



PROCESS
INDUSTRY
PRACTICES

September 2020

Electrical

PIP ELSTR01G
IEC Liquid-Immersed Power Transformers

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In an effort to minimize the cost of process industry facilities, this Practice has been prepared from the technical requirements in the existing standards of major industrial users, contractors, or standards organizations. By harmonizing these technical requirements into a single set of Practices, administrative, application, and engineering costs to both the purchaser and the manufacturer should be reduced. While this Practice is expected to incorporate the majority of requirements of most users, individual applications may involve requirements that will be appended to and take precedence over this Practice. Determinations concerning fitness for purpose and particular matters or application of the Practice to particular project or engineering situations should not be made solely on information contained in these materials. The use of trade names from time to time should not be viewed as an expression of preference but rather recognized as normal usage in the trade. Other brands having the same specifications are equally correct and may be substituted for those named. All Practices or guidelines are intended to be consistent with applicable laws and regulations including OSHA requirements. To the extent these Practices or guidelines should conflict with OSHA or other applicable laws or regulations, such laws or regulations must be followed. Consult an appropriate professional before applying or acting on any material contained in or suggested by the Practice.

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1. Scope

This Practice describes the requirements for design, manufacture, inspection, testing, and shipping of three-phase and single-phase liquid-immersed power transformers in accordance with applicable International Electrotechnical Commission (IEC) standards.

2. References

Applicable parts of the following industry codes and standards shall be considered an integral part of this Practice. The edition in effect on the date of contract award shall be used, except as otherwise noted. Short titles are used herein where appropriate.

Industry Codes and Standards

- American Society for Standards and Materials (ASTM)
 - ASTM D1275 - *Standard Test Method for Corrosive Sulfur in Electrical Insulating Liquids*
- International Electrotechnical Commission (IEC)
 - IEC 60034-1 - *Rotating electrical machines - Part 1: Rating and performance*
 - IEC 60034-6 - *Rotating electrical machines - Part 6: Methods of cooling (IC Code)*
 - IEC 60068-2 - *Environmental testing - Part 2: Tests-All Parts*
 - IEC 60076-1 - *Power transformers - Part 1: General*
 - IEC 60076-2 - *Power transformers - Part 2: Temperature rise for liquid-immersed transformers*
 - IEC 60076-3 - *Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air*
 - IEC 60076-5 - *Power transformers - Part 5: Ability to withstand short circuit*
 - IEC 60076-10 - *Power transformers - Part 10: Determination of Sound Levels*
 - IEC 60076-20 - *Power transformers - Part 20: Energy Efficiency*
 - IEC 60076-22-1 - *Power transformers – Part 22-1 Power transformer and reactor fittings-protective devices*
 - IEC 60099-4 - *Surge Arresters - Part 4: Metal-oxide surge arresters without gaps for a.c. systems*
 - IEC 60099-5 - *Surge Arresters - Part 5: Selection and application recommendations*
 - IEC 60099-6 - *Surge Arresters - Part 6: Surge arresters containing both series and parallel gapped structures - System voltage of 52 kV and less*
 - IEC 60099-8 - *Surge Arresters - Part 8: Metal-oxide surge arresters with external series gap (EGLA) for overhead transmission and distribution lines of a.c. systems above 1 kV*
 - IEC 60099-9 - *Surge Arresters - Part 9: Metal-oxide surge arresters without gaps for HVDC converter stations*
 - IEC 60137 - *Insulated bushings for alternating voltages above 1000 V*