



Hammond Power
Solutions Inc.

**1.2kV Class
Hazardous Location
Encapsulated Distribution Transformers
Typical Specification**

**Compliant to IECEx System
(IEC System for Certification to Standards relating to
Equipment for use in Explosive Atmospheres)**

(Class I, Zone 2, Group IIC, T3 Hazardous Locations)

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1 **GENERAL**

1.1 SCOPE

- A This section defines dry-type low voltage, encapsulated enclosed transformers typically used in hazardous locations.

1.2 RELATED DOCUMENTS

- A Drawing and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3 REFERENCES

- A IEC 60079-0, 7th Edition (2017-12) + Corr. 1 (2020-01) + I-SH 01 (2019-04) + I-SH 02 (2019-06) Explosive Atmosphere Part 0: General Requirement
- B IEC 60079-7, Edition 5.1 (2017-08) Explosive atmospheres – Part 7: Equipment protection by increased safety "e"
- C IEC 60529 - Degrees of Protection provided by Enclosures (IP Code)
- D ATEX Directive 2014/34EU – equipment and protective systems intended for use in potentially explosive
- E Equipment and Protective Systems intended for use in potentially explosive atmospheres
- F Regulations 2016: Guidance (GB)
- G NEMA ST-20 Dry-Type Transformer for General Applications
- H Seismic: International Building Code (IBC 2015), The California Building Code (CBC2016) and National Building Code of Canada (NBC 2015), OSHPD.
- I ABS Type Approval for Marine Duty Service and Offshore Application

1.4 TESTING & QUALITY CONTROL

- A Test each model design and submit report on request
- B Standard production tests to include:
- Applied potential test
 - Induced voltage test
 - Voltage ratio test
 - No load and excitation current test
- C Additional type test should be made available on request include:
- Sound level test
 - Temperature rise test

1.5 SUBMITALS

- A Submit shop drawing and product data for approval and final documentation in the quantities listed according to the Conditions of the contract.
- i Customer name, customer location and customer order number shall identify all transmittals.
- ii Product Data including kVA rating, average winding temperature rise, detailed enclosure dimensions, primary & secondary nominal voltages, primary voltage taps, no load & full load losses, impedances, unit weight, warranty.

1.6 STORAGE AND HANDLING

- A Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from potential damage from weather and construction operations. Store so condensation will not form on or in the transformer housing and if necessary, apply temporary heat where required to obtain suitable service conditions.
- B Handle transformer using proper equipment for lifting and handling; use when necessary lifting eye and/or brackets provided for that purpose.

1.7 WARRANTY

- A The transformer shall carry a 10 year limited warranty.
(For details, refer to the manufacturers published warranty)

2 PRODUCTS

2.1 GENERAL CONSTRUCTION:

- A All three phase transformers shall be encapsulated type. Transformers shall be constructed with three coils and a single 3- leg core. The primary side of each transformer shall, if applicable, be provided with taps that align with NEMA ST-20.
- B Transformers shall be designed, constructed and rated in accordance with IECEx System.
- C Scott-T designs not acceptable.

2.2 VOLTAGE AND KVA REQUIREMENTS:

- A Primary Voltage: Three Phase – [380], [400], [415], [480], [600], [480/600], [690], [other]* Volts
 - *208D/Y to 690D/Y
- B Secondary Voltage: Three Phase - [208Y/120], [220Y/1127], [230Y/133], [240D], [240Y/139], [380Y/220], [400Y/231],[480Y/277], [600Y/347], [690Y/440], [other]* Volts
 - *208D/Y to 690D/Y
- C kVA Rating: Three Phase – [6], [9], [15], [30], [45], [75], [other]* kVA
 - *6 to 75kVA
- D System Frequency: [60], [50/60] Hertz

2.3 KEY REQUIREMENTS:

- A Typical impedance at 60Hz: 1.8% to 6.5%
- B Nameplate Rating: Linear load, 50/60Hz
- C In-rush currents not to exceed 20 x RMS

2.4 BASIC REQUIREMENTS:

- A Insulation Class: 130°C or 180°C system (dependent on kVA)
- B Temperature Rise: 115°C, [95°C], [80°C], [other]
- C Voltage Taps Configuration: [90%], [92.5%], [95%], [97.5%], [100%], [102.5%] *, [105%] **
 - *102.5% tap not available for 6kVA rated more than 673V
 - ** 105% tap not available for 6kVA rated more than 657V
- D Core construction: High grade non-aging, fully processed silicon steel laminations or better
- E Coil conductors: Copper windings, with terminations brazed, welded or bolted
- F Electrostatic Shielding on all three phase units
- G Excitation current: 3% of full load current rating (max.)
- H Sound level: NEMA ST-20
- I Enclosure: Non-ventilated; IP66/IP66X -Type 4, [Type 4X]
- J Enclosure Finish: ANSI 61 Grey textured powder coating suitable for UL50E outdoor applications [other]
- K Transformers shall terminate in mounting pads. Primary and secondary terminations are to have terminals on the same side of the transformer mounted on separate insulated supports, with the LV terminations in the upper half of the enclosure and HV terminations in the lower half. Contractors shall provide all necessary lugs.
- L IECEx System (IEC System for Certification to Standards relating to Equipment for use in Explosive Atmospheres)
- M 10 kV BIL for both HV and LV coils
- N Approved for Hazardous Locations Class I, Zone 2, Group IIC, T3
- O Type ABS Approval for Marine Duty Service and Offshore Applications – Electric Distribution and Propulsion
- P Built to NEMA ST-20 and in accordance with all applicable standards
- Q Units designed for step-up applications shall be marked accordingly
- R Mounting:
 - i Encapsulated units up to 325lbs: Suitable for wall or floor mounting
 - ii Encapsulated over 325 lbs: Suitable for floor mounting only
- S Provide bottom entry provisions at the front of the enclosure bottom plate

- T Seismic: Transformers shall be designed and seismically qualified according to the International Building Code (IBC) 2015, and the American Society of Civil Engineers ASCE 7-10 specifications, with the following design parameters:
- Spectral acceleration: $S_{DS} \leq 2.0g$
 - Importance factor: $I_p = 1.5$
 - Attachment/height ratio: $z/h = 1.0$
- i. Compliance must be demonstrated by testing
 - ii. Transformers must be approved for O.S.H.P.D California

OPTIONS:

- Enclosures: [Type 4X Stainless Steel]
- Stainless Steel Breather Drain for Type 4 and 4X Enclosures
- Stainless Steel Nameplate

2.5 ACCEPTABLE PRODUCT AND MANUFACTURER:

- A **HPS TITAN® X** brand transformers or similar manufactured by: Hammond Power Solutions Inc. (Canada: 1-888-798-8882 / U.S.: 1-866-705-4684)
- B Substitutions are permitted, subject to meeting all requirements of this specifications well as written approval from the Consulting Engineering firm at least 10 days prior to bid closing.

3 EXECUTION

3.1 INSTALLATION

- A The installing contractor shall install the HPS Titan® X Encapsulated Distribution Transformer per the manufacturer's recommended installation practices as found in the installation, operation, and maintenance manual in compliance with all applicable national and local codes.
- B Transformers cannot be back (reverse) fed unless specifically designed for and marked accordingly.
- C Make sure the transformer is levelled.
- D Check for damage and loose connections.
- E Mount transformer to comply with all applicable codes.
- F Install seismic restraint where indicated on the drawing.
- G Coordinate all work in this section with all work of other sections.
- H Prior to putting transformer into service, verify secondary voltages and if necessary adjust primary taps.