



Certificate of Type Approval (RQS)

This is to certify that Hammond Power Solutions Inc.
has met the requirements of ABS Product Type Approval for
Transformers & Reactors

Model Name(s): Types as per attached "pdf" file

Presented to:

Hammond Power Solutions Inc.
595 Southgate Drive
Guelph
Ontario N1G 3W6
Canada

Intended Service:

Marine Duty Service and Offshore Applications - Electric Distribution and Propulsion

Description:

Type J, K, KN: 3-Phase Transformers; Type G, F, FN: 1-Phase Transformers; Type JR, KR, KNR: 3-Phase Reactors; Type GR, FR, FNR: 3-Phase Reactors; Type QT: 3-Phase Transformers; Type Q: 1-Phase Transformers; Type CV, CVHW (not filed with UL): 1-Phase Constant Voltage Transformers; Type E: 1-Phase Control Transformers; Type 3AH: 1-Phase Control Transformers

Ratings:

Type J, K, KN: Rating Volts Up to 34.5KV & Up to 21MVA; Type G, F, FN: Rating Volts Up to 34.5KV & Up to 7MVA; Type JR, KR, KNR: Rating Volts Up to 15KV & Up to 5000A; Type GR, FR, FNR: Rating Volts Up to 15KV & Up to 5000A; Type QT: Rating Volts Up to 660V & Up to 45KVA; Type Q: Rating Volts Up to 660V & Up to 25KVA; Type CV, CVHW (not filed with UL): Rating Volts Up to 600V & Up to 5KVA; Type E: Rating Volts Up to 660V & Up to 15KVA; Type 3AH: Rating Volts Up to 660V & Up to 16.5KVA

Service Restrictions:

1) Transformers rated more than 1 kV (phase to phase) are to be provided with anticondensation heaters and are to have degree of protection not less than IP44, or than IP23 if installed in spaces accessible to qualified personnel only. 2) Transformers rated 1kV or less and over 10 kVA/phase are to be provided with anticondensation heaters, unless arranged for hot standby (energized throughout the standby period - in this case a warning plate is to be posted near the disconnecting device for primary feeder). 3) Interphase reactors and transformers used with semiconductor converters for main or auxiliary propulsion service are to be provided with high temperature alarms as per 4-8-5/5.17.10, set at not more than the limit listed in 4-8-3/7.3.2 as a function of relevant insulation class. 4) For Unit Certification requirements, see following comments.

Comments:

1) All LV (1 kV or less rated voltage) transformers rated 1 kVA or more (1-phase) and 5 kVA or more (3-phase) intended for essential or emergency services are to be tested by the Manufacturer, whose certificate of tests will be submitted to the Bureau. Routine tests are to include (as a minimum): measurement of winding resistance, voltage ratio, impedance voltage, short circuit impedance, insulation resistance, load loss, no-load loss and excitation current, phase rotation and polarity, dielectric strength and temperature rise for the prototype of each size and type. 2) All interphase reactors and three phase HV (more than 1 kV rated voltage) transformers (or 3-phase bank transformers) rated 100 kVA or more are to be

tested in the presence of the Surveyor as per IEC 60076 and 4-8-3/7.3.5 and 4-8-5/3.7.5(e). Other HV transformers (less than 100 kVA) will be accepted on the basis of a performance test conducted after installation in the presence of the Surveyor. 3) Each transformer is to be provided with a nameplate in corrosion resistant material, showing all data as per 4-8-3/7.3.6. In addition, the nameplates of HV transformers are to show information about the applicable standard (IEC 60076) and the short duration power frequency withstand voltage for verification of insulation level of each winding. 4) Protection degree of enclosure is to be not less than that specified by SVR 4-8-3/Table 2 or MODU 4-3-3/Table 1, as a function of the intended location.

Notes / Documentation:

Term of Validity:

This product/model is covered under Product Design Assessment (PDA) Certificate # 04-HS435190-PDA, dated 05/May/2004. This PDA Certificate expires May of 2009. It will remain valid for the 5 years from date of issue or until the Rules or specifications used in the assessment are revised (whichever occurs first).

ABS Rules:

2004 Steel Vessel Rules 1-1-4/3.7, 4-8-3/7, 4-8-5/3.7.5, 4-8-5/5.17.10, 2001 MODU Rules 4-3-4/9

National Standards:

ANSI C57.12.91 (1979) Transformer Test; CSA C22.2 No. 66-1956; C22.2 No. 47-M90 (CSA L3902); UL E147879, E112313, E61431, E50394,

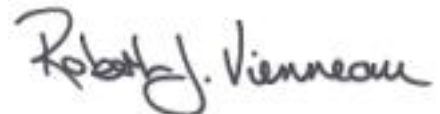
International Standards:

IEC 60076-3

Government Authority:

EUMED:

Others:



Manager, ABS Programs

ABS has used due diligence in the preparation of this certificate and it represents the information on the product in the ABS Records as of the date and time the certificate was printed. Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. Limited circumstances may allow only Prototype Testing to satisfy Type Approval. The approvals of Drawings and Products remain valid as long as the ABS Rule, to which they were assessed, remains valid. ABS cautions manufacturers to review and maintain compliance with all other specifications to which the product may have been assessed. Further, unless it is specifically indicated in the description of the product; Type Approval does not necessarily waive witnessed inspection or survey procedures (where otherwise required) for products to be used in a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS. Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.