

IEEE Trial-Use Standard for Indoor AC Switches (1 kV–38 kV) for Use in Metal-Enclosed Switchgear

Sponsor
**Switchgear Committee
of the
IEEE Power Engineering Society**

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IEEE Standards Board

Abstract: Indoor ac medium-voltage switches for use in enclosures for application in power circuits at voltages above 1 kV through 38 kV are covered. These include stationary or drawout, manual or power operation, fused or unfused.

Keywords: indoor ac switches, metal-enclosed switchgear

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Introduction

(This introduction is not a part of IEEE Std C37.20.4-1996, IEEE Trial-Use Standard for Indoor AC Switches (1 kV-38 kV) for Use in Metal-Enclosed Switchgear.)

This standard has been developed to define the basic design and performance requirements for indoor medium-voltage switches intended for use in metal-enclosed switchgear covered in IEEE Std C37.20.2-1993 and IEEE Std C37.20.3-1996. This standard was developed based upon design criteria stated in IEEE Std C37.30, IEEE Std C37.32, and IEEE Std C37.34. For other switches, see references IEEE Std C37.30-1992, IEEE Std C37.32-1990, and IEEE Std C37.34-1994.¹

This trial-use standard includes the requirements for only metal-enclosed interrupter switchgear. These requirements were previously a part of IEEE Std C37.20-1969 (Reaff 1981), IEEE Standard for Switchgear Assemblies Including Metal-Enclosed Bus (1974 consolidated edition).² Other types of equipment previously included in IEEE Std C37.20-1969 (Reaff 1981) are incorporated in separate publications.

The rated short-time current is an indication of the ability of the switch to survive a “through-fault,” which may occur if the primary circuit protection fails to clear and the backup protection has to operate. In the past, the standards have set a single time duration for this fault condition. This time duration (2 s) has been based on the maximum tripping delay T for medium-voltage circuit breakers. The 2 s requirement reduces the complexity of coordination and protection studies performed by the user and purchaser of the equipment; however, this requirement became restrictive especially concerning newer technologies and faster acting backup protection schemes. This standard allows a rating for “short-time current duration.” It will require the user and/or purchaser to specify the short-time current and the short-time current duration for the equipment based upon needs and backup protection. It will also require the manufacturer to label the equipment for both ratings. ANSI C37.22 lists the preferred ratings for indoor AC switches used in metal-enclosed switchgear, which are not restrictive.

This standard uses IEEE 4-1978, IEEE Standard Techniques for High-Voltage Testing, instead of the current revision of the document. This was done because of the omission of several correction factors and test procedures needed and used by the Switchgear Committee in standards for switchgear and circuit breakers. The Switchgear Committee has requested coordination and revision of the current standard IEEE Std 4-1995 to address these test procedures and correction factors.

Publication of this trial-use standard for comment and criticism has been approved by the Institute of Electrical and Electronics Engineers. Trial-Use standards are effective for 24 months from the date of publication. Comments for revision will be accepted for 18 months after publication. Suggestions for revision should be directed to the Secretary, IEEE Standards Board, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, and should be received no later than 22 May 1998. It is expected that following the 24-month period, this trial-use standard, revised as necessary, shall be submitted to the IEEE Standards Board for approval as a full-use standard.

This standard was prepared by a working group of the Switchgear Assemblies Technical Committee, National Electrical Manufacturers Association (NEMA). NEMA is responsible for clause 5., Ratings, and clause 7., Construction.

The IEEE Switchgear Assemblies Subcommittee of the IEEE Switchgear Committee, which reviewed and approved this document is responsible for clause 3., Definitions; clause 4., Service conditions; clause 6., Tests; and clause 8., Application guide.

This publication is one of a series covering Switchgear Assemblies as follows (see figure A):

¹These references are available from the IEEE. For more information on references, see clause 2.

²IEEE Std C37.20-1969 has been withdrawn. This standard was delineated into the various branches of the IEEE Std C37.20 series.

ANSI C37.22/D7	Preferred Ratings for Indoor Medium-Voltage Switches and Drawout Medium-Voltage Circuit Breakers Used in Enclosures
IEEE Std C37.20.1-1993	Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear (1000 V and Below)
IEEE Std C27.20.2-1993	Metal-Clad and Station-Type Cubicle Switchgear (Above 1000 V)
IEEE Std C37.20.3-1996	Metal-Enclosed Interrupter Switchgear (Above 1000 V)
IEEE Std C37.20.4-1996	Indoor AC Switches (1 kV-38 kV) for Use in Metal-Enclosed Switchgear
IEEE Std C37.21-1985	Control Switchboards
IEEE Std C37.23-1987	Metal-Enclosed Bus and Guide for Calculating Losses in Isolated Phase Bus

Through this joint effort over the many years, the switchgear assemblies standards have been of extreme value to the industry and further suggestions for improvement gained in the use of this standard will be welcomed.

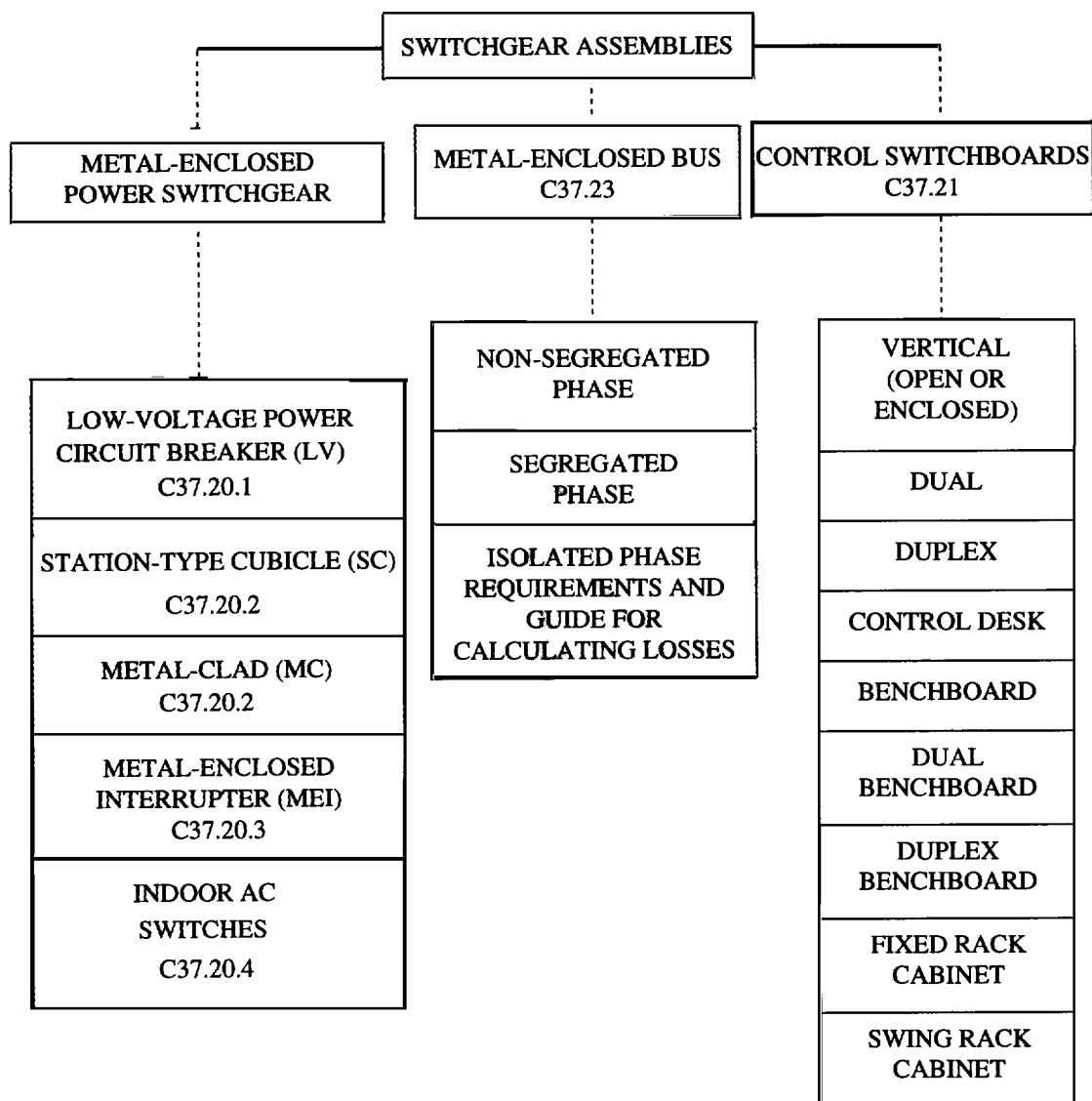


Figure A —Types of switchgear assemblies

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IEEE Trial-Use Standard for Indoor AC Switches (1 kV–38 kV) for Use in Metal-Enclosed Switchgear

1. Scope

This standard covers indoor ac medium-voltage switches for use in enclosures for application in power circuits at voltages above 1 kV through 38 kV as follows:

- a) Stationary or drawout
- b) Manual or power operation
- c) Fused or unfused

The term *indoor* is intended to indicate that the enclosure provides a degree of protection to the switch and the enclosure may be suitable for indoor, outdoor, or other service conditions and complies with the requirements of switchgear assemblies as defined by IEEE Std C37.20.2-1993¹ or IEEE Std C37.20.3-1996.

This standard does not apply to subsurface load interrupting switches in IEEE Std C37.71-1984, switches intended for use in padmounted switchgear in ANSI C37.72-1987 and IEEE PC37.73, and to high-voltage air switches in IEEE Std C37.30-1992.

NOTES:

- 1 — Within this standard, the word “switch(es)” shall be considered to mean enclosed, indoor, three-phase, ac medium-voltage switch(es) as defined by this scope.
- 2 — There are switch designs that have short-circuit current interrupting capability, and these devices are covered by this standard only to the extent of meeting the listed testing requirements. However, due to the additional capability, additional testing is required and the manufacturers should be consulted.

¹Information on references can be found in clause 2.

2. References

When the standards referenced in this document are superseded by a revision approved by the issuing authority, the latest revision shall apply, except as noted for IEEE Std 4-1978.

ANSI C37.22/D7, Preferred Ratings for Indoor Medium-Voltage Switches and Drawout Medium Voltage Circuit Breakers Used in Enclosures.²

ANSI C37.57-1990, American National Standard for Switchgear—Metal Enclosed Interrupter Switchgear Assemblies—Conformance Testing.³

ANSI C37.58-1990, American National Standard for Switchgear—Indoor AC Medium-Voltage Switches for Use in Metal-Enclosed Switchgear—Conformance Test Procedures.

ANSI C37.72-1987, American National Standard for Manually-Operated, Dead-Front, Padmounted Switchgear with Load-Interrupting Switches and Separable Connectors for Alternating-Current Systems.

ANSI/NFPA 70B-1994, Electrical Equipment Maintenance.⁴

IEEE Std 1-1986 (R1992), IEEE Standard General Principles for Temperature Limits in the Rating of Electric Equipment and for the Evaluation of Electrical Insulation (ANSI).⁵

IEEE Std 4-1978, IEEE Standard Techniques For High-Voltage Testing (ANSI).⁶

IEEE Std C37.09-1979 (R1988), IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis (ANSI/DoD).

IEEE Std C37.20.2-1993, IEEE Standard for Metal-Clad and Station-Type Cubicle Switchgear (ANSI).

IEEE Std C37.20.3-1996, IEEE Standard for Metal-Enclosed Interrupter Switchgear (ANSI).

IEEE Std C37.30-1992, IEEE Standard Requirements for High-Voltage Air Switches (ANSI).

IEEE Std C37.40-1993, IEEE Standard Service Conditions and Definitions for High-Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories (ANSI).

IEEE Std C37.41-1994, IEEE Standard Design Tests for High-Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories (ANSI).

IEEE Std C37.48-1988 (R1992), IEEE Guide for Application, Operation, and Maintenance of High-Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories (ANSI).

IEEE Std C37.71-1984 (R1990), IEEE Standard for Three-Phase, Manually Operated Subsurface Load Interrupting Switches for AC Systems (ANSI).

²As this standard goes to press, ANSI C37.22 is being developed. The draft standard is, however, available from ANSI. Anticipated publication date is December 1996. Contact the ANSI Sales Department at (212) 642-4900.

³ANSI publications are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

⁴NFPA publications are available from Publications Sales, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101, USA.

⁵IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA.

⁶The 1978 standard is used instead of the current test standard because of the need for several correction factors that were omitted in the revised document.