PROCESS INDUSTRY PRACTICES

COMPLETE REVISION
August 2017

Electrical

PIP ELSSG02
Design and Fabrication of Medium-Voltage Metal-Clad Switchgear Above 1000 V to 38 kV

PURPOSE AND USE OF PROCESS INDUSTRY PRACTICES

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.

This Practice is subject to revision at any time.

PUBLISHING HISTORY

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Data Form

ELSSG02-D – Data Sheet for Design and Fabrication of Medium-Voltage Metal-Clad Switchgear Above 1000 V to 38 kV

1. Scope

This Practice covers minimum requirements for design, fabrication, inspection, testing, shipment, and documentation, for metal-clad switchgear containing insulated buses, draw-out power circuit breakers, control, instrumentation, and metering, for installation in unclassified areas. This Practice also covers remote monitoring and control requirements.

2. References

Applicable parts of the following Practices, industry codes and standards, and references 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.

2.1 Process Industry Practices (PIP)

- PIP ELSBD01 – *Design and Fabrication of Metal-Enclosed Nonsegregated-Phase Bus Duct Assemblies*
- PIP ELSBD01D – *Data Sheet for Design and Fabrication of Metal-Enclosed Nonsegregated-Phase Bus Duct Assemblies*
- PIP ELSBD02 – *Design and Fabrication of Metal-Enclosed Cable Bus Assemblies*
- PIP ELSBD02D – *Data Sheet for Design and Fabrication of Metal-Enclosed Cable Bus Assemblies*
- PIP ELSSG12 – *Design and Fabrication of Outdoor Enclosures for Motor Controllers and Switchgear*

2.2 Industry Codes and Standards

- American National Standards Institute, Inc. (ANSI)
  - ANSI Z535.4 – *American National Standard for Product Safety Signs and Labels*
- American Society for Testing and Materials (ASTM)
  - ASTM B117-11 – *Standard Practice for Operating Salt Spray (Fog) Apparatus*
  - ASTM D1535-12 – *Standard Practice for Specifying Color by the Munsell System*
  - ASTM D2794-93 – *Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)*
  - ASTM D3363-05 – *Standard Test Method for Film Hardness by Pencil Test*
- Institute of Electrical and Electronic Engineers (IEEE)
  - IEEE C37.20.2 – *Standard for Metal-Clad Switchgear*
  - IEEE C37.20.7 – *Guide for Testing Medium-Voltage Metal-Enclosed Switchgear Rated up to 38 kV for Internal Arcing Faults*
  - IEEE C37.21 – *Control Switchboards*
  - IEEE C37.100.1 – *Standard of Common Requirements for High-Voltage Power Switchgear Rated Above 1000 V*

3. Definitions

arc resistant equipment: Equipment designed to withstand the effects of an internal arcing fault, as indicated by meeting test requirements of ANSI C37.20.7

internal arcing fault: An unintentional discharge of electrical energy in air within the confines of an electrical equipment enclosure

owner: The party who owns the facility wherein the medium-voltage metal-clad switchgear will be used

metal-clad switchgear: The term metal-clad switchgear, in this Practice, is in accordance with switchgear features and requirements for metal-clad switchgear given in Section 3 of *IEEE C37.20.2*-2015.

purchaser: The party who awards the contract to the supplier. The purchaser may be the owner or the owner's authorized agent.

purchaser's inspector: The purchaser's authorized representative with authority to act in the interest of, and on behalf of, the purchaser in all quality assurance matters

supplier: The party responsible for manufacturing, furnishing and/or installing the medium-voltage metal-clad switchgear

4. Requirements

4.1 Service Conditions

4.1.1 Unless otherwise specified on the purchaser's *PIP ELSSG02-D* Data Sheet, equipment shall be designed in accordance with *IEEE C37.100.1* to perform satisfactorily under the following conditions:

a. Ambient temperature within the limits of -30°C (-18°F) and 40°C (104°F)

b. Altitude of installation does not exceed 1000 m (3300 feet)

c. Humidity within the limits of 0 - 95% non-condensing, over a 24 hour period and 0 - 90% non-condensing, over a 1 month period

d. Pollution level I "light"

4.1.2 Supplier shall clearly state during proposal any derating factors required to meet the service conditions of Section 4.1.1.

4.1.3 Seismic requirements shall be as specified on the purchaser's *PIP ELSSG02-D* Data Sheet. If specified on the purchaser's *PIP ELSSG02-D* Data Sheet, the manufacturer shall provide a type test report demonstrating compliance and anchoring recommendations for all equipment.

4.2 Ratings

4.2.1 The ratings of the switchgear assemblies and the system parameters shall be in accordance with the purchaser's *PIP ELSSG02-D* Data Sheet, attached one line diagram, and as given in this Practice.