Ramon
21	Henrich Arevalo	Sitio Goroyan, San Ramon
22	Allan Morco	Sitio Goroyan, San Ramon
23	Amelia Araneta	Sitio Goroyan, San Ramon
24	Nerissa Belga	Sitio Goroyan, San Ramon
25	Eva Tendenilla Mortalia	Sitio Goroyan, San Ramon
26	Vicenta Orgaya	Sitio Goroyan, San Ramon
27	Noe Orgaya	Sitio Goroyan, San Ramon
28	Jose Orgaya Jr.	Sitio Goroyan, San Ramon



Del Rosario, Naga City

TECHNICAL PLANNING SECTION
LINE OPERATION DIVISION
ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO LEMONSITUHAN, BRGY. SAN RAMON, SIRUMA, CAMARINES SUR

BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Elena Latre	Sitio Lemonsituhan, San Ramon
2	Lilia Latre	Sitio Lemonsituhan, San Ramon
3	Rochelle Latre	Sitio Lemonsituhan, San Ramon
4	Bicay Hamto	Sitio Lemonsituhan, San Ramon
5	Unsing Hamto	Sitio Lemonsituhan, San Ramon



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO KINASTILLOHAN, BRGY. SAN RAMON, SIRUMA, CAMARINES SUR

BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Romeo Bejerano	Sitio Kinastillohan, San Ramon
2	Ronnie Dela Cruz	Sitio Kinastillohan, San Ramon
3	Jowel Villacoquer	Sitio Kinastillohan, San Ramon
4	Jose Gregorio Jr.	Sitio Kinastillohan, San Ramon
5	Rommel Bejerano	Sitio Kinastillohan, San Ramon
6	Efren Breis	Sitio Kinastillohan, San Ramon
7	Argie Gregorio	Sitio Kinastillohan, San Ramon
8	Shiela Gregorio	Sitio Kinastillohan, San Ramon
9	Gemma Dela Cruz	Sitio Kinastillohan, San Ramon
10	Danilo Dela Cruz	Sitio Kinastillohan, San Ramon



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO SAN ISIDRO, BATAAN, TINAMBAC, CAMARINES SUR

BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Angelina Dolores	Sitio San Isidro, Bataan
2	Rachel Tedria	Sitio San Isidro, Bataar
3	Abel Tedria	Sitio San Isidro, Bataar
4	Rowena Sarmiento	Sitio San Isidro, Bataar
5	Dominic Echaluce	Sitio San Isidro, Bataar
6	Jessica Velez	Sitio San Isidro, Bataar
7	Ceazar Tedria	Sitio San Isidro, Bataar
8	Marichy Sarmiento	Sitio San Isidro, Bataar
9	Ferdinand Belludo Momboy	Sitio San Isidro, Bataar
10	Riza Asaula	Sitio San Isidro, Bataar
11	Pio Sarmiento Jr.	Sitio San Isidro, Bataan
12	Erwin Talisay	Sitio San Isidro, Bataan



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG ZONE 4, BRGY. BATAAN, TINAMBAC, CAMARINES SUR

BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Aiza Reyes	Zone 4, Brgy. Bataan
2	Rubi Robles	Zone 4, Brgy. Bataan
3	Victor Concepcion	Zone 4, Brgy. Bataan
4	Aladin Enciso	Zone 4, Brgy. Bataan
5	Aira Enciso	Zone 4, Brgy. Bataan
6	Roderick San Juan	Zone 4, Brgy. Bataan
7	Marcial Monsalve	Zone 4, Brgy. Bataan
8	Francisco Clisura	Zone 4, Brgy. Bataan
9	Jose Absen	Zone 4, Brgy. Bataan
10	Salde Kalyaw	Zone 4, Brgy. Bataan
11	Joven Taduran	Zone 4, Brgy. Bataan
12	Rexandy Taduran	Zone 4, Brgy. Bataan
13	Alfie Portugal	Zone 4, Brgy. Bataan
14	Danilo Enciso	Zone 4, Brgy. Bataan
15	Bobby Olores	Zone 4, Brgy. Bataan
16	Elpidio Ferrer	Zone 4, Brgy. Bataan
17	Pablito Sotero	Zone 4, Brgy. Bataan
18	Porita Gonzales	Zone 4, Brgy. Bataan
19	Sixto Nanale	Zone 4, Brgy. Bataan
20	Glen Nanale	Zone 4, Brgy. Bataan
21	Rolly Nanale	Zone 4, Brgy. Bataan
22	Virginia Dela Torre	Zone 4, Brgy. Bataan



Del Rosario, Naga City

TECHNICAL PLANNING SECTION
LINE OPERATION DIVISION
ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO BARIES, BRGY. MANANAO, TINAMBAC, CAMARINES SUR

	BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS	
1	Dalipay Gallao Navares	Sitio Baries, Brgy. Mananao	
2	Bienvenido Puric Bedes	Sitio Baries, Brgy. Mananao	
3	Jessabel Orlan Villar	Sitio Baries, Brgy. Mananao	
4	Sarah Fabricante	Sitio Baries, Brgy. Mananao	
5	Josefina M. Bedes	Sitio Baries, Brgy. Mananao	
6	Jeffrey M. Bedes	Sitio Baries, Brgy. Mananao	
7	Calixto L. Villar	Sitio Baries, Brgy. Mananao	
8	Armando Amata	Sitio Baries, Brgy. Mananao	
9	Armando Amata Jr.	Sitio Baries, Brgy. Mananao	
10	Jesica Amata	Sitio Baries, Brgy. Mananao	
11	Adam Amata	Sitio Baries, Brgy. Mananao	
12	Ruel Bandol	Sitio Baries, Brgy. Mananao	
13	Michelle Opena	Sitio Baries, Brgy. Mananao	
14	Rosemarie Dela Rosa	Sitio Baries, Brgy. Mananao	
15	Bobby Abo	Sitio Baries, Brgy. Mananao	
16	Robert Dela Rosa	Sitio Baries, Brgy. Mananao	
17	Elvira Agor	Sitio Baries, Brgy. Mananao	
18	Domingo M. Abo	Sitio Baries, Brgy. Mananao	
19	Amy Delos Santos	Sitio Baries, Brgy. Mananao	
20	Franklin Banes	Sitio Baries, Brgy. Mananao	
21	Michael Quinones	Sitio Baries, Brgy. Mananao	
22	Ronald Estabaya	Sitio Baries, Brgy. Mananao	



Del Rosario, Naga City

TECHNICAL PLANNING SECTION LINE OPERATION DIVISION ENGINEERING DEPARTMENT

SITIO ELECTRIFICATION PROGRAM

PROJECT TITLE:

EXTENSION OF DISTRIBUTION LINE ALONG SITIO LAMING, BRGY. PANTAT,
TINAMBAC, CAMARINES SUR

BENIFICIARIES		
COUNT	NAME OF BENIFICIARIES	ADDRESS
1	Roderick Plandez	Sitio Laming, Brgy. Pantat
2	Hardy Agbones	Sitio Laming, Brgy. Pantat
3	Loven Agbones	Sitio Laming, Brgy. Pantat
4	Arcadio Gaudino	Sitio Laming, Brgy. Pantat
5	Aljhon Plandez	Sitio Laming, Brgy. Pantat
6	Samy Guisec	Sitio Laming, Brgy. Pantat
7	Dante Selpo	Sitio Laming, Brgy. Pantat
8	Ernesto Quimat	Sitio Laming, Brgy. Pantat
9	Elmer Quimat	Sitio Laming, Brgy. Pantat
10	Bandileon Selpo	Sitio Laming, Brgy. Pantat
11	Angie Plandez	Sitio Laming, Brgy. Pantat
12	Lyzel Selpo	Sitio Laming, Brgy. Pantat
13	Flora Plandez	Sitio Laming, Brgy. Pantat
14	Alex Gaudino	Sitio Laming, Brgy. Pantat
15	Apolinario Vargas	Sitio Laming, Brgy. Pantat
16	Domingo Vargas	Sitio Laming, Brgy. Pantat
17	Amada Guisec	Sitio Laming, Brgy. Pantat
18	Gina Alde	Sitio Laming, Brgy. Pantat
19	Juditha Vargas	Sitio Laming, Brgy. Pantat
20	Ruben Bernardino	Sitio Laming, Brgy. Pantat
21	Nicolas Brigerra	Sitio Laming, Brgy. Pantat
22	Gabriel Morena	Sitio Laming, Brgy. Pantat
23	Aflredo Daton	Sitio Laming, Brgy. Pantat

Section VIII. Bill of Quantities

Lot 1

Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Lines for ten (10) Sitios in Calabanga, Milaor, Minalabac, and Pili

Project Description: Construction of Distribution Line in Sitio Zone 7, Barangay Burabod, Calabanga

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	13 pieces
Bolt, Double Upset, 5/8" x 10"	6 pieces
Bolt, Oval Eye, 5/8" x 9"	12 pieces
Bolt, Oval Eye, 5/8" x 10"	13 pieces
Bolt, Machine, 5/8" x 8"	21 pieces
Bolt, Machine, 5/8" x 10"	10 pieces
Bolt, Machine, 5/8" x 12"	4 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	4 pieces
Bolt, Single Upset, 5/8" x 10"	2 pieces
Bracket, Clevis Deadend without Spool	8 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	4 pieces
Clamp, Anchor Rod Bonding, Single Eye	13 pieces
Clamp, Loop Deadend, #1/0 ACSR	32 pieces 4 pieces
Clamp, Deadend Strain, #1/0 ACSR	•
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	26 pieces
Clevis, Secondary Swinging without Spool	2 pieces 19 pieces
Shackle, Anchor, Forged Steel, Galvanized	6 pieces
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	657 meters
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	1,093 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	1,039 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	37 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	1 piece
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	11 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	5 pieces
Cutout and Arrester Combination, Porcelain	2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	8 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	21 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	18 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	12 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Lock, Mf Type, 5/8"	74 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	8 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	13 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	23 sets
Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	5 pieces
Spacer, Pipe, 3/4" x 1-1/2"	4 pieces
Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding	1 unit
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	70 pieces 13 pieces
Wisher, Square, Flat, 4 X 4 X 1/2 With 1/6 Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG	64 feet
Wire, Tie, Insulated, Soft, #4 AWG	116 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	16 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	249 feet
Wire, Guy, Steel, 3/8", 7 Strand	650 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	6 pieces
Pole, Steel, 35', 3.5 mm	10 pieces
Log, Anchor, Concrete, 8" x 4'	13 pieces
	70 P10000

Project Description: Construction of Distribution Line in Sitio Zone 4, Barangay Lugsad, Calabanga

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	20 pieces
Bolt, Double Upset, 5/8" x 10"	21 pieces
Bolt, Oval Eye, 5/8" x 9"	8 pieces
Bolt, Oval Eye, 5/8" x 10" Polt Thimble Fig. 5/8" x 0". Straight Type	30 pieces
Bolt, Thimble Eye, 5/8" x 9", Straight Type Bolt, Machine, 5/8" x 8"	1 piece 58 pieces
Bolt, Machine, 5/8" x 10"	12 pieces
Bolt, Machine, 5/8" x 12"	4 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	19 pieces
Bolt, Single Upset, 5/8" x 10"	4 pieces
Bracket, Clevis Deadend without Spool	10 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	3 pieces
Clamp, Anchor Rod Bonding, Single Eye Clamp, Loop Deadend, #1/0 ACSR	20 pieces 68 pieces
Clamp, Deadend Strain, #1/0 ACSR	4 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	42 pieces
Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	1 piece
Clevis, Secondary Swinging without Spool	35 pieces
Shackle, Anchor, Forged Steel, Galvanized	5 pieces
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	2,218 meters
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	3,550 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	2,529 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	71 pieces
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #10 - #2/0	2 pieces 12 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	8 pieces
Cutout and Arrester Combination, Porcelain	2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	24 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	56 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	33 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	10 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional	7 pieces
Nut, Lock, Mf Type, 5/8" Nut, Thimble Eye, 5/8", Single Eye	154 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	1 piece 24 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	20 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	55 sets
Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	8 pieces
Spacer, Pipe, 3/4" x 1-1/2"	4 pieces
Transformer, Pole Type, Conventional, Amorphous, 25 KVA, Cu-Cu Winding	1 unit
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	153 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	20 pieces
Washer, Square, Curved, 3" x 5"/16" with 11/16" Diameter Hole	1 piece
Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG	184 feet
Wire, Tre, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	308 feet 34 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	430 feet
Wire, Guy, Steel, 3/8", 7 Strand	1,070 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	14 pieces
Pole, Steel, 35', 3.5 mm	27 pieces
Log, Anchor, Concrete, 8" x 4'	20 pieces

Project Description: Construction of Distribution Line in Sitio Maytagas, Barangay Quinale, Calabanga

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	27 pieces
Bolt, Double Upset, 5/8" x 10"	7 pieces
Bolt, Oval Eye, 5/8" x 9"	28 pieces
Bolt, Oval Eye, 5/8" x 10"	36 pieces
Bolt, Machine, 5/8" x 8"	33 pieces
Bolt, Machine, 5/8" x 10"	20 pieces
Bolt, Machine, 5/8" x 12"	20 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	3 pieces
Bolt, Single Upset, 5/8" x 10" Bracket, Clevis Deadend without Spool	7 pieces 18 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	7 pieces
Clamp, Anchor Rod Bonding, Single Eye	27 pieces
Clamp, Loop Deadend, #1/0 ACSR	84 pieces
Clamp, Deadend Strain, #1/0 ACSR	12 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	54 pieces
Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	3 pieces
Clevis, Secondary Swinging without Spool	51 pieces
Shackle, Anchor, Forged Steel, Galvanized	15 pieces
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	1,696 meters
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	2,835 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	2,043 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	74 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	2 pieces
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	15 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod Cutout and Arrester Combination, Porcelain	12 pieces 2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	24 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	56 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	30 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	30 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional	10 pieces
Nut, Lock, Mf Type, 5/8"	148 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	24 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	27 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	44 sets
Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	12 pieces
Spacer, Pipe, 3/4" x 1-1/2"	20 pieces
Transformer, Pole Type, Conventional, Amorphous, 25 KVA, Cu-Cu Winding	1 unit
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	132 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	27 pieces
Wire, Tie, January Soft, #4 AWG	136 feet
Wire, Tie, Insulated, Soft, #4 AWG	276 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	42 feet 549 feet
Wire, Guy, Steel, 3/8", 7 Strand	1,350 feet
Wile, Guy, Steel, 5/6 , 7 Strain	1,330 1661
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	15 pieces
Pole, Steel, 35', 3.5 mm	18 pieces
Log, Anchor, Concrete, 8" x 4'	27 pieces

Project Description: Construction of Distribution Line in Sitio Zone 4, Barangay Cabugao, Milaor

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	10 pieces
Bolt, Double Upset, 5/8" x 10"	16 pieces
Bolt, Oval Eye, 5/8" x 9"	18 pieces
Bolt, Oval Eye, 5/8" x 10"	10 pieces
Bolt, Machine, 5/8" x 8"	40 pieces
Bolt, Machine, 5/8" x 10"	10 pieces
Bolt, Machine, 5/8" x 12"	8 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	15 pieces
Bolt, Single Upset, 5/8" x 10" Bracket, Clevis Deadend without Spool	1 piece 8 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	6 pieces
Clamp, Anchor Rod Bonding, Single Eye	10 pieces
Clamp, Loop Deadend, #1/0 ACSR	36 pieces
Clamp, Deadend Strain, #1/0 ACSR	9 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	20 pieces
Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	1 piece
Clevis, Secondary Swinging without Spool	20 pieces
Shackle, Anchor, Forged Steel, Galvanized	10 pieces
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	3,353 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	1,739 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	36 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	2 pieces
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	15 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod Cutout and Arrester Combination, Porcelain	2 pieces 2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	24 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	49 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	11 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	20 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional	4 pieces
Nut, Lock, Mf Type, 5/8"	118 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	24 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	10 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	59 sets
Rod, Armor, Preformed, #1/0 ACSR, Double Support	4 sets
Rod, Tapping, Preformed, #1/0 ACSR	6 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	2 pieces
Spacer, Pipe, 3/4" x 1-1/2"	8 pieces
Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	1 unit
Washer, Square, Flat, 2-1/4 x 2-1/4 x 3/16 , 13/16 Diameter Hole Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	114 pieces 10 pieces
Washer, Square, Flat, 4 X 4 X 1/2 With 7/6 Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG	360 feet
Wire, Tie, Insulated, Soft, #4 AWG	84 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	18 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	162 feet
Wire, Guy, Steel, 3/8", 7 Strand	500 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	2 pieces
Pole, Steel, 35', 3.5 mm	18 pieces
Log, Anchor, Concrete, 8" x 4'	10 pieces
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Project Description: Construction of Distribution Line in Sitio Zone 6, Barangay Del Socorro, Minalaba

	PROJECT
MATERIALS DESCRIPTION	REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	2 pieces
Bolt, Double Upset, 5/8" x 10"	2 pieces
Bolt, Oval Eye, 5/8" x 10"	2 pieces
Bolt, Machine, 5/8" x 8"	2 pieces
Bolt, Machine, 5/8" x 10"	2 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	2 pieces
Clamp, Anchor Rod Bonding, Single Eye	2 pieces
Clamp, Loop Deadend, #1/0 ACSR	4 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	4 pieces
Clevis, Secondary Swinging without Spool	2 pieces
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	288 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	288 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	8 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	1 piece
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	6 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	1 piece
Cutout and Arrester Combination, Porcelain	1 set
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	2 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	2 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Lock, Mf Type, 5/8"	10 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	2 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	2 sets
Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	1 piece
Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding	1 unit
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	10 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	2 pieces
Wire, Tie, Insulated, Soft, #4 AWG	8 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	2 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	57 feet
Wire, Guy, Steel, 3/8", 7 Strand	100 feet
Concrete/Steel Materials	
Pole, Steel, 35', 3.5 mm	4 pieces
Log, Anchor, Concrete, 8" x 4'	2 pieces
Log, Anonor, Concrete, o x 4	Z pieces

Project Description: Construction of Distribution Line in Sitio Zone 3, Barangay Timbang, Minalabac

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	11 pieces
Bolt, Double Upset, 5/8" x 10"	13 pieces
Bolt, Oval Eye, 5/8" x 9"	4 pieces
Bolt, Oval Eye, 5/8" x 10"	5 pieces
Bolt, Machine, 5/8" x 8"	31 pieces
Bolt, Machine, 5/8" x 10"	8 pieces
Bolt, Machine, 5/8" x 12"	4 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	10 pieces
Bolt, Single Upset, 5/8" x 10"	4 pieces
Bracket, Clevis Deadend without Spool	6 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	3 pieces
Clamp, Anchor Rod Bonding, Single Eye	11 pieces
Clamp, Loop Deadend, #1/0 ACSR	12 pieces
Clamp, Deadend Strain, #1/0 ACSR	2 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	22 pieces
Clevis, Secondary Swinging without Spool	7 pieces
Shackle, Anchor, Forged Steel, Galvanized	2 pieces
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	2,108 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	1,189 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	35 pieces
·	1 piece
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	10 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod Cutout and Arrester Combination, Porcelain	2 pieces 2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	14 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	32 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	8 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	4 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Lock, Mf Type, 5/8"	81 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	14 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	11 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	44 sets
Rod, Armor, Preformed, #1/0 ACSR, Double Support	2 sets
Rod, Tapping, Preformed, #1/0 ACSR	3 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	2 pieces
Spacer, Pipe, 3/4" x 1-1/2"	4 pieces
Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding	1 unit
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	77 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	11 pieces
Wire, Tie, Aluminum Alloy, Soft, #4 AWG	208 feet
Wire, Tie, Insulated, Soft, #4 AWG	72 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	6 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	158 feet
Wire, Guy, Steel, 3/8", 7 Strand	550 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	6 pieces
Pole, Steel, 35', 3.5 mm	13 pieces
Log, Anchor, Concrete, 8" x 4'	11 pieces
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Project Description: Construction of Distribution Line in Sitio Zone 1, Barangay Binobong, Pili

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	8 pieces
Bolt, Double Upset, 5/8" x 10"	12 pieces
Bolt, Oval Eye, 5/8" x 9"	8 pieces
Bolt, Oval Eye, 5/8" x 10"	9 pieces
Bolt, Machine, 5/8" x 8"	16 pieces
Bolt, Machine, 5/8" x 10"	8 pieces
Bolt, Machine, 5/8" x 12"	8 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	4 pieces
Bolt, Single Upset, 5/8" x 10"	8 pieces
Bracket, Clevis Deadend without Spool	6 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	3 pieces
Clamp, Anchor Rod Bonding, Single Eye	8 pieces
Clamp, Loop Deadend, #1/0 ACSR	14 pieces
Clamp, Deadend Strain, #1/0 ACSR Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	2 pieces 16 pieces
Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	2 pieces
Clevis, Secondary Swinging without Spool	13 pieces
Shackle, Anchor, Forged Steel, Galvanized	4 pieces
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	2,092 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	1,362 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	29 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	1 piece
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	10 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	1 piece
Cutout and Arrester Combination, Porcelain	2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	12 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	36 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	7 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	8 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Lock, Mf Type, 5/8"	75 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	12 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	8 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	42 sets
Rod, Armor, Preformed, #1/0 ACSR, Double Support	4 sets
Rod, Tapping, Preformed, #1/0 ACSR	3 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	1 piece
Spacer, Pipe, 3/4" x 1-1/2" Transformer, Pole Type, Conventional, Ameriphous, 15 KVA, Cu Cu Winding	8 pieces
Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding	1 unit
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	67 pieces 8 pieces
Wire, Tie, Aluminum Alloy, Soft, #4 AWG	176 feet
Wire, Tie, Insulated, Soft, #4 AWG	72 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	7 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	114 feet
Wire, Guy, Steel, 3/8", 7 Strand	400 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	9 pieces
Pole, Steel, 35', 3.5 mm	11 pieces
Log, Anchor, Concrete, 8" x 4'	8 pieces
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Project Description: Construction of Distribution Line in Sitio Zone 6, Barangay Binobong, Pili

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	1 piece
Bolt, Double Upset, 5/8" x 10"	7 pieces
Bolt, Oval Eye, 5/8" x 10"	5 pieces
Bolt, Machine, 5/8" x 8"	1 piece
Bolt, Single Upset, 5/8" x 10"	8 pieces
Clamp, Anchor Rod Bonding, Single Eye	1 piece
Clamp, Loop Deadend, #1/0 ACSR	8 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	2 pieces
Clevis, Secondary Swinging without Spool	5 pieces
Conductor, Bare, ACSR #1/0, AWG 6/1	631 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	631 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	10 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	16 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	4 pieces
Nut, Lock, Mf Type, 5/8"	21 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	1 piece
Rod, Armor, Preformed, #1/0 ACSR, Single Support	16 sets
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	21 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	1 piece
Wire, Tie, Insulated, Soft, #4 AWG	32 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	4 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	29 feet
Wire, Guy, Steel, 3/8", 7 Strand	50 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	9 pieces
Log, Anchor, Concrete, 8" x 4'	1 piece

Project Description: Construction of Distribution Line in Sitio Zone 2, Barangay Del Rosario, Pili

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	3 pieces
Bolt, Oval Eye, 5/8" x 10"	6 pieces
Bolt, Machine, 5/8" x 8"	3 pieces
Bolt, Single Upset, 5/8" x 10"	2 pieces
Clamp, Anchor Rod Bonding, Single Eye	3 pieces
Clamp, Loop Deadend, #1/0 ACSR	8 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	6 pieces
Clevis, Secondary Swinging without Spool	6 pieces
Conductor, Bare, ACSR #1/0, AWG 6/1	181 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	181 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	7 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	1 piece
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	4 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	4 pieces
Nut, Lock, Mf Type, 5/8"	11 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	3 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	4 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	1 piece
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	11 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	3 pieces
Wire, Tie, Insulated, Soft, #4 AWG	8 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	4 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	43 feet
Wire, Guy, Steel, 3/8", 7 Strand	150 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	3 pieces
Log, Anchor, Concrete, 8" x 4'	3 pieces

Project Description: Construction of Distribution Line in Sitio Zone 7, Barangay Pawili, Pili

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	22 pieces
Bolt, Double Upset, 5/8" x 10"	17 pieces
Bolt, Oval Eye, 5/8" x 9"	14 pieces
Bolt, Oval Eye, 5/8" x 10"	21 pieces
Bolt, Machine, 5/8" x 8"	66 pieces
Bolt, Machine, 5/8" x 10"	12 pieces
Bolt, Machine, 5/8" x 12"	8 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	22 pieces
Bolt, Single Upset, 5/8" x 10" Bracket, Clevis Deadend without Spool	1 piece
Bracket, Transformer Pole Mounting for Single Transformer	10 pieces 2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	3 pieces
Clamp, Anchor Rod Bonding, Single Eye	22 pieces
Clamp, Loop Deadend, #1/0 ACSR	38 pieces
Clamp, Deadend Strain, #1/0 ACSR	2 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	44 pieces
Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	5 pieces
Clevis, Secondary Swinging without Spool	28 pieces
Shackle, Anchor, Forged Steel, Galvanized	7 pieces
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	4,996 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	2,312 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	63 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	1 piece
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	10 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	1 piece
Cutout and Arrester Combination, Porcelain Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	2 sets
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	30 pieces 59 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	19 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	14 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional	4 pieces
Nut, Lock, Mf Type, 5/8"	159 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	30 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	22 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	86 sets
Rod, Armor, Preformed, #1/0 ACSR, Double Support	4 sets
Rod, Tapping, Preformed, #1/0 ACSR	3 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	1 piece
Spacer, Pipe, 3/4" x 1-1/2"	8 pieces
Transformer, Pole Type, Conventional, Amorphous, 25 KVA, Cu-Cu Winding	1 unit
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	151 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	22 pieces
Wire, Tie, Ingulated, Soft, #4 AWG	488 feet
Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	108 feet 19 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	202 feet
Wire, Glounding, Aldmindin Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand	1,100 feet
Concrete/Steel Materials	,
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Pole, Steel, 30', 3.5 mm	6 pieces
Pole, Steel, 35', 3.5 mm	32 pieces
Log, Anchor, Concrete, 8" x 4'	22 pieces

Lot 2

Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Lines for ten (10) Sitios in Siruma and Tinambac

Project Description: Construction of Distribution Line in Sitio Kalebhok, Barangay Cabugao, Siruma

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	16 pieces
Bolt, Double Upset, 5/8" x 10"	5 pieces
Bolt, Oval Eye, 5/8" x 9"	6 pieces
Bolt, Oval Eye, 5/8" x 10"	11 pieces
Bolt, Machine, 5/8" x 8"	24 pieces
Bolt, Machine, 5/8" x 10"	11 pieces
Bolt, Machine, 5/8" x 12"	6 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8" Bolt, Single Upset, 5/8" x 10"	2 pieces
Bracket, Clevis Deadend without Spool	5 pieces 6 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	2 pieces
Clamp, Anchor Rod Bonding, Single Eye	16 pieces
Clamp, Loop Deadend, #1/0 ACSR	28 pieces
Clamp, Deadend Strain, #1/0 ACSR	5 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	32 pieces
Clevis, Secondary Swinging without Spool	16 pieces
Shackle, Anchor, Forged Steel, Galvanized	5 pieces
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	733 meters
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	1,126 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	834 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	39 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	3 pieces
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	10 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	7 pieces
Connector, Split Bolt Cutout and Arrester Combination, Porcelain	1 piece 2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 3	10 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	24 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	10 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	10 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional	6 pieces
Nut, Lock, Mf Type, 5/8"	68 pieces
Pin, Pole Top, Channel, 1" Thread, 20" Long	10 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	16 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	20 sets
Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	7 pieces
Spacer, Pipe, 3/4" x 1-1/2"	6 pieces
Staple, Groundwire, 1/2" x 2"	6.13 pounds
Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding	1 unit
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	73 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG	16 pieces 56 feet
Wire, Tie, Insulated, Soft, #4 AWG	120 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	14 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	359 feet
Wire, Guy, Steel, 3/8", 7 Strand	800 feet
Timber/Concrete Materials	
Pole, Wood, 30', Class 1, US	7 pieces
Pole, Wood, 35', Class 3, US	6 pieces
Pole, Wood, 45', Class 3, US	2 pieces
Log, Anchor, Concrete, 8" x 4'	16 pieces
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Project Description: Construction of Distribution Line in Sitio Proper, Barangay Pamintan-Bantilan, Siruma

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MATERIALS DESCRIPTION	REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter Bolt, Double Upset, 5/8" x 10"	15 pieces 3 pieces
Bolt, Oval Eye, 5/8" x 9"	10 pieces
Bolt, Oval Eye, 5/8" x 10"	32 pieces
Bolt, Thimble Eye, 5/8" x 9", Straight Type Bolt, Machine, 5/8" x 8"	1 piece
Bolt, Machine, 5/8" x 10"	19 pieces 16 pieces
Bolt, Machine, 5/8" x 12"	2 pieces
Bolt, Machine, 5/8" x 14"	8 pieces
Bolt, Machine, 5/8" x 18" Bolt, Single Upset, 5/8" x 8"	1 piece 1 piece
Bolt, Single Upset, 5/8" x 10"	1 piece
Bracket, Clevis Deadend without Spool	12 pieces
Bracket, Transformer Pole Mounting for Single Transformer	4 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0 Clamp, Anchor Rod Bonding, Single Eye	6 pieces 15 pieces
Clamp, Loop Deadend, #1/0 ACSR	76 pieces
Clamp, Deadend Strain, #1/0 ACSR	6 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel Clevis, Secondary Swinging without Spool	32 pieces 38 pieces
Shackle, Anchor, Forged Steel, Galvanized	6 pieces
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	194 meters
Conductor, Bare, ACSR #2, AWG 6/1	2 meters
Conductor, Bare, ACSR #1/0, AWG 6/1 Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	850 meters 4 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	850 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	44 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2 Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	3 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	17 pieces 12 pieces
Cutout and Arrester Combination, Porcelain	2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 3	4 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 Insulator, Spool, 3", ANSI, Class 53 - 4	21 pieces 34 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	12 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional Nut, Lock, Mf Type, 5/8"	11 pieces
Nut, Thimble Eye, 5/8", Single Eye	83 pieces 1 piece
Pin, Pole Top, Channel, 1" Thread, 20" Long	4 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	15 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support Rod, Tapping, Preformed, #1/0 ACSR	17 sets 4 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	12 pieces
Spacer, Pipe, 3/4" x 1-1/2"	2 pieces
Staple, Groundwire, 1/2" x 2" Transformer, Pole Type, Conventional, Amorphous, 25 KVA, Cu-Cu Winding	10.50 pounds 1 unit
Truss Guy for Down Guy	1 set
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	82 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	15 pieces
Washer, Square, Curved, 3" x 3" x 5/16" with 11/16" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG	1 piece 24 feet
Wire, Tie, Insulated, Soft, #4 AWG	88 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	38 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand	536 feet 820 feet
Timber/Concrete/Steel/Fiber Materials	
Pole, Wood, 30', Class 1, US	12 pieces
Pole, Steel, 30', 3.5 mm	1 piece
Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm	2 pieces 3 pieces
Log, Anchor, Concrete, 8" x 4'	15 pieces
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Project Description: Construction of Distribution Line in Sitio Punta, Barangay Pinitan, Siruma

Attachment, Guy, Malleable Type with 11/16" Hole Diameter	MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Bolt, Oval Eye, 5/8" x 9" 10 pieces Bolt, Machine, 5/8" x 10" 23 pieces Bolt, Machine, 5/8" x 10" 14 pieces Bolt, Machine, 5/8" x 10" 17 pieces Bolt, Machine, 5/8" x 12" 12 pieces Bolt, Machine, 5/8" x 14" 4 pieces Bolt, Single Upset, 5/8" x 10" 1 piece Bolt, Single Upset, 5/8" x 10" 1 piece Bracket, Clevis Deadend without Spool 15 pieces Bracket, Transformer Pole Mounting for Single Transformer 2 sets Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0 3 pieces Clamp, Loy Deadend, \$110 ACSR 6 pieces Clamp, Loy Straight, 3 Bolt, Heavy Duty Steel 28 pieces Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel 28 pieces Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel 28 pieces Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel 28 pieces Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clamp, Loy Straight, 3 Bolt, Heavy Duty Steel 28 pieces Clamp, Loy Straight, 3 Bolt, Heavy Duty Steel 3 pieces Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel 3 pieces	Attachment, Guy, Malleable Type with 11/16" Hole Diameter	14 pieces
Bolt, Wachine, 5/8" x 10" 14 pieces Bolt, Machine, 5/8" x 10" 17 pieces Bolt, Machine, 5/8" x 10" 17 pieces Bolt, Machine, 5/8" x 10" 12 pieces Bolt, Machine, 5/8" x 14" 4 pieces Bolt, Machine, 5/8" x 14" 4 pieces Bolt, Single Upset, 5/8" x 10" 1 piece Bolt, Single Upset, 5/8" x 10" 1 pieces Bott, Machine, 5/8" x 14" 4 pieces Bott, Machine, 5/8" x 10" 1 pieces Bracket, Clevis Deadend without Spool 3 pieces Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0 3 pieces Clamp, Doop Deadend, #1/0 ACSR 6 pieces Clamp, Doop Deadend, #1/0 ACSR 6 pieces Clamp, Dudender Strain, #1/0 ACSR 6 pieces Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clamp, Suspension, Machine, Wing Advanced 6 pieces Clamp, Suspension, Machine,	Bolt, Double Upset, 5/8" x 10"	2 pieces
Bolt, Machine, 5/8" x 10" 14 pieces Bolt, Machine, 5/8" x 10" 17 pieces Bolt, Machine, 5/8" x 12" 12 pieces Bolt, Machine, 5/8" x 14" 4 pieces Bolt, Single Upset, 5/8" x 10" 1 piece Bolt, Single Upset, 5/8" x 10" 1 piece Bracket, Clevis Deadend without Spool 15 pieces Bracket, Transformer Pole Mounting for Single Transformer 2 sets Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0 3 pieces Clamp, Loop Deadend, #1/0 ACSR 6 pieces Clamp, Loop Deadend, #1/0 ACSR 6 pieces Clamp, Deadend Strain, #1/0 ACSR 6 pieces Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 pieces Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 pieces Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV) 606 meters Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (80 V) 1 meter Conductor, Insulated, ACSR #2, AWG 6/1 (600 V) 2 meters Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2 3 pieces Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #1/0 - #2/0 12 pieces		10 pieces
Bolt, Machine, 5/8" x 10" 17 pieces Bolt, Machine, 5/8" x 12" 12 pieces Bolt, Machine, 5/8" x 14" 4 pieces Bolt, Single Upset, 5/8" x 10" 1 piece Bracket, Clevis Deadend without Spool 15 pieces Bracket, Transformer Pole Mounting for Single Transformer 2 sets Clamp, Anchor Rod Bonding, Single Eye 14 pieces Clamp, Loop Deadend, #1/0 ACSR 6 pieces Clamp, Dudendend Strain, #1/0 ACSR 6 pieces Clamp, Dudendend Strain, #1/0 ACSR 6 pieces Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel 28 pieces Clamp, Suppassion, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clamp, Suppassion, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clamp, Suppassion, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clamp, Suppassion, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 pieces Clamp, Suppassion, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 pieces Clamp, Suppassion, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 pieces Clamp, Suppassion, 4 Suppassion, 4 Suppassion, 4 Suppassion, 4 Suppassion, 4 Suppassion, 4 Suppassion, 4 Suppassion, 4 Suppassion, 4 Suppassion, 4 Suppass		'
Bolt, Machine, 5/8" x 12" 4 pieces Bolt, Kachine, 5/8" x 10" 1 piece Bolt, Single Upset, 5/8" x 10" 1 piece Bracket, Clevis Deadend without Spool 15 pieces Bracket, Clevis Deadend without Spool 3 pieces Clamp, Hor Line, #2 - #2/0 ACSR Main to #2 - #2/0 3 pieces Clamp, Loop Deadend, #1/0 ACSR 56 pieces Clamp, Loop Deadend, #1/0 ACSR 6 pieces Clamp, Deadend Strain, #1/0 ACSR 6 pieces Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 pieces Conductor, Insulated, ACSR #1/0 AWG Bolf 30 pieces Shackle, Anchor, Forged Steel, Galvanized 7 pieces Conductor, Insulated, ACSR #1/0, AWG Bolf 1 meter Conductor, Insulated, ACSR #1/0, AWG Bolf 1 meter Conductor, Insulated, ACSR #1/0, AWG Bolf 1 meters Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 3 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Culout and Arrester Combination		•
Bolt, Marchine, 5/8" x 14" 4 pieces Bracket, Clevis Deadend without Spool 15 pieces Bracket, Transformer Pole Mounting for Single Transformer 2 sets Clamp, Hot Line, #2 + #2/0 ACSR Main to #2 - #2/0 3 pieces Clamp, Anchor Rod Bonding, Single Eye 14 pieces Clamp, Deadend, #1/0 ACSR 6 pieces Clamp, Deadend Strain, #1/0 ACSR 6 pieces Clamp, Duspersion, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clamp, Suppersion, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 30 pieces Clamp, Suppersion, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clevis, Secondary Swinging without Spool 30 pieces Shackle, Anchor, Forgad Steel, Galvanized 7 pieces Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (500 V) 606 meters Conductor, Insulated, ACSR #2, AWG 6/1 1,150 meters Conductor, Insulated, ACSR #2, AWG 6/1 (600 V) 1,150 meters Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 3 pieces Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #1/0 - #2/0 12 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Conne		
Bolt, Single Upset, 5/8" x 10" 1 piece Bracket, Clevis Deadend without Spool 15 pieces Bracket, Transformer Pole Mounting for Single Transformer 2 sets Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0 3 pieces 14 pieces 14 pieces 14 pieces 14 pieces 14 pieces 14 pieces 14 pieces 14 pieces 14 pieces 14 pieces 14 pieces 14 pieces 14 pieces 14 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pieces 15 pi		•
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Bracket, Transformer Pole Mounting for Single Transformer 2 sets Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0 3 pieces Clamp, Anchor Rod Bonding, Single Eye 14 pieces Clamp, Loop Deadend, #1/0 ACSR 56 pieces Clamp, Daddend Strain, #1/0 ACSR 28 pieces Clamp, Daddend Strain, #1/0 ACSR 28 pieces Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clevis, Secondary Swinging without Spool 30 pieces Shackle, Anchor, Forged Steel, Galvanized 7 pieces Conductor, Insulated, Tew Wire, ACSR #1/0, AWG 6/1 (23 KV) 606 meters Conductor, Insulated, ACSR #2, AWG 6/1 1,150 meters Conductor, Insulated, ACSR #2, AWG 6/1 (600 V) 2 meters Connector, Compression, YHO 150, 43 - #1/0 ACSR Run To #6 - #2 37 pieces Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2 3 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Cuntu and Arrester Combination, Porcelain 2 sets Insulator, Spool, 1-3/4", ANSI, Class 53 - 4 25 pieces Insulator, Spool, 1-3/4", ANSI, Class 55 - 5 14 pieces Insulator, Spool, 1-3/4", ANSI, Class 56 - 5 <td></td> <td>· · · · · · · · · · · · · · · · · · ·</td>		· · · · · · · · · · · · · · · · · · ·
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Clamp, Loop Deadend, #1/0 ACSR 56 pieces Clamp, Deadend Strain, #1/0 ACSR 6 pieces Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel 28 pieces Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel 28 pieces Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clevis, Secondary Swinging without Spool 30 pieces Shackle, Anchor, Forged Steel, Galvanized 7 pieces Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV) 606 meters Conductor, Bare, ACSR #2, AWG 6/1 1,150 meters Conductor, Insulated, ACSR #2, AWG 6/1 (600 V) 2 meters Conductor, Insulated, ACSR #3, AWG 6/1 (600 V) 1,150 meters Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 37 pieces Connector, Compression, YHD 200, #1/0 - #2/0 ACSR Run To #6 - #2 3 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Cutout and Arrester Combination, Porcelain 2 sets Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 23 pieces Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 23 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 14 pieces Nut, Lock, Mit Type, 5/8"	·	
Clamp, Deadend Strain, #1/0 ACSR 6 pieces Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel 28 pieces Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 pieces Clevis, Secondary Swinging without Spool 30 pieces Shackle, Anchor, Forged Steel, Galvanized 7 pieces Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 1 meter Conductor, Bare, ACSR #2, AWG 6/1 1,150 meters Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V) 2 meters Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V) 1,150 meters Connector, Compression, YHO 150, #3 *#1/0 ACSR Run To #6 - #2 37 pieces Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2 3 pieces Connector, Ground Rod (Clamp) for 5/8* Steel Rod 9 pieces Connector, Ground Rod (Clamp) for 5/8* Steel Rod 9 pieces Cutout and Arrester Combination, Porcelain 2 sets Insulator, Porcelain, ANSI, Class 53 - 2 23 pieces Insulator, Spool, 1-3/4*, ANSI, Class 53 - 2 23 pieces Insulator, Spool, 3*, ANSI, Class 53 - 4 25 pieces Insulator, Suspension, 6*, Porcelain, Clevis Type 14 pieces Nut, Lock, Mf Type, 5/8*		•
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel 28 pieces Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clevis, Secondary Swinging without Spool 30 pieces Shackle, Anchor, Forged Steel, Galvanized 7 pieces Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV) 606 meters Conductor, Bare, ACSR #2, AWG 6/1 1 meter Conductor, Bare, ACSR #2, AWG 6/1 1,150 meters Conductor, Insulated, ACSR #2, AWG 6/1 (600 V) 2 meters Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V) 2 meters Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V) 2 meters Connector, Compression, YHO 150, #3 *#1/0 ACSR Run To #6 * #2 37 pieces Connector, Compression, YHO 200, #1/0 *#2/0 ACSR Run To #6 *#2 37 pieces Connector, Compression, YHO 300, #1/0 *#2/0 ACSR Run To #6 *#2 37 pieces Connector, Ground Rod (Clamp) for 5/8 Steel Rod 9 pieces Cutout and Arrester Combination, Porcelain 2 sets Insulator, Pin Type, Porcelain, ANSI, Class 55 * 5 14 pieces Insulator, Pin Type, Porcelain, ANSI, Class 53 * 2 23 pieces Insulator, Spool, 3", ANSI, Class 53 * 2 23 pieces Insulator, Spool, 3", ANSI, Class 53 * 2 25 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 14 pieces Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes 2 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", 7 Strand 10 pieces Nut, Eye, 5/8", 7 Strand 10 piece		· ·
Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum) 1 piece Clevis, Secondary Swinging without Spool 30 pieces Shackle, Anchor, Forged Steel, Galvanized 7 pieces Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV) 606 meters Conductor, Bare, ACSR #2, AWG 6/1 1 meter Conductor, Bare, ACSR #1/0, AWG 6/1 (600 V) 2 meters Conductor, Insulated, ACSR #2, AWG 6/1 (600 V) 2 meters Conductor, Insulated, ACSR #2, AWG 6/1 (600 V) 1,150 meters Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V) 1,150 meters Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 3 pieces Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 3 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Cutout and Arrester Combination, Porcelain 2 sets Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5 14 pieces Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 23 pieces Insulator, Spool, 3", ANSI, Class 53 - 2 25 pieces Insulator, Spool, 3", ANSI, Class 53 - 4 25 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 14 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Eye, 5/8", Conventional 10 pieces Rod, Anchor, Threaded, Single Eye, 5/8" x 7 14 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 10 pieces Rod, Ground Steel, Galvanized, 5/8" x 10' 10 pieces Rod, Ground Steel, Galvanized, 5/8" x 10' 10 pieces Rod, Ground Steel, Galvanized, 5/8" x 10' 10 pieces Rod, Ground Steel, Galvanized, 5/8" x 10'		· ·
Clevis, Secondary Swinging without Spool 30 pieces		
Shackle, Anchor, Forged Steel, Galvanized		· · · · · · · · · · · · · · · · · · ·
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV) 606 meters Conductor, Bare, ACSR #2, AWG 6/1 1 meter Conductor, Bare, ACSR #2, AWG 6/1 (600 V) 2 meters Conductor, Insulated, ACSR #2, AWG 6/1 (600 V) 2 meters Conductor, Insulated, ACSR #2, AWG 6/1 (600 V) 3 1,150 meters Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V) 4 1,150 meters Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 3 pieces Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2 3 pieces Connector, Compression, YHO 300, #1/0 - #2/0 ACSR Run To #6 - #2 3 pieces Connector, Compression, YHO 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0 2 12 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Cutout and Arrester Combination, Porcelain 2 sets Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5 14 pieces Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 2 23 pieces Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 2 23 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 14 pieces Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes 2 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Lock, Mf Type, 5/8" 75 pieces Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long 14 pieces Rod, Anchor, Threaded, Single Eye, 5/8" x 7 14 pieces Rod, Arnor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Tapping, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Tapping, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Washer, Square, Flat, 4" x 1-1/2" x 2-1/4" x 3/16", 13/16" Diameter Hole 71 pieces Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole 71 pieces Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole 71 pieces Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole 72 feet Wire, Tie, Aluminum Alloy, Soft, #4 AWG 409 feet Wire, Tape, Armor, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Tape, Armor, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Tape, Armor, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Suy, Steel, 3/8", 7 Strand 700 feet Pole, St		
Conductor, Bare, ACSR #1/0, AWG 6/1 Conductor, Insulated, ACSR #2, AWG 6/1 (600 V) Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V) Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V) Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2 Connector, Compression, YHO 300, #1/0 - #2/0 ACSR Run To #6 - #2 Connector, Ground Rod (Clamp) for 5/8" Steel Rod Connector, Ground Rod (Clamp) for 5/8" Steel Rod Cutout and Arrester Combination, Porcelain Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5 Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis Type Insulator, Suspension, 6", Porcelain, Clevis	Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V) 2 meters Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V) 1,150 meters Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 37 pieces Connector, Compression, YHD 200, #1/0 - #2/0 ACSR Run To #6 - #2 3 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Cutout and Arrester Combination, Porcelain 2 sets Insulator, Pin Type, Porcelain, ANSI, Class 53 - 5 14 pieces Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 23 pieces Insulator, Spool, 3", ANSI, Class 53 - 2 25 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 14 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 14 pieces Nut, Lock, Mf Type, 5/8" 75 pieces Nut, Lock, Mf Type, 5/8" 75 pieces Nut, Lock, Mf Type, 5/8" 75 pieces Nod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Spacer, Pipe, 3/4" x 1-1/2" 12 pieces	Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V) Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2 Connector, Compression, YHO 300, #1/0 - #2/0 ACSR Run To #6 - #2 Connector, Ground Rod (Clamp) for 5/8" Steel Rod Connector, Ground Rod (Clamp) for 5/8" Steel Rod Q pieces Cutout and Arrester Combination, Porcelain Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5 Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 Insulator, Spool, 3", ANSI, Class 53 - 2 Insulator, Spool, 3", ANSI, Class 53 - 4 Insulator, Suspension, 6", Porcelain, Clevis Type Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes Nut, Eye, 5/8", Conventional Nut, Lock, Mf Type, 5/8" To pieces Nut, Eye, 5/8", Conventional Nut, Lock, Mf Type, 5/8" Fin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long Rod, Anchor, Threaded, Single Eye, 5/8" x 7' Rod, Ground Steel, Salvanized, 5/8" x 10' Spacer, Pipe, 3/4" x 1-1/2" Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 4" x 4" x 1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Wisher, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" Wire, Grounding, Aluminum Alloy, 0.5 " x 0.3" Pole, Steel, 30', 3.5 mm S pieces Pole, Steel, 30', 3.5 mm S pieces Pole, Steel, 40', 3.0 mm	Conductor, Bare, ACSR #1/0, AWG 6/1	1,150 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2 3 pieces Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2 3 pieces Connector, Compression, YHO 300, #1/0 - #2/0 ACSR Run To #6 - #2 12 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Cutout and Arrester Combination, Porcelain 2 sets Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5 14 pieces Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 23 pieces Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 25 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 14 pieces Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes 2 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Lock, Mf Type, 5/8" 75 pieces Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long 14 pieces Rod, Anchor, Threaded, Single Eye, 5/8" x 7' 14 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding 1 unit Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole 71 pieces Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole 72 feet Wire, Tie, Insulated, Soft, #4 AWG 75 feet Wire, Tie, Insulated, Soft, #4 AWG 76 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Guy, Steel, 3/8", 7 Strand 9 pieces Pole, Steel, 30', 3.5 mm 9 pieces Pole, Steel, 40', 3.0 mm 1 piece		
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2 Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0 12 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Cutout and Arrester Combination, Porcelain 2 sets Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5 14 pieces Insulator, Spool, 1-3/4", ANSI, Class 55 - 5 14 pieces Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 18 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 19 pieces Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes 2 pieces Nut, Eye, 5/8", Conventional Nut, Lock, Mf Type, 5/8" Nut, Lock, Mf Type, 5/8" Nut, Lock, Mf Type, 5/8" Nut, Lock, Mf Type, 5/8" Nut, Lock, Mf Type, 5/8" Nut, Lock, Mf Type, 5/8" Nut, Lock, Mf Type, 5/8" Nut, Lock, Mf Type, 5/8" 10 pieces Rod, Anchor, Threaded, Single Eye, 5/8" x 7' 14 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support Rod, Tapping, Preformed, #1/0 ACSR Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Spacer, Pipe, 3/4" x 1-1/2" 12 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG Teet Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Fole, Steel, 3/8", 7 Strand Pole, Steel, 3/9", 3.5 mm 9 pieces Pole, Steel, 40', 3.5 mm 9 pieces Pole, Steel, 40', 3.0 mm		
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0 12 pieces Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Cutout and Arrester Combination, Porcelain 2 sets Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5 14 pieces Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 23 pieces Insulator, Spool, 3", ANSI, Class 53 - 4 25 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 14 pieces Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes 2 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Lock, Mf Type, 5/8" 75 pieces Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long 14 pieces Rod, Anchor, Threaded, Single Eye, 5/8" x 7' 14 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Spacer, Pipe, 3/4" x 1-1/2" 12 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding 1 unit Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole 71 pieces Wire, Tie, Insulated, Soft, #4 AWG 12 feet Wire, Tie, Insulated, Soft, #4 AWG 409	·	· ·
Connector, Ground Rod (Clamp) for 5/8" Steel Rod 9 pieces Cutout and Arrester Combination, Porcelain 2 sets Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5 14 pieces Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 23 pieces Insulator, Supension, 6", Porcelain, Clevis Type 14 pieces Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes 2 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Lock, Mf Type, 5/8" 75 pieces Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long 14 pieces Rod, Anchor, Threaded, Single Eye, 5/8" x 7' 14 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Spacer, Pipe, 3/4" x 1-1/2" 12 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding 1 unit Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole 71 pieces Wire, Tie, Aluminum Alloy, Soft, #4 AWG 72 feet Wire, Tie, Insulated, Soft, #4 AWG 160 feet Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Guy, Steel, 3/8", 7 Strand		· ·
Cutout and Arrester Combination, Porcelain Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5 Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 Insulator, Spool, 3", ANSI, Class 53 - 2 Insulator, Suspension, 6", Porcelain, Clevis Type Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes Link, Fye, 5/8", Conventional Lock, Mf Type, 5/8" Nut, Lock, Mf Type, 5/8" Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long Rod, Anchor, Threaded, Single Eye, 5/8" x 7' Lock, Armor, Preformed, #1/0 ACSR, Single Support Rod, Armor, Preformed, #1/0 ACSR, Single Support Rod, Ground Steel, Galvanized, 5/8" x 10' Spacer, Pipe, 3/4" x 1-1/2" Locks, Pipe, 3/4" Locks, Pipe, 3/4" Locks,	·	
Insulator, Pin Type, Porcelain, ANSI, Class 53 - 2 14 pieces Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 23 pieces Insulator, Spool, 3", ANSI, Class 53 - 4 25 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 14 pieces Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes 2 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Lock, Mf Type, 5/8" 75 pieces Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long 14 pieces Rod, Anchor, Threaded, Single Eye, 5/8" x 7' 14 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Tapping, Preformed, #1/0 ACSR 2 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Spacer, Pipe, 3/4" x 1-1/2" 12 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding 1 unit Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole 71 pieces Wire, Tie, Aluminum Alloy, Soft, #4 AWG 72 feet Wire, Tie, Insulated, Soft, #4 AWG 160 feet Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Guy, Steel, 3/8", 7 Strand 8 p		•
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 23 pieces Insulator, Spool, 3", ANSI, Class 53 - 4 25 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 14 pieces Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes 2 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Lock, Mf Type, 5/8" 75 pieces Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long 14 pieces Rod, Anchor, Threaded, Single Eye, 5/8" x 7' 14 pieces Rod, Armor, Preformed, #1/0 ACSR 20 sets Rod, Tapping, Preformed, #1/0 ACSR 2 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Spacer, Pipe, 3/4" x 1-1/2" 12 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding 1 unit Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole 71 pieces Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole 14 pieces Wire, Tie, Aluminum Alloy, Soft, #4 AWG 160 feet Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Grunding, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Guy, Steel, 3/8", 7 Strand		
Insulator, Spool, 3", ANSI, Class 53 - 4 25 pieces Insulator, Suspension, 6", Porcelain, Clevis Type 14 pieces Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes 2 pieces Nut, Eye, 5/8", Conventional 10 pieces Nut, Lock, Mf Type, 5/8" 75 pieces Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long 14 pieces Rod, Anchor, Threaded, Single Eye, 5/8" x 7' 14 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Spacer, Pipe, 3/4" x 1-1/2" 12 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding 1 unit Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole 71 pieces Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole 14 pieces Wire, Tie, Aluminum Alloy, Soft, #4 AWG 72 feet Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Guy, Steel, 3/8", 7 Strand 700 feet Concrete/Steel Materials Pole, Steel, 30', 3.5 mm 9 pieces Pole, Steel, 40', 3.0 mm 1 pieces		· · · · · · · · · · · · · · · · · · ·
Insulator, Suspension, 6", Porcelain, Clevis Type Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes Nut, Eye, 5/8", Conventional Nut, Lock, Mf Type, 5/8" 75 pieces Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long Rod, Anchor, Threaded, Single Eye, 5/8" x 7' Rod, Armor, Preformed, #1/0 ACSR, Single Support Rod, Capping, Preformed, #1/0 ACSR Rod, Ground Steel, Galvanized, 5/8" x 10' Spacer, Pipe, 3/4" x 1-1/2" 12 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Grounding, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Toncrete/Steel Materials Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm 1 pieces Pole, Steel, 40', 3.0 mm 1 pieces		
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes Nut, Eye, 5/8", Conventional Nut, Lock, Mf Type, 5/8" 75 pieces Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long Rod, Anchor, Threaded, Single Eye, 5/8" x 7' Rod, Armor, Preformed, #1/0 ACSR, Single Support Rod, Armor, Preformed, #1/0 ACSR Rod, Ground Steel, Galvanized, 5/8" x 10' Spacer, Pipe, 3/4" x 1-1/2" Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Concrete/Steel Materials Pole, Steel, 30', 3.5 mm Pole, Steel, 30', 3.5 mm 9 pieces Pole, Steel, 40', 3.0 mm 1 piece		
Nut, Eye, 5/8", Conventional 10 pieces Nut, Lock, Mf Type, 5/8" 75 pieces Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long 14 pieces Rod, Anchor, Threaded, Single Eye, 5/8" x 7' 14 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Tapping, Preformed, #1/0 ACSR 2 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Spacer, Pipe, 3/4" x 1-1/2" 12 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding 1 unit Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole 71 pieces Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole 14 pieces Wire, Tie, Aluminum Alloy, Soft, #4 AWG 72 feet Wire, Tie, Insulated, Soft, #4 AWG 160 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Guy, Steel, 3/8", 7 Strand 700 feet Concrete/Steel Materials Pole, Steel, 30', 3.5 mm 9 pieces Pole, Steel, 40', 3.0 mm 1 piece		· · · · · · · · · · · · · · · · · · ·
Nut, Lock, Mf Type, 5/8" Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long Rod, Anchor, Threaded, Single Eye, 5/8" x 7' Rod, Armor, Preformed, #1/0 ACSR, Single Support Rod, Tapping, Preformed, #1/0 ACSR Rod, Ground Steel, Galvanized, 5/8" x 10' Spacer, Pipe, 3/4" x 1-1/2" Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Grunding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm 75 pieces Pole At pieces Pole, Steel, 40', 3.0 mm 75 pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole At pieces Pole		· · · · · · · · · · · · · · · · · · ·
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long 14 pieces Rod, Anchor, Threaded, Single Eye, 5/8" x 7' 14 pieces Rod, Armor, Preformed, #1/0 ACSR, Single Support 20 sets Rod, Tapping, Preformed, #1/0 ACSR 2 sets Rod, Ground Steel, Galvanized, 5/8" x 10' 9 pieces Spacer, Pipe, 3/4" x 1-1/2" 12 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding 1 unit Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole 71 pieces Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole 14 pieces Wire, Tie, Aluminum Alloy, Soft, #4 AWG 72 feet Wire, Tie, Insulated, Soft, #4 AWG 160 feet Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG 409 feet Wire, Guy, Steel, 3/8", 7 Strand 700 feet Concrete/Steel Materials Pole, Steel, 30', 3.5 mm 8 pieces Pole, Steel, 35', 3.5 mm 9 pieces Pole, Steel, 40', 3.0 mm 1 pieces	· · · · · · · · · · · · · · · · · · ·	
Rod, Anchor, Threaded, Single Eye, 5/8" x 7' Rod, Armor, Preformed, #1/0 ACSR, Single Support Rod, Armor, Preformed, #1/0 ACSR Rod, Tapping, Preformed, #1/0 ACSR Rod, Ground Steel, Galvanized, 5/8" x 10' Spacer, Pipe, 3/4" x 1-1/2" 12 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding 1 unit Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole 71 pieces Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole 14 pieces Wire, Tie, Aluminum Alloy, Soft, #4 AWG 72 feet Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Pole, Steel, 30', 3.5 mm 8 pieces Pole, Steel, 35', 3.5 mm 9 pieces Pole, Steel, 40', 3.0 mm 1 piece		
Rod, Armor, Preformed, #1/0 ACSR, Single Support Rod, Tapping, Preformed, #1/0 ACSR Rod, Ground Steel, Galvanized, 5/8" x 10' Spacer, Pipe, 3/4" x 1-1/2" Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Wisher, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5" x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Concrete/Steel Materials Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm 1 piece		
Rod, Ground Steel, Galvanized, 5/8" x 10' Spacer, Pipe, 3/4" x 1-1/2" 12 pieces Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm 1 piece		
Spacer, Pipe, 3/4" x 1-1/2" Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Pole, Steel, 30', 3.5 mm Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm 1 piece	Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm 1 piece	Rod, Ground Steel, Galvanized, 5/8" x 10'	9 pieces
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Concrete/Steel Materials Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm Pole, Steel, 40', 3.0 mm 71 pieces 72 feet 160 feet 28 feet 409 feet 71 pieces		12 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Concrete/Steel Materials Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm 1 piece		
Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" 28 feet Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Concrete/Steel Materials Pole, Steel, 30', 3.5 mm 8 pieces Pole, Steel, 35', 3.5 mm 9 pieces Pole, Steel, 40', 3.0 mm 1 piece		
Wire, Tie, Insulated, Soft, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Concrete/Steel Materials Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm Pole, Steel, 40', 3.0 mm 160 feet 28 feet 409 feet 700 feet 409 feet 700 feet	·	·
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3" Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Concrete/Steel Materials Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm 1 piece		
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG Wire, Guy, Steel, 3/8", 7 Strand Concrete/Steel Materials Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm 1 piece		
Wire, Guy, Steel, 3/8", 7 Strand Concrete/Steel Materials Pole, Steel, 30', 3.5 mm Pole, Steel, 35', 3.5 mm Pole, Steel, 40', 3.0 mm 700 feet 8 pieces 9 pieces 1 piece		
Pole, Steel, 30', 3.5 mm 8 pieces Pole, Steel, 35', 3.5 mm 9 pieces Pole, Steel, 40', 3.0 mm 1 piece		
Pole, Steel, 35', 3.5 mm 9 pieces Pole, Steel, 40', 3.0 mm 1 piece	Concrete/Steel Materials	
Pole, Steel, 35', 3.5 mm 9 pieces Pole, Steel, 40', 3.0 mm 1 piece	Pole, Steel, 30', 3.5 mm	8 pieces
Pole, Steel, 40', 3.0 mm 1 piece		

Project Description: Construction of Distribution Line in Sitio Goroyan, Barangay San Ramon, Siruma

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	61 pieces
Bolt, Carriage 3/8" x 4-1/2"	16 pieces
Bolt, Double Arming, 5/8" x 18"	12 pieces
Bolt, Double Upset, 5/8" x 10"	19 pieces
Bolt, Oval Eye, 5/8" x 9"	26 pieces
Bolt, Oval Eye, 5/8" x 10"	17 pieces
Bolt, Machine, 1/2" x 8"	4 pieces
Bolt, Machine, 5/8" x 6" Bolt, Machine, 5/8" x 8"	16 pieces 107 pieces
Bolt, Machine, 5/8" x 10"	51 pieces
Bolt, Machine, 5/8" x 12"	36 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	23 pieces
Bolt, Single Upset, 5/8" x 9"	8 pieces
Bolt, Single Upset, 5/8" x 10"	10 pieces
Brace, Crossarm, 28", Steel or Wood	16 each
Bracket, Clevis Deadend without Spool	33 pieces
Bracket, Mounting for Transformer Pole	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	8 pieces
Clamp, Anchor Rod Bonding, Single Eye	61 pieces
Clamp, Loop Deadend, #1/0 ACSR	50 pieces
Clamp, Deadend Strain, #1/0 ACSR Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	12 pieces
Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	122 pieces 9 pieces
Clevis, Secondary Swinging without Spool	38 pieces
Shackle, Anchor, Forged Steel, Galvanized	21 pieces
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	5,020 meters
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	6,242 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	2,539 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	161 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	5 pieces
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	15 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	8 pieces
Cutout and Arrester Combination, Porcelain Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	2 sets
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	83 pieces 107 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	24 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	42 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional	20 pieces
Nut, Lock, Mf Type, 3/8"	16 pieces
Nut, Lock, Mf Type, 1/2"	4 pieces
Nut, Lock, Mf Type, 5/8"	335 pieces
Pin, Pole Top, Channel, 1" Thread, 25" Long	83 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	61 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	106 sets
Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	8 pieces
Spacer, Pipe, 3/4" x 1-1/2" Transformer, Pole Type, Conventional, Amorphous, 25 KVA, Cu-Cu Winding	52 pieces 1 unit
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	299 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	61 pieces
Washer, Round, 1-3/8" Diameter with 9/16" Diameter Hole	4 pieces
Wire, Tie, Aluminum Alloy, Soft, #4 AWG	464 feet
Wire, Tie, Insulated, Soft, #4 AWG	752 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	25 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	660 feet
Wire, Guy, Steel, 3/8", 7 Strand	3,050 feet
Concrete/Steel Materials	
Pole, Steel, 35', 3.5 mm	82 pieces
Log, Anchor, Concrete, 8" x 4'	61 pieces
Crossarm, Steel, 3" x 4" x 8', 3.0 mm	8 pieces

Project Description: Construction of Distribution Line in Sitio Lemonsitohan, Barangay San Ramon, Siruma

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	16 pieces
Bolt, Carriage 3/8" x 4-1/2"	4 pieces
Bolt, Double Arming, 5/8" x 18"	3 pieces
Bolt, Double Upset, 5/8" x 10"	5 pieces
Bolt, Oval Eye, 5/8" x 9"	16 pieces
Bolt, Oval Eye, 5/8" x 10"	11 pieces
Bolt, Machine, 1/2" x 8"	1 piece
Bolt, Machine, 5/8" x 6"	4 pieces
Bolt, Machine, 5/8" x 8" Bolt, Machine, 5/8" x 10"	34 pieces 16 pieces
Bolt, Machine, 5/8" x 12"	12 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	9 pieces
Bolt, Single Upset, 5/8" x 10"	3 pieces
Brace, Crossarm, 28", Steel or Wood	4 each
Bracket, Clevis Deadend without Spool	14 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	6 pieces
Clamp, Anchor Rod Bonding, Single Eye	16 pieces
Clamp, Loop Deadend, #1/0 ACSR	30 pieces
Clamp, Deadend Strain, #1/0 ACSR	8 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	32 pieces
Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	2 pieces
Clevis, Secondary Swinging without Spool	21 pieces
Shackle, Anchor, Forged Steel, Galvanized Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	10 pieces 1,539 meters
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	2,114 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	940 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	51 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	2 pieces
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	13 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	7 pieces
Cutout and Arrester Combination, Porcelain	2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	23 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	39 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4 Insulator, Suspension, 6", Porcelain, Clevis Type	13 pieces 20 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional	6 pieces
Nut, Lock, Mf Type, 3/8"	4 pieces
Nut, Lock, Mf Type, 1/2"	1 piece
Nut, Lock, Mf Type, 5/8"	116 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	23 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	16 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	37 sets
Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	7 pieces
Spacer, Pipe, 3/4" x 1-1/2"	12 pieces
Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	1 unit
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	108 pieces 16 pieces
Washer, Round, 1-3/8" Diameter with 9/16" Diameter Hole	1 pieces
Wire, Tie, Aluminum Alloy, Soft, #4 AWG	136 feet
Wire, Tie, Insulated, Soft, #4 AWG	236 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	15 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	346 feet
Wire, Guy, Steel, 3/8", 7 Strand	800 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	8 pieces
Pole, Steel, 35', 3.5 mm	21 pieces
Log, Anchor, Concrete, 8" x 4'	16 pieces
Crossarm, Steel, 3" x 4" x 8', 3.0 mm	2 pieces
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Project Description: Construction of Distribution Line in Sitio Kinastillohan, Barangay San Ramon, Siruma

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	25 pieces
Bolt, Double Upset, 5/8" x 10"	1 piece
Bolt, Oval Eye, 5/8" x 9"	18 pieces
Bolt, Oval Eye, 5/8" x 10"	7 pieces
Bolt, Machine, 5/8" x 8"	49 pieces
Bolt, Machine, 5/8" x 10"	17 pieces
Bolt, Machine, 5/8" x 12"	30 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	12 pieces
Bolt, Single Upset, 5/8" x 10"	1 piece
Bracket, Clevis Deadend without Spool	15 pieces
Bracket, Mounting for Transformer Pole	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0 Clamp, Anchor Rod Bonding, Single Eye	3 pieces
Clamp, Loop Deadend, #1/0 ACSR	25 pieces 22 pieces
Clamp, Deadend Strain, #1/0 ACSR	6 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	50 pieces
Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	5 pieces
Clevis, Secondary Swinging without Spool	18 pieces
Shackle, Anchor, Forged Steel, Galvanized	11 pieces
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	2,496 meters
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	2,778 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	283 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	68 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	3 pieces
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	12 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	4 pieces
Cutout and Arrester Combination, Porcelain	2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	44 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	42 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	5 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	22 pieces
Link, Fuse, Universal, Bottom Head, Type K, 2 Amperes	2 pieces
Nut, Eye, 5/8", Conventional	4 pieces
Nut, Lock, Mf Type, 5/8" Pin, Pole Top, Channel, 1" Thread, 25" Long	137 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	44 pieces 25 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	36 sets
Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	4 pieces
Spacer, Pipe, 3/4" x 1-1/2"	30 pieces
Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding	1 unit
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	115 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	25 pieces
Wire, Tie, Aluminum Alloy, Soft, #4 AWG	272 feet
Wire, Tie, Insulated, Soft, #4 AWG	364 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	11 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	301 feet
Wire, Guy, Steel, 3/8", 7 Strand	1,250 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	4 pieces
Pole, Steel, 35', 3.5 mm	35 pieces
Log, Anchor, Concrete, 8" x 4'	25 pieces

Project Description: Construction of Distribution Line in Sitio San Isidro, Barangay Bataan, Tinambac

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	22 pieces
Bolt, Double Arming, 5/8" x 18"	2 pieces
Bolt, Double Upset, 5/8" x 10"	5 pieces
Bolt, Oval Eye, 5/8" x 9" Bolt, Oval Eye, 5/8" x 10"	20 pieces 6 pieces
Bolt, Machine, 1/2" x 6"	2 pieces
Bolt, Machine, 1/2" x 10"	3 pieces
Bolt, Machine, 5/8" x 8"	46 pieces
Bolt, Machine, 5/8" x 10"	17 pieces
Bolt, Machine, 5/8" x 12"	14 pieces
Bolt, Machine, 5/8" x 14" Bolt, Single Upset, 5/8" x 8"	4 pieces 12 pieces
Bolt, Single Upset, 5/8" x 10"	2 pieces
Brace, Sidearm, Diagonal, 7 Feet	2 pieces
Bracket, Clevis Deadend without Spool	15 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	3 pieces
Clamp, Anchor Rod Bonding, Single Eye	22 pieces
Clamp, Loop Deadend, #1/0 ACSR Clamp, Deadend Strain, #1/0 ACSR	14 pieces 4 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	44 pieces
Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	7 pieces
Clevis, Secondary Swinging without Spool	17 pieces
Shackle, Anchor, Forged Steel, Galvanized	11 pieces
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	1,945 meters
Conductor, Bare, ACSR #2, AWG 6/1 Conductor, Bare, ACSR #1/0, AWG 6/1	1 meter 2,287 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2,207 meters 2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	959 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	60 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	2 pieces
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	11 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod Cutout and Arrester Combination, Porcelain	6 pieces 2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	31 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	40 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	11 pieces
Pin, Crossarm, Steel, 1-3/8" x 14", 23KV	4 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	22 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional Nut, Lock, Mf Type, 1/2"	2 pieces 4 pieces
Nut, Lock, Mf Type, 5/8"	130 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	27 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	22 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	44 sets
Rod, Armor, Preformed, #1/0 ACSR, Double Support	1 set
Rod, Tapping, Preformed, #1/0 ACSR Rod, Ground Steel, Galvanized, 5/8" x 10'	2 sets 6 pieces
Spacer, Pipe, 3/4" x 1-1/2"	14 pieces
Transformer, Pole Type, Conventional, Amorphous, 25 KVA, Cu-Cu Winding	1 unit
Truss Guy for Down Guy	1 set
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	120 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	22 pieces
Washer, Round, 1-3/8" Diameter with 9/16" Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG	4 pieces 224 feet
Wire, Tie, Insulated, Soft, #4 AWG	304 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	7 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	368 feet
Wire, Guy, Steel, 3/8", 7 Strand	1,100 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	6 pieces
Pole, Steel, 35', 3.5 mm	28 pieces
Pole, Steel, 40', 3.0 mm	1 piece

Project Description: Construction of Distribution Line in Sitio Zone 4, Barangay Bataan, Tinambac

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	9 pieces
Bolt, Double Upset, 5/8" x 10"	7 pieces
Bolt, Oval Eye, 5/8" x 9"	4 pieces
Bolt, Oval Eye, 5/8" x 10"	22 pieces
Bolt, Machine, 5/8" x 8"	17 pieces
Bolt, Machine, 5/8" x 10"	4 pieces
Bolt, Machine, 5/8" x 12"	4 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	4 pieces
Bolt, Single Upset, 5/8" x 10" Brooket, Clavia Deadand without Speek	2 pieces
Bracket, Clevis Deadend without Spool	2 pieces
Bracket, Transformer Pole Mounting for Single Transformer Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	2 sets 3 pieces
Clamp, Anchor Rod Bonding, Single Eye	9 pieces
Clamp, Loop Deadend, #1/0 ACSR	46 pieces
Clamp, Deadend Strain, #1/0 ACSR	2 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	18 pieces
Clevis, Secondary Swinging without Spool	24 pieces
Shackle, Anchor, Forged Steel, Galvanized	2 pieces
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	445 meters
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	900 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	930 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	32 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	1 piece
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	10 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	6 pieces
Cutout and Arrester Combination, Porcelain Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	2 sets
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	8 pieces 24 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	15 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	4 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional	6 pieces
Nut, Lock, Mf Type, 5/8"	60 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	8 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	9 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	16 sets
Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	6 pieces
Spacer, Pipe, 3/4" x 1-1/2"	4 pieces
Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding	1 unit
Truss Guy for Down Guy	1 set
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	56 pieces
Washer, Square, Flat, 4 × 4 × 1/2 with 7/8 Diameter Hole Wire, Tie, Aluminum Alloy, Soft, #4 AWG	9 pieces 48 feet
Wire, Tie, Insulated, Soft, #4 AWG	96 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	23 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	267 feet
Wire, Guy, Steel, 3/8", 7 Strand	450 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	7 pieces
Pole, Steel, 35', 3.5 mm	7 pieces
Log, Anchor, Concrete, 8" x 4'	9 pieces
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Project Description: Construction of Distribution Line in Sitio Baries, Barangay Mananao, Tinambac

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	18 pieces
Bolt, Double Upset, 5/8" x 10"	11 pieces
Bolt, Oval Eye, 5/8" x 9"	4 pieces
Bolt, Oval Eye, 5/8" x 10"	26 pieces
Bolt, Machine, 5/8" x 8"	24 pieces
Bolt, Machine, 5/8" x 10"	5 pieces
Bolt, Machine, 5/8" x 12"	6 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	3 pieces
Bolt, Single Upset, 5/8" x 10"	13 pieces
Bracket, Clevis Deadend without Spool	3 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	3 pieces
Clamp, Anchor Rod Bonding, Single Eye	18 pieces
Clamp, Loop Deadend, #1/0 ACSR	52 pieces
Clamp, Deadend Strain, #1/0 ACSR Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	2 pieces
Clevis, Secondary Swinging without Spool	36 pieces 28 pieces
Shackle, Anchor, Forged Steel, Galvanized	20 pieces 2 pieces
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	454 meters
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	1,799 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	1,345 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	52 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	1 piece
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	10 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod	2 pieces
Cutout and Arrester Combination, Porcelain	2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	9 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	39 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	19 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	4 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional	5 pieces
Nut, Lock, Mf Type, 5/8"	89 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	9 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7"	18 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	32 sets
Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	2 pieces
Spacer, Pipe, 3/4" x 1-1/2" Transformer, Pole Type, Conventional, Ameriphous, 15 KV/A, Cu Cu Winding	6 pieces
Transformer, Pole Type, Conventional, Amorphous, 15 KVA, Cu-Cu Winding Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	1 unit 83 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	18 pieces
Wire, Tie, Aluminum Alloy, Soft, #4 AWG	48 feet
Wire, Tie, Insulated, Soft, #4 AWG	124 feet
Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	26 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	202 feet
Wire, Guy, Steel, 3/8", 7 Strand	900 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	20 pieces
Pole, Steel, 35', 3.5 mm	7 pieces
Log, Anchor, Concrete, 8" x 4'	18 pieces
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Project Description: Construction of Distribution Line in Sitio Laming, Barangay Pantat, Tinambac

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Attachment, Guy, Malleable Type with 11/16" Hole Diameter	20 pieces
Bolt, Double Upset, 5/8" x 10"	8 pieces
Bolt, Oval Eye, 5/8" x 9"	10 pieces
Bolt, Oval Eye, 5/8" x 10"	12 pieces
Bolt, Machine, 5/8" x 8"	56 pieces
Bolt, Machine, 5/8" x 10"	15 pieces
Bolt, Machine, 5/8" x 12"	26 pieces
Bolt, Machine, 5/8" x 14"	4 pieces
Bolt, Single Upset, 5/8" x 8"	18 pieces
Bolt, Single Upset, 5/8" x 10" Bracket, Clevis Deadend without Spool	16 pieces 13 pieces
Bracket, Transformer Pole Mounting for Single Transformer	2 sets
Clamp, Hot Line, #2 - #2/0 ACSR Main to #2 - #2/0	3 pieces
Clamp, Anchor Rod Bonding, Single Eye	20 pieces
Clamp, Loop Deadend, #1/0 ACSR	20 pieces
Clamp, Deadend Strain, #1/0 ACSR	6 pieces
Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel	40 pieces
Clamp, Suspension, Aluminum Alloy Clevis, 2 Bolts, #2/0 ACSR (Maximum)	1 piece
Clevis, Secondary Swinging without Spool	19 pieces
Shackle, Anchor, Forged Steel, Galvanized	7 pieces
Conductor, Insulated, Tree Wire, ACSR #1/0, AWG 6/1 (23 KV)	2,467 meters
Conductor, Bare, ACSR #2, AWG 6/1	1 meter
Conductor, Bare, ACSR #1/0, AWG 6/1	2,720 meters
Conductor, Insulated, ACSR #2, AWG 6/1 (600 V)	2 meters
Conductor, Insulated, ACSR #1/0, AWG 6/1 (600 V)	1,075 meters
Connector, Compression, YHO 150, #3 - #1/0 ACSR Run To #6 - #2	79 pieces
Connector, Compression, YHO 200, #1/0 - #2/0 ACSR Run To #6 - #2	3 pieces
Connector, Compression, YHD 300, #1/0 - #2/0 ACSR Run To #1/0 - #2/0	12 pieces
Connector, Ground Rod (Clamp) for 5/8" Steel Rod Cutout and Arrester Combination, Porcelain	3 pieces 2 sets
Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5	46 pieces
Insulator, Spool, 1-3/4", ANSI, Class 53 - 2	71 pieces
Insulator, Spool, 3", ANSI, Class 53 - 4	3 pieces
Insulator, Suspension, 6", Porcelain, Clevis Type	14 pieces
Link, Fuse, Universal, Bottom Head, Type K, 3 Amperes	2 pieces
Nut, Eye, 5/8", Conventional	5 pieces
Nut, Lock, Mf Type, 5/8"	162 pieces
Pin, Pole Top, Channel, 1" Thread, 1-3/8" x 25" Long	46 pieces
Rod, Anchor, Threaded, Single Eye, 5/8" x 7'	20 pieces
Rod, Armor, Preformed, #1/0 ACSR, Single Support	64 sets
Rod, Tapping, Preformed, #1/0 ACSR	2 sets
Rod, Ground Steel, Galvanized, 5/8" x 10'	3 pieces
Spacer, Pipe, 3/4" x 1-1/2"	26 pieces
Transformer, Pole Type, Conventional, Amorphous, 25 KVA, Cu-Cu Winding	1 unit
Washer, Square, Flat, 2-1/4" x 2-1/4" x 3/16", 13/16" Diameter Hole	144 pieces
Washer, Square, Flat, 4" x 4" x 1/2" with 7/8" Diameter Hole	20 pieces
Wire, Tie, Aluminum Alloy, Soft, #4 AWG Wire, Tie, Insulated, Soft, #4 AWG	272 feet 432 feet
Wire, Tie, Insulated, 30tt, #4 AWG Wire, Tape, Armor, Aluminum Alloy, 0.5 " x 0.3"	432 feet 10 feet
Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG	310 feet
Wire, Guy, Steel, 3/8", 7 Strand	1,000 feet
Concrete/Steel Materials	
Pole, Steel, 30', 3.5 mm	4 pieces
Pole, Steel, 35', 3.5 mm	35 pieces
Log, Anchor, Concrete, 8" x 4'	20 pieces
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Lot 3

Supply of Labor and Materials for the House Wiring Installation of the Twenty (20) Sitios

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Zone 7, Barangay Burabod, Calabanga

Bill of Materials:

MATERIALS DESCRIPTION Conductor, Duplex, #6, AWG Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2 Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected Housewiring Materials PROJECT REQUIREMENTS 360 meters 24 pieces 12 pieces 12 sets

(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10"; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Zone 4, Barangay Lugsad, Calabanga

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Conductor, Duplex, #6, AWG	600 meters
Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2	40 pieces
Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected	20 pieces
Housewiring Materials	20 sets
(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)	

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Maytagas, Barangay Quinale, Calabanga

Bill of Materials:

Housewiring Materials

PROJECT MATERIALS DESCRIPTION **REQUIREMENTS** Conductor, Duplex, #6, AWG 1,050 meters Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2 Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected

(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces -Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)

70 pieces 35 pieces 35 sets

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Zone 4, Barangay Cabugao, Milaor

Bill of Materials:

MATERIALS DESCRIPTION Conductor, Duplex, #6, AWG Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2 Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected Housewiring Materials (1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Zone 6, Barangay Del Socorro, Minalabac

Bill of Materials:

MATERIALS DESCRIPTION Conductor, Duplex, #6, AWG Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2 Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected Housewiring Materials PROJECT REQUIREMENTS 810 meters 54 pieces 47 pieces 27 sets

(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10"; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Zone 3, Barangay Timbang, Minalabac

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Conductor, Duplex, #6, AWG	600 meters
Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2	40 pieces
Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected	20 pieces
Housewiring Materials	20 sets
(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)	

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Zone 1, Barangay Binobong, Pili

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Conductor, Duplex, #6, AWG	390 meters
Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2	26 pieces
Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected	13 pieces
Housewiring Materials	13 sets
(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT B Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4";	
4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)	

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Zone 6, Barangay Binobong, Pili

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Conductor, Duplex, #6, AWG	570 meters
Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2	38 pieces
Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected	19 pieces
Housewiring Materials	19 sets
(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)	

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Zone 2, Barangay Del Rosario, Pili

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Conductor, Duplex, #6, AWG	300 meters
Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2	20 pieces
Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected	10 pieces
Housewiring Materials	10 sets
(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)	

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Zone 7, Barangay Pawili, Pili

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Conductor, Duplex, #6, AWG	390 meters
Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2	26 pieces
Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected	13 pieces
Housewiring Materials	13 sets
(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)	

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Kalebhok, Barangay Cabugao, Siruma

Bill of Materials:

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Conductor, Duplex, #6, AWG	810 meters
Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2	54 pieces
Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected	27 pieces
Housewiring Materials	27 sets
(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10"; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)	

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Proper, Barangay Pamintan-Bantilan, Siruma

Bill of Materials:

PROJECT MATERIALS DESCRIPTION **REQUIREMENTS**

Conductor, Duplex, #6, AWG

Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2

Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected Housewiring Materials

(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces -Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)

1,290 meters

86 pieces

43 pieces

43 sets

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Punta, Barangay Pinitan, Siruma

Bill of Materials:

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Conductor, Duplex, #6, AWG	930 meters
Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2	62 pieces
Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected	31 pieces
Housewiring Materials	31 sets
(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)	

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Goroyan, Barangay San Ramon, Siruma

Bill of Materials:

for 5/8" Steel Rod tamperproof)

MATERIALS DESCRIPTION Conductor, Duplex, #6, AWG Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2 Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected Housewiring Materials (1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4", 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10; 3

meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Lemonsitohan, Barangay San Ramon, Siruma

Bill of Materials:

PROJECT MATERIALS DESCRIPTION REQUIREMENTS Conductor, Duplex, #6, AWG 300 meters Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2

Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected Housewiring Materials

(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces -Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)

20 pieces

10 pieces

10 sets

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Kinastillohan, Barangay San Ramon, Siruma

Bill of Materials:

PROJECT MATERIALS DESCRIPTION REQUIREMENTS Conductor, Duplex, #6, AWG 300 meters

Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2 Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected Housewiring Materials

(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces -Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)

20 pieces

10 pieces

10 sets

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio San Isidro, Barangay Bataan, Tinambac

Bill of Materials:

PROJECT MATERIALS DESCRIPTION **REQUIREMENTS** Conductor, Duplex, #6, AWG Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2

Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected Housewiring Materials

(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces -Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)

360 meters 24 pieces 12 pieces 12 sets

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Zone 4, Barangay Bataan, Tinambac

Bill of Materials:

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Conductor, Duplex, #6, AWG	660 meters
Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2	44 pieces
Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected	22 pieces
Housewiring Materials	22 sets
(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)	

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Baries, Barangay Mananao, Tinambac

Bill of Materials:

MATERIALS DESCRIPTION Conductor, Duplex, #6, AWG Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2 Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected Housewiring Materials (1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT Connector, 3/4"; 4 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10"; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)

Project Description: Installation of KWHR Meters and Housewiring Materials in Sitio Laming, Barangay Pantat, Tinambac

Bill of Materials:

MATERIALS DESCRIPTION	PROJECT REQUIREMENTS
Conductor, Duplex, #6, AWG	690 meters
Connector, Compression, YHO 100, #6 - #2 ACSR Run To #6 - #2	46 pieces
Meter, KWH, 1 Phase, Class 1, 240 V, 10(60) A, Electronic, Bottom Connected	23 pieces
Housewiring Materials	23 sets
(1 set - Circuit Breaker (15 Amps.); 2 pieces - Receptacle; 2 pieces - CFL Bulb (15W); 2 sets - Tumbler Switch; 1 set - Convenience Outlet (2 gang); 2 pieces - Junction Box (plastic with cover); 5 meters - PDX Wire #10; 10 meters - PDX Wire #12; 10 meters - PDX Wire #14; 1 roll - Electrical Tape; 30 pieces - Insulated, Staple Wire; 1 piece - EMT Entrance Cap, 3/4"; 1 piece - EMT LB Conduit, 3/4"; 1 length - EMT Pipe, 3/4"; 3 pieces - EMT Elbow, 3/4"; 2 pieces - EMT Reducer 1" x 3/4"; 5 pieces - EMT Connector, 3/4"; 4 pieces - EMT Coupling; 6 pieces - PVC C-Clamp; 1 piece - Rod, Ground Steel, Galvanized, 5/8" x 10'; 3 meters - Wire, Grounding, Aluminum Alloy, Stranded or Solid, #6 AWG and 1 piece - Clamp, Ground Rod for 5/8" Steel Rod tamperproof)	

Lot No.	Project Name	Bill of Quantities
1	Supply of Labor and Materials for the Construction of	
	Primary and Secondary Distribution Lines for ten (10) Sitios in Calabanga, Milaor, Minalabac, and Pili	Note: See Section VI - Technical
2	Supply of Labor and Materials for the Construction of	Specifications
	Primary and Secondary Distribution Lines for ten (10) Sitios	(Terms of
	in Siruma and Tinambac	Reference) for
3	Supply of Labor and Materials for the House Wiring Installation of the Twenty (20) Sitios	complete details.

Section IX. Checklist of Technical and Financial Documents

Checklist of Technical and Financial Documents

Lot 1 & 2

I. TECHNICAL COMPONENT ENVELOPE

Class "A" Documents

Leg		<u>cuments</u>
	(a)	Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages) in accordance with Section 8.5.2 of the IRR;
	(b)	DTI business name registration/Securities and Exchange Commission (SEC) registration certificate, whichever is appropriate under laws of the Philippines.
	(c)	Valid and current Mayor's permit/municipal license: (principal place of business)
	(d)	Tax Clearance Certificate;
	(e)	Philippine Contractors Accreditation Board (PCAB) License at least Category B with Specialty in Electrical Works SP-EE classification; and registered to undertake projects with Size Range of at least Medium A;
	(f)	Audited Financial Statement of the previous year;
T_{ac}	hnica	l Documents
	(a)	Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; and
	(b)	Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided under the rules; and
	(c)	Special PCAB License in case of Joint Ventures <u>and</u> registration for the type and cost of the contract to be bid; <u>and</u>
	(d)	Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission <u>or</u> original copy of Notarized Bid Securing Declaration; <u>and</u>
	(e)	Project Requirements, which shall include the following: a. Organizational chart for the contract to be bid;
		b. List of contractor's key personnel (e.g., Project Manager/Engineers, Foreman, Lineman, Heavy Equipment Operator, and Safety Officer for Lot 1 & 2; and Project Manager/Engineers, and Electrician for Lot 3), to be assigned to the contract to be bid, with their complete qualification and experience data;
		c. List of contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership or certification of availability of equipment from the equipment

lessor/vendor for the duration of the project, as the case may be; and

(f) Original duly signed Omnibus Sworn Statement (OSS) <u>and</u> if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

Financial Documents

(a) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC).

Class "B" Documents

(b) If applicable, duly signed joint venture agreement (JVA) in accordance with RA No. 4566 and its IRR in case the joint venture is already in existence <u>or</u> duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

II. FINANCIAL COMPONENT ENVELOPE

(a) Original of duly signed and accomplished Financial Bid Form; and

Other documentary requirements under RA No. 9184

- (b) Original of duly signed Bid Prices in the Bill of Quantities; and
- (c) Duly accomplished Detailed Estimates Form, including a summary sheel indicating the unit prices of construction materials, labor rates, and equipment rentals used in coming up with the Bid; <u>and</u>
- (d) Cash Flow by Quarter.

Checklist of Technical and Financial Documents

Lot 3

I. TECHNICAL COMPONENT ENVELOPE

Class "A" Documents

Leg	<u>al Do</u> (a)	<u>cuments</u> Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages) in accordance with Section 8.5.2 of the IRR;
	(b)	DTI business name registration/Securities and Exchange Commission (SEC) registration certificate, whichever is appropriate under laws of the Philippines.
	(c)	Valid and current Mayor's permit/municipal license: (principal place of business)
	(d)	Tax Clearance Certificate;
	(e)	Philippine Contractors Accreditation Board (PCAB) License at least Category C & D with Specialty in Electrical Works SP-EE classification; and registered to undertake projects with Size Range of at least Small B;
	(f)	Audited Financial Statement of the previous year;
	_	
	<u>hnica</u> (a)	<u>I Documents</u> Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; <u>and</u>
	(b)	Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided under the rules; and
	(c)	Special PCAB License in case of Joint Ventures <u>and</u> registration for the type and cost of the contract to be bid; <u>and</u>
	(d)	Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission <u>or</u> original copy of Notarized Bid Securing Declaration; <u>and</u>
	(e)	Project Requirements, which shall include the following: a. Organizational chart for the contract to be bid;
		b. List of contractor's key personnel (<i>e.g.</i> , Project Manager/Engineers, Foreman, Lineman, Heavy Equipment Operator, and Safety Officer for Lot 1 & 2; and Project Manager/Engineers, and Electrician for Lot 3), to be assigned to the contract to be bid, with their complete qualification and experience data;
		c. List of contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership or certification of availability of equipment from the equipment

	lessor/vendor for the duration of the project, as the case may be; and
(f)	Original duly signed Omnibus Sworn Statement (OSS) <u>and</u> if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.
Financia	d Documents
(a)	The prospective bidder's computation of Net Financial Contracting Capacity (NFCC).
	Class "B" Documents
(b)	If applicable, duly signed joint venture agreement (JVA) in accordance with RA No. 4566 and its IRR in case the joint venture is already in existence or duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.
II. FINANC	IAL COMPONENT ENVELOPE
(a)	Original of duly signed and accomplished Financial Bid Form; and
Other do	cumentary requirements under RA No. 9184
(b)	Original of duly signed Bid Prices in the Bill of Quantities; and
(c)	Duly accomplished Detailed Estimates Form, including a summary sheet indicating the unit prices of construction materials, labor rates, and equipment
	rentals used in coming up with the Bid; <u>and</u>
(d)	Cash Flow by Quarter.

Section IX. Sample Forms

List of all Ongoing Government & Private contracts including contracts awarded but not yet started

Value of
Outstanding
Works/
Undelivered
Portion

Business Nan	ne:							
Business Add	lress:							
	a. Owner's		Bidder's Ro	ole	a.	Date Awarde	% (Accompl	
Name of Contract/ Project Cost	Names b. Address c. Telephone Nos.	Nature of Work	Description	%		d Date Started Date of Comple tion	Planned	Actua
Government								
Private								
							Total Co	g t
Note: This st	atement shall be	supporte	d with any of	the f	ollo	wing:	Total Co.	<u> </u>
 Notice Offici Sales 	e of Award and/o e to Proceed issue al Receipts Invoices ase Orders							
Certificate of	Accomplishmen	ts signed	by the owner	or a	utho	rized repre	esentative	
Submitted by	:							
Designation Date		·	Printed Name			· 		

Statement of all completed Government & private contracts which are similar or not similar in nature and complexity to the Contract to be Bid

Amount at Awarded Amount at Completion Duration

Business Nan	ne:				
Business Add	dress:				
			Bidder's F	Role	a.
Name of Contract/ Project Cost	a. Owner's Namesb. Addressc. Telephone Nos.	Nature of Work	Description	%	b.
Cavammant					c.
Government					+
D: 4					
<u>Private</u>					
Notes This st	stamont shall be supported	with any of the follow	vin a.		
Note: This st	atement shall be supported	with any of the follow	ving:		
1. Contra	act				
	icate of Completion				
	icate of Acceptance al Receipts				
5. Sales	-				
6. Purch	ase Orders				
Submitted by	:				
	(Pr	rinted Name & Signati	ıre)		
Designation	÷		· 		_
Date	:				

Business Name:

Statement identifying the bidder's single largest completed contract similar to the contract to be bid within the relevant period of five (5) years, as provided in the bidding documents

Business Add	dress:	 							
	a. Owner's		Bidder's Ro	ole	a.	Date Awarde	% (Accompl		Value of
Name of Contract/ Project Cost	a. Owner's Names b. Address c. Telephone Nos.	Nature of Work	Description	%		d Date Started Date of Comple tion	Planned	Actual	Outstanding Works/ Undelivered Portion
Government									
Private									
11114110									
							Total Co	st	
 Notic Notic 	tatement shall be e of Award and/o e to Proceed issu- ial Receipts Invoices	or Contrac	et	the f	ollo	wing:			
	ase Orders								
Certificate of	Accomplishmen	ts signed	by the owner	or a	utho	rized repre	esentative		
Submitted by	:								
Davis d'			Printed Name		_				
Designation Date	:								

OMNIBUS SWORN STATEMENT

REPUBLIC OF THE PHILIPPINES)
CITY/MUNICIPALITY OF) S.S.
AFFIDAVIT
I, [Name of Affiant], of legal age, [Civil Status], [Nationality], and residing at [Address of Affiant], after having been duly sworn in accordance with law, do hereby depose and state that:
1. Select one, delete the other:
If a sole proprietorship: I am the sole proprietor of [Name of Bidder] with office address at [address of Bidder];
If a partnership, corporation, cooperative, or joint venture: I am the duly authorized and designated representative of [Name of Bidder] with office address at [address of Bidder];
2. Select one, delete the other:
If a sole proprietorship: As the owner and sole proprietor of [Name of Bidder], I have full power and authority to do, execute and perform any and all acts necessary to represent it in the bidding for (the above-captioned materials) of the Camarines Sur II Electric Cooperative, Inc. (CASURECO II);
If a partnership, corporation, cooperative, or joint venture: I am granted full power and authority to do, execute and perform any and all acts necessary and/or to represent the [Name of Bidder] in the bidding for (the above-captioned materials), of the Camarines Sur II Electric Cooperative, Inc. (CASURECO II), as shown in the attached [state title of attached document showing proof of authorization (e.g., duly notarized Secretary's Certificate issued

3. [Name of Bidder] is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government/foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board;

by the corporation or the members of the joint venture)];

- 4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;
- 5. [Name of Bidder] is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;

6. Select one, delete the rest:

If a sole proprietorship: I am not related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

If a partnership or cooperative: None of the officers and members of [Name of Bidder] is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

If a corporation or joint venture: None of the officers, directors, and controlling stockholders of [Name of Bidder] is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

- 7. [Name of Bidder] complies with existing labor laws and standards; and
- 8. [Name of Bidder] is aware of and has undertaken the following responsibilities as a Bidder:
 - a) Carefully examine all of the Bidding Documents;
 - b) Acknowledge all conditions, local or otherwise, affecting the implementation of the Contract;
 - c) Made an estimate of the facilities available and needed for the contract to be bid, if any; and
 - d) Inquire or secure Supplemental/Bid Bulletin(s) issued for the [Name of the Project], if any.
- 9. [Name of Bidder] did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

10. In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriating or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s. 1930, as amended, or the Revised Penal Code.

	nereunto affixed my signature this	day of
, (year) at the City of	, Philippines.	
	Affiant	_
SUBSCRIBED AND SWORN to b	efore me this <u>(date)</u> at the City of	,
picture) No/s and valid until	owing: Passport, Driver's License, TIN & SSS	o ib with
	NOTARY PUBLIC UNTIL_	
	PTR. No	
	TIN	
Doc. No		
Page No.		
Book No		
Series (year)		

Bid Securing Declaration Form

[shall be submitted with the Bid if bidder opts to provide this form of bid security]

BID SECURING DECLARATION

Project Identification No.: [Insert number]

To: [Insert name and address of the Procuring Entity]

I/We, the undersigned, declare that:

- 1. I/We understand that, according to your conditions, bids must be supported by a Bid Security, which may be in the form of a Bid Securing Declaration.
- 2. I/We accept that: (a) I/we will be automatically disqualified from bidding for any procurement contract with any procuring entity for a period of two (2) years upon receipt of your Blacklisting Order; and, (b) I/we will pay the applicable fine provided under Section 6 of the Guidelines on the Use of Bid Securing Declaration, within fifteen (15) days from receipt of the written demand by the procuring entity for the commission of acts resulting to the enforcement of the bid securing declaration under Sections 23.1(b), 34.2, 40.1 and 69.1, except 69.1(f),of the IRR of RA No. 9184; without prejudice to other legal action the government may undertake.
- 3. I/We understand that this Bid Securing Declaration shall cease to be valid on the following circumstances:
 - a. Upon expiration of the bid validity period, or any extension thereof pursuant to your request:
 - b. I am/we are declared ineligible or post-disqualified upon receipt of your notice to such effect, and (i) I/we failed to timely file a request for reconsideration or (ii) I/we filed a waiver to avail of said right; and
 - c. I am/we are declared the bidder with the Lowest Calculated Responsive Bid, and I/we have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this ____ day of [month] [year] at [place of execution].

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]

[Insert signatory's legal capacity]

Affiant

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

Bid Form

Date:
Series N°:
To: CAMARINES SUR II ELECTRIC COOPERATIVE, INC. (CASURECO II), Del Rosario Naga City.
Gentlemen and/or Ladies:
Having examined the Bidding Documents including Bid Bulletin Numbers [insert numbers], the receipt of which is hereby duly acknowledged, we, the undersigned, offers the Provision for the provision for (the above-captioned materials) in conformity with the said Bidding Documents for the sum of [total Bid amount in words and figures] or such other sums as may be ascertained in accordance with the Schedule of Prices attached herewith and made part of this Bid.
We undertake, if our Bid is accepted, to deliver the goods in accordance with the delivery schedule specified in the Schedule of Requirements.
If our Bid is accepted, we undertake to provide a performance security in the form, amounts, and within the times specified in the Bidding Documents.
We agree to abide by this Bid for the Bid Validity Period of 120 days and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
Until a formal Contract is prepared and executed, this Bid, together with your written acceptance thereof and your Notice of Award, shall be binding upon us.
We certify/confirm that we comply with the eligibility requirements as per ITB of the Bidding Documents.
Dated this day of 20
[signature] [in the capacity of]
Duly authorized to sign Bid for and on behalf of

AUTHORITY OF SIGNATORY

I,	, General Manager/Proprietor of	, a
single proprietorship under the laws of	, General Manager/Proprietor of with its register, has made const	ed office at
appointed place and stead, to do, execute and perf of (Name of Project) as fully and effe	form any and all acts necessary and / or represent in actively as corporation might do if personally present had hereby confirming all that said representative shadows.	the bidding ant with full
	hereunto set may hand this, Philippines.	day of
General Manager/Proprietor		

ACKNOWLEDGEMENT

REPUE	BLIC OF THE PHILIPPINES)		
CITY/N	MUNICIPALITY OF) S.S.		
BEFOR	RE ME, a Notary Public, persona	lly appeared		
	NAME	RES.CERT.#	ISSUED AT	ISSUED ON
				
me that	Known to me to be the same pethe same is their free act and vo		e foregoing and wh	ho acknowledged
	WITNESS BY HAND and sea	al this day of		
	WITNESS MY HAND AND S	SEAL		
Doc. No	o. :			
Page N				
Book N				
Series o	of :			

to

SAMPLE MEMORANDUM OF AGREEMENT

This Agreement is made and executed this day of at Naga City, Philippines by and between:
CAMARINES SUR II ELECTRIC COOPERATIVE, INC., an electric cooperative duly organized and existing under and by virtue of the laws of the Republic of the Philippines with principal office located at Del Rosario, Naga City represented herein by its Board President, JOHN PAUL S. STA. ANA, hereinafter referred to as "CASURECO II",
and
WITNESSETH:
CASURECO II desires to engage the services of the CONTRACTOR that the below stated project should be completed according to the plans and specifications as specified thereto, hereinafter referred to as the PROJECT; CASURECO II accepted the bids submitted by the CONTRACTOR for the completion of the PROJECT, viz:
(identify the project Lot details),
CASURECO II conducted a public bidding for the (the above-captioned project Lot), and the Bid of the CONTRACTOR is
The Notice of Award was issued to the CONTRACTOR on and the CONTRACTOR posted its Performance Security on in the amount of Php;
The abovementioned PROJECT shall be completed within (<i>specify the no. of days as per Lot No.</i>).upon receipt of the Notice to Proceed (NTP).
The following documents shall constitute integral parts of this contract:
 a) Contract Agreement; b) Bidding Documents; c) Winning bidder's bid, including the Eligibility requirements, Technical and Financial Proposals, and all other documents/statements submitted; d) Performance Security; e) Notice of Award of Contract; and f) Other contract documents that may be required by existing laws and/or CASURECO II concerned in the Bidding Documents

For and in consideration of the foregoing premises, the parties herein mutually agreed to the following terms and conditions;

1. The **CONTRACTOR** shall fully and diligently perform all works necessary for the completion of the **PROJECT** in accordance with the requirements of the approved plans and specifications and the terms of the Service Contract Documents which shall be made integral part of this contract;

- 2. Equipment, Poles, Line Hardware, kWh Meters and Conductors (*choose as applicable*) to be used must pass and be in accordance with the standards set forth by the National Electrification Administration (NEA), hereto attached as ANNEX ___;
- 3. **Terms of Payment.** Payment shall be made through progress billing upon submission of the required accomplishment report, duly verified/inspected by the cooperative's authorized representatives, to wit:
 - A. Fifteen percent (15%) payment of the contract Price as Mobilization Fee shall be released upon written request and submission of equivalent letter of credit by the **CONTRACTOR**.
 - B. Twenty-Five percent (25%) of the Contract Price shall be paid to the **CONTRACTOR** for an accomplishment of at least 25% of the construction phase within thirty (30) days after the submission of the following documents:
 - 1. Progress Billing
 - 2. Detailed Statement of Work Accomplished (SWA)
 - 3. Request of payment by the Contractor
 - 4. Pictures/photographs of original site conditions (for first billing only)
 - 5. Pictures/photographs of work accomplished.
 - C. Fifty percent (50%) of the Contract Price shall be paid to the **CONTRACTOR** within thirty (30) days upon completing the project and submitting the following documents:
 - 1. Billing Statement
 - 2. Detailed Statement of Work Accomplished (SWA)
 - 3. As-built plans and drawings
 - 4. An inspection report from CASURECO II's authorized personnel/representative.
 - 5. Request of payment by the Contractor
 - 6. Pictures/photographs of the completed project
 - D. **CASURECO II** shall withhold the remaining ten percent (10%) of the Contract Price within one (1) year to cover warranty obligations of the **CONTRACTOR**. This shall be released upon the issuance of a Certificate of Acceptance from CASURECO II and NEA authorized personnel/representatives.
- 4. The Cooperative shall promptly pay the **CONTRACTOR** of its performance as stipulated above, less authorized deductions (e.g. retention, withholding tax, damages etc.);
- 5. The **CONTRACTOR** shall be liable for damages sustained by the Cooperative's distribution lines caused by its men, occurring in connection with the performance of its work;
- 6. The **CONTRACTOR** shall take all necessary precaution for the safety of his workforce, bystander and properties both private and public, and shall comply with all applicable provisions of safety laws/instruction, to prevent accidents;
- 7. The **CONTRACTOR** shall be required to clean/remove all debris in the work area before leaving the concerned area;
- 8. The **CONTRACTOR** holds the Cooperative free from any and all liabilities and claims for damages, injuries, death or losses, suffered by its own men or third parties, including costs of litigation, if any, in connection with, or arising out, of the performance of its work and obligations, under this Contract;
- 9. Warranty and Defects Liabilities.
 - 9.1 The **CONTRACTOR** shall be solely responsible and liable for defects and/or failures of the completed project within a warranty period of one (1) year upon energization/installation.

9.2 The **CONTRACTOR** is given a period of thirty (30) days for the correction of defects

	within warranty period.	a period of unity (50) days for the correction of defects		
10.		ately upon signing of both parties and the work shall be from the receipt of Notice to Proceed (NTP) by the		
11.	1. Liquidated Damages. Failure to comply with the terms and conditions of the contract will result in the payment of corresponding penalties/liquidated damages in the amount to 1/10 of 1% of the cost of the unperformed portion of every day of delay. Once the cumulative amount of liquidated damages reaches 10% of the amount of the contract, CASURECO II shall rescind the contract, without prejudice to other courses of action and remedies open to it;			
12.	2. Termination for Other Causes. Contract termination shall be initiated in case it is determined prima facie by CASURECO II that the CONTRACTOR has engaged, before, or during the implementation of the contract, in unlawful deeds and behaviors relative to contract acquisition and implementation, such as, but not limited to corrupt, fraudulent, collusive, coercive, and obstructive practices as stated in ITB Clause 4.			
13.	3. Violation of any of the terms and conditions stipulated hereof, shall be brought to the adverse party before the proper court in Naga City, subject to the laws on jurisdiction.			
	WITNESS WHEREOF, the parties have 24 at Naga City, Philippines.	ve hereunto affixed signatures this day of,		
CO By:	ONTRACTOR:	CASURECO II By:		
		JOHN PAUL STA. ANA Board President CASURECO II		
	Signed in the p	presence of principal witness:		

ENGR. EDGARDO R. PIAMONTE

Acting General Manager

CONFIRMING STATEMENT ON WARRANTY BEING OFFERED

BIDS AND AWARDS COMMITTEE

Camarines Sur II Electric Cooperative, Inc. Del Rosario, Naga city

Attention: ENGR. MARY FRANCE D. MORALES

BAC Chairman

Project: (Please choose as applicable)

- Lot 1 Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Lines for ten (10) Sitios in Calabanga, Milaor, Minalabac, and Pili
- Lot 2 Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Lines for ten (10) Sitios in Siruma and Tinambac
- Lot 3 Supply of Labor and Materials for the House Wiring Installation of the Twenty (20) Sitios

COMPANY NAME

CONFIRMING STATEMENT ON DELIVERY SCHEDULE

BIDS AND AWARDS COMMITTEE

Camarines Sur II Electric Cooperative, Inc. Del Rosario, Naga city

Attention: ENGR. MARY FRANCE D. MORALES

BAC Chairman

Project: (Please choose as applicable)

- Lot 1 Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Lines for ten (10) Sitios in Calabanga, Milaor, Minalabac, and Pili
- Lot 2 Supply of Labor and Materials for the Construction of Primary and Secondary Distribution Lines for ten (10) Sitios in Siruma and Tinambac
- Lot 3 Supply of Labor and Materials for the House Wiring Installation of the Twenty (20) Sitios

Dear ENGR. MORALES,

In compliance with the requirement of Camarines Sur II Electric Cooperative, Inc. for the above stated project, we [COMPANY NAME], with office address at

conforms with the following completion schedule:

Lot No.	Project Description	Project Duration/ Completion
	Supply of Labor and Materials for the Construction of	
1	Primary and Secondary Distribution Lines for ten (10) Sitios	
	in Calabanga, Milaor, Minalabac, and Pili	
2	Supply of Labor and Materials for the Construction of	
	Primary and Secondary Distribution Lines for ten (10) Sitios	
	in Siruma and Tinambac	
3	Supply of Labor and Materials for the House Wiring	
	Installation of the Twenty (20) Sitios	

Very truly yours,	
[Signature over printed name of authorized signatory]	
Date:	