



## City of Norwich

Norwich Public Utilities  
100 Broadway, Room No. 105  
Norwich, CT 06360

Phone: (860)823-3706

Fax: (860)823-3812

E-mail: [whathaway@cityofnorwich.org](mailto:whathaway@cityofnorwich.org)

### INVITATION FOR BIDS

**Bid No.: 7624**

**Due Date and Time: April 17, 2019 at 2:00 P.M.**

**Title: Pad-Mount Transformers**

**Special Instructions:**

The following information must appear in the lower left hand corner of the envelope: Sealed Bid No: 7624  
Not to be opened until **April 17, 2019** at 2:00 P.M.

**Return Bids to:**

William R. Hathaway, Purchasing Agent  
City of Norwich  
100 Broadway, Room 105  
Norwich, CT 06360-4431



**CITY OF NORWICH, CONNECTICUT**  
**PLEASE RETURN THIS FORM IMMEDIATELY!**

**Acknowledgement: Receipt of Bid Documents**

**Bid No.:** 7624  
**Title:** Pad-Mount Transformers

Please take a moment to acknowledge receipt of the attached documents. Your compliance with this request will help the City of Norwich to maintain proper follow-up procedures and will ensure that your firm will receive any addendum that may be issued.

Date Issued: 03/26/2019

Date Documents Received: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Do you plan to submit a response? \_\_\_\_\_ Yes \_\_\_\_\_ No

Print or type the following information:

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

Received by: \_\_\_\_\_

**Note: Faxed or e-mailed acknowledgements are requested.**

**Fax No.:** (860)823-3812

**E-mail:** [whathaway@cityofnorwich.org](mailto:whathaway@cityofnorwich.org)

**Fax or e-mail this sheet only. A cover sheet is not required.**

**DO NOT FAX OR E-MAIL YOUR RESPONSE TO THIS BID**



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### INVITATION FOR BIDS

#### Bid No. 7624

The Purchasing Agent for the City of Norwich, on behalf of Norwich Public Utilities, will receive sealed bids for **Pad-Mount Transformers** until 2:00 P.M. prevailing time on **April 17, 2019** at which time they will be publicly opened and read aloud. All bids are to be delivered to William R. Hathaway, Purchasing Agent, City of Norwich, 100 Broadway, Room 105, Norwich, CT 06360.

Copies of the Bid Documents may be downloaded from the following websites:

<http://www.norwichct.org>

<http://das.ct.gov>

Questions regarding this bid must be submitted in writing to William R. Hathaway, Purchasing Agent, at [whathaway@cityofnorwich.org](mailto:whathaway@cityofnorwich.org) or by facsimile to (860)823-3812, no later than 1:00 P.M. on March 29, 2019

Norwich Public Utilities reserves the to accept or reject any and all bid responses, in whole or in part, to waive technical defects, minor irregularities and omissions if, in its judgment, the best interests of Norwich Public Utilities will be served.

No Bidder may withdraw its bid within sixty (60) days of the bid opening date. Should there be reason why the contract cannot be awarded within the specified time, the time may be extended by mutual agreement between the City of Norwich and the designated, qualified low bidder.

All final awards of the bid shall be in compliance with City of Norwich Code of Ordinances §7-46 – Delinquent Tax Setoff Against Money Due Bidder or Contractor.

All bidders must submit an original and one (1) copy of their bid in a sealed envelope bearing the name and address of the bidder and the bid number.

Responding bidders must ensure that employees and applicants for employment are not discriminated against because of their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such bidder that such disability prevents performance of the work involved.



# City of Norwich Connecticut

Department of Finance/Purchasing  
100 Broadway, Room 105  
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## Standard Bid and Contract Terms and Conditions

All Invitations for Bids issued by the City of Norwich ("City") will bind Bidders to the terms and conditions listed below, unless specified otherwise in any individual Invitation for Bids.

The contractor agrees to comply with the statutes and regulations as they exist on the date of this contract and as they may be adopted or amended from time to time during the term of this contract and any amendments thereto.

### Submission of Bids

1. Bids must be submitted on forms supplied by the City Purchasing Department. Telephone or facsimile Bids will not be accepted in response to an Invitation for Bids.
2. Bidders shall bear any and all costs associated with response to this invitation to Bid, including the costs for any presentation and/or demonstrations (if applicable).
3. The time and date Bids are to be opened is given in each Bid issued. Bids received after the specified time and date of Bid opening given in each Bid shall not be considered. **Bid envelopes must clearly indicate the Bid number** as well as the date and time of the opening of the Bid. The name and address of the Bidders shall appear in the upper left hand corner of the envelope.
4. If it becomes necessary to revise any part of this request or if additional data is necessary to enable interpretation of provisions of this document, revisions or addenda will be provided to all prospective firms who receive this document; such revisions or addenda will additionally be posted on the following websites:  
<http://www.norwichct.org/bids.aspx>  
[http://das.ct.gov/SCP\\_Search/Default.aspx](http://das.ct.gov/SCP_Search/Default.aspx)
5. This document includes an acknowledgement page; this page must be faxed back to the Purchasing Department, to ensure proper notification of changes to the published documents. The City of Norwich does not assume responsibility for any vendor that does not receive revisions or addenda, where the vendor has not acknowledged receipt of any portion thereof.
6. Incomplete Bid forms may result in the rejection of The Bid. Amendments to Bids received by the City after the time specified for opening of Bids, shall not be considered. Bids shall be computer prepared, typewritten or handwritten in ink. All Bids shall be signed by a person duly authorized to sign Bids on behalf of the Bidders. Unsigned Bids shall be rejected. Errors, alterations or corrections on both the original and copy of the Bid schedule to be returned must be initialed by the person signing the Bid or their authorized designee. In the event an authorized designee initials the correction, there must be written authorization from the person signing the Bid to the person initialing the erasure, alterations, or correction. Failure to do so shall result in rejection of Bid for those items erased, altered or corrected and not initialed.
7. The City of Norwich reserves the right to accept or reject any and all Bid responses, in whole or in part, to waive technical defects, irregularities and omissions if, in its judgment, the best interests of the City will be served. Determination of the best interests of the City shall include consideration of pending civil litigation between the City and any firm submitting a Bid to the City or its subcontractor or supplier. The City also reserves the right to make multiple awards.
8. Conditional Bids are subject to rejection in whole or In part. A conditional Bid is defined as one which limits, modifies, expands or supplements any of the terms and conditions and/or specifications of the invitation for Bids.
9. Alternate Bids will not be considered, unless specifically authorized in the invitation to Bid. An alternate Bid is defined as one which is submitted in addition to the Bidders primary response to the invitation for Bids.
10. Prices should be extended in decimal, not fraction, to be net, and shall include transportation and delivery charges fully prepaid by the Contractor to the destination specified in the Bid, and subject only to cash discount. In the event of a



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### Standard Bid and Contract Terms and Conditions

discrepancy between the unit price and the extension, the unit price shall govern.

11. Pursuant to Section 12-412 of the Connecticut General Statutes, municipalities are exempt from the payment of excise, transportation and sales taxes imposed by the Federal Government and/or the State. Such taxes must not be included in Bid prices.
12. By its submission the Bidder represents that the Bid is not made in connection with any other Bidders submitting a Bid for the same commodity or commodities and is in all respects fair and without collusion or fraud.
13. All Bids will be opened and read publicly and upon award are subject to public inspection, subject to the provisions of Section 1-210 of the Connecticut General Statutes (Freedom of Information). Copies of information resulting from any Bid opening are generally not available until a contract has been formally awarded.
14. Bid and or performance bonds may be required, if specifically required within the specifications. Bonds must meet the following requirements:

**Corporation** - must be signed by an official of the corporation above their official title and the corporate seal must be affixed over the signature; **Firm or Partnership** - must be signed by all the partners and indicate they are "doing business as"; **Individual** - must be signed by the owner and indicated as "Owner". The surety company executing the bond or countersigning must be licensed in Connecticut and the bond must be signed by an official of the surety company with the corporate seal affixed over their signature. Signatures of two witnesses for both the principal and the surety must appear on the bond. Power of attorney for the official signing the bond for the surety company must be submitted with the bond.

15. The City requires the Contractor to carry commercial general liability insurance to protect it from loss. The following minimum limits shall be met:  
**Bodily Injury and Property Damage:** \$1,000,000 each occurrence; \$2,000,000 aggregate  
**Products or Completed Operations:** \$1,000,000 each occurrence; \$2,000,000 aggregate and be written with a per project aggregate.  
**Professional Liability (Errors and Omissions):** \$2,000,000 each occurrence  
**Commercial Automobile Coverage including owned, non-owned, leased and hired vehicles (if used on City property):** \$1,000,000 combined single limit for each accident  
**Workers' Compensation:** Shall be in accordance with State of Connecticut requirements at the time of Bid.  
**Umbrella/Excess Liability:** \$2,000,000 each occurrence; \$2,000,000 aggregate and providing coverage over the Commercial General Liability, Commercial Automobile Liability and the Employer Liability section of the Workers Compensation coverage..

The Contractor shall provide the City with a Certificate of Insurance before any work is performed. The City of Norwich, its officers (both elected and appointed), employees, and agents shall be named as additional insured on all policies, except Professional Liability and Workers Compensation, on a primary and non-contributory basis.

All policies, except Professional Liability, shall contain a waiver of subrogation in favor of the City of Norwich, executed by the insurance company.

Thirty (30) days' notice of cancellation is required and must be provided to the City of Norwich via certified mail.

#### Samples

16. Accepted Bid samples do not supersede the Specifications for quality unless sample is superior in quality. All deliveries shall have at least the same quality as the accepted Bid sample. Samples are furnished free of charge. Samples may be held for comparison with deliveries.



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#### Award

17. Award will be based on quality of the articles or services to be supplied, their conformance with specifications, delivery terms, price, administrative costs, past performance, and financial responsibility. The Purchasing Department may correct inaccurate awards resulting from clerical or administrative errors.
18. The Purchasing Agent may reject any Bidders in default of any prior contract or guilty of misrepresentation or any Bidders with a member of its firm in default or guilty of misrepresentation.

#### Delinquent Tax Set Off

19. In accordance with §7-46 of the City of Norwich Code of Ordinances, the award of any contract for the performance of any work, or the furnishing of any services and/or materials or equipment, any vendor or successful bidder shall agree that any taxes, landfill fees or special assessments due from the vendor or successful bidder to the City of Norwich, unless previously paid, may be set off against any monies that may be due from the City of Norwich to the vendor or successful bidder for the performance of work or the furnishing of services and/or materials or equipment under said contract.
20. Any person, vendor or successful bidder performing any work or furnishing any services or material or equipment to the City or any department, board or agency thereof, shall, as a condition of doing such or furnishing services or material or equipment, agree that any delinquent taxes, landfill fees or special assessments due from him, her or it to the City, unless previously paid, may be set off against any monies that may be due from the City to such person, vendor or successful bidder for the performance of such work or the furnishing of services or materials or equipment.

#### Contract

21. The existence of the contract shall be determined in accordance with the requirements set forth above. However, the award of the contract is not an order to ship.
22. The Contractor shall not assign or otherwise dispose of their contract or their right, title or interest, or their power to execute such contract to any other person, firm or corporation without the prior written consent of the Purchasing Department.
23. Bidders have ten days after notice of award to refuse acceptance of the award; after ten days the award will be binding on the Contractor. If the Contractor refuses to accept the award within the ten day period, the award will be made to the next lowest responsible qualified Bidders.
24. Failure of a Contractor to deliver commodities or perform services as specified will constitute authority to purchase said commodities or services on the open market. Contractor agrees to promptly reimburse the City for excess cost of these purchases. The purchases will be deducted from the contracted quantities.
25. The Bidders hereinafter referred to as persons requesting the use of city facilities of the City of Norwich, or in contracting with the City of Norwich for goods, services, materials, labor and the like with the City of Norwich and its respective officers, agents, servants and employees agrees to indemnify, defend and save harmless from and against any and all claims, damages, losses, litigation expenses, counsel fees and compensation arising out of any injuries (including death) sustained by, or alleged to have been sustained by, the servants, employees or agents of the City of Norwich and its respective officers, agents, servants and employees, or of the Bidders or of any participant or spectator, and from injuries including death) sustained by, or alleged to have been sustained by, the public or any persons on or near the site or on any other person or damage to property, real or personal, including property of the City of Norwich and their respective officers, agents, servants and employees, caused in whole or in part by the acts or omission of the Bidders or any participant or spectator or anyone directly or indirectly employed or working for the Bidders while engaged in the activity in the City of Norwich.



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26. Notwithstanding any provision or language in this contract to the contrary, the purchasing agent may terminate this contract whenever he/she determines in his/her sole discretion that such termination is in the best interests of the City. Any such termination shall be effected by delivery to the Contractor of a written notice of termination. The notice of termination shall be sent by registered mail to the Contractor address furnished to the City for purposes of correspondence or by hand delivery. Upon receipt of such notice, the Contractor shall both immediately discontinue all services affected (unless the notice directs otherwise) and deliver to the City all data, drawings, specifications, reports, estimates, summaries, and such other information and materials as may have been accumulated by the Contractor in performing his duties under this contract, whether completed or in progress. All such documents, information, and materials shall become the property of the City. In the event of such termination, the Contractor shall be entitled to reasonable compensation as determined by the Office of Corporation Counsel for the City of Norwich, however, no compensation for lost profits shall be allowed.
27. Notwithstanding any provision or language in this contract to the contrary, the purchasing agent may terminate this contract for cause in the event of any default by the Contractor, or if the Contractor fails to comply with any contract terms and conditions, or fails to provide the City, upon request, with adequate assurances of future performance. In the event of termination for cause, the City shall not be liable to the Contractor for any amount of supplies or services not accepted, and the Contractor shall be liable to the City for any and all rights and remedies provided by law. If it is determined that the City improperly terminated this contract for default, such termination shall be deemed a termination for convenience.
28. The individual signing this submittal hereby declares that no person or persons other than members of his/her own organization are interested in this Project or in the contract proposed to be taken; that it is made without any connection with any other person or persons making a Bid for the same work and is in all respects fair and without collusion or fraud; that no person acting for or employed by the City of Norwich is directly or indirectly interested therein, or in the supplies or works to which it relates or will receive any part of the profit or any commission therefrom in any manner which is unethical or contrary to the best interests of the City of Norwich.

#### Delivery

29. All products and equipment delivered must be new, and shall include any and all manufacturer warranties, unless otherwise stated in the Bid specifications.
30. Delivery will be onto the specified City loading docks by the Contractor unless otherwise stated in the Bid specifications.
31. Payment terms are net 30 days after receipt of goods or properly executed invoice, whichever is later, unless otherwise specified. A contractor may quote payment discount terms which may be considered in making the award.

#### Saving Clause

32. The Contractor shall not be liable for losses or delays in the fulfillment of the terms of the contract due to wars, acts of public enemies, strikes, fires, floods, acts of God or any other acts not within the control of or reasonably prevented by the Contractor. The Contractor will give written notice of the cause and probable duration of any such delay.

#### Advertising

33. Contractors may not reference sales to the City for advertising and promotional purposes without the prior specific approval of the Purchasing Department.

#### Rights

34. Any and all data collected by the contractor relative to either the performance of services or delivery of materials shall remain the sole property of the City of Norwich. Such data includes historic usage of materials and services as collected by the contractor, as it relates to Norwich purchasing activity. The City has sole and exclusive right and title to all printed material produced for the City, whether acceptable or unacceptable, and the contractor shall not copyright any printed matter produced under the contract.



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35. The Contractor assigns to the City all rights title and interests in and to all causes of action it may have under Section 4 of the Clayton Act, 15 USC 15, or under Chapter 624 of the general statutes. This assignment occurs when the Contractor is awarded the contract.
35. Contractor agrees that it is in compliance with all applicable federal, state and local laws and regulations, including but not limited to Connecticut General Statutes Sections 4a-60 and 4a-60a, 4a-60g, and 46a-68b through 46a-68f, inclusive, as amended by the June 2015 Special Session Public Act No. 15-5, as well as the provisions of Title VI of the Civil Rights Act of 1964 and all amendments thereto. The Contractor also agrees that it will hold the City harmless and indemnify the City from any action which may arise out of any act by the contractor concerning lack of compliance with these laws and regulations. All purchases will be in compliance with Section 22a-194 to Section 22a-194g of the Connecticut General Statutes related to product packaging.
36. This contract is subject to provisions of Executive Order No. Three of Governor Thomas J. Meskill promulgated June 16, 1971, the provisions of Executive Order No. Seventeen of Governor Thomas J. Meskill promulgated February 15, 1973 and section 16 of Public Act 91-58 nondiscrimination regarding sexual orientation, and the provisions of Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999 regarding Violence in the Workplace Prevention Policy.



## **THREE-PHASE, PAD-MOUNT, DEAD-FRONT, LOOP-FEED DISTRIBUTION TRANSFORMERS**

### **1.0 SCOPE**

- 1.1 These Specifications cover the electrical characteristics and mechanical features of three-phase, 60Hz, mineral-oiled immersed, self-cooled, pad-mounted, compartmental-type distribution transformers, rated 1500 KVA and smaller. See Table of Transformers for a detailed description of the transformer(s) covered by this specification.
- 1.2 All requirements shall be in accordance with the latest revision of ANSI Standard C57.12.26-1992 (dead-front, loop-feed).

### **2.0 CONSTRUCTION**

- 2.1 A single cabinet shall be affixed to the transformer, which shall enclose the transformer primary and secondary bushings. The cabinet shall be divided into high-voltage and low-voltage compartments with a **permanent** divider.
- 2.2 The high-voltage and low-voltage compartments shall be segregated so that it is possible to isolate the high-voltage compartment while work is being done in the low-voltage compartment. Separate doors shall cover each compartment per ANSI C57.12.26, Section 7.
- 2.3 The cabinet shall be weatherproof, and the enclosure security shall be able to withstand all tests of the latest revisions of NEMA Standard Proposal No. TR-P9-1977. All bolt-down connections to the transformer shall be made internally. The cabinet doors shall open outward and provide a means of padlocking. Lift-up or vertical opening doors are not acceptable, except for a small lift-up section over the high-voltage compartment for the purpose of easing the removal of the fuses. The cabinet doors shall be of the detachable type.
- 2.4 Unlocking the padlock and disengaging the pentahead bolt shall permit access to both the high-voltage and low-voltage terminations when the compartment doors are removed or opened. There shall be a steel barrier between the high-voltage and low-voltage compartments.
- 2.5 In addition to the regular locking provisions, all access doors shall be secured by a recessed, captive, pentahead bolt, which threads into a nut with a blind hole. A pentahead bolt shall be considered "captive" when the retention scheme will prevent it from being readily removed during normal operation of the door(s) or hood(s). The recess is to be non-rotating. The dimensions of the pentahead bolt and non-rotating recess shall comply with Figure 3 of ANSI C57.12.25-1990. If all doors may be secured with a single bolt, one bolt will be sufficient.

- 2.6 Each latched door shall be latched at a minimum of three (3) points. In addition to the three-point latching, one (1) pentahead bolt shall be coordinated with the latch and padlock to prevent latching and insertion of the padlock into the hasp until the bolt head is essentially completely seated. A door catch must be provided to hold doors in open position. Storage for catch, when not in use, shall be provided.
- 2.7 Stainless steel hinges and stainless steel pins (Type 304) shall be provided.
- 2.8 The cabinet roof may be either (1) one roof covering the bushing compartment and the transformer, or (b) two separate roofs, one covering the bushing compartment and one covering the transformer. The roof(s) shall be constructed so as to shed water. If two roofs are used, water shall not collect at intersection of the two roofs.
- 2.9 Cabinet security shall be evaluated in accordance with the test procedures and requirements of ANSI C57.12.28-1988.
- 2.10 Oil level at 25°C must be permanently indicated by an identifiable stencil or marking on the exterior of the tank wall within the secondary compartment.

### **3.0 PRESSURE RELIEF, PLUGS AND VALVES**

- 3.1 A self-actuating pressure relief device to relieve slow pressure build-up shall be provided which will automatically vent when pressure reaches  $10 \pm 2$  PSIG, and releases when pressure falls to 6 PSIG.
- 3.2 A one (1) inch NPT upper plug for filling and testing must be provided in the low voltage compartment.
- 3.3 A one (1) inch drain valve with built-in sampling device must be provided.

### **4.0 TANK GROUND**

- 4.1 The tank grounds shall be per ANSI C57.12.26, Section 7.6.4 except:

One copper-faced steel or stainless steel pad, 2" x 3 1/2" with two 1/2" – 13 NC tapped holes spaced on 1-3/4" centers shall be welded to the transformer tank in lower right portion of the primary compartment. This ground connection shall include one corrosion proof connector that will accommodate #8 solid thru 2/0 AWG stranded copper wire.

### **5.0 CORE, COIL AND DIELECTRIC FLUID**

- 5.1 There shall be three (3) primary and three (3) secondary windings wound on a five-legged, or equivalent, core design to eliminate unbalanced and ferroresonant conditions.

- 5.2 All insulating paper used as layer insulation in transformer coils shall be coated on both sides with a thermosetting adhesive and properly cured prior to impregnating with oil, or the coils shall be wound with primary conductor containing a thermosetting adhesive which, when properly cured, will form an effective bond, both turn-to-turn and layer-to-layer.
- 5.3 After the core/coil assembly has been dried, the transformer must be filled with hot degassed oil to ensure impregnation of oil into coils.
- 5.4 Dielectric Fluid - Oil furnished in the transformer must be inhibited new oil and meet the minimum requirements as specified in Table 1, "Functional Property Requirements," of ASTM designation D3487 and ANSI C57.106.
- 5.5 All transformer oil must be bulk tested for Polychlorinated Biphenyls (PCBs) per ASTM D4059, and certified as having no detectable level of PCBs. A copy of the certification is to be included with the invoice for payment of the unit(s).
- 5.6 The transformer nameplate shall show that the dielectric fluid contains no detectable level of PCBs.

## **6.0 LOW VOLTAGE TERMINATIONS AND ACCESSORIES**

- 6.1 The externally clamped low voltage bushings shall be epoxy with a threaded stud, which meets ANSI C57.12.26, Figure 9d and/or a, b or c (dead-front). For 750KVA or greater, one-piece porcelain is acceptable.
- 6.2 Bushing arrangements shall be per ANSI C57.12.26, Figures 3 & 4, or Figures 7 & 8.  
**Note (loop-feed): Two (2) 2-Pole switches shall be provided, which allow individual isolation or parallel operation of the two (2) feeder circuits; one (1) 4-Pole switch is NOT acceptable.**
- 6.3 Transformers 300KVA or less shall have 6-bolt NEMA H tinned copper secondary spades. 500KVA transformers shall have **8-hole**, or greater, secondary spades per ANSI standards. Transformers 750KVA or greater shall have **10-hole**, or greater secondary spades per ANSI standards. For transformers 500KVA or greater, a vertical insulated support shall be provided for strain relief on the bushings.

## **7.0 HIGH VOLTAGE TERMINATIONS**

- 7.1 Dead-front, externally clamped universal type bushing wells or internal bushings that comply with ANSI C57.12.26 latest revision. **Bushings on loop feed transformers shall be rated for 600 amps and meet ANSI/IEEE 386.**
- 7.2 The primary bushings shall be arranged per ANSI C57.12.26 Figures 2 and 3 or 6 and 7.

- 7.3 The bushings shall be appropriately labeled H<sub>1</sub>, H<sub>2</sub>, or H<sub>3</sub>, adjacent to each bushing.

## 8.0 PROTECTIVE AND SWITCHING DEVICES

### 8.1 Fusing

- 8.1.1 All transformers shall be furnished with bayonet-type fuses in an oil immersed, draw-out, expulsion fuse designed to protect the transformer in the event of internal or secondary faults, or under overload conditions and is hot stick operational. Fuse selection shall be based on transformer overload conditions. Fuse rating shall meet 1800 interrupting RMS amps and 135 loadbreak amps at 80% PF. **For dual-voltage primary applications, if applicable, fuses shall be furnished and labeled for both voltages. Units shall be shipped connected and fused for the lower voltage.**
- 8.1.2 **One (1) set of spare fuses shall be provided for each primary.**
- 8.1.3 Fuse Curve Characteristics should be equivalent to Cooper (RTE) 353C this is a NON dual Sensing fuse type.

## 9.0 OIL-IMMERSED SWITCHING

- 9.1 Specifically designed for submersible and pad-mounted transformers which allows quick isolation of a line fault available at the following rates:
- |   |                  |
|---|------------------|
| 9.2 Maximum Voltage                     | 15.5kV           |
| 9.3 Continuous & Interrupting Current   | 400A (loop-feed) |
| 9.4 Momentary & Making (KA)             | 12KA Sym.        |
| 9.5 Current (RMS)                       | 19.2KA Asm       |
| 9.6 Mechanical Operations               | 500+             |
| 9.7 Impulse Withstand Voltage           | 95kV             |
| 9.8 60 Hz. Withstand Voltage Design     | 35 kV            |
| 9.9 60 Hz. Withstand Voltage Production | 34kV             |
| 9.10 Corona Extinction Voltage (RMS)    | 11kV             |

## 10.0 NEUTRAL CONNECTION

- 10.1 The high voltage and low voltage winding neutrals shall be internally connected to the H<sub>0</sub> X<sub>0</sub> bushing with provisions for opening the connection for separately testing the high and low voltage windings. The connection shall be readily accessible from a hand hole on the cover of the tank.
- 10.2 The H<sub>0</sub> X<sub>0</sub> bushing shall be provided with a spade type terminal with four-hole NEMA "H" drilling and a removable strap between the bushing and a tank ground.
- 10.3 The link connecting the H<sub>0</sub> X<sub>0</sub> bushing to the ground pad shall be either copper or stainless steel and shall be capable of carrying the transformers full fault current.

**11.0 TAPS**

- 11.1 Transformers shall be furnished with 4 - 2 ½% full capacity taps, 2 above and 2 below normal, controlled by a no-load externally operated tap changer, the handle of which shall be located in the high voltage compartment. The switch is for de-energized operation only.

## **SINGLE-PHASE, PAD-MOUNT, DEAD-FRONT, LOOP-FEED DISTRIBUTION TRANSFORMERS**

### **1.0 SCOPE**

- 1.1 This specification covers the electrical characteristics and mechanical features of single-phase, 60Hz, mineral-oiled immersed, self-cooled, loop-feed, dead-front, pad-mounted distribution transformers, rated 167 kVA and smaller. These transformers are intended for single-phase step-down voltage operation where primary voltages are 4800V phase-to-phase delta and/or 13800V phase-to-phase grounded wye (7970V phase-neutral) and secondaries will be 240/120V.
- 1.2 All requirements shall be in accordance with the latest revision of ANSI Standard C57.12.25-1990, or latest revision, except as modified by this specification.
- 1.3 Design requirements for transformer(s) covered by this specification are listed in Table of Transformers.

### **2.0 CONSTRUCTION**

- 2.1 A single cabinet shall be affixed to the transformer, which shall enclose the transformer primary and secondary bushings and conform to ANSI C57.12.25-1990, or latest revision. There shall be no segregation or barrier between the high and low-voltage portions of the compartment.
- 2.2 The cabinet shall be weatherproof, and the enclosure security shall be able to withstand all tests of the latest revisions of NEMA Standard Proposal No. TR-P9-1977. All bolt-down connections to the transformer shall be made internally. The cabinet doors shall open outward and be provided a means of padlocking. A clamshell or flip-top design is also acceptable. The cabinet door(s) shall be of the detachable type.
- 2.3 Unlocking the padlock and disengaging the pentahead bolt shall permit access to both the high-voltage and low-voltage terminations when the compartment door(s) are removed or opened.
- 2.4 In addition to the regular locking provisions, all access doors shall be secured by a recessed, captive, pentahead bolt, which threads into a nut with a blind hole. A pentahead bolt shall be considered "captive" when the retention scheme will prevent it from being readily removed during normal operation of the door(s) or hood(s). The recess is to be non-rotating. The dimensions of the pentahead bolt and non-rotating recess shall comply with Figure 3 of ANSI C57.12.25-1990. If all doors may be secured with a single bolt, one bolt will be sufficient.
- 2.5 Door(s) shall be latched at a minimum of three (3) points. In addition to the three-

point latching, one (1) pentahead bolt shall be coordinated with the latch and padlock to prevent latching and insertion of the padlock into the hasp until the bolt head is essentially completely seated. A door catch must be provided to hold doors in the open position. Storage for the catch, when not in use, must be provided. A single lift-up door per ANSI C57.12.25 is also acceptable.

- 2.6 Stainless steel hinges and stainless steel pins (Type 304) shall be provided.
- 2.7 The cabinet roof may be either (1) one roof covering the bushing compartment and the transformer, or (b) two separate roofs, one covering the bushing compartment and one covering the transformer. The roof(s) shall be constructed so as to shed water. If two roofs are used, water shall not collect at intersection of the two roofs.
- 2.8 Cabinet security shall be evaluated in accordance with the test procedures and requirements of ANSI C57.12.28-1988.
- 2.9 Oil level at 25°C must be permanently indicated by an identifiable stencil, marking on the exterior of the tank wall within the secondary portion of the compartment or some other means of visually identifying oil level.
- 2.10 A nameplate made of corrosion-resistant material and conforming to ANSI C57.12.00-1993 shall be affixed to the inside of the LV portion of the compartment. Nameplate shall clearly indicate month and year of manufacture, location, size and type of any protective devices on connection diagram and non-detect PCB levels in oil.
- 2.11 Transformers shall be equipped with a suitable means for lifting.
- 2.12 Cable accessory parking stand shall be provided per ANSI C57.12.25-1990.

### **3.0 PRESSURE RELIEF, PLUGS AND VALVES**

- 3.1 A self-actuating pressure relief device to relieve slow pressure build-up shall be provided which will automatically vent when pressure reaches  $10 \pm 2$  PSIG, and releases when pressure falls to 6 PSIG.
- 3.2 A one (1) inch NPT upper plug for filling and testing must be provided in the low voltage compartment.
- 3.3 A one (1) inch drain valve with built-in sampling device must be provided.

### **4.0 TANK GROUND**

- 4.1 The tank grounds shall be per ANSI C57.12.25-1990, Section 6.6.4 except:

One copper-faced steel or stainless steel pad, 2" x 3 1/2" with two 1/2" – 13 UNC tapped holes spaced on 1-3/4" centers shall be welded to the transformer tank in lower right portion of the primary compartment. This ground connection shall include one corrosion proof connector that will accommodate #8 solid thru 2/0 AWG stranded copper wire.

## **5.0 CORE, COIL AND DIELECTRIC FLUID**

- 5.1 All insulating paper used as layer insulation in transformer coils shall be coated on both sides with a thermosetting adhesive and properly cured prior to impregnating with oil, or the coils shall be wound with primary conductor containing a thermosetting adhesive which, when properly cured, will form an effective bond, both turn-to-turn and layer-to-layer.
- 5.2 After the core/coil assembly has been dried, the transformer must be filled with hot degassed oil to ensure impregnation of oil into coils.
- 5.3 Dielectric Fluid - Oil furnished in the transformer must be inhibited new oil and meet the minimum requirements as specified in Table 1, "Functional Property Requirements," of ASTM designation D3487 and ANSI C57.106.
- 5.4 All transformer oil must be bulk tested for Polychlorinated Biphenyls (PCBs) per ASTM D4059, and certified as having no detectable level of PCBs. A copy of the certification is to be included with the invoice for payment of the unit(s).
- 5.5 The transformer nameplate shall show that the dielectric fluid contains no detectable level of PCBs.

## **6.0 LOW VOLTAGE TERMINATIONS AND ACCESSORIES**

- 6.1 The externally clamped low voltage bushings shall be epoxy with a threaded stud, which meets ANSI C57.12.25-1990, Figure 4c.
- 6.2 Bushing arrangements shall be per ANSI C57.12.25-1990, Figures 1 or 2. The secondary neutral shall be solidly grounded to the tank.  
**Note (loop-feed): Two (2) 2-Pole switches shall be provided, which allow individual isolation or parallel operation of the two (2) feeder circuits; one (1) 4-Pole switch is NOT acceptable.**
- 6.3 Transformer secondary shall have 4-hole NEMA type tinned copper spades.

## **7.0 HIGH VOLTAGE TERMINATIONS**

- 7.1 The high voltage terminations shall consist of two replaceable stud clamped-in bushing wells of the proper KV and BIL rating designated as H1A and H1B, and located as specified in ANSI C57.12.25-1990, or latest revision.
- 7.2 Bushing arrangements shall be per ANSI C57.12.25-1990, Figures 1 and 2.



7.3 Bushing well inserts shall be provided and installed prior to shipment.

## **8.0 PROTECTIVE AND SWITCHING DEVICES**

### **8.1 Fusing**

- 8.1.1 All transformers shall be furnished with bayonet-type fuses in an oil immersed, draw-out, expulsion fuse designed to protect the transformer in the event of internal or secondary faults, or under overload conditions and is hot stick operational. Fuse selection shall be based on transformer overload conditions. Fuse rating shall meet 1800 interrupting RMS amps and 135 loadbreak amps at 80% PF.
- 8.1.2 Fuse Curve Characteristics should be equivalent to Cooper (RTE) 353C this is a NON dual Sensing fuse type.

### **8.2 Oil-Immersed Switching**

- 8.2.1 Specifically designed for submersible and pad-mounted transformers which allows quick isolation of a line fault available at the following rates:
- |   |            |
|---|------------|
| 8.2.1.1 Maximum Voltage (L-Grd)             | 8.9kV      |
| 8.2.1.2 Continuous & Interrupting Current   | 300A       |
| 8.2.1.3 Momentary & Making (KA)             | 12KA Sym.  |
| 8.2.1.4 Current (RMS)                       | 19.2KA Asm |
| 8.2.1.5 Mechanical Operations               | 500+       |
| 8.2.1.6 Impulse Withstand Voltage           | 95kV       |
| 8.2.1.7 60 Hz. Withstand Voltage Design     | 35 kV      |
| 8.2.1.8 60 Hz. Withstand Voltage Production | 34kV       |
| 8.2.1.9 Corona Extinction Voltage (RMS)     | 11kV       |

## **9.0 NEUTRAL CONNECTION**

- 9.1 The high voltage and low voltage winding neutrals shall be internally connected per ANSI C57.12.25-1990.
- 9.2 A minimum of two (2) ground pads located in the lower portion of the user compartment, one below the H and one below the X.

## **10.0 TAPS**

- 10.0 Transformers shall be furnished with 4 - 2 ½% full capacity taps, 2 above and 2 below normal, controlled by a no-load externally operated tap changer, the handle of which shall be located in the high voltage compartment. The switch is for de-energized operation only.

**THREE-PHASE, PAD-MOUNT  
13.8kVGRY/7970V-4.8kVDELTA LOOP-FEED STEP-DOWN  
DISTRIBUTION TRANSFORMERS**

**1.0 SCOPE**

- 1.1 These Specifications cover the electrical characteristics and mechanical features of three-phase, 60Hz, mineral-oiled immersed, self-cooled, pad-mounted, compartmental-type distribution transformers, rated 2500 kVA and smaller. The transformers are intended for installation on pads for operation on radial systems. See Table of Transformers for a detailed description of the transformer(s) covered by this specification.
- 1.2 All requirements shall be in accordance with the latest revision of ANSI Standards, except as modified by these Specifications.

**2.0 CONSTRUCTION**

- 2.1 A single cabinet shall be affixed to the transformer, which shall enclose the transformer primary and secondary bushings. The cabinet shall be divided into high-voltage and secondary compartments with a **permanent** divider.
- 2.2 The high-voltage and secondary compartments shall be segregated so that it is possible to isolate the high-voltage compartment while work is being done in the secondary compartment. Separate doors shall cover each compartment per ANSI C57.12.26, Section 7.
- 2.3 The cabinet shall be weatherproof, and the enclosure security shall be able to withstand all tests of the latest revisions of NEMA Standard Proposal No. TR-P9-1977. All bolt-down connections to the transformer shall be made internally. The cabinet doors shall open outward and be provided a means of padlocking. Lift-up or vertical-opening doors are not acceptable, except for a small lift-up section over the high-voltage compartment for the purpose of easing the removal of the fuses. The cabinet doors shall be of the detachable type.
- 2.4 Unlocking the padlock and disengaging the pentahead bolt shall permit access to both the high-voltage and low-voltage terminations when the compartment doors are removed or opened. There shall be a steel barrier between the high-voltage and low-voltage compartments.
- 2.5 In addition to the regular locking provisions, all access doors shall be secured by a recessed, captive, pentahead bolt, which threads into a nut with a blind hole. A pentahead bolt shall be considered “captive” when the retention scheme will prevent it from being readily removed during normal operation of the door(s) or

hood(s). The recess is to be non-rotating. The dimensions of the pentahead bolt and non-rotating recess shall comply with Figure 3 of ANSI C57.12.25-1990. If all doors may be secured with a single bolt, one bolt will be sufficient.

- 2.6 Each latched door shall be latched at a minimum of three (3) points. In addition to the three-point latching, one (1) pentahead bolt shall be coordinated with the latch and padlock to prevent latching and insertion of the padlock into the hasp until the bolt head is essentially completely seated. A door catch must be provided to hold doors in the open position. Permanent storage for the catch, when not in use, must be provided.
- 2.7 Stainless steel hinges and stainless steel pins (Type 304) shall be provided.
- 2.8 The cabinet roof may be either (1) one roof covering the bushing compartment and the transformer, or (b) two separate roofs, one covering the bushing compartment and one covering the transformer. The roof(s) shall be constructed so as to shed water. If two roofs are used, water shall not collect at the intersection of the two roofs.
- 2.9 Cabinet security shall be evaluated in accordance with the test procedures and requirements of ANSI C57.12.28-1988.
- 2.10 Oil level at 25°C must be permanently indicated by an identifiable stencil or marking on the exterior of the tank wall within the secondary compartment.

### **3.0 PRESSURE RELIEF, PLUGS AND VALVES**

- 3.1 A self-actuating pressure relief device to relieve slow pressure build-up shall be provided which will automatically vent when pressure reaches  $10 \pm 2$  PSIG, and releases when pressure falls to 6 PSIG.
- 3.2 A one (1) inch NPT upper plug for filling and testing must be provided in the secondary compartment.
- 3.3 A one (1) inch drain valve with built-in sampling device must be provided.

### **4.0 TANK GROUND**

- 4.1 The tank grounds shall be per ANSI C57.12.26, Section 7.6.4 except:
  - 4.1.1 One copper-faced steel or stainless steel pad, 2" x 3 ½" with two ½" – 13 NC tapped holes spaced on 1-3/4" centers shall be welded to the transformer tank in lower right portion of the primary compartment. This ground connection shall include one corrosion proof connector that will accommodate #8 solid thru 2/0 AWG stranded copper wire.

## **5.0 CORE, COIL AND DIELECTRIC FLUID**

- 5.1 There shall be three (3) primary and three (3) secondary windings wound on a five-legged, or equivalent, core design to eliminate unbalanced and ferroresonant conditions.
- 5.2 All insulating paper used as layer insulation in transformer coils shall be coated on both sides with a thermosetting adhesive and properly cured prior to impregnating with oil, or the coils shall be wound with primary conductor containing a thermosetting adhesive which, when properly cured, will form an effective bond, both turn-to-turn and layer-to-layer.
- 5.3 After the core/coil assembly has been dried, the transformer must be filled with hot degassed oil to ensure impregnation of oil into coils.
- 5.4 Dielectric Fluid - Oil furnished in the transformer must be inhibited new oil and meet the minimum requirements as specified in Table 1, "Functional Property Requirements," of ASTM designation D3487 and ANSI C57.106.
- 5.5 All transformer oil must be bulk tested for Polychlorinated Biphenyls (PCBs) per ASTM D4059, and certified as having no detectable level of PCBs. A copy of the certification is to be included with the invoice for payment of the unit(s).
- 5.6 The transformer nameplate shall show that the dielectric fluid contains no detectable level of PCBs.

## **6.0 SECONDARY TERMINATIONS AND ACCESSORIES**

- 6.1 The externally clamped secondary bushings shall be rated for 4800V and 75kV BIL. The externally clamped secondary bushings shall be porcelain or equal and meet applicable ANSI standards.
- 6.2 Bushing arrangements shall be as near as possible, while meeting clearance requirements, to ANSI C57.12.26 Figures 3 and 4 without the X0 bushing or ANSI C57.12.22 Figures 2 and 3 without the X0 bushing.
- 6.3 The transformers shall have 6-hole secondary spades in accordance with applicable ANSI standards.

## **7.0 HIGH VOLTAGE TERMINATIONS**

- 7.1 Dead Front Design with 200 Amp load break bushings on the high side and 600 amp dead break on the low side.

- 7.2 The primary bushings shall be arranged as identified in Table of Transformers.
- 7.3 The bushings shall be appropriately labeled H0, H1, H2 or H3, adjacent to each bushing.

## 8.0 PROTECTIVE AND SWITCHING DEVICES

### 8.1 Polymer Lightning Arresters

- 8.1.1 Designed for overvoltage protection caused by lightning. Three (3) Ohio Brass, or approved equal, 6kV and/or 12KV PDV Riser Pole Polymer Arresters, as applicable, shall be provided as standard features on live-front transformers. **For stepdown transformers arresters shall be provided for both voltages (i.e., 12kV for 13,800V primary and 6kV for 4,800V secondary).**
- 8.1.2 The arresters shall be mounted and the conductor from the lightning arresters to the primary bushing shall be insulated.
- 8.1.3 For shipping, arresters shall be braced to prevent mechanical damage.
- 8.1.4 An insulated cap shall be provided and installed on line side of the arrester.

### 8.2 Fusing

- 8.2.1 No Fusing to be provided

### 8.3 Oil-Immersed Switching

- 8.3.1 Specifically designed for submersible and pad-mounted transformers which allows quick isolation of a line fault available at the following rates:
  - 8.3.1.1 Maximum Primary Voltage 15.5kV
  - 8.3.1.2 Maximum Secondary Voltage 5.0kV
  - 8.3.1.3 Continuous & Interrupting Current 300A
  - 8.3.1.4 Momentary & Making (KA) 12KA Sym.
  - 8.3.1.5 Current (RMS) 19.2KA Asm
  - 8.3.1.6 Mechanical Operations 500+
  - 8.3.1.7 Impulse Withstand Voltage 95kV
  - 8.3.1.8 60 Hz. Withstand Voltage Design 35 kV
  - 8.3.1.9 60 Hz. Withstand Voltage Production 34kV
  - 8.3.1.10 Corona Extinction Voltage (RMS) 11kV

## 9.0 NEUTRAL CONNECTION

- 9.1 The high voltage winding neutral H0 bushing shall be supplied for customer grounding , as required.

**Common to All Transformers**

**1.0 PERFORMANCE REQUIREMENTS**

- 1.1 **Salt Spray Test.** For coatings on the surface of the base of the enclosure, and a minimum of 2 inches up from the base on both the interior and exterior surfaces, a panel shall be scribed to bare metal and tested for 1500 hours in a 5% salt spray in accordance with ASTM B117-85 E1. For all other surfaces on the interior and exterior of the enclosure, a panel shall be scribed to bare metal and tested for 1000 hours in a 5% salt spray in accordance with ASTM B117-85 E1. Loss of adhesion from bare metal shall not extend more than 1/8 inch from the scribe. Underfilm corrosion shall not extend more than 1/16 inch from the scribe.
- 1.2 **Crosshatch Adhesion Test.** A panel shall be scribed to bare metal with a crosshatch pattern and tested in accordance with ASTM D3359-83. Method A shall be used for films thicker than 5 mils, and Method B shall be used for films less than, or equal to, 5 mils. There shall be 100% adhesion to the bare metal and between layers.
- 1.3 **Humidity Test.** A panel shall be tested for 1000 hours in accordance with ASTM D2247-86A, except that the test shall be conducted at 45°C + 1°C. There shall be no blisters.
- 1.4 **Impact Test.** A test panel shall be impacted using procedures described in ASTM D2794-84 at a value of 160 inch-pounds. There shall be no chipping of the paint on the impact (intrusion) side of the test panel.
- 1.5 **Oil Resistance Test.** Two test panels shall be immersed in mineral oil or the liquid used as an insulating medium for 72 hours, one at room temperature (20°C to 25°C) and one at 100°C to 105°C. There shall be no apparent changes, such as color shift, blisters, loss of hardness or streaking.
- 1.6 **Ultraviolet Resistance Weathering Test.** The following test is required only for coated surfaces on the exterior of the enclosure. A test panel shall be exposed for 500 hours in accordance with ASTM G53-84, utilizing the FS-40 bulb with a cycle for four hours ultraviolet at 55°C, followed by four hours condensation at 40°C. Loss of gloss as a result of this test should not exceed 50% of original gloss as per ASTM D523-85 E1.
- 1.7 **Abrasion Resistance – Taber Abraser Test.** A panel having the minimum dry thickness (-0, +0.1 mil) of the total coating system shall be tested using a CS-10 wheel, 1000-gram weight, in accordance with ASTM D4060-84. The number of cycles of abrasion required to wear the coating through to the substrate shall be at least 3000 cycles.

## **2.0 PAINT FINISH**

- 2.1 The transformer shall have a corrosion-resistant finish, which shall be capable of meeting the functional specifications shown in the Performance Requirements of ANSI C57.12.28-1988.
- 2.2 Unless otherwise specified, the top coat color shall be Munsell 7GY 3.29/1.5 pad-mount green.
- 2.3 An extra coat of primer shall be applied over the bottom three inches of the base to further prohibit corrosion. This coating will be applied over the “top coat” of paint.

## **3.0 TESTS**

- 3.1 All transformers manufactured under this Specification shall be tested for load (85°C) and no load (85°C) losses, percent impedance (85°C) and exciting current (100% voltage). A copy of these results shall be provided to the Purchaser.
- 3.2 All transformers shall be capable of withstanding short-circuits in accordance with ANSI C57.12.00-1993 and ANSI C57.12.90-1993.
- 3.3 All transformers shall pass the following tests:
  - 3.3.1 Connection Test
  - 3.3.2 Demagnetization
  - 3.3.3 High to low iron continuity
  - 3.3.4 Low to high iron continuity
  - 3.3.5 400 Hertz over potential
  - 3.3.6 Iron loss
  - 3.3.7 Impulse test

## **4.0 Efficiency and Nameplates**

- 4.1 All transformers shall be compliant to the latest DOE Efficiency standards.
- 4.2 Nameplates shall be placed inside the secondary compartment and the outside of the transformer.

## **5.0 SUBMITTAL REQUIREMENTS**

- 5.1 Each bidder shall submit a proposal with the data listed below and shall submit a description of any changes, additions or exceptions to the specification proposed, together with reasons for the departure.

- 5.2 Product evaluation and conformance to specification will be determined on the basis of information submitted. The drawings and data furnished must be in sufficient detail and clarity to enable making a complete and positive check with the technical provisions of the specification.
- 5.3 Required Data:
- 5.4 Details of the primary bushings and connections to the high voltage leads and the primary fuse. The manufacturer's name and catalog number will suffice provided no exceptions are requested.
- 5.5 Details of the secondary bushings; include overall dimensions, materials and finish such as plating.
- 5.6 Average core losses and load losses (windings) at full load at 85°C.
- 5.7 Impedance of windings at rated load expressed in percentage of rated voltage.
- 5.8 Information concerning details of construction, tank materials and tank finish; i.e. bracing, latching, stainless steel hinges, 7 mils paint, and etc.
- 5.9 Make, specifications, number of gallons, and weight of oil.
- 5.10 Complete primary fuse data including fuses specified for each size of transformer. The manufacturer and catalog number of fuse(s) and holder(s) will suffice, providing no exceptions are requested.
- 5.11 Construction drawings indicating the dimensions of the transformer tanks and any cabinets, cable openings, approximate weights and transformer kVA, voltage and winding connections must be provided prior to delivery and are subject to final approval.
- 5.12 Record drawings must be provided and must include nameplate drawings and the transformer outline upon receipt of transformer.

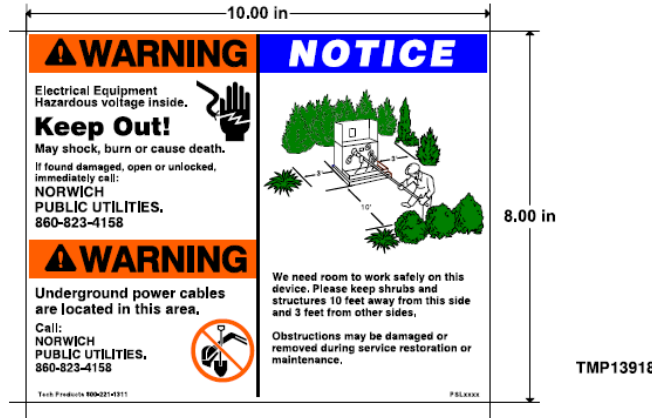
## **6.0 OPERATING EXPERIENCE**

- 6.1 The transformer manufacturer shall have a performance record demonstrating a minimum of twenty (20) years successful experience in utility pad-mount transformer application from the manufacturing plant specified.

## **7.0 WARNING/DANGER DECALS**

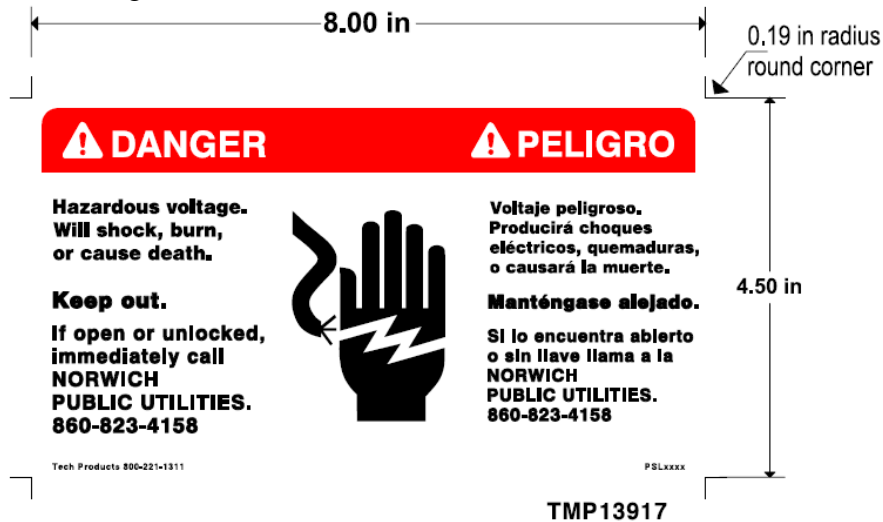
- 7.1 A Warning Decal similar to the one shown below must be affixed to the outside of the transformer on all four sides.





7.1.1 \* Finger Lift tabs for easy removal\*

7.2 A Danger Decal similar to the one shown below must be affixed to the inside of the transformer in both the secondary compartment and the high voltage compartment along with on the inside of the doors



7.2.1

8.0 DATA TO BE FURNISHED BY THE SUCCESSFUL BIDDER

- 8.1 The successful bidder shall supply:
- A. One copy of outline dimensions of the transformer with accessories.
  - B. One copy of the transformer nameplate.
  - C. One copy of the instruction book covering installation, operation and maintenance of the equipment.
  - D. One copy of certified test data for each transformer supplied. The test data shall contain the minimum following information: (1) core loss, (2) load

loss, (3) exciting current at rated voltage, (4) insulation tests.

- E. Warning and Danger Stickers must be submitted and approved after notice of award.

## **9.0 GUARANTEE AND PENALTIES**

- 9.1 The failure of any transformer due to defective design, material and/or workmanship within twelve (12) months after being energized or eighteen (18) months after delivery, shall be repaired or replaced without cost to Norwich Public Utilities. Any defect in design, material and/or construction discovered within this period shall be corrected on all transformers furnished on this order at the manufacturer's expense, either by repair or replacement.

**Table of Transformers**

Size (KVA)	Type	Primary Voltage	Secondary Voltage	Taps	Dimension (inches) Requirement	Weight (lbs.)	Oil (Gals.)
<b><u>SINGLE PHASE PADMOUNTS (Footprint Dimensions and cable openings for padmount transformers shall fit typical pads. See Attached Detail A)</u></b>							
25	Loop-Feed Dead-Front	13,800GrY/7,970	240/120	Yes	Footprint: ≤ 38W x 40D Overall: ≤ 34H x 38W x 40D	≤ 2500	≤ 140
50	Loop-Feed Dead-Front	13,800GrY/7,970	240/120	Yes	Footprint: ≤ 38W x 42D Overall: ≤ 38H x 40W x 44D	≤ 2500	≤ 140
50	Loop-Feed Dead-Front	4,800x13,800GrY/7,970	240/120 W/CSP	Yes	Footprint: ≤ 38W x 42D Overall: ≤ 38H x 40W x 44D	≤ 2500	≤ 140
75	Loop-Feed Dead-Front	13,800GrY/7,970	240/120	Yes	Footprint: ≤ 40W x 46D Overall: ≤ 42H x 42W x 48D	≤ 2800	≤ 160
75	Loop-Feed Dead-Front	4,800x13,800GrY/7,970	240/120 W/CSP	Yes	Footprint: ≤ 40W x 46D Overall: ≤ 42H x 42W x 48D	≤ 2800	≤ 160
100	Loop-Feed Dead-Front	13,800GrY/7,970	240/120	Yes	Footprint: ≤ 40W x 46D Overall: ≤ 42H x 42W x 48D	≤ 2800	≤ 160
100	Loop-Feed Dead-Front	4,800x13,800GrY/7,970	240/120 W/CSP	Yes	Footprint: ≤ 40W x 46D Overall: ≤ 42H x 42W x 48D	≤ 2800	≤ 160
167	Loop-Feed Dead-Front	13,800GrY/7,970	240/120	Yes	Footprint: ≤ 40W x 46D Overall: ≤ 42H x 42W x 48D	≤ 2800	≤ 160
167	Loop-Feed Dead-Front	4,800x13,800GrY/7,970	240/120 W/CSP	Yes	Footprint: ≤ 40W x 46D Overall: ≤ 42H x 42W x 48D	≤ 2800	≤ 160
<b><u>THREE PHASE PADMOUNTS (Footprint Dimensions and cable openings for padmount transformers shall fit typical pads. See Attached Detail B &amp; C)</u></b>							
75	Loop-Feed Dead-Front	4,800x13,800GrY/7,970	208Y/120	Yes	Footprint: ≤ 58W x 47D Overall: ≤ 56H x 60W x 50D	≤ 3500	≤ 150
150	Loop-Feed Dead-Front	4,800x13,800GrY/7,970	208Y/120	Yes	Footprint: ≤ 58W x 47D Overall: ≤ 56H x 60W x 50D	≤ 3500	≤ 150
300	Loop-Feed Dead-Front	13,800GrY/7,970	208Y/120	Yes	Footprint: ≤ 60W x 50D Overall: ≤ 58H x 60W x 54D	≤ 5000	≤ 200
300	Loop-Feed Dead-Front	4,800x13,800GrY/7,970	208Y/120	Yes	Footprint: ≤ 60W x 50D Overall: ≤ 58H x 60W x 54D	≤ 5000	≤ 200

300	Loop-Feed Dead-Front	4,800x13,800GrY/7,970	480Y/277	Yes	Footprint: ≤ 60W x 50D Overall: ≤ 58H x 60W x 54D	≤ 5000	≤ 200
500	Loop-Feed Dead-Front	13,800GrY/7,970	208Y/120	Yes	Footprint: ≤ 72W x 60D Overall: ≤ 70H x 74W x 70D	≤ 6500	≤ 300
500	Loop-Feed Dead-Front	13,800GrY/7,970	480Y/277	Yes	Footprint: ≤ 72W x 60D Overall: ≤ 70H x 74W x 70D	≤ 6500	≤ 300
500	Loop-Feed Dead-Front	4,800x13,800GrY/7,970	480Y/277	Yes	Footprint: ≤ 72W x 60D Overall: ≤ 70H x 74W x 70D	≤ 6500	≤ 300
750	Loop-Feed Dead-Front	13,800GrY/7,970	208Y/120	Yes	Footprint: ≤ 72W x 60D Overall: ≤ 70H x 74W x 70D	≤ 8000	≤ 400
750	Loop-Feed Dead-Front	13,800GrY/7,970	480Y/277	Yes	Footprint: ≤ 72W x 60D Overall: ≤ 70H x 74W x 70D	≤ 8000	≤ 400
1000	Loop-Feed Dead-Front	13,800GrY/7,970	208Y/120	Yes	Footprint: ≤ 72W x 60D Overall: ≤ 70H x 74W x 70D	≤ 9900	≤ 550
1000	Loop-Feed Dead-Front	13,800GrY/7,970	480Y/277	Yes	Footprint: ≤ 74W x 64D Overall: ≤ 72H x 76W x 70D	≤ 9900	≤ 550
1500	Loop-Feed Dead-Front	4,800x13,800GrY/7,970	480Y/277	Yes	Footprint: ≤ 76W x 70D Overall: ≤ 80H x 76W x 70D	≤ 10,000	≤ 600
2500	Loop-Feed Dead-Front	4,800x13,800GrY/7,970	480Y/277	Yes	Footprint: ≤ 76W x 70D Overall: ≤ 80H x 76W x 70D	≤ 16,000	≤ 650

**13.8GRY-4.8DELTA STEPDOWN THREE PHASE PADMOUNTS (Footprint Dimensions and cable openings for padmount transformers shall fit typical pads. See Attached Detail C)**

750	Loop-Feed Dead-Front	13,800GrY/7,970	4800 Delta	No	Footprint: ≤ 76W x 70D Overall: ≤ 80H x 76W x 70D	≤ 9500	≤ 550
1500	Loop-Feed Dead-Front	13,800GrY/7,970	4800 Delta	No	Footprint: ≤ 76W x 70D Overall: ≤ 80H x 76W x 70D	≤ 17000	≤ 650
2500	Loop-Feed Dead-Front	13,800GrY/7,970	4800 Delta	No	Footprint: ≤ 76W x 70D Overall: ≤ 80H x 76W x 70D	≤ 17000	≤ 650



Please quote Norwich Public Utilities your prices for the commodities or services listed below.

All prices must be FOB Destination. You must show Unit Price and Total Price or your bid may be rejected.

Website:  
<http://www.norwichpublicutilities.com>

Norwich Public Utilities is exempt from the payment of Federal Excise taxes and the State of Connecticut Sales tax.

Norwich Public Utilities reserves the right to reject in whole or in part any or all submitted bids.

Vendor Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

**THIS IS NOT A PURCHASE ORDER.** Fill in and return to the address below.

**Page 1 of 1**

ISSUED BY: <b>City of Norwich, Connecticut</b>	(RETURN BID TO THE ATTENTION OF) <b>William R. Hathaway</b>	BID NUMBER 7624
ADDRESS <b>100 Broadway, Room 105 Norwich, CT06360-4431</b>		DATE ISSUED March 19, 2019
DELIVERY ADDRESS <b>As requested by Norwich Public Utilities</b>		DATE AND TIME BID REQUIRED April 17, 2019 at 2:00 P.M.
TELEPHONE NUMBER <b>(860)823-3706</b>		

**SINGLE PHASE PADMOUNT**

ITEM NO.	DESCRIPTION	EA	QUANTITY	UNIT PRICE	TOTAL PRICE
1.	25 KVA, 13800GrY/7970, 240/120		6		
2.	50 KVA, 13800GrY/7970, 240/120		6		
3.	50 KVA, 4,800x13,800GrY, 240/120 w/CSP		6		
4.	75 KVA, 13800GrY/7970, 240/120		1		
5.	75 KVA, 4,800x13,800GrY, 240/120 w/CSP		1		
6.	100 KVA, 4,800x13,800GrY, 240/120		1		
7.	100 KVA, 4,800x13,800GrY, 240/120 w/CSP		1		
8.	167 KVA, 13,800GrY/7,970, 240/120		1		
9.	167 KVA, 4,800x13,800GrY, 240/120 w/CSP		1		

**THREE PHASE PADMOUNTS**

10.	75 KVA, 4,800X13800GRy/7,970, 208Y/120		1		
11.	150 KVA, 4,800X13800GRy/7,970, 208Y/120		1		
12.	300 KVA, 13,800GrY/7,970, 208Y/120		2		
13.	300 KVA, 4,800X13800GRy/7,970, 208Y/120		2		
14.	300 KVA, 4,800X13800GRy/7,970, 480Y/277		2		
15.	500 KVA, 13,800GrY/7,970, 208Y/120		2		
16.	500 KVA, 13,800GrY/7,970, 480Y/270		2		
17.	500 KVA, 4,800X13800GRy/7,970, 480Y/277		2		

18.	750 KVA, 13,800GrY/7,970, 208Y/120		1		
19.	750 KVA, 13,800GrY/7,970, 480Y/277		1		
20.	1000 KVA, 13,800GrY/7,970, 208Y/120		1		
21.	1000 KVA, 13,800GrY/7,970, 480Y/277		1		
22.	1500 KVA, 4,800X13800GRy/7,970, 480Y/277		1		
23.	2500 KVA, 4,800X13800GRy/7,970, 480Y/277		1		

**STEPDOWN -THREE PHASE PADMOUNTS**

24.	750 KVA, 13,800GrY/7,970, 4800 DELTA		1		
25.	1500 KVA, 13,800GrY/7,970, 4800 DELTA		1		
26.	2500 KVA, 13,800GrY/7,970, 4800 DELTA		2		

GRAND TOTAL

- Price must include freight
- NPU reserves the right to make multiple awards
- One (1) year contract with the option, at NPU's discretion, to renew for two (2) additional one (1) year terms
- Price increases considered annually at the time of renewal. Must be based on verifiable criteria such as the Consumer Price Index.

NAME (SIGNED)	TITLE	TELEPHONE NO. & EXTENSION
NAME (PRINTED)	FEIN/SSN	DISCOUNT PAYMENT TERMS ____%, _____ days, Net 30
EMAIL ADDRESS	FAX NO.	

