

TECHNICAL SPECIFICATIONS

DISTRIBUTION TRANSFORMERS; PADMOUNT - GENERAL

I. GENERAL REQUIREMENTS

I.1. SPECIFICATIONS

These specifications cover electrical and mechanical features of pad mounted transformers used on the JEA distribution system. Transformers supplied under this specification shall meet the requirements of the latest revision of the following list of standards and guides established for distribution transformers except where they conflict with JEA specifications, in which case JEA specifications shall apply.

AMERICAN STANDARD TESTING OF MATERIALS (ASTM)
AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
CODE OF FEDERAL REGULATIONS (EPA)
EDISON ELECTRIC INSTITUTE (EEI)
FEDERAL LAWS "RCRA" AND "CERCLA" FOR HAZARDOUS WASTE
INSTITUTE OF ELECTRICAL & ELECTRONICS ENGINEERING (IEEE)
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION (NEMA)
SOUTHEASTERN ELECTRIC EXCHANGE (SEE)

I.2. ENVIRONMENTAL ACCEPTABILITY

- I.2.1. Transformers will be environmentally acceptable and, as of the date of manufacture, shall comply with all laws in effect, pertaining to hazardous chemicals.
- I.2.2. No dielectric fluid shall contain commercial chemical products which would be regulated as hazardous waste as defined in list 40 CFR 261 if disposed, or if released into the environment. Nor shall the dielectric fluid contain chemicals in excess of their reportable quantities if released into the environment, according to 40 CFR 302. Finally, a Material Safety Data Sheet shall be provided for any dielectric fluids used in transformers. Upon request, the manufacturer must certify that no transformer contains dielectric fluid with a Polychlorinated Biphenyl concentration in excess of one part per million (1 ppm). Such certification that the dielectric contains less than 1 ppm shall be verified.

I.3. TECHNICAL INQUIRIES

Any inquiry relating to the Technical Specifications shall be directed to Standards

II. APPROVED MANUFACTURERS

A listing of APPROVED MANUFACTURERS for each specific Distribution Transformer ITEM ID is shown in the JEA "Master Material Catalog – Electric" on jea.com at the following URL:

<https://apps.jea.com/MaterialsCatalog/emmc.pdf> **However, the approved manufacturers still must have their drawings pre-approved before providing a quotation as stated in section VII.** Manufacturers may sub-contract work to any of these Manufactures for said ITEM ID's.

III. **AMORPHOUS CORE TRANSFORMERS**

Amorphous core transformers are being accepted on a case by case approval for single phase pad mount transformers only.

IV. **MATERIAL**

Incoming material shall be inspected by qualified Quality Control Personnel. Material such as transformer oil, primary and secondary conductor, insulation materials, gasket material and core steel shall be checked and tested at regular intervals to insure that quality is uniform throughout and has not deteriorated during storage. Oil compatibility test results will be made available to JEA upon request. New material or design changes, or transformer components, such as bushings, bayonets, latching devices, paint systems, or brackets shall be submitted to JEA for approval prior to inclusion in manufacturing.

IV.1. **REPAIR PARTS**

A parts list will be furnished, upon request, for repair equipment. Lists will cover items such as bayonets, gaskets, bushings, tap changers, etc.

IV.2. **ELIGIBILITY OF MATERIAL**

IV.2.1. Manufacturers and catalog numbers listed in the latest revision of the JEA "Master Material Catalog – Electric" or described in the technical portion of this specification

IV.2.2. All reasonable efforts will be made by the JEA to eliminate errors in the aforementioned master material catalog which might result in a bidder bidding an item eventually ruled unacceptable by JEA, but such possible occurrence shall not become the basis for any claim for damage or loss.

IV.3. **TRANSFORMER OIL:**

IV.3.1. Transformer oil can be Mineral Oil, FR3, BIO-TEMP or other oil approved by JEA Standards

V. **WARRANTY**

JEA will pay no freight charges on warranty transformers. Warranty will be one year from date of installation or eighteen months from date of delivery, whichever comes first.

VI. **SUBMITTAL REQUIREMENTS**

VI.1. **THE FOLLOWING INFORMATION MUST BE PROVIDED AND APPROVED BY JEA STANDARDS**

VI.1.1. **The Technical Specifications:**

OIL FILLED PADMOUNTED SINGLE PHASE TRANSFORMERS

OIL FILLED PADMOUNTED THREE PHASE TRANSFORMERS

lists approved manufacturer catalog numbers for various components, consisting of but not limited to, primary and secondary bushings, primary bushing inserts, secondary connectors or kits, ground lugs, lightning arresters, tap changers, weak links, clip fuses and bayonets. All alternate manufacturers or catalog numbers must be approved by the Technical Standards Representative prior to submittal of drawings.

VI.1.2. Prior to finalizing a contract, manufacturer must submit one copy of the shop drawings, showing all relevant detail and dimensions, including nameplate information, for each item, specifically listing the item ID. Manufacturer must supply total winding loss as defined by ANSI which includes stray losses, and must list impedance and efficiency. Shop Drawings shall include the information as seen on an Excel Spreadsheet shown in the example at the end of the specification.

- VI.1.3. Data shall be guaranteed for all transformers subject to tolerance stated in ANSI Standard C57.12.00-91 2011.
- VI.1.4. Approved manufacturer drawings shall be marked approved and signed by the standards engineer and then a copy returned to the manufacturer.

VI.2. THE FOLLOWING INFORMATION MUST BE FINALIZED PRIOR TO SHIPMENT OF MATERIAL:

- VI.2.1. Drawings sent prior to quotation must be re-submitted prior to shipment of any items to insure there have been no material or design changes. If changes are required they must be noted by the manufacturer and approved by the appropriate JEA standards engineer.

VII. COIL & CORE CONSTRUCTION

VII.1. COIL

- VII.1.1. Aluminum or Copper high voltage and low voltage coils are acceptable.
- VII.1.2. All transformer coils shall be designed to maintain their full nameplate KVA rating throughout the temperature range. All materials used shall be of the 65°C (80°C hot spot) class and be thoroughly tested for compatibility with all transformer components before inserted into design. All insulating paper used as layer insulation in transformer coils shall be coated on both sides with thermosetting adhesive and properly cured prior to oil impregnation to form a uniform effective bond both turn-to-turn and layer-to-layer. Alternate means of bonding of coils that are wound with primary and secondary conductor, including sheet secondary conductors, must be approved prior to manufacture. Margins shall be even and equal on both sides of the coil.
- VII.1.3. Oil ducts shall be strong enough to withstand full short circuit forces, and resist deformation or collapsing after full oil absorption takes place. They shall run the full width of the coil to prevent cutting insulation. It is recommended that either fiber pressboard sticks permanently glued to the paper or processed hardwood maple sticks be used for oil ducts. No other wood will be accepted.
- VII.1.4. All primary and secondary windings shall be free of burrs or defects.
- VII.1.5. All connections to sheet windings shall be metallurgic ally bonded with conduction in area significantly greater than the area of the coil lead cross section.
- VII.1.6. When aluminum risers are used, special attention must be called to the connections at the secondary bus. If EC grade aluminum is used, a T6061 hard aluminum pad shall be welded at this junction to insure a good aluminum to copper electrical path, and at the same time "trap" the metal so that no cold flow can occur. All welds shall have a conduction area significantly greater than the cross section of the riser. Only brass nuts, bolts and washers used as current carrying components shall be used at or above the oil level. All bolted connections shall be cleaned with proper solvents and or abrasives prior to assembly. Secondary risers on 120/240 volt overhead units shall be sufficiently long to allow for coil paralleling as needed.
- VII.1.7. Special attention shall also be given to primary lead connections. If aluminum wire is used, the connector should be of the type that traps the aluminum and cuts through the insulation and oxide. The riser within the coil shall be securely anchored to prevent the lead from being pulled out during assembly, shipment or repair.
- VII.1.8. The completed coil shall have a neat, clean appearance free from rips, debris or ragged insulation.

- VII.1.9. 50 kVA or smaller transformers shall be supplied with interlaced secondary windings or non-interlaced secondary windings if a Cooper external secondary arrestor is permanently installed on the tank wall and connected to the secondary studs with ring terminals.

VII.2. CORE

- VII.2.1. Silicon steel core(s) shall be manufactured from grain oriented steel laminations, and coated with a glass-hard insulation. The core(s) shall be fully annealed to relieve stresses incurred during manufacturing process.
- VII.2.2. The core(s) shall be de-burred and free from defect to prevent sheet-to-sheet shorting.
- VII.2.3. All three phase pad mounted transformer core assemblies shall be of the five-legged design or designed to provide a low reluctance return path for the single phase zero sequence flux.

VII.3. CORE-COIL ASSEMBLY

- VII.3.1. The core(s) and coil(s), after assembly, shall be mounted in a rigid steel frame, constructed in such a way as to hold the coil(s) within the core window without placing undue stress on the core(s) or short circuit the laminations at any point. The frame shall include steel channel plates at top and bottom and be connected by bars, bolts or banding straps.
- VII.3.2. Wood may be used as blocking between core, coil or steel channels only if said wood is completely constrained and cannot move during shipping, operation or short circuiting. The wood, if used, shall be fully dried and processed prior to its installation. Only fully cured hardwood shall be used. Alternative materials (for example, hardwood particles with resin) require approval prior to manufacture.
- VII.3.3. The core-coil assembly shall be thoroughly dried by baking in an oven and then secured with bolts in the transformer tank and covered with non-contaminated deaerated oil. Special provisions shall be taken to prevent re-entrance of moisture into the core-coil assembly prior to being covered with oil. Oil filling shall take place while unit is under vacuum.
- VII.3.4. Primary and secondary leads shall be mounted and connected in such a manner as to prevent pulling away or twisting under short circuit. Fiber pressboard or processed hardwood maple may be used for lead blocking only when said blocks are dried and installed in accordance with Section 2.3.2. above.

VIII. TANK CONSTRUCTION

VIII.1. TANK

- VIII.1.1. Single phase and three phase pad mount transformer tanks, enclosures, hinges, door handles and bolt nut hardware shall be all welded 409, 304L or 400CB stainless steel construction unless otherwise noted on specific items. **The three phase pad mount transformers required to be 304L stainless steel shall have their tanks, enclosures, hinges, door handles and bolt nut hardware all welded stainless steel construction per the grade of stainless steel stated in this specification.** Tanks shall be free of rust, welding slag or spatter, and other contamination before entering the finishing process. Tanks shall be shot blasted or treated with appropriate chemicals to prevent corrosion and to insure a good bond with the primer.

- VIII.1.2. All single phase and three phase pad mounted transformer tanks will have lifting points, bolts or welded on hooks, as may be required to lift the transformer. Single phase units will have a minimum of two, one on each side of the tank. Three phase units will have a minimum of four, two on each side of the tank.
- VIII.1.3. All pad mount tanks shall be designed with the base recessed (bottom of tanks off ground).

VIII.2. NAMEPLATE

- VIII.2.1. A durable aluminum or stainless steel nameplate shall be affixed on each transformer tank and shall bear the minimum information specified in Table 9, nameplate A and B, of ANSI C57.12.00 where applicable. The nameplate for all oil filled transformers must state they certify "NON-PCB" dielectric.
- VIII.2.2. Each nameplate shall state the month and year of manufacture.
- VIII.2.3. Indication of a stainless steel tank shall be stamped on the nameplate by either SS or stainless steel. Also, the grade shall be stated. (Example 409 SS, 304L SS and etc.).
- VIII.2.4. Nameplates shall include bar coding information. The information shall be in accordance with EEI and consist of the manufacturer's identification, transformer serial number and JEA item identification number.

VIII.3. COVERS

- VIII.3.1. Pad mounted transformer tanks shall have either welded covers or bolted on covers with a false top to insure no access to cover nuts when transformer is mounted and locked on its pad. Covers and false covers shall be treated in accordance with EEI requirements.
- VIII.3.2. Covers shall be domed to aid in water run-off with no trough to collect debris or moisture.

VIII.4. EXTERIOR FINISH

- VIII.4.1. All pad mounted transformer finishes shall be in accordance with the ANSI C57.12.28. The tanks must be thoroughly cleaned and dried before the finish is applied. The tank finish shall consist of sufficient coat(s) of high grade quality paint which will not fade, blister or chalk and will be scuff resistant, to insure a system which is exceptionally serviceable in areas of direct sunlight and high humidity for a minimum 25 year period.
- VIII.4.2. Padmount transformer tanks shall be Munsell 7 GY 3.29/1.5 olive green. Painted stencils or decals, located on the side of the tank, shall be orange or yellow to afford a sharp contrast with the tank finish.

VIII.5. MOUNTING

- VIII.5.1. Provisions shall be provided for lifting transformers into place. In addition, pad mounted transformers shall be constructed such that it may also be skidded or slid into place on the mounting pad without disturbing the entrance cable. (Note: removable skirt/sill).
- VIII.5.2. Two stainless steel cleats with 11/16" X 6" slots shall be supplied with each single phase pad mounted transformer for anchoring to the pad. The cleat opening shall be slot punched or machined to a smooth inside slot finish without jagged edges. (See exhibit II). The cleats shall be attached to the parking stand holder to prevent loss during shipping or being discarded with the pallet.

VIII.6. TERMINAL COMPARTMENTS-PADMOUNTS

- VIII.6.1. The high and low voltage terminating compartments shall meet the requirements for tamper resistance as specified in the latest revision of ANSI.
- VIII.6.2. A one half inch captive, spring loaded, penta head bolt of silicon bronze material with NC class 2 threads, shall be supplied on each pad mounted transformer. This penta head bolt shall be made captive in a metal cup that is permanently attached to the cover by a continuous weld. The cup shall be designed to prevent collection of moisture and debris and provide protection for the bolt threads when the transformer door is slammed. A minimum 3/8" hole shall be provided for a padlock. The nut with NC class 2 threads shall be attached to the sill in a manner that will allow it to be replaced.
- VIII.6.3. All interfacing stationary and moving parts of the hinge shall be stainless steel with stainless steel pins. The hinge shall be of sufficient strength to withstand normal abuse (such as slamming open or closed) without bending or breaking.

IX. ACCESSORY EQUIPMENT

IX.1. COMPONENTS

All components shall be installed in accordance with component manufacturers' instructions.

IX.2. SAFETY LABELS

Safety labels shall consist of decals and/or painted stencils. Bilingual (English/Spanish) Warning and Danger labels will be attached to individual cabinets of pad mounted single phase, two phase, three phase, and three phase step-down transformers. Labels shall be applied such that no air bubbles will form to cause brittleness and cracking. The manufacturer shall provide, and attach to the transformer, operation warning decals for the following equipment (but not limited to); tap changers, pressure relief devices, switches and bayonet fuses. These warning labels are in addition to specific labels required in the various technical specifications.

IX.3. PCB LABELS

All transformers containing dielectric fluid shall have a Non-PCB label on the outside front center visible to the public with letters not less than one inch high.

IX.4. PRESSURE RELIEF VALVE

Each transformer shall be equipped with a Pressure relief Valve.

X. FINAL TESTING AND INSPECTION

X.1. QUALITY INSPECTION

- X.1.1. Good quality control shall be exercised at all times to insure completed transformer meets guaranteed losses. Manufacturers shall have in place: engineering product specifications on all parts, assemblies, and finished products; manufacturing product instructions defining how each part is to be made and tested; and documentation of the essential quality characteristics and how each is measured. Such non-proprietary information shall be made available to JEA when requested.
- X.1.2. Transformers shall receive a final quality inspection before shipping with special attention to oil leaks at bushings, welds, chips and scratches to finish, decals and add on accessories.

X.2. TESTING

- X.2.1. Testing shall be per the Federal Register, Part III, Department of Energy, 10 CFR Part 431, Energy conservation Program for Commercial Equipment: Distribution Transformers Energy conservation Standards; Final Rule, April, 18, 2013.
- X.2.2. One hundred percent of transformers leaving production line shall have been tested for the following:
 - A. Polarity
 - B. Ratio - on all taps.
 - C. Load Losses (or Winding Losses)
 - D. No Load Losses (or Core Losses)
 - E. Dielectric - Induced and Applied Potential on pad mounted units. Refer to ANSI Standards for specific units.
 - F. Pressure on tanks - All tanks shall be tested in such a manner to positively indicate leaks. (Manufacture shall provide a copy of the testing procedure).
 - G. Impulse - All transformers shall receive and pass at least one full wave production line impulse test at one hundred percent of rated BIL. The impulse test shall be on 100% of all transformers.
- X.2.3. Sample or prototype transformers of each class and each KVA size shall be tested for:
 - A. Short Circuit - Classifications used by JEA shall be able to withstand testing in accordance with ANSI C57.12.90.
 - B. Radio Interference
 - C. Stray Loss (calculated)
 - D. Life Test on Components
 - E. Exciting Current
 - F. Impedance
 - G. Power Factor - limited to 1% according to Doble testing procedures.
- X.2.4. The results of sample or prototype test shall be made available to JEA in the form of a Certified Test Report when requested.
- X.2.5. Transformers shall be supplied with a maximum power factor of 1% according to Doble testing procedures.

XI. TEST REPORTS SUBMITTALS

Transformer suppliers, manufacturers, and/or representatives must submit transformer test reports on all transformers shipped. The report is to be E-mailed to JEA: Kris Rosenhauer (rosekk@jea.com), Trevor Parker (Parkta@jea.com), and Brandon Schmacher (Schubj@jea.com). JEA to supply address upon award of contract and changes as necessary.

- XI.1. Each test report must be submitted within 30 days after each shipment to the Supervisor of the Test Facility and include the following data:
- A. Customer: JEA
 - B. JEA Purchase Order Number
 - C. Quantity Ordered
 - D. JEA Solicitation number
 - E. Bid item number
 - F. Core Loss of each transformer
 - G. Average core loss of all transformers on report
 - H. Winding Loss of each transformer
 - I. Average winding loss of all transformers on report
 - J. Impulse Test Statement.
 - K. KVA size
 - L. Primary voltage
 - M. Secondary voltage
 - N. Impedance

XII. ASSET MANAGEMENT DATA SUBMITTAL

Transformer suppliers, manufacturers, and/or representatives must submit transformer Asset Management Data reports on all transformers shipped. The report is to be E-mailed to JEA: Andrew Motsinger (Motsat@jea.com), Kris Rosenhauer (RoseKK@jea.com), and Trevor Parker (Parkta@jea.com).

- XII.1. Each report must include the following data in an excel format, may place multiple units on same page.
- A. Manufacturer
 - B. Model Number
 - C. Manufacturer Part Number
 - D. Serial Number
 - E. Date Manufactured
 - F. Bar Code Number
 - G. Purchase Order Number
 - H. Purchase Price
 - I. Warranty Start Date
 - J. Warranty Duration
 - K. Tap Position
 - L. Percent Impedance
 - M. KVA Rating
 - N. Primary Voltage
 - O. Secondary Voltage
 - P. Transformer Type
 - Q. Number of Phases

XIII. LOSS SUMMARY REPORT

XIII.1. A LOSS SUMMARY REPORT (following) must be used and certified by the Manufacturer covering all transformers shipped annually during the term of the Contract. This form must be submitted within 30 days after the last transformer shipment each year to:

JEA: Electric Distribution Standards

Trevor Parker: parkta@jea.com Kris Rosenhauer: rosekk@jea.com

- NOTES:
1. No other test reports are required
 2. P.O. numbers are not required on the final summary report.

XIII.2. It is JEA's expectation that the manufacturer shall meet the quoted losses throughout the term of the contract. JEA will accept for delivery transformers which meet the losses quoted in the bid form plus/minus the material tolerances allowed by ANSI. Each manufacturer is required to submit annually a Final Summary Report. The average load and no load losses for all transformers shipped shall meet the quantities quoted plus one percent. JEA reserves the right to charge the manufacturer for excess losses.

XIV. TRANSFORMER EFFICIENCY REQUIREMENTS

The transformers supplied under this specification shall meet the minimum transformer efficiencies, as described by the Federal Register, Part III, Department of Energy, 10 CFR Part 431, Distribution Transformers Energy conservation Standards; Final Rule, April, 18, 2013.

XIV.1. TABLE I.1. – STANDARD LEVELS FOR LIQUID-IMMERSED DISTRIBUTION TRANSFORMERS IS SHOWN BELOW FOR INFORMATION PURPOSES.

| Single Phase | | Three Phase | |
|--------------|------------|-------------|------------|
| KVA | Efficiency | KVA | Efficiency |
| 10 | 98.70 | 15 | 98.65 |
| 15 | 98.82 | 30 | 98.83 |
| 25 | 98.95 | 45 | 98.92 |
| 37.5 | 99.05 | 75 | 99.03 |
| 50 | 99.11 | 112.5 | 99.11 |
| 75 | 99.19 | 150 | 99.16 |
| 100 | 99.25 | 225 | 99.23 |
| 167 | 99.33 | 300 | 99.27 |
| 250 | 99.39 | 500 | 99.35 |
| 333 | 99.43 | 750 | 99.40 |
| 500 | 99.49 | 1000 | 99.43 |
| 667 | 99.52 | 1500 | 99.48 |
| 833 | 99.55 | 2000 | 99.51 |
| | | 2500 | 99.53 |
| | | 3750 | 99.53 |

Note: All efficiency values are at 50 percent of nameplate-rated load, determined according to the DOE test procedure. 10 CFR Part 431, Sub-part K, Appendix A

XIV.2. A PORTION OF TABLE I.2. – STANDARD LEVELS FOR MEDIUM-VOLTAGE, DRY-TYPE DISTRIBUTION TRANSFORMERS IS SHOWN BELOW FOR INFORMATION PURPOSES.

| <u>Three Phase</u> | |
|--------------------|-------------------|
| <u>KVA</u> | <u>Efficiency</u> |
| 500 | 99.09 |
| 750 | 99.21 |
| 1000 | 99.28 |
| 1500 | 99.37 |
| 2000 | 99.43 |
| 2500 | 99.47 |

Note: All efficiency values are at 50 percent of nameplate-rated load, determined according to the DOE test procedure. 10 CFR Part 431, Sub-part K, Appendix A

XV. ANNUAL TRAINING

Each manufacturer that receives an award under this Contract shall be required to provide annually a one day seminar on transformers to JEA personnel at JEA's facility. The seminar shall be at no additional cost to JEA.

| Field Name | Description | Typical Data (Examples shown below) |
|------------|-------------|--|
|------------|-------------|--|

MANUFACTURER
TRANSFORMER TEST REPORT SHEET

"LOSS SUMMARY REPORT"
FOR

JEA Solicitation NO. _____

| | | | | |
|--------------------|--------------------|-------------------------------|-------------------------------|----------------------------------|
| BID ITEM NO. | <u>JEA ITEM ID</u> | TOTAL QTY.* <u>ORDERED</u> | AVERAGE * <u>CORE LOSS</u> | AVERAGE * <u>WINDING LOSS</u> |
|--------------------|--------------------|-------------------------------|-------------------------------|----------------------------------|

* FOR THE 12 MONTH PERIOD

MANUFACTURER NAME: _____

CERTIFIED BY: _____ DATE: _____

| ITEM ID | JEA ITEM ID | TRACG001 |
|------------|--|--------------|
| INDEX | file index number (not user assigned) | |
| TYPE | Transformer Type RPAD=1PH Padmount CPAD=3PH Padmount VAULT=3PH Vault type | RPAD |
| PRI | Primary Voltage Description | 14760/25565Y |
| SEC | Secondary Voltage Description | 120/240 |
| KVA | kVA Rating | 50 |
| MFG | Manufacturer Code | XYZ |
| CATID | Catalog/Part Number | |
| FEATURES | Construction Features | 1HV CONV |
| TAPS | Taps Y=Yes N=No | Y |
| FUSE | Fuse - Series Winding | NA |
| FUSE2 | Fuse - Parallel Winding (if DV) | NA |
| FUSELINK | Fuselink (bayonet) | NA |
| FUSELINK2 | Fuselink - Parallel Winding (if DV) | NA |
| COST | Delivered Price | \$ 477.00 |
| NL | No Load Losses - watts @ 20deg C | 74 |
| LL | Load Losses - watts @ 85deg C | 379 |
| AUX | Auxiliary watts (fans/pumps/etc...) | 0.00 |
| IZ | %Impedance | 5.75 |
| IEX | %Exciting Current | 1.00 |
| TStray | Total Stray Losses | 0.00 |
| Eddy | Eddy Losses | 0.00 |
| AWR | Average Winding Rise - Deg C | 56.50 |
| TOR | Top Oil Rise - Deg C | 45.00 |
| HSG | Hottest Spot Gradient - Deg C | 18.30 |
| TOTC | Top Oil Time Constant (hours) | 2.40 |
| HSTC | Hottest Spot Time Constant (minutes) | 10.00 |
| N | Top Oil Exponent - p.u. | 0.80 |
| M | Hot Spot Exponent - p.u. | 0.80 |
| TOTWT | Total Weight (lbs) | 353.00 |
| INTW | Interior (Core&Coil) Weight (lbs) | 171.20 |
| TKWT | Tank and Fittings Weight (lbs) | 59.30 |
| FLUID TYPE | Type of dielectric Fluid | MINERAL OIL |
| FLUID | Fluid Gallons | 12.90 |
| HVCM | Primary Winding Conductor Material (CU/AL) | CU |
| HVCW | Primary Winding Conductor Weight (lbs) | 22.50 |
| LVCM | Secondary Winding Conductor Material (CU/AL) | AL |
| LVCW | Secondary Winding Conductor Weight (lbs) | 12.90 |
| COREWT | Core Weight (lbs) | 128.72 |
| TKHT | Tank Height (inches) | 27.80 |
| TKWD | Tank Width (inches) - or Diameter if Round | 15.00 |
| TKDP | Tank Depth (inches) | 0.00 |
| AIRSPACE | Air Space above Oil (inches) | 0.00 |
| ADIM | Total (overall) Height (inches) | 37.90 |
| BDIM | Total (overall) Width (inches) | 20.70 |
| CDIM | Total (overall) Depth (inches) | 22.80 |
| COMMENT | Manufacture comments | |

Adjustments

| Date | Change | Author |
|----------|---|--------|
| 10/26/20 | Added New Section XIII. Asset Management Data | PARKTA |
| 10/26/20 | In XII and XIII Added Emails for Test and Asset Data to be sent to | PARKTA |
| 10/29/20 | Changed references from IFB to Solicitation | PARKTA |
| 10/29/20 | VII.1.2 Added in "Prior to finalizing a contract," | PARKTA |
| 3/30/22 | Removed requirement for IFD Pressure relief device, previously found under X.4. | PARKTA |
| 8/24/23 | Removed Bid wording from I.3 | PARKTA |
| 8/24/23 | Added to Amorphous Core III. | PARKTA |
| 8/24/23 | Removed IV.2.3-2.5 | PARKTA |
| 8/24/23 | Removed Bid wording from IV.3.1 | PARKTA |
| 8/24/23 | Removed VI | PARKTA |
| 8/24/23 | Removed Bid wording throughout VII.1 | PARKTA |
| 8/24/23 | Corrected Section numbering | PARKTA |
| 3/14/24 | Corrected Address for JEA on pg 9 to new Address | PARKTA |
| 3/14/24 | Some items may be slightly on different pages due to copy over | PARKTA |
| 7/16/25 | Updated Loss Summary report | PARKTA |