

Draft

# **Virgin Islands Water and Power Authority**

## Specification for Single-Phase and Three-phase Overhead-type Distribution Transformers

(Revised 7/24/09)

Specification No. \_\_\_\_\_

Date of Issue \_\_\_\_\_

SECTION	TOPIC	PAGE
1.	SCOPE.....	3
2.	RATINGS.....	4
3.	MANUFACTURERS.....	10
4.	HIGH VOLTAGE BUSHINGS AND TERMINALS.....	10
5.	LOW VOLTAGE BUSHINGS AND TERMINALS.....	11
6.	PROTECTION .....	12
7.	TANK.....	13
8.	NOISE.....	15
9.	TRANSFORMER NAMEPLATE.....	15
10.	STENCILING.....	15
11.	ACCESSORIES.....	16
12.	BAR CODING.....	16
13.	APPROVAL OF DESIGN.....	16
14.	TESTING AND LOSSES.....	17
15.	DOCUMENTATION REQUIREMENTS.....	18
16.	SHIPPING.....	19
17.	GUARANTEE.....	19
18.	INSPECTION.....	19
19.	ELIGIBILITY OF BIDDER.....	19
	Attachment "A" (Order Form for Single-Phase).....	20
	Attachment "B" (Order Form for Three-Phase.....	21

**(VIWAPA)**

**Specification for  
Single-phase and Three-phase Overhead-type Distribution  
Transformers**

**1. SCOPE**

- 1.1 This specification covers the electrical and mechanical characteristics of single-phase and three-phase, 60-hertz, self-cooled, oil-immersed, conventional overhead-type distribution transformers.
- 1.2 All characteristics, definitions, and terminology, except as specifically covered in this specification, shall be in accordance with the latest revision of the following ANSI standards.
- C57.12.00 - IEEE Standard General Requirements for Liquid-Immersed Distribution, Power and Regulating Transformers.
- C57.12.20 - Overhead-Type Distribution Transformers, 150 KVA and Smaller: High Voltage, 24,940 Volts and Below: Low Voltage, 277/480 Volts and Below.
- C57.12.31 - Tank Coating for Distribution Transformers
- C57.12.35 - Bar Coding for Distribution Transformers.
- C57.12.90 - IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers and IEEE Guide for Short-Circuit Testing of Distribution and Power Transformers.
- C57.12.91 - Guide for Loading Mineral-Oil-Immersed Overhead and Pad-Mounted Transformers rated 500 kVA and less with 55°C or 65°C average winding rise.
- 1.3 In addition to the above requirements, the transformers shall also meet or exceed the new efficiency requirements of the Department of Energy, as specified in "DOE Standard 10 CFR 431"

**2. RATINGS**

- 2.1 The transformer shall be designed in accordance with this specification and shall have one of the following kVA ratings:

- a) Single-phase: 10,15,25,37.5,50,75,100, 167
- b) Three-phase: 30,45,75,112.5,150

The applicable kVA rating and type shall be specified on the "Order Form".

- 2.2 The primary voltage and the basic insulation level (BIL) for single-phase overhead transformer (Single Ratio) shall be 13,800 GRDY/7,970 VOLTS with 95kV BIL and 24,940GRDY/14,400 VOLTS with 125kV BIL, as shown in Table 1.

Table 1  
**Ratings for Single-phase Overhead Transformers  
(Single Ratio)**

Transformer High-voltage		Minimum BIL for Low-voltage rating of:	
Rating (V)	BIL (kV)	120/240V* BIL (kV)	277/480* BIL (kV)
13800GrdY/7970 24940GrdY/14400 †	95 125	30 30	30 30
Optional Transformer: δ 13200GrdY/7620	95	30	30

\* Low-voltage rating of 120/240 volts or 277/480 volts is suitable for two-and three-wire single phase service and four-wire three phase services.

† Suitable for wye-connection on systems where ground conditions permit the use of 18-kV arresters.

δ VIWAPA may order the optional transformer when needed.

The applicable voltage rating shall be specified on the "Order Form" (see Attachment A.

- 2.3 The primary voltage and the basic insulation level (BIL) for three-phase overhead transformer (T-connected) shall be 13,800 GRDY/7,970 VOLTS with 95kV BIL and 24,940GRDY/14,400 VOLTS with 125kV BIL. See Table 2.

Table 2

### Ratings for Three-phase Overhead Transformers (T-connected)

Transformer High-voltage		Minimum BIL for Low-voltage Rating of:	
Rating (V)	BIL (kV)	208Y/120V* BIL(kV)	480Y/277V* BIL(kV)
13800GrdY/7970 24940GrdY/14400 †	95 125	30 30	30 30
Optional Transformer: δ 13200GrdY/7620	95	30	30

\* Low-voltage rating of 120/208 volts or 277/480 volts is suitable for series, multiple, or four-wire service.

† Suitable for wye-connection on systems where ground conditions permit the use of 18-kV arresters.

δ VIWAPA may order the optional transformer when needed.

The applicable voltage rating shall be specified on the “Order Form” (See Attachment B).

- 2.4 If specified, the transformer shall have a dual voltage primary to be reconnected with an externally operable switch. The transformer has to be de-energized before changing the primary taps. The primary voltage and the basic insulation level (BIL) shall be 13,800GRDY/7,970 X 24,940GRDY/14,400 VOLTS (dual voltage primary) with 95X125 kV BIL for the single-phase transformer (series multiple), see Table 3. For three-phase (series multiple) transformer, the primary voltage and the basic insulation level (BIL) shall be 13,800GRDY/7,970 X 24,940GRDY/14,400 VOLTS (dual voltage primary), see Table 4.

Note: VIWAPA may order the optional dual voltage primary single-phase and three-phase transformers with primary voltages 13,200GRDY/7,620 X 24,940GRDY/14,400 VOLTS, when needed.

Table 3  
**Ratings for Single-phase Overhead Transformers  
 (Dual Voltage)**

Transformer High-voltage		Minimum BIL for Low-voltage Rating of:	
Rating (V)	Minimum BIL (kV)	120/240V * BIL (kV)	277/480V * BIL (kV)
13800GrdY/7970 x 24940GrdY/14400 †	95 x 125	30	30
Optional Transformer: δ 13200Y/7620 x 24940Y/14400 †	95 x 125	30	30

\* Low-voltage rating of 120/240 volts or 277/480 volts is suitable for two-and three-wire for single service and four-wire three-phase service.

† Suitable for wye-connection on systems where ground conditions permit the use of 18-kV arresters.

δ VIWAPA may order the optional transformer when needed.

The applicable dual voltage rating shall be specified on the “Order Form” (See Attachment A).

Table 4  
**Ratings for Three-phase Overhead Transformers  
 (Dual Voltage)**

Transformer High-voltage		Minimum BIL for Low-voltage Rating of:	
Rating (V)	Minimum BIL (kV)	208Y/120V * BIL (kV)	480Y/277V * BIL (kV)
13800GrdY/7970 x 24940GrdY/14400 †	95 x 125	30	30
Optional Transformer: δ 13200GrdY/7620 x 24940GrdY/14400 †	95 x 125	30	30

\* Low-voltage rating of 120/240 volts or 277/480 volts is suitable for two-and three-wire for single service and four-wire three-phase service.

† Suitable for wye-connection on systems where ground conditions permit the use of 18-kV arresters.

δ VIWAPA may order the optional transformer when needed.

The applicable multiple voltage rating shall be specified on the “Order Form” (See Attachment B).

- 2.5 The secondary voltage shall be one of the following. The basic insulation level (BIL) of the secondary voltage shall be 30 kV.

a) Single-phase transformers secondary voltages are: (See Table 5)

120/240 (3 bushings)  
 277/480 2 bushings)  
 277 (2 bushings)

Table 5  
**Secondary Ratings for Single-phase Overhead Transformers**

Secondary voltage(s)	Phase (s)
240Y/120	1
240Y/120	1
240Y/120	1
240Y/120	1
240Y/120	1
240Y/120	1
480Y/277	1
480Y/277	1
480Y/277	1
480Y/277	1
480Y/277	1
480Y/277	1
277	1
277	1
277	1
277	1
277	1
277	1

The applicable secondary voltage shall be specified on the “Order Form” (See Attachment A).

b) Three-phase transformers secondary voltages are: (See Table 6)

120/208 (4 bushings)  
 277/480 (4 bushings)



Table 6  
**Secondary Ratings for Three-phase Overhead Transformers**

Secondary voltage(s)	Phase (s)
208Y/120	3
208Y/120	3
208Y/120	3
208Y/120	3
208Y/120	3
480Y/277	3
480Y/277	3
480Y/277	3
480Y/277	3
480Y/277	3

The applicable secondary voltage shall be specified on the “Order Form” (See Attachment B).

- 2.6 Transformer may be furnished with full capacity high-voltage taps. The primary taps shall be clearly labeled and the transformer has to be de-energized before changing the taps with an externally operable switch, as specified in ANSI C57.12.20. The unit shall have one of the following tap configurations:

For transformers with high voltage 13800GrdY/7970 or 24940GrdY/14400

No taps

One - 2½% tap above and Three 2½% taps below rated voltage

Two - 2½% taps above and below rated voltage

For transformer with 13200GrdY/7620 (Optional transformer):

One - 2½% tap above and Three 2½% taps below rated voltage

The applicable tap configuration shall be specified on the “Order Form”

- 2.7 Primary and secondary voltage ratings, phase configurations, and KVA capacities as specified herein are at 60 hertz.

- 2.8 Windings on the transformers shall be copper and/or aluminum winding oil immersed, (non-PCB type), self cooled, seal stainless steel tank construction, isolated primary and secondary.
- 2.9 Insulation level shall be on Class 15kV, 65 Degree C, 95kV BIL and Class 25kV, 65 Degree C, 125kV BIL.

### 3. MANUFACTURERS

- 3.1 Acceptable manufacturers for these transformers shall be the following: Cooper Power System (RTE), Howard Industries, ABB, General Electric, and any other manufacturers that can demonstrate their ability to provide quality products in a timely manner.
- 3.2 Manufacture must have ISO-9001 quality certification
- 3.3 Manufacturer must construct/build these transformers in the United State of America.

### 4. HIGH VOLTAGE BUSHINGS AND TERMINALS

- 4.1 The high-voltage bushings shall be in accordance with Table 7.

Table 7  
**Electrical Characteristics of Bushings**

BIL Withstand (kV)	<u>Creepage Distance*</u> InchesMillimeters		60-Hz Dry 1-Minute Withstand (kV)	60-Hz Wet 10-Second Withstand (kV)
30	-	-	10	6
45	-	-	15	13
60	-	-	21	20
75	-	-	27	24
95	10½ ± ½	267 ± 13	35	30
125	16½ ± ½	419 ± 38	42	36
150	17	432	60	50

\* Creepage distances are minimum values where no tolerance is specified.

Note: WIWAPA may order extra creepage distance for primary bushings when needed.

The applicable creepage distance shall be specified on the "Order Form"

- 4.2 The high voltage bushing terminals provided shall be tin plated eyebolt type to accommodate both aluminum and copper conductors. The size of these terminals shall be in accordance with ANSI C57.12.2, latest version, and with a 9/16" hex head connector nut.

Table 8  
**High-voltage Terminal Sizes for  
Single-phase and Three-phase Transformers**

Size of <u>Terminal Opening</u> Inches Millimeters	AWG Size of Conductor Terminal will Accommodate	kVA Range for <u>High-Voltage Rating of:</u> 5 kV 7.2 kV and to below 34.5kV
5/16 7.9 5/8 15.9	No 8 Solid to No 2 Stranded No 6 Solid to No 4/0-19 Stranded	10-16710-500 250-500 ---

- 4.3 The bushing terminals shall be equipped with one of the following: PVC Birdguards, Handwheel birdguards, No birdguards. The number of each type will be specified in the inquiry.
- 4.4 Primary bushings shall not have bolt lengths or protrusions, which would interfere with wildlife guards. The retaining nut shall allow use of a ratcheting type box wrench.
- 4.3 The color of the bushings shall match Light Gray Number 70, Munsell Notation 5BG7.0/0.4.

## 5. LOW VOLTAGE BUSHINGS AND TERMINALS

- 5.1 The low-voltage bushings provided shall be in accordance with Table 9.
- 5.2 The bushing terminals provided shall be tin plated to accommodate both aluminum and copper conductors. NEMA pad spade lugs will be needed on the larger units. The size of the terminals shall be in accordance with Table 9.
- 5.3 The internal secondary leads shall be permanently embossed with the letters A, B, C, and D per ANSI C57.12.00 and C57.12.20. This marking can be used as a means to locate such leads with respect to one another for internal reconnection.

Table 9  
**Low-voltage Terminal Sizes for Single-phase and Three-Phase Transformers**

Size of Terminal Opening Inches Millimeters	AWG Size of Conductor Terminal will Accommodate	Transformer Low Voltage Rating (volts)		
		120/240	240/480	277
5/16    7.9	No 8 Solid to No 2 Stranded	-	-	-
5/8    15.9	No 6 Solid to No 4/0-19 Stranded	10-15	10-25	10-25
13/16   20.6	No 2 Solid to 350 kcmil-19 Stranded	25-50	37 ½ - 100	37 ½ - 100
15/16   23.8	No 1/0 Solid to 500 kcmil-37 Stranded	75	-	-
1-1/4   31.8	No 2/0 Solid to 1000 kcmil-61 Stranded	100	-	-
Spade H	- - -	167-250	167-500	167-250
Spade J	- - -	333-500	-	333-500

## 6. PROTECTION

6.1 The protection scheme provided with the transformer shall consist of the following checked attributes. If for any reason a special protection scheme is required it will be clearly stated on the inquiry.

- ☐ **Standard** No protection is required with the transformer.
- ☐ **Protected** Primary overvoltage protection will be provided by an, externally mounted, normal-duty or heavy-duty, VariSTAR or VariGAP MOV arrester.
- ☐ **Protected** Secondary overvoltage protection shall be provided by an internally or externally mounted, high-energy, ANSI approved light-duty distribution class MOV arrester.
- ☐ **Protected** Primary overcurrent protection shall be provided by an internally mounted weak link fuse.

- [ ] **Protected Plus** Secondary overcurrent and transformer overload protection shall be provided by a breaker installed on the secondary side of the transformer. This breaker shall have the capability to energize and de-energize the secondary service by one hot stick operation. This device shall be used in conjunction with an expulsion fuse on the primary side of the transformer.

## 7. TANK

- 7.1 Transformers shall be of sealed-tank construction. Sealed-tank construction is that which seals the interior of the tank from the atmosphere and in which the gas plus the fluid volume remains constant.
- 7.2 The tank shall be stainless steel (Type 304L) tank, cover, clamping band.
- 7.3 The tank shall meet ANSI C57-12.31 paint performance requirements. The paint finish process shall apply a durable, corrosion resistant finish and meets all the requirements of ANSI C57.12.28.
- 7.4 The gasket joints are to afford a sealed tank in accordance with industry standards. Gasket material shall be durable and reusable Buna N rubber or equal (ordinary cork or corkprene shall not be permitted) with a durometer rating of 65 to 80.
- 7.5 The core and coil shall be vacuum processed to ensure maximum penetration of insulating fluid into the coil insulation system. While under vacuum, the windings will be energized to heat the coils and drive out moisture, and the transformer will be filled with preheated filtered degassed insulating fluid. The core shall be manufactured from burr-free, grain-oriented silicon steel and shall be precisely stacked to eliminate gaps in the corner joints. The coil shall be insulated with B-stage, epoxy coated, diamond pattern, insulating paper, which shall be thermally cured under pressure to ensure proper bonding of conductor and paper.
- 7.6 The dielectric coolant (non-PCB) in the transformer must be highly refined inhibited new mineral oil and meet the minimum requirements as specified in Table 1, "Functional Property Requirements," of ASTM D3487 and ANSI C57.106.
- 7.7 As an alternate, the bidder is encouraged to submit an additional proposal for an Environmentally Friendly type transformer fluid such as Vegetable / Seed oil. The bidder shall submit an MSDS sheet for the proposed fluid.

- 7.8 The tank shall include a pressure relief device as a means to relieve pressure in excess of pressure resulting from normal operation. The pressure relief requirements including venting and sealing characteristics for single-phase and three-phase transformers shall be in accordance with the latest revision of the ANSI Standard C57.12.20.
- 7.9 The tank coating shall meet all requirements in ANSI C57.12.31 including:
- Salt spray
  - Crosshatch adhesion
  - Humidity
  - Impact
  - Oil resistance
  - Ultraviolet accelerated weathering
  - Abrasion resistance - taber abraser
- 7.10 The tank provided shall have a recessed tank bottom which offers protection when sliding over rough surfaces.
- 7.11 The tank shall have an internal mark, which indicates the proper oil level per Section 6.2.3 of ANSI C57.12.20.
- 7.12 The tank shall be provided with a mild steel cover ring with stainless steel cover ring loops and a stainless steel bolt. The tank cover shall have an insulating coating per ASTM D149. A bronze nut shall also be provided to eliminate corrosion problems and avoid galling.
- 7.13 The tank shall include arrester mounting pads, grounding provisions, ANSI support lugs (hanger brackets), lift lugs and double hanger brackets.
- 7.14 Tank grounding provisions shall consist of a steel pads, with a ½ inch 13 NC tapped hole, 7/16 inch deep and located near the bottom of the tank. The threads shall be protected by a corrosion resistant flanged cup pressed into the threaded opening of the ground pad.
- 7.15 All transformers shall have a tank grounding connectors and shall be solderless. It will accommodate AWG conductor size No. 8 solid to No. 2 stranded.
- 7.16 Low voltage grounding provisions shall consist of a steel pad with a ½ inch 13 NC tapped hole, 7/16 inch deep. The threads shall be protected by a corrosion resistant flanged cup pressed into the threaded opening of the ground pad.

## **8. NOISE**

- 8.1 Transformer sound levels shall not exceed the values specified in the latest revision of NEMA Publication TR 1-0.11.

## **9. TRANSFORMER NAMEPLATE**

- 9.1 The transformer shall have bar coded nameplate and shall conform to ANSI C57.12.00, nameplate A.
- 9.2 Nameplates shall also include the date of manufacturer, month and year. Nameplates shall be permanently marked with essential operating data including transformer BIL, total weight, gallons of insulating fluid, and shall meet ANSI C57.12.00. Metric units of measure (i.e. liters and/or kg) shall NOT be shown on the nameplate. Codes are not acceptable.
- 9.3 The type of dielectric fluid shall be so marked on the nameplate.
- 9.4 The transformer nameplates shall be stamped "INSULATING FLUID IS NON-PCB CONTAMINATED"

## **10. STENCILING**

- 10.1 All transformers shall be stenciled with a minimum two inch black letters that shall not fade under normal weather conditions and last the life of the transformer. Decals may be used in place of stenciling.
- 10.2 Transformer KVA size and secondary voltage shall be stenciled on the exterior of the transformer. The location shall be per ANSI C57.12.20. If an internal secondary arrester is used, stencil ISLA below the secondary bushings.
- 10.3 If the transformer has an internal arrester, INT HVLA below the kVA rating
- 10.4 The SS for stainless steel shall be stenciled at the bottom.

## **11. ACCESSORIES**

11.1 The following checked accessories shall be provided:

- ☐ 25 kV insulated cover
- ☐ 15 kV insulated cover
- ☐ PVC bird guards
- ☐ Handwheel bird guards
- ☐ Extra creep bushings
- ☐ Stainless steel hardware
- ☐ Stainless steel cover
- ☐ Stainless steel cover band
- ☐ Stainless steel body construction
- ☐ ½" drain valve with sampling device
- ☐ Tank ground connector (double bushing units)

Any additional accessories will be specified on the "Order Form"

## **12. BAR CODING**

12.1 A temporary bar code label shall be attached to the exterior of the transformer in accordance with ANSI C57.12.35.

## **13. APPROVAL OF DESIGN**

13.1 Successful bidder, within 2-3 weeks following receipt of purchase order, shall submit to the Electrical Engineering Manager of VIWAPA shop drawing of transformer design (showing data and all relevant transformer information) for approval prior to design acceptance. This shall include, at a minimum, dimensions, fuse sizing and selection, details of support connection, name and instruction plates. No fabrication shall be done without approved drawings being received by vendor.



## **14. TESTING AND LOSSES**

- 14.1 Units will comply with minimum efficiency mandated by the new DOE efficiency requirements. Units shall be tested for no-load (20°C) losses, load (85°C) losses, total (85°C) losses, percent impedance (85°C), excitation current (100% voltage). Each unit shall be subjected to a full wave voltage impulse and leak test. The manufacturer shall provide certification upon request for all design and other tests listed in Table 19 of ANSI C57.12.00 including verification that the design has passed short circuit criteria per ANSI C57.12.00 and C57.12.90.
- 14.2 All transformers must be completely tested in accordance with NEMA Standard TR-1 and ANSI Standards C57.12.00 and C57.12.90, and must meet the manufacturer's performance guarantees within the prescribed tolerances.
- 14.3 Complete and adequate testing facilities for performing the standards tests shall be operated by the supplier in the factory in which his transformers are produced. The supplier must maintain adequate and reliable test records of the units tested. Certified test reports shall be submitted to VIWAPA at the time of delivery or invoicing of transformers.
- 14.4 Descriptive information shall be furnished together with performance data on each rating of transformer with the bid proposal. The data shall include: rating; actual test voltages applied to both windings; induced-potential test; average copper temperature rise at rated load; no-load; load; and total-load losses; percent regulation at rated load 100 percent power factor and at rated load 80 percent power factor; percent impedance; outline dimensions; and net weights.
- 14.5 It shall be expressly understood that these performance specifications, as furnished by the successful bidder, shall constitute guarantees, with variance there from only insofar as allowable by applicable NEMA and ANSI Standards tolerances.
- 14.6 Transformers that are not meeting the specified DOE efficiencies and the requirements of these specifications will not be accepted.

## 15. DOCUMENTATION REQUIREMENTS

- 15.1 The manufacturer shall submit with each quotation the following information:
1. No Load Losses – at rated voltage corrected to 20°C.
  2. Load Losses – at rated load corrected to 85°C.
  3. Total Losses
  4. Voltage Regulation – at 100% load and 0.80 lagging power factor.
  5. Percent Impedance
- 15.2 Manufacturer shall submit a certified test report of actual test results of each transformer. This test report shall contain the following information:
1. Customer name and purchase order
  2. Manufacturer name and transformer series numbers
  3. KVA size and high and low voltage
  4. Losses (no-load, load, total)
  5. Percent impedance
  6. Percent exciting current @ rated voltage
  7. Percent voltage regulation at rated load, 0.80 power factor
- 15.3 The manufacturer shall provide a distribution record for each shipment and an electronic file for each transformer shipment at a minimum contains the following information. File shall be a text file with one transformer per line or other approved format.
1. Serial Number
  2. KVA
  3. Impedance
  4. Weight
  5. Gallons of Oil
  6. Load Losses
  7. No-Load losses
  8. High Voltage Rating
  9. Low voltage Rating
  10. Phase (1 or 3)
  11. Percent exciting Current at 100% voltage
  12. Date of transformer test

## **16. SHIPPING**

- 16.1 Transformers shall be shipped on pallets, properly crated secured, banded, blocked or bolted to the transformer with adequate bracing.
- 16.2 The customer shall be notified at least 24 hours in advance of shipment. Shipper shall give total number of units to be shipped and the weight of the heaviest unit(s).

## **17. GUARANTEE**

- 17.1 Any transformer developing faults because of defective material, workmanship, or design within one year from the date of delivery and acceptance shall be promptly reconstructed, repaired, or replaced by the contractor without charge to VIWAPA. The VIWAPA will give notice of observed defects with reasonable promptness.

## **18. INSPECTION**

- 18.1 All transformers furnished under these specifications will be subject to inspection and test upon receipt at the VIWAPA's warehouse. Transformers that are not meeting the specified DOE efficiencies and the requirements of these specifications will not be accepted.
- 18.2 The VIWAPA's representative shall be at all times have the right to inspect the material in the course of manufacturer and make or witness such tests from time to time. The manufacturer shall furnish the representative reasonable facilities for so doing and for obtaining such information as desired respecting the character of materials used.

## **19. ELIGIBILITY OF BIDDER**

- 19.1 Any bidder may seek to place his product on the eligibility list by submitting factory test data, pictures of factory processes, detailed descriptions of processes, samples, reference to satisfied customers, etc. to convince the VIWAPA's Electrical Engineering Manager that the product, if purchased, will have a reasonable probability of compliance with these specifications. All such information must be submitted prior to submission of bids. The burden of proof is on the bidder.

**Attachment "A"**

**Single-phase Overhead-Type Distribution Transformer**

\_\_\_\_\_, Inc.

Date \_\_\_\_\_

I. Rating (KVA) [ Quantity of each]:

\_\_\_\_ 10 \_\_\_\_ 25 \_\_\_\_ 37.5 \_\_\_\_ 50 \_\_\_\_ 70 \_\_\_\_ 100

II. Type: \_\_\_\_ Conventional \_\_\_\_ CSP

III. HV Bushing: \_\_\_\_ Single bushing \_\_\_\_ Double bushing; \_\_\_\_ 95 kV BIL \_\_\_\_ 125 kV BIL

IV. Primary Voltage (volts):

\_\_\_\_ 13,800 Grd Y/7970 \_\_\_\_ 24,940 Grd Y/14,400  
\_\_\_\_ 13,800 Grd Y/7970 X 24,940 Grd Y/14,400 (dual voltage primary)

Optional:

\_\_\_\_ 13200 Grd Y/7620  
\_\_\_\_ 13,200 Grd Y/7620 X 24,940 Grd Y/14,400 (dual voltage primary)

V. Secondary Voltage (volts):

\_\_\_\_ 120/240 (3 bushings) \_\_\_\_ 277/480 (2 bushings) \_\_\_\_ 277 (2 bushings)

VI. Primary taps:

\_\_\_\_ None \_\_\_\_ Two-21/2% above and below \_\_\_\_ One-21/2% above and Three 21/2% below

Optional:

\_\_\_\_ One-21/2% above and Three 21/2% below

VII. Tank:

\_\_\_\_ Stainless Steel (standard) \_\_\_\_ Stainless Steel (Type 304L) \_\_\_\_ Non-Stainless Steel

VIII. Lightning Arrester Housing: \_\_\_\_ polymer (silicone) \_\_\_\_ porcelain

IX. Shipping:

Notify \_\_\_\_\_ at phone # \_\_\_\_\_  
at least 24 hours before shipment. Receiving hours are \_\_\_\_\_  
Monday through Friday. Ship to \_\_\_\_\_ office in  
\_\_\_\_\_, Virgin Islands.

X. Other Special requirements:

**Attachment "B"**

**Three-phase Overhead-Type Distribution Transformer**

\_\_\_\_\_, Inc.

Date \_\_\_\_\_

I. Rating (KVA) [ Quantity of each]:

\_\_\_\_ 30 \_\_\_\_ 45 \_\_\_\_ 75 \_\_\_\_ 112.5 \_\_\_\_ 150

II. Type: \_\_\_\_ Conventional \_\_\_\_ CSP

III. HV Bushing: \_\_\_\_ Three-phase Triplex \_\_\_\_ "T-Connected"; \_\_\_\_ 95 kV BIL \_\_\_\_ 125 kV BIL

IV. Primary Voltage (volts):

\_\_\_\_ 13,800 Grd Y/7970 \_\_\_\_ 24,940 Grd Y/14,400  
\_\_\_\_ 13,800 Grd Y/7970 X 24,940 Grd Y/14,400 (dual voltage primary)

Optional:

\_\_\_\_ 13200 Grd Y/7620  
\_\_\_\_ 13,200 Grd Y/7620 X 24,940 Grd Y/14,400 (dual voltage primary)

V. Secondary Voltage (volts):

\_\_\_\_ 120/208 (4 bushings) \_\_\_\_ 277/480 (4 bushings)

VI. Primary taps:

\_\_\_\_ None \_\_\_\_ Two-21/2% above and below \_\_\_\_ One-21/2% above and Three 21/2% below

Optional:

\_\_\_\_ One-21/2% above and Three 21/2% below

VII. Tank:

\_\_\_\_ Stainless Steel (standard) \_\_\_\_ Stainless Steel (Type 304L) \_\_\_\_ Non-Stainless Steel

VIII. Lightning Arrester Housing: \_\_\_\_ polymer (**silicone**) \_\_\_\_ porcelain

IX. Shipping:

Notify \_\_\_\_\_ at phone # \_\_\_\_\_  
at least 24 hours before shipment. Receiving hours are \_\_\_\_\_  
Monday through Friday. Ship to \_\_\_\_\_ office in  
\_\_\_\_\_, Virgin Islands.

X. Other Special requirements:

\_\_\_\_\_