

**PANGASINAN I ELECTRIC COOPERATIVE (PANELCO I)**

San Jose, Bani, Pangasinan

CWDO No. 63928-502-7969 Telefax No. 6375-551-5564

Email: panelco_one@yahoo.com Website: www.panelcoi.com.ph

ITB Ref No. 2021-016

**BIDS AND AWARDS COMMITTEE
INVITATION TO SEALED BID**

The Pangasinan I Electric Cooperative (PANELCO I) thru its constituted Bids and Awards Committee invites interested dealers, contractors and suppliers to participate in the bidding for the following:

| Particulars | Approved Budget Cost (Inclusive of all Taxes) | Source of Funding | Price of Bid Documents (Non- Refundable) |
|---|--|---|---|
| Acquisition of Communication Wireless System (Construction and Installation of Pole and Distribution Line) | Php 1,097,211.74 | Reinvestment Fund for sustainable CAPEX (RFSC) | Php. 0 |

1. Schedule of bidding activities are as follows:

| Activities | Schedule |
|--|--------------------------|
| Posting of invitation to Bid | July 7, 2021 |
| Deadline of Submission and Opening of Bids | July 14, 2021 12:00 NN |
| Bid Evaluation | July 15 to July 22, 2021 |
| Notice of Award and Contract Preparation | July 23 to 28, 2021 |

2. ELIGIBILITY REQUIREMENTS

- a. DTI business name registration or SEC Registration Certificate;
- b. Valid and current Mayor's permit/Municipal License;
- c. Tax Payer's Identification Number;
- d. BIR Value Added Tax Registration;
- e. Certification that the supplier/contractor is not black listed or banned from bidding by the government or any of its agencies and other private corporations or electric cooperative;
- f. PCAB License
- g. Compliance with Executive Order (EO) #398
 - ✓ Proof of Vat Payments for the past six months
 - ✓ Tax Clearance from the BIR
 - ✓ On-going, completed or awarded contract not yet stated within the relevant period specifying the following:
 - Name of Contract
 - Date of Contract
 - Amount of Contract and Value of Outstanding Contracts
 - Date of Delivery and
 - End-user's acceptance if completed

3. INSTRUCTIONS

1. Any bid proposal above ABC shall be automatically disqualified
2. The bidding activities shall be held on the above schedules at GM's Residence Conference Hall PANELCO I Main Office Barangay San Jose, Bani, Pangasinan
3. Physical presence of the bidders during the opening of bids is not required due to COVID-19 pandemic, however interested bidders may opt to joined the conference via zoom



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PROJECT : INSTALLATION OF POLE AND CONSTRUCTION OF DISTRIBUTION LINE FOR CAPEX PROJECT NO. 28 ; ACQUISITION OF COMMUNICATION WIRELESS SYSTEM

| Description | Location of Project | Pole Height | Project Cost |
|--|------------------------------|-------------|--------------|
| Erection of Pole for Communication Wireless System | Anda Collection Office | 90 ft. | |
| Erection of Pole for Communication Wireless System | Bolinao Sub-Office | 80ft | |
| Erection of Pole for Communication Wireless System | Concordia Bolinao Substation | 130ft | |
| Erection of Pole for Communication Wireless System | Tara Bolinao Substation | 90ft. | |
| Erection of Pole for Communication Wireless System | Panelco I Main Office | 130ft | |
| Erection of Pole for Communication Wireless System | Bobonot, Substation | 130ft | |
| Erection of Pole for Communication Wireless System | Infanta Collection Office | 80ft. | |
| Erection of Pole for Communication Wireless System | Mabini Collection Office | 80ft | |
| Erection of Pole for Communication Wireless System | Alaminos Sub-Office | 80ft | |
| Erection of Pole for Communication Wireless System and Construction of Distribution Line | Magsaysay, Agno (Agno Relay) | 130ft | |
| Erection of Pole for Communication Wireless System | Bani Substation | 50ft | |

Total Labor Cost -

| DESCRIPTION | UNIT COST (PESOS) | PROJECT REQ'MNTS. | EXTENDED COST |
|---|----------------------|----------------------|------------------|
| Attachment, Guy, Malleable Type With 11/16" Hole Diameter | | | |
| Bolt, Double Upset, 5/8" X 10" | | | |
| Bolt, Oval Eye, 5/8" X 9" | | | |
| Bolt, Oval Eye, 5/8" X 10" | | | |
| Bolt, Machine, 5/8" X 8" | | | |
| Bolt, Machine, 5/8" X 10" | | | |
| Bolt, Machine, 5/8" X 12" | | | |
| Bolt, Single Upset, 5/8" X 10" | | | |
| Bracket, Clevis Deadend Without Spool | | | |
| Clamp, Hot Line, #2 - #4/0 ACSR Main to #2 - #4/0 | | | |
| Clamp, Anchor Bonding, Single Eye Rod | | | |
| Clamp, Loop Deadend, #6 to #2/0 ACSR | | | |
| Clamp, Deadend Strain, #1/0 ACSR | | | |
| Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel | | | |
| Clevis, Secondary Swinging Without Spool | | | |
| Conductor, Bare, ACSR #1/0, AWG 6/1 (Meters) | | | |
| Conductor, Insulated, ACSR #1/0, AWG 6/1 (Meters) | | | |
| Connector, Compression, #6 - #1/0 ACSR Run To #6 - #2 | | | |
| Connector, Compression, #1/0 - #2/0 ACSR Run To #1/0 - #2/0 | | | |
| Cutout And Arrester Combination With Load Break | | | |
| Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5 | | | |
| Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 | | | |
| Insulator, Spool, 3", ANSI, Class 53 - 4 | | | |
| Insulator, Suspension, 6", Clevis Type | | | |
| Link, Fuse, Universal, Bottom Head, Type K, 8 Amperes | | | |
| Nut, Lock, Mf Type, 5/8" | | | |
| Pin, Pole Top, Channel, 1" Thread, 20" Long | | | |
| Rod, Anchor, Threaded, Single Eye, 5/8" X 7' | | | |
| Rod, Armor, Preformed, #2 ACSR, Single Set | | | |
| Rod, Armor, Preformed, #1/0 ACSR, Single Set | | | |
| Rod, Armor, Preformed, #1/0 ACSR, Double Set | | | |
| Rod, Tapping, Preformed, #1/0 ACSR | | | |
| Spacer, Pipe, 3/4" X 1-1/2" | | | |
| 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 (Feet) | | | |
| Wire, Tape, Armor, Aluminum Alloy, 0.5" X 0.3" (Feet) | | | |
| Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG (Feet) | | | |
| Wire, Guy, Steel, 3/8", 7 Strand (Feet) | | | |
| Pole, Steel, 30' | | | |
| Block, Anchor, Concrete | | | |

TOTAL MATERIAL COST P _____ **-**

Summary of Evaluation :

| | | |
|---------------------|----------|----------|
| Total Material Cost | P | - |
| Total Labor Cost | P | - |
| TOTAL | P | - |

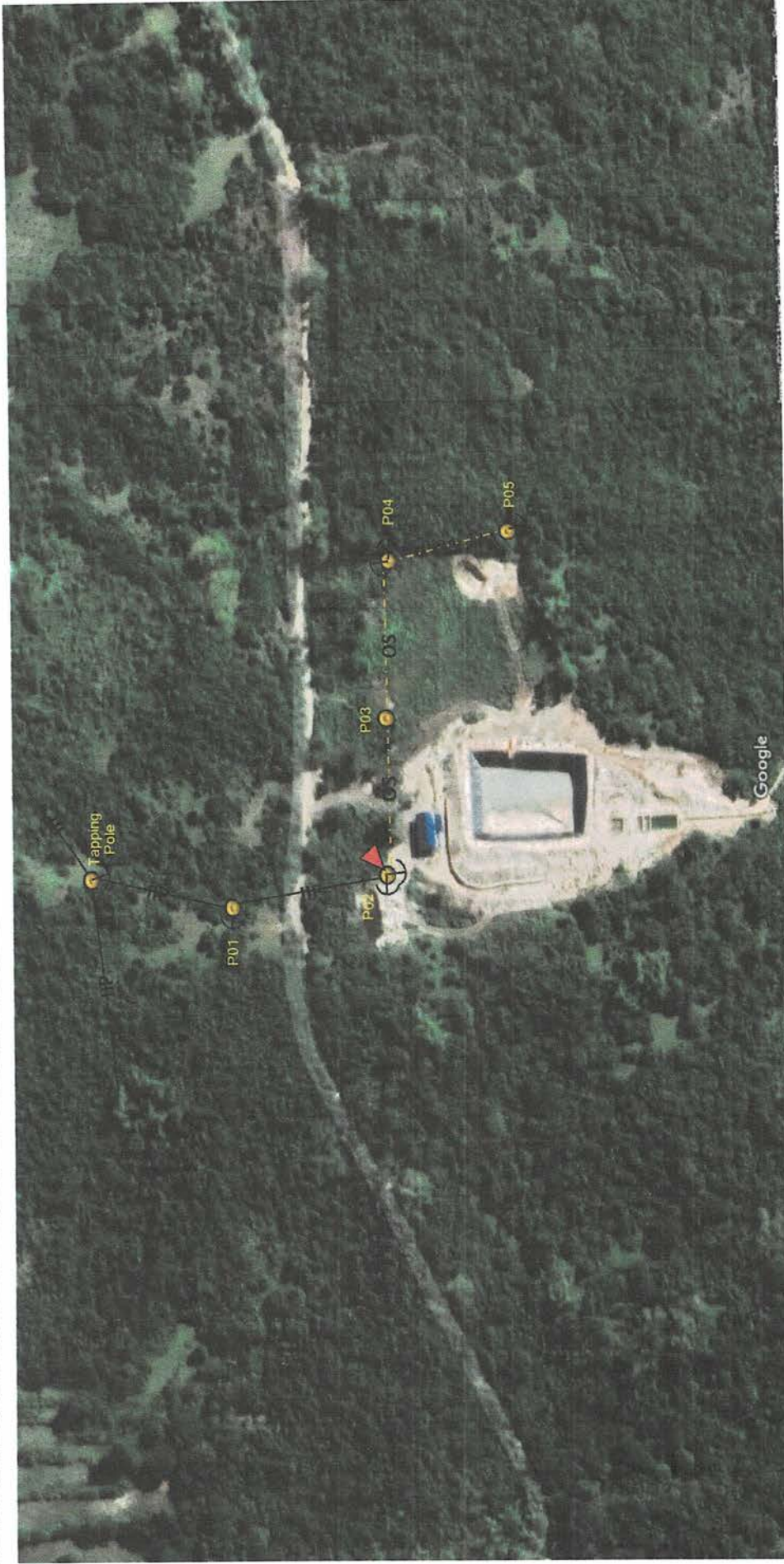
Labor on erection of tower
line extension for agno tower
TOTAL COST

**Construction of Distribution Line in Brgy. Magsaysay, Agno,
Pangasinan**

Bill of Quantities

| DESCRIPTION | PROJECT REQUIREMENTS | |
|---|----------------------|-------|
| | Quantity | Unit |
| Attachment, Guy, Malleable Type With 11/16" Hole Diameter | 6 | PC/S |
| Block, Anchor, Concrete | 6 | PC/S |
| Bolt, Double Upset, 5/8" X 10" | 1 | PC/S |
| Bolt, Machine 5/8" x 2", HDG | 2 | PC/S |
| BOLT, MACHINE 5/8" X 12", HDG | 2 | PC/S |
| Bolt, Machine, 5/8" X 8" | 6 | PC/S |
| Bolt, Machine, 5/8" X 10" | 2 | PC/S |
| Bolt, Oval Eye, 5/8" X 9" | 4 | PC/S |
| Bolt, Oval Eye, 5/8" X 10" | 8 | PC/S |
| Bolt, Single Upset, 5/8" X 10" | 1 | PC/S |
| Bracket, Clevis Deadend Without Spool | 1 | PC/S |
| Clamp, Anchor Bonding, Single Eye Rod | 6 | PC/S |
| Clamp, Deadend Strain, #1/0 ACSR | 2 | PC/S |
| Clamp, Guy Straight, 3 Bolt, Heavy Duty Steel | 12 | PC/S |
| CLAMP, HOT LINE, #2-#4/0 ACSR | 2 | PC/S |
| Clamp, Loop Deadend, #6 to #2/0 ACSR | 20 | PC/S |
| Clevis, Secondary Swinging Without Spool | 10 | PC/S |
| Conductor, Bare, ACSR #1/0, AWG 6/1 (Meters) | 460 | MTR/S |
| Conductor, Insulated, ACSR #1/0, AWG 6/1 (Meters) | 184 | MTR/S |
| CONDUCTOR, INSULATED, COPPER # 2/7 | 4 | MTR/S |
| CONDUCTOR, INSULATED, COPPER #8 | 6 | MTR/S |
| Connector, Compression, #1/0 - #2/0 ACSR Run To #1/0 - #2/0 | 4 | PC/S |
| Connector, Compression, #6 - #1/0 ACSR Run To #6 -#2 | 12 | PC/S |
| CONNECTOR, COMPRESSION, YHO 150, RUN #3-#1/0-TAP #6-#2 | 2 | PC/S |
| Connector, Ground Rod Clamp, 5/8" | 1 | PC/S |
| Current Limiting Fuse, USA, 23KV, w/Grove and Spline | 1 | PC/S |
| FUSE CUT OUT & LIGHTNING ARRESTER COMBINATION, 15KV | 2 | SET/S |
| Hot Line Stirrup, #4/0 ACSR, Thread Type | 1 | PC/S |
| Insulator, Pin Type, Porcelain, ANSI, Class 55 - 5 | 2 | PC/S |
| Insulator, Spool, 1-3/4", ANSI, Class 53 - 2 | 5 | PC/S |
| Insulator, Spool, 3", ANSI, Class 53 - 4 | 8 | PC/S |
| Insulator, Suspension, 6", Clevis Type | 4 | PC/S |
| LINK, FUSE, UNIVERSAL, BOTTOM HEAD, TYPE K, 2A | 1 | PC/S |
| Link, Fuse, Universal, Bottom Head, Type K, 8 Amperes | 1 | PC/S |
| Nut, Lock, MT Type, 5/8" | 27 | PC/S |
| Pin, Pole Top, Channel, 1" Thread, 20" Long | 2 | PC/S |
| Pole, Steel, 30' | 5 | PC/S |
| Rod, Anchor, Threaded, Single Eye, 5/8" X 7' | 6 | PC/S |
| Rod, Armor, Preformed, #1/0 ACSR, Double Set | 1 | SET/S |
| Rod, Armor, Preformed, #1/0 ACSR, Single Set | 1 | SET/S |
| Rod, Armor, Preformed, #2 ACSR, Single Set | 2 | SET/S |
| Rod, Ground Steel, Galvanized, 5/8" x 10', HDG | 1 | PC/S |
| Rod, Tapping, Preformed, #1/0 ACSR | 1 | SET/S |
| Spacer, Pipe, 3/4" X 1-1/2" | 2 | PC/S |
| TRANSFORMER HANGER, 1 PHASE | 2 | SET/S |

| | | |
|--|-----|------|
| TRANSFORMER, POLE TYPE, CONVENTIONAL, AMORPHOUS, 15 KVA | 1 | PC/S |
| WASHER, SQUARE, FLAT, 2 1/4" X 2 1/4" X 3/16" | 24 | PC/S |
| Washer, Square, Flat, 4" X 4" X 1/2" With 7/8" Diameter Hole | 6 | PC/S |
| Wire, Grounding Galvanized, 3 strand, 5/16" Dia. | 35 | FT |
| Wire, Grounding, Aluminum Alloy, 3 Strand, #4 AWG (Feet) | 30 | FT |
| Wire, Guy, Steel, 3/8", 7 Strand (Feet) | 300 | FT |
| Wire, Tape, Armor, Aluminum Alloy, 0.5 " X 0.3" (Feet) | 10 | FT |
| Wire, Tie, Aluminum Alloy, Soft, #4 AWG (Feet) | 32 | FT |



PROJECT TITLE:

Single Phase Primary & Secondary Line Extension



LOCATION:

Brgy. Magsaysay, Agno, Pangasinan

GANTT CHART

CONSTRUCTION WORK SCHEDULE

Name of Project : ACQUISITION OF COMMUNICATION WIRELESS SYSTEM (CAPEX PROJECT NO. 28)

ABC : P 1,097,211.74

Fund Source : CAPEX

| ACTIVITIES | Month | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| | No. of Days | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | Day | | |
| 1. Final Survey, R.O.W. acquisition and Staking | 2 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Hauling / Spotting / Anchors | 5 | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Pole Hole Digging | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Pole Grounding / Erection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. Anchor Digging / Spotting Backfilling / Setting | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. Pole Top Assembly Dressing | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. R.O.W. Clearing | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. Guying | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. Conductor Payout | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. Final Stringing / Armoring | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. Transformer Installation | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12. Final Inspection and Corrections | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total No of Days | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Note: Installation of pole and construction of Distribution Lines shall commence after receipt of notice of award by the winning contractor/bidder to complete the project within 30 calendar days. Bidding and delivery schedule is not included in the Gantt Chart

Scope of works

1. Final Survey, R.O.W. acquisition and final staking
2. Hauling and spotting
3. Hole digging
4. Pole grounding ,erection
5. Anchor digging, spotting and backfilling, setting
6. Pole dressing and grounding
7. Right of way clearing
8. Guying
9. Conductor payout
10. Final stringing and armoring
11. Transformer installation
12. Final inspection and corrections

Technical Specifications

1. SPECIFICATION FOR PORCELAIN INSULATORS:

- a. All porcelain insulators types shall conform in all respect to ANSI Specification.
- b. Each Insulator shall bear the manufacturers symbol and year of manufacturer.
- c. Each insulator shall have smooth glazed surface, free from imperfections or blemishes which can impair service life and performance.
- d. Each insulator type shall be tested using method described in ANSI C29.1-1982,(6) OR iec 383:1983,(7).
- e. Overhead distribution line insulator shall be securely packaged for shipping and handling. Each package shall be marked with the number or insulators enclosed the manufacturers name, insulator class name and catalog number.
- f. The performance and dimensional requirements of overhead distribution lie insulators 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.

SPECIFICATION FOR SUPPORT GROUND WIRE:

- a. Support ground wire shall be made from either iron or steel of a grade and equality to meet the strength requirements required in the normal use of the support ground wire.
- b. Support ground wire shall be free of rough or uneven surface and edges so as to ensure safety in handling and installation.
- c. After fabrication, support ground wire shall be hot dipped galvanize in accordance with ANSI/ ASTM A153-82(1).
- d. Support ground wire shall be securely package for shipping and handling, each package shall contained 100 items and shall be clearly marked with the manufactured name and catalog number.
- e. The performance and dimensional requirement based on other internationally recognized standards are acceptable only if the requirements of such standards are acceptable only if the requirements quoted in this document.

SPECIFICATION FOR TIE, SPOOL, AND PREFOMED:

- a. Tie, spool, and preformed shall be made from aluminum in accordance with ASTM B686-82.
- b. Tie, spool, and preformed shall be reasonably smooth and free from blemishes and imperfection not consistent with good commercial practice.
- c. Tie, spool, and preformed shall securely package for shipping and handling, each package shall contained 100 items and shall be clearly marked with the manufacturers name and catalog number.
- d. The performance and dimensional requirements based on other internationally recognized standards are acceptable only if the requirements of such standards are acceptable only if the requirements quoted in this document.

SPECIFICATION FOR ACSR:

- a. ACSR conductors shall conform in all respect to the dimensional and performance requirements of this document, which covers:
 - steel core wire
 - Aluminum wire
- b. The ACSR conductor shall be classified as class A as designated in ASTM B232 (1).
- c. The number and diameter of aluminum and steel wires and standing shall conform to the requirements of the table 1, 2 and 3 of ASTM B232 (1).
- d. The electrical resistivity limits and values of the aluminum rod are presented in table 4 of ASTM B230 (3).
- e. The conductor shall be free from imperfections, sharp protrusions and blemishes not consistent with good commercial surface.
- f. 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).
- g. Conductors shall be shipped on non-returnable reels manufactured from aluminum, steel or export quality preservative treated wood lagging.

| SIZE AWG OR MCM | STRANDS NO. & SIZE IN INCHES | | OVERALL DIAMATE R (INCHES) | RESISTANCE OHM/MILE @ 25 Deg Celcius | ULTIMATE STRENGTH POUNDS |
|--------------------|---------------------------------|------------|----------------------------------|--|--------------------------------|
| | Aluminu m | Steel | | | |
| 6 | 6 X .0661 | 1 X .06610 | 0.198 | 3.56 | 1,170 |
| 4 | 6 X .0834 | 6 X .0834 | 0.25 | 2.24 | 1,830 |
| 2 | 6 X .1092 | 1 X .1092 | 0.306 | 1.41 | 2,790 |
| 1/0 | 6 X .1327 | 6 X .1327 | 0.398 | 0.885 | 4,280 |
| 2/0 | 6 X .1490 | 6 X .1490 | 0.447 | 0.702 | 5,345 |
| 3/0 | 6 X .1672 | 6 X .1672 | 0.502 | 0.556 | 6,675 |
| 4/0 | 6 X .1878 | 6 X .1878 | 0.563 | 0.441 | 8,420 |

SPECIFICATION FOR ARMOR ROD:

- a. Armor rod and guard shall be made of an aluminum alloy which conforms to the requirements of ASTM B211 HEAT TREATED ALLOY 6061, (1), or equivalent.
- b. Preformed armor rod and line guard shall have smooth surfaces and rounded ends, and shall fit the conductor snugly.
- c. Performed armor rod and line guard shall exhibit strength characteristics equivalent to those of the conductor to which they are applied.

SPECIFICATION FOR MACHINE BOLT:

- a. Drop forged machine bolt and compatible square nut must be fabricated from steel that complies with the requirements o ANSI standard C135.1 1979 (1).
- b. The machine bolts and compatible square nuts shall be hot dip galvanize in accordance with ANSI/ASTMA153-82 (2).
- c. The threaded portion of machine bolts shall be provided with machine bolts threads and before galvanizing, must comply with class 2 of the ANSI standard for unified screw thread, ANSI B1.1-1982, (5) and conform to ANSI C135.1-1979 (1).
- d. After galvanizing, the bolts thread shall permit compatible nuts to be run the entire length of the thread without the aid of tools.
- e. Nuts shall be trapped in accordance with ANSI C135.1-1979, TABLE 8, (1).
- f. Machine bolts with nuts installed shall meet the tensile strength requirements listed in table 10 of ANSI C135.1-1979, (1).

SPECIFICATION FOR OVAL EYEBOLTS:

- a. Oval eyebolts and compatible square nuts must be fabricated from materials that comply with the requirement of ANSI standard C135.1-1979, (1).
- b. Oval eyebolts and compatible square nuts shall be hot dip galvanized in accordance with ANSI/ASTM A153-82 (2).
- c. Rolled thread must be provide on the threaded portion of the oval eyebolts before galvanizing, must comply with class 2 of ANSI standard, ANSI B1.1-1982, (5) and conform to ANSI C135.1 1979, (4).
- d. Oval eyebolts with nuts installed shall meet the strength requirements listed in section 6 of ANSI C135.4-1979, (1).

SPECIFICATION FOR SINGLE AND DOUBLE UPSET SPOOL INSULATOR BOLTS:

- a. Upset bolt assemblies shall fabricate from materials that comply either with the requirements section 3 of ANSI standard C135.1-1980 (1) or NEMA PH31-1977, (2).
- b. Upset bolts and its accessories shall be hot dip galvanized in accordance with ANSI/ASTM a153-82 (3).
- c. The threaded portion of single and double upset bolts before galvanizing comply with class 2 of ANSI standard for unified screw thread, ANSI B1.1-1982, (8) and shall conform to ANSI C135.1-1980 (1).
- d. Individually a single upset bolt shall develop a minimum of 1900 pounds and a double upset spool shall develop a minimum of 800 pounds without deflecting more than 10 degrees when tested by procedure describe herein section 7 of ANSI C135.31-1980 (1).
- e. Single and double upset bolts and accessories shall be securely package for shipping. Each package shall contain fifty sets and shall be clearly marked with the manufacturer's name and catalog number.

SPECIFICATION FOR STEEL OVAL EYENUTS:

- a. Oval eye nuts shall be fabricated from materials that comply with ASTM A663-82 (1). The materials shall be of grade and quality which can meet requirement o ANSI C135.31-1979, (2).
- b. Oval eye nut 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 symbol of identification marks in a location that will not impair its function.
- c. Oval eye nut shall be securely packaged for shipment. Each packaged shall contain one hundred oval eye nut and shall be clearly marked with manufacturer's name and catalog number.

SPECIFICATION FOR CONCRETE ANCHOR BLOCK

| Concrete Anchor Blocks | | Min Break Load | Outside Diameter | | Wall Thickness | Weight (Approx.) |
|------------------------|---------------|----------------|------------------|--------|----------------|------------------|
| Meter | ft. (approx.) | | mm | inches | mm | Kgs. |
| 0.9 | 3 | 4,000 | 150 | 6 | 42 | 30 |
| 1.2 | 4 | 5,000 | 200 | 8 | 42 | 60 |

Specifications for Steel Poles

Bidders must state under the Column "Statement of Compliance" either "Comply" or "Not Comply" against each of the individual parameters of each Specification stating the corresponding performance parameter of the equipment offered. Statements of "Comply" or "Not Comply" must be supported by evidence in a Bidders Bid and cross-referenced to that evidence. Evidence shall be in the form of manufacturer's un-amended sales literature, unconditional statements of specification and compliance issued by the manufacturer, samples, independent test data etc., as appropriate. A statement that is not supported by evidence or is subsequently found to be contradicted by the evidence presented will render the Bid under evaluation liable for rejection. A statement either in the Bidders statement of compliance or the supporting evidence that is found to be false either during Bid evaluation, post-qualification or the execution of the Contract may be regarded as fraudulent and render the Bidder or supplier liable for prosecution subject to the provisions of ITB Clause

3.1(a)(ii)and/or GCC Clause 2.1(a)(ii).

| SCOPE: | COMPLIANCE / FORM OF EVIDENCE | |
|--|--------------------------------------|--|
| <p>This specification establishes the physical characteristic and performance requirements of steel poles for use on PANELCO I electric distribution system. Poles specification shall conform in all respects to the performance of this standard. The next figures and references of the standards supplement each other shall be considered part of this standard. The poles are to be the embedded type and not require a special foundation.</p> | | |
| <p>MATERIAL: 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.'</p> | | |
| <p>FINISHING: 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 ANSVASTM A153-82, Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware. This standard 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 free from coated 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</p> | | |

| <p>excess zinc.</p> <p>DIMENSION: 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.</p> | | | | | | | | | | |
|---|-------------|----------|------|------|------|------|------|------|--|--|
| <p>STRENGTH: The strength of the pole is specified as 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 each classification must be able to withstand without damage is shown on the table below;</p> <p>POLE STRENGTH AND GROUND LINE DIMENSION:</p> <table border="1" data-bbox="332 959 738 1158"> <thead> <tr> <th>POLE LENGTH</th> <th>STRENGTH</th> </tr> </thead> <tbody> <tr> <td>30/2</td> <td>3700</td> </tr> <tr> <td>35/2</td> <td>3700</td> </tr> <tr> <td>40/2</td> <td>3700</td> </tr> </tbody> </table> <p>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.</p> | POLE LENGTH | STRENGTH | 30/2 | 3700 | 35/2 | 3700 | 40/2 | 3700 | | |
| POLE LENGTH | STRENGTH | | | | | | | | | |
| 30/2 | 3700 | | | | | | | | | |
| 35/2 | 3700 | | | | | | | | | |
| 40/2 | 3700 | | | | | | | | | |

| SPECIFICATIONS | STATEMENT OF COMPLIANCE |
|--|-------------------------|
| <p>MARKINGS: Each steel pole shall be identified by the supplier by stamping into the pole, prior to coating, with letters not less than 1/2" high squarely on the face of the pole at ten (10) feet from the butt of the pole. The following information shall be stamped into the pole:</p> <ul style="list-style-type: none"> • Supplier's name • Month and year of manufacture • Length of pole • Class of pole • Type of coating • Pole production or serial number <p>The marks shall be legible after application of the protective coating.</p> | |
| <p>INSPECTION AND TESTING: The manufacturer shall conduct factory tests to verify that the poles comply with the requirements of this standard. PANELCO I reserves the right to witness ANY OR ALL factory tests and the Supplier shall notify PANELCO I fifteen (15) days before each test is to be conducted. PANELCO I expect to commission an internationally recognized third party,</p> | |

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, ten more from the same lot may 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, and 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 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 steadily until it reaches 50%. Hold 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 successively 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 nearest 5 kilograms. The pole is considered to have failed the break load test if it yielded at less than the minimum breaking load.

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
- Pole dimensions
- Load, including point of failure Deflection
- Recovery

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

| Ht. | Thickness (mm) | Butt Ø (mm) | Tip Ø (mm) | Design Load (kg) | Yield Stress (mpa) | Zinc coating | Total Weight Kg. |
|-----|----------------|-------------|------------|------------------|--------------------|--------------|------------------|
| 25 | 3.0 | 152 | 120 | 300 | 345 | 86 | 72 |
| 30 | 3.0 | 226 | 127 | 500 | 345 | 86 | 126 |
| 35 | 3.0 | 248 | 127 | 500 | 345 | 86 | 170 |
| 40 | 3.0 | 317 | 127 | 500 | 345 | 86 | 227 |

Information to be furnished;

- a. Authentication Certificate
- b. Manufacturer Test Report

TECHNICAL SPECIFICATIONS FOR DISTRIBUTION TRANSFORMER

2. SCOPE:

This specification covers the electrical, mechanical, and performance requirements for single phase, mineral- oil filled, BRAND NEW overhead type distribution transformers for use on 13,200/7620volts, 60Hz, grounded Y, Coop distribution system.

3. GENERAL:

Distribution Transformers furnished shall conform in all respects to the requirements of this document. The transformers will be used in a hot tropical climate with high humidity's and high annual rain fall.

4. TRANSFORMER TYPE:

This specification covers the requirements for conventional type transformers. All productive devices will be provided by the user.

5. RATINGS:

1) Nominal ratings:

| | CSP | Conventional | |
|---------------|------------|---------------|---------------|
| | | 50KVA & under | 75KV& Over |
| a. HV Winding | 7620 Volts | 7620 Volts | 7620Volts |
| b. LV Winding | 240 Volts | 120/240 Volts | 240/480 Volts |

2) Basic Insulation Level (BIL)

- a. HV Winding = 95 KV
- b. LV Winding = 30 KV

3) Operating Frequency= 60 Hz

4) Transformers shall be guaranteed to have the following impedances:

| Size (KVA) | % Impedance | Tolerance |
|---------------|-------------|-----------|
| 10 Through 75 | 2.0 | +/- 10% |

Test reports shall be submitted by the manufacturer showing % I, %IZ and % total impedance for each type and transformer size.

- 5) Ambient air temperature is 30 °C. Average winding temperature rise above ambient shall not exceed 65 °C when measured by the resistance method. The hottest spot temperature rise of the winding shall not exceed 85 °C over ambient. Temperature rise of, the insulating liquid shall not exceed 65 °C above ambient when, measured near the tap of the tank. Temperature limits shall not exceed when the transformer is operated at rated KVA output and rated secondary voltage for twenty-four hours.
- 6) Transformers with efficiency below 98% or losses exceeding the following limits are not acceptable and will be automatically rejected.

| KVA rating | (Amorphous metal core type) | |
|------------|-----------------------------|----------------------------|
| | No- load Losses Watts | Full- load Losses Watts |
| 15 | ≤15 | ≤195 |
| 25 | ≤18 | ≤290 |
| 37.5 | ≤30 | ≤360 |

7) Audible sound level

Transformers shall be designed so that, the average sound level does not exceed the following levels or they will automatically rejected.

| KVA rating | Average Sound Level (Decibels) |
|--------------|--------------------------------|
| 50 and below | 45 |

6. DESIGN:

1. Transformers shall be designed in accordance with the latest revisions of ANSI Standards C57.12.00 and C57.12.20.
2. Transformers shall be Class OA (self-cooled), amorphous type and have two (2) windings of high conductivity copper.
3. Transformer shall have a high voltage off load tap changer with two, 2.5 % taps below rated voltage and two, 2.5 %, a taps above rated voltage. The no load tap changer shall be operable by an external handle or lever and provision shall be made for fastening or sealing the handle to prevent unauthorized or inadvertent operation of the mechanism. A small decal should also be placed near the operating handle to warn against operation of the tap changer while the transformer is energized.

4. HV Bushings:

- a. Industry standard, outdoor type porcelain.
- b. Connector shall be bolted ring type suitable for copper or aluminum conductors. Connectors shall accommodate the range of suitable conductor sizes.
- c. Conventional type transformers shall have two (2) high voltage bushings and one position support lugs.

5. LV BUSHING:

- a. Industry standard, outdoor type, porcelain.
- b. Connectors shall be bolted ring type connectors which shall be suitable for use with copper or aluminum conductors and shall accommodate the range of suitable conductor sizes.
- c. Conventional transformers shall have three (3) low voltage bushings. The outside tank ground strap shall be connected for 240 volt operation. There shall be no internal ground or tank connection to any of the low voltage bushings for either type of transformer.

6. TANK :

- a. Transformer tank shall be bolted type design complete with cover and gaskets.
- b. Tank shall be supplied with a tank grounding bolted ring –type connector suitable for use with copper or aluminum conductors. The connector shall have range a range of #6 to #2 AWG.
- c. There shall be a low voltage (no internal ground) grounding provision with a removable copper strap.
- d. Tank shall have permanent lugs for lifting the complete unit. There shall be facilities for lifting the core and coil assembly.

- e. The nameplate shall be made of stainless steel and shall have engraved letters filled with black enamel. Nameplate information must include, but is not limited to the following:

Serial Number
Class
Number of phases
Frequency
Voltage Rating
KVA ratings
Design Ambient Temperature
Temperature rise, degrees \square C
Polarity
Percent Impedance
Total weight (in KG)
Connection Diagram
Name of Manufacturer
Installation and operating instructions reference manuals
The word "Transformer"
Type of insulating liquid (generic name preferred)
Conductor material of each winding

7. Insulating oil: Insulating oil shall be new, unused mineral oil, PCB FREE and shall meet the requirements of ANSI/ASTM D3487.
8. Lock Washers: All electrical connections, bushings mounting bolts and cover attachment bolts require lock washers. Lock washers shall be fabricated from material that complies with the requirements of ANSI B18.21.1 (4).

7. TEST:

All tests shall be performed as per the latest revision of ANSI Standard C57.12.90. Factory test shall include, but are not limited to, the following:

1. Resistance measurement of all windings.
2. Ratio Test
3. Polarity and phase relation test
4. Test to determine no-load losses at rated voltage and frequency.
5. Excitation current at rated voltage and frequency.
6. Impedance voltage and load loss measurement.
7. Induced potential test (low frequency dielectric test)
8. Dielectric tests of insulating oil

8. INFORMATION TO BE FURNISHED WITH A TENDER:

1. The bidder shall furnish the following guaranteed information with his Tender.

- c. PCB free Certificate from the Manufacturer
- d. Authentication Certificate
- e. Manufacturer Test Report

Summary of Technical Specification for 15, 25, 37.5 and 50 KVA

| | | |
|------------------------------|---|--------------------------|
| 1. Primary Voltage | : | 7620/13200 V |
| 2. Secondary Voltage | : | 120/240 V |
| 3. Taps | : | 7620/7811/8001/8192/8382 |
| 4. Phase | : | 1 |
| 5. Number of Primary Bushing | : | 2 |
| 6. Type of Cooling | : | OA/ONAN |
| 7. Insulating Fluid | : | Mineral Oil |
| 8. Frequency | : | 60 Hz |
| 9. Efficiency | : | ≥98% |
| 10. BIL (KV) HV | : | 95 |
| 11. BIL (KV) LV | : | 30 |
| 12. Polarity | : | Additive |
| 13. Core | : | Amorphous |
| 14. Primary Winding | : | Copper |
| 15. Secondary Winding | : | Copper |
| 16. No Load Loss (max.) | | |
| a. 15kVa | : | ≤15 Watts |
| b. 25kVa | : | ≤18 Watts |
| c. 37.5kVa | : | ≤30 Watts |
| 17. Load Loss (max.) | | |
| a. 15kVa | : | ≤195 Watts |
| b. 25kVa | : | ≤290 Watts |
| c. 37.5kVa | : | ≤360 Watts |

Technical Specifications

9. SPECIFICATION FOR PORCELAIN INSULATORS:

- a. All porcelain insulators types shall conform in all respect to ANSI Specification.
- b. Each Insulator shall bear the manufacturers symbol and year of manufacturer.
- c. Each insulator shall have smooth glazed surface, free from imperfections or blemishes which can impair service life and performance.
- d. Each insulator type shall be tested using method described in ANSI C29.1-1982,(6) OR iec 383:1983,(7).
- e. Overhead distribution line insulator shall be securely packaged for shipping and handling. Each package shall be marked with the number or insulators enclosed the manufacturers name, insulator class name and catalog number.
- f. The performance and dimensional requirements of overhead distribution lie insulators 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.

SPECIFICATION FOR SUPPORT GROUND WIRE:

- f. Support ground wire shall be made from either iron or steel of a grade and equality to meet the strength requirements required in the normal use of the support ground wire.
- g. Support ground wire shall be free of rough or uneven surface and edges so as to ensure safety in handling and installation.
- h. After fabrication, support ground wire shall be hot dipped galvanize in accordance with ANSI/ ASTM A153-82(1).
- i. Support ground wire shall be securely package for shipping and handling, each package shall contained 100 items and shall be clearly marked with the manufactured name and catalog number.
- j. The performance and dimensional requirement based on other internationally recognized standards are acceptable only if the requirements of such standards are acceptable only if the requirements quoted in this document.

SPECIFICATION FOR TIE, SPOOL, AND PREFORMED:

- e. Tie, spool, and preformed shall be made from aluminum in accordance with ASTM B686-82.
- f. Tie, spool, and preformed shall be reasonably smooth and free from blemishes and imperfection not consistent with good commercial practice.
- g. Tie, spool, and preformed shall securely package for shipping and handling, each package shall contained 100 items and shall be clearly marked with the manufacturers name and catalog number.
- h. The performance and dimensional requirements based on other internationally recognized standards are acceptable only if the requirements of such standards are acceptable only if the requirements quoted in this document.

SPECIFICATION FOR ACSR:

- h. ACSR conductors shall conform in all respect to the dimensional and performance requirements of this document, which covers:
 - steel core wire
 - Aluminum wire
- i. The ACSR conductor shall be classified as class A as designated in ASTM B232 (1).
- j. The number and diameter of aluminum and steel wires and standing shall conform to the requirements of the table 1, 2 and 3 of ASTM B232 (1).
- k. The electrical resistivity limits and values of the aluminum rod are presented in table 4 of ASTM B230 (3).
- l. The conductor shall be free from imperfections, sharp protrusions and blemishes not consistent with good commercial surface.
- m. 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).
- n. Conductors shall be shipped on non-returnable reels manufactured from aluminum, steel or export quality preservative treated wood lagging.

| SIZE AWG OR MCM | STRANDS NO. & SIZE IN INCHES | | OVERALL DIAMETER (INCHES) | RESISTANCE OHM/MILE @ 25 Deg Celcius | ULTIMATE STRENGTH POUNDS |
|--------------------|---------------------------------|------------|---------------------------------|--|--------------------------------|
| | Aluminum | Steel | | | |
| 6 | 6 X .0661 | 1 X .06610 | 0.198 | 3.56 | 1,170 |
| 4 | 6 X .0834 | 6 X .0834 | 0.25 | 2.24 | 1,830 |
| 2 | 6 X .1092 | 1 X .1092 | 0.306 | 1.41 | 2,790 |
| 1/0 | 6 X .1327 | 6 X .1327 | 0.398 | 0.885 | 4,280 |
| 2/0 | 6 X .1490 | 6 X .1490 | 0.447 | 0.702 | 5,345 |
| 3/0 | 6 X .1672 | 6 X .1672 | 0.502 | 0.556 | 6,675 |
| 4/0 | 6 X .1878 | 6 X .1878 | 0.563 | 0.441 | 8,420 |

SPECIFICATION FOR ARMOR ROD:

- d. Armor rod and guard shall be made of an aluminum alloy which conforms to the requirements of ASTM B211 HEAT TREATED ALLOY 6061, (1), or equivalent.
- e. Preformed armor rod and line guard shall have smooth surfaces and rounded ends, and shall fit the conductor snugly.
- f. Performed armor rod and line guard shall exhibit strength characteristics equivalent to those of the conductor to which they are applied.

SPECIFICATION FOR MACHINE BOLT:

- g. Drop forged machine bolt and compatible square nut must be fabricated from steel that complies with the requirements of ANSI standard C135.1 1979 (1).
- h. The machine bolts and compatible square nuts shall be hot dip galvanized in accordance with ANSI/ASTMA153-82 (2).
- i. The threaded portion of machine bolts shall be provided with machine bolts threads and before galvanizing, must comply with class 2 of the ANSI standard for unified screw thread, ANSI B1.1-1982, (5) and conform to ANSI C135.1-1979 (1).
- j. After galvanizing, the bolts thread shall permit compatible nuts to be run the entire length of the thread without the aid of tools.
- k. Nuts shall be trapped in accordance with ANSI C135.1-1979, TABLE 8, (1).
- l. Machine bolts with nuts installed shall meet the tensile strength requirements listed in table 10 of ANSI C135.1-1979, (1).

SPECIFICATION FOR OVAL EYEBOLTS:

- e. Oval eyebolts and compatible square nuts must be fabricated from materials that comply with the requirement of ANSI standard C135.1-1979, (1).
- f. Oval eyebolts and compatible square nuts shall be hot dip galvanized in accordance with ANSI/ASTM A153-82 (2).
- g. Rolled thread must be provide on the threaded portion of the oval eyebolts before galvanizing, must comply with class 2 of ANSI standard, ANSI B1.1-1982, (5) and conform to ANSI C135.1 1979, (4).
- h. Oval eyebolts with nuts installed shall meet the strength requirements listed in section 6 of ANSI C135.4-1979, (1).

SPECIFICATION FOR SINGLE AND DOUBLE UPSET SPOOL INSULATOR BOLTS:

- f. Upset bolt assemblies shall fabricate from materials that comply either with the requirements section 3 of ANSI standard C135.1-1980 (1) or NEMA PH31-1977, (2).
- g. Upset bolts and its accessories shall be hot dip galvanized in accordance with ANSI/ASTM a153-82 (3).
- h. The threaded portion of single and double upset bolts before galvanizing comply with class 2 of ANSI standard for unified screw thread, ANSI B1.1-1982, (8) and shall conform to ANSI C135.1-1980 (1).
- i. Individually a single upset bolt shall develop a minimum of 1900 pounds and a double upset spool shall develop a minimum of 800 pounds without deflecting more than 10 degrees when tested by procedure describe herein section 7 of ANSI C135.31-1980 (1).
- j. Single and double upset bolts and accessories shall be securely package for shipping. Each package shall contain fifty sets and shall be clearly marked with the manufacturer's name and catalog number.

SPECIFICATION FOR STEEL OVAL EYENUTS:

- d. Oval eye nuts shall be fabricated from materials that comply with ASTM A663-82 (1). The materials shall be of grade and quality which can meet requirement o ANSI C135.31-1979, (2).
- e. Oval eye nut 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 symbol of identification marks in a location that will not impair its function.
- f. Oval eye nut shall be securely packaged for shipment. Each packaged shall contain one hundred oval eye nut and shall be clearly marked with manufacturer's name and catalog number.

SPECIFICATION FOR CONCRETE ANCHOR BLOCK

| Concrete Anchor Blocks | | Min Break Load | Outside Diameter | | Wall Thickness | Weight (Approx.) |
|------------------------|---------------|----------------|------------------|--------|----------------|------------------|
| Meter | ft. (approx.) | | mm | inches | mm | Kgs. |
| 0.9 | 3 | 4,000 | 150 | 6 | 42 | 30 |
| 1.2 | 4 | 5,000 | 200 | 8 | 42 | 60 |

Specifications for Steel Poles

Bidders must state under the Column "Statement of Compliance" either "Comply" or "Not Comply" against each of the individual parameters of each Specification stating the corresponding performance parameter of the equipment offered. Statements of "Comply" or "Not Comply" must be supported by evidence in a Bidders Bid and cross-referenced to that evidence. Evidence shall be in the form of manufacturer's un-amended sales literature, unconditional statements of specification and compliance issued by the manufacturer, samples, independent test data etc., as appropriate. A statement that is not supported by evidence or is subsequently found to be contradicted by the evidence presented will render the Bid under evaluation liable for rejection. A statement either in the Bidders statement of compliance or the supporting evidence that is found to be false either during Bid evaluation, post-qualification or the execution of the Contract may be regarded as fraudulent and render the Bidder or supplier liable for prosecution subject to the provisions of ITB Clause

3.1(a)(ii) and/or GCC Clause 2.1(a)(ii).

| | COMPLIANCE / FORM OF EVIDENCE | |
|---|-------------------------------|--|
| SCOPE: | | |
| This specification establishes the physical characteristic and performance requirements of steel poles for use on PANELCO I electric distribution system. Poles specification shall conform in all respects to the performance of this standard. The next figures and references of the standards supplement each other shall be considered part of this standard. The poles are to be the embedded type and not require a special foundation. | | |
| MATERIAL: 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.' | | |
| FINISHING: 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 ANSVASTM A153-82, Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware. This standard 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 free from coated 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.

DIMENSION:

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.

STRENGTH:

The strength of the pole is specified as 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 each classification must be able to withstand without damage is shown on the table below;

POLE STRENGTH AND GROUND LINE DIMENSION:

| POLE LENGTH | STRENGTH |
|-------------|----------|
| 30/2 | 3700 |
| 35/2 | 3700 |
| 40/2 | 3700 |

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.

| SPECIFICATIONS | STATEMENT OF COMPLIANCE |
|--|-------------------------|
| <p>MARKINGS: Each steel pole shall be identified by the supplier by stamping into the pole, prior to coating, with letters not less than 1/2" high squarely on the face of the pole at ten (10) feet from the butt of the pole. The following information shall be stamped into the pole:</p> <ul style="list-style-type: none"> • Supplier's name • Month and year of manufacture • Length of pole • Class of pole • Type of coating • Pole production or serial number <p>The marks shall be legible after application of the protective coating.</p> | |

INSPECTION AND TESTING:

The manufacturer shall conduct factory tests to verify that the poles comply with the requirements of this standard. PANELCO I reserves the right to witness ANY OR ALL factory tests and the Supplier shall notify PANELCO I fifteen (15) days before each test is to be conducted. PANELCO I expect 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, ten more from the same lot may 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, and 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 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 steadily until it reaches 50%. Hold 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 successively 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 nearest 5 kilograms. The pole is considered to have failed the break load test if it yielded at less than the minimum breaking load.

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
- Pole dimensions
- Load, including point of failure Deflection
- Recovery

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

| Ht. | Thickness (mm) | Butt Ø (mm) | Tip Ø (mm) | Design Load (kg) | Yield Stress (mpa) | Zinc coating | Total Weight Kg. |
|-----|----------------|-------------|------------|------------------|--------------------|--------------|------------------|
| 25 | 3.0 | 152 | 120 | 300 | 345 | 86 | 72 |
| 30 | 3.0 | 226 | 127 | 500 | 345 | 86 | 126 |
| 35 | 3.0 | 248 | 127 | 500 | 345 | 86 | 170 |
| 40 | 3.0 | 317 | 127 | 500 | 345 | 86 | 227 |

Information to be furnished;

- f. Authentication Certificate
- g. Manufacturer Test Report