

GP 16-10-01	Power Transformers	July 2001
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Power Transformers

GP 16-10-01

Scope

[I] This Global Practice (GP) covers the design of power transformers.

[I] An asterisk (*) indicates that a decision by Purchaser is required or that additional information shall be furnished by Purchaser.

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1. Required References

This Section lists Practices and Standards that are generically referenced and assumed to be a part of this document. Unless otherwise specified herein, use the latest edition.

1.1. Standards for Use in U.S.A.

[I] The following standards shall be used for transformers purchased in the U.S.A. for use in the U.S.A.

1.1.1. Global Practices–ExxonMobil Engineering Practices

GP 20-01-01	Inspection of Equipment and Materials
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1.1.2. ExxonMobil Data Sheets

ExxonMobil Data Sheets	ExxonMobil Data Sheet Home Page
D161001C01	Electric - Liquid-Filled Transformers - Documentation Requirements Sheet
I161001C01	Electric - Liquid-Filled Transformers - Inspection and Testing Requirements Sheet
T161001C01	Electric - Liquid-Filled Transformers - Basic Data and Specifications - Customary Units
T161001M01	Electric - Liquid-Filled Transformers - Basic Data & Specifications - Metric Units
T161001C02	Electric - Liquid-Filled Transformers - Transformer Elements and Accessories - Customary Units
T161001C03	Electric - Liquid-Filled Transformers - Vendor Supplied Data - Customary Units
T161001M02	Electric - Liquid-Filled Transformers - Transformer Elements and Accessories - Metric Units

1.1.3. ANSI–American National Standards Institute

ANSI C57.12.13	Conformance Requirements for Liquid-Filled Transformers Used in Unit Installations, Including Unit Substations
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1.1.4. ASTM–American Society for Testing & Materials

ASTM D 3487	Standard Specification for Mineral Insulating Oil Used in Electrical Apparatus
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1.1.5. IEEE–Institute of Electrical & Electronics Engineers

IEEE C57.12.00	Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers (ANSI/IEEE)
IEEE C57.12.01	Standard General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid-Cast and/or Resin-Encapsulated Windings (ANSI/IEEE)
IEEE C57.12.90	Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers (ANSI/IEEE)
IEEE C57.12.91	Standard Test Code for Dry-Type Distribution and Power Transformers

1.1.6. NEMA–National Electrical Manufacturers Association

NEMA C57.12.10	Transformers - 230 kV and Below 833 / 958 - 8333 / 10 417 kVA, Single-Phase, and 750 / 862 - 60 000 / 80 000 / 100 000 kVA, Three-Phase Without Load Tap Changing; and 3750 / 4687 - 60 000 / 80 000 / 100 000 kVA with Load Tap Changing - Safety Req.
NEMA C57.12.20	Transformers - Standard for Overhead Type Distribution Transformers, 500 kVA and Smaller: High Voltage, 34500 Volts and Below; Low Voltage, 7970/13800Y Volts and Below
NEMA C57.12.22	Transformers - Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers with High-Voltage Bushings, 2500 kVA and Smaller High Voltage, 34 500 Grd Y/19 920 Volts and Below Low Voltage, 480 Volts and Below

1.2. Standards for Use Outside U.S.A.

- 1) [I] The following standards shall be used for transformers purchased outside the U.S.A.
- 2) * [I] For other conditions of purchase and use, additional or equivalent standards of manufacture and test shall be specified by Purchaser.

1.2.1. IEC–International Electrotechnical Commission

IEC 60071-1	Insulation Co-Ordination Part 1: Definitions, Principles and Rules
IEC 60071-2	Insulation Co-Ordination - Part 2: Application Guide
IEC 60076-10	Power Transformers - Part 10: Determination of Sound Levels
IEC 60076-8	Power Transformers - Application Guide
IEC 60137	Insulated Bushings for Alternating Voltages Above 1000 V
IEC 60289	Reactors
IEC 60296	Specification for Unused Mineral Insulating Oils for Transformers and Switchgear

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IEC 60354	Loading Guide for Oil-Immersed Power Transformers
IEC 60529	Degrees of Protection Provided by Enclosures (IP Code)
IEC 60616	Terminal and Tapping Markings for Power Transformers
IEC 60726	Dry-Type Power Transformers

2. Additional Requirements

* [I] [GP 20-01-01](#) shall be used with this Practice as specified by Purchaser.

3. Definitions

Term	Description
Captive Transformer	A captive transformer supplies a single utilization device, usually a large motor. The transformer may be located either at the substation or near the device it supplies.
Fully Insulated Bars	Fully insulated bars are fully coated or covered with solid insulating material. These may be insulated as individual bars. The insulation is intended to prevent the propagation of arcs between phases or between phase and ground.
Switch Making Capacity	Switch making capacity is the maximum momentary current for which the switch can be closed onto a standing fault without self-opening and without sustaining damage. Momentary current may be defined in terms of peak or RMS amperes.

4. Documentation

4.1. Typical Transformer Data

[I] Typical transformer data shall be furnished with all bid proposals as noted below. These data shall then be corrected to apply to the actual transformers purchased, and shall be furnished with the required final drawings and parts information.

- 1) Losses (watts):
 - a) No load at 100 and 110 percent rated voltage
 - b) Total at 50, 75, 100, and 125 percent of self-cooled rating

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