



Hammond Power
Solutions Inc.

Typical Specification

1.2kV Class Hazardous Location Encapsulated Distribution Transformers

**Compliant to ANSI/ISI 12.12.10
(Class 1, Division 2, Groups A, B, C, D and
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 ANSI/ISA 12.12.01 Nonincendive Electrical Equipment for Use in Class II and II, Division 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations.
- B UL Std. 5085-1 Low Voltage Transformers Part 1: General (Requirements)
- C UL Std. 5085-2 Low Voltage Transformers Part 2: General Purpose (Transformers)
- D CSA C22.2 No 66.1-06 Low Voltage Transformers Part 1: General (Requirements)
- E CSAC22.2 No 66.2-06 Low Voltage Transformers Part 1: General Purpose (Transformers)
- F UL 50E-2015/CSA C22.2 No. 94.2-15: Enclosures for Electrical Equipment, Environmental Considerations
- G Seismic: International Building Code (IBC 2015), The California Building Code (CBC2016) and National Building Code of Canada (NBC 2015), OSHPD.
- H ABS Type Approval for Marine Duty Service and Offshore Application
- I NEMA ST-20 Dry-Type Transformer for General Applications
- J IEEE C57.12.01 General Requirements for Dry-Type Distribution and Power Transformer.
- K IEEE C57.12.91-2011 Standard Test Code for Dry-Type Distribution and Power Transformer.

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:
- Short circuit test, BIL – basic impulse insulation level test
 - Partial discharge test
 - 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. Customer name, customer location and customer order number shall identify all transmittals.
- B 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 UL, CSA, and NEMA standards. If shipping to Europe, transformer will carry a CE mark.
- C If transformer is to be used for non-linear load applications, the transformer shall be de-rated as per ANSI/IEEE C57.110.
- D Scott-T designs not acceptable.

2.2 VOLTAGE AND kVA REQUIREMENTS:

- A Primary Voltage:
Three Phase – [380], [400], [480], [600], [480/600], [other] Volts
- B Secondary Voltage:
Three Phase - [208Y/120], [230Y/133] [240D], [380Y/220],
[400Y/231],[480Y/277], [600Y/347] [other] Volts
- C kVA Rating:
Three Phase – [2], [6], [9], [15], [30], [45], [75], [112], [150], [other] kVA
- D System Frequency: 60, [50], [other] Hertz

2.3 KEY REQUIREMENTS:

- A Typical impedance at 60Hz: 1.8% to 6.5%
- B Nameplate Rating: Linear load, 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 Taps: [2 x ± 5% (1FCAN, 1FCBN)], [4 x ± 2.5% (2FCAN, 2FCBN)], [2 x +2.5%, 4 x -2.5% (2FCAN, 4FCBN)], [none], [other].
- 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; Type 4, [Type 4X], [other].
- J Enclosure Finish: ANSI 61 Grey textured powder coating suitable for UL50 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 cUL listed, [CE Mark]
- M 10 kV BIL for both HV and LV coils.
- N UL Approved for Hazardous Locations [ANSI/ISA 12.12.10 (Class 1, Division 2, Groups A,B,C,D and Class I, Zone 2, Group IIC, T3 Hazardous Location), (Temperature Classification equal to T3C/T3A),[UL5085-1&UL5085-2]
- 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 UL, CSA and ANSI/IEEE 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: $z/h = 1.0$
 Compliance must be demonstrated by testing.
 Transformers must be approved for O.S.H.P.D California.

OPTIONS:

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

2.5 ACCEPTABLE PRODUCT AND MANUFACTURER:

- A **HPS TITAN® N** 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® N 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 that 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.