

UL 1558

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Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear

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UL Standard for Safety for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear, UL 1558

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UL 1558

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Switchgear

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Fourth Edition

February 25, 1999

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements.

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FOREWORD

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product employing materials or having forms of construction which conflict with specific requirements of the Standard cannot be judged to comply with the Standard. A product employing materials or having forms of construction not addressed by this Standard may be examined and tested according to the intent of the requirements and, if found to meet the intent of this Standard, may be judged to comply with the Standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

INTRODUCTION

1 Scope

1.1 These requirements cover metal-enclosed low-voltage power circuit breaker switchgear assemblies containing but not limited to such devices as low-voltage power circuit breakers, other interrupting devices, switches, control, instrumentation and metering, protective and regulating equipment.

1.2 These requirements cover equipment intended for use in ordinary locations in accordance with the National Electrical Code.

1.3 These requirements are intended to supplement and be used in conjunction with the Standard for Metal-Enclosed Low Voltage Power Circuit Breaker Switchgear, ANSI C37.20.1, and the Standard for Conformance Testing of Metal-Enclosed Low-Voltage AC Power Circuit Breaker Switchgear Assemblies, ANSI C37.51.

1.4 These requirements cover equipment rated 600 V ac or less nominal, 635 V ac maximum.

1.5 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this Standard, and that involves a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements to determine that the level of safety as originally anticipated by the intent of this Standard is maintained. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this Standard shall not be judged to comply with this Standard. Where appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this Standard.

1.5 added February 25, 1999

2 Glossary

2.1 TAP – A terminal or provision for a terminal intended for field wiring that is located on the supply side of the service disconnecting means. The tap is intended to be used in accordance with the National Electrical Code, ANSI/NFPA 70-1993.

3 References

Section 3 added February 25, 1999

3.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

4 General

4.1 Requirements for the equipment covered by this Standard are contained in the Standard for Metal-Enclosed Low-Voltage Circuit Breaker Switchgear, ANSI C37.20.1-1993 and the Standard for Conformance Testing of Metal-Enclosed Low-Voltage AC Power Circuit Breaker Switchgear Assemblies, ANSI C37.51-1989(R1995). The requirements in this Standard shall be applied in addition to those contained in the above documents, or as alternatives where so specified.

4.2 It is specifically not intended that these requirements be used alone to evaluate these devices.

4.3 Figures 4.1 – 4.3 show typical switchgear layouts. It is recognized that other arrangements are possible.

CONSTRUCTION

5 Accelerated Aging of Gaskets

5.1 The requirements of this section are applicable to gaskets relied upon to enable an enclosure to meet the rain test specified in 5.2.9 of ANSI C37.20.1-1993.

5.2 A gasket of an elastomeric or thermoplastic material or a composition gasket utilizing an elastomeric material employed to make an enclosure rainproof shall comply with 5.3 and 5.4.

5.3 If an enclosure is provided with a rubber or rubber-like gasket, samples of the gasket shall be subjected to a temperature of $70 \pm 1^\circ\text{C}$ ($158 \pm 1.8^\circ\text{F}$) in circulating air for 168 hours. The tensile strength after the exposure shall not be less than 60 percent and the elongation shall not be less than 75 percent of the values determined with unaged samples.

5.4 A gasket of thermoplastic material, or a composition thereof, may be accepted after consideration of the effects of heat aging, distortion under conditions of use, and the means of securing the gasket to the cover or enclosure.

6 Primary or Power Carrying Circuits

6.1 General

6.1.1 The requirements of this section shall be applied in addition to those specified in 6.1.1 of ANSI C37.20.1-1993.

6.2 Bus bars

6.2.1 The bending of a bus bar shall not result in visible cracks, but roughening or slight surface crazing is acceptable.

6.2.2 A bolted joint involving aluminum bus bars shall comply with the requirements of 6.2.3 and 6.2.4, unless:

a) A spring washer as described in 6.2.6 is used at one end of each bolt securing current-carrying parts together is used, or

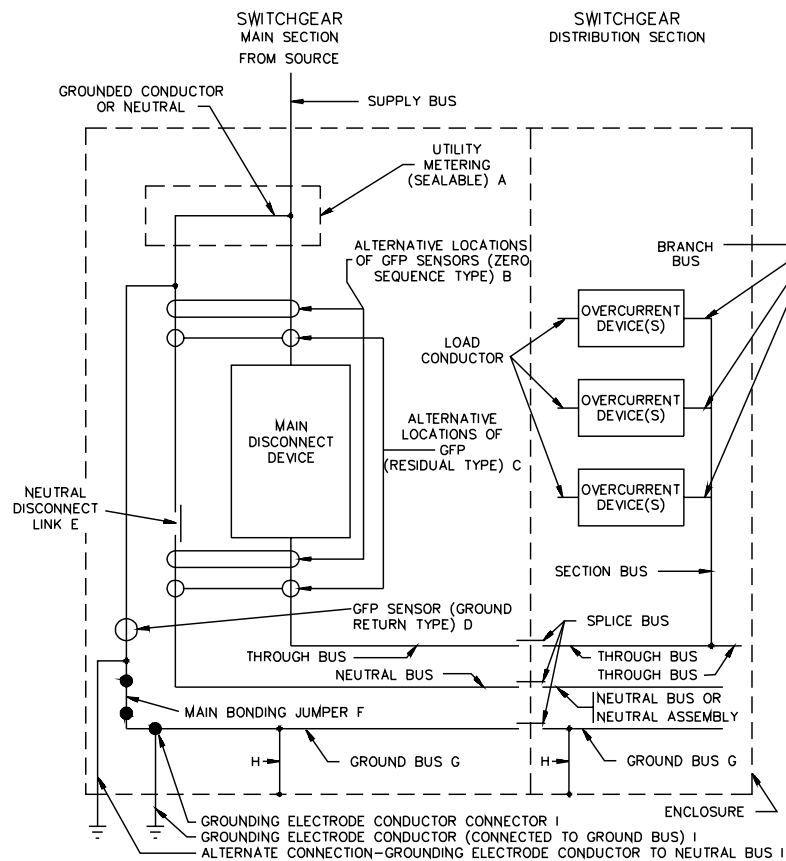
b) A locknut or a split-ring lock washer and a flat washer as described in 6.2.5 is used and each aluminum bus in the joint has a tensile yield strength of at least 20,000 psi (138 MPa).

c) A flat washer, as described in 6.2.5, and aluminum bolts are used with aluminum bus bars.

6.2.3 A switchgear bus, as mentioned in 6.2.2, that employs a bolted joint construction with aluminum bus bars shall be subjected to the test described in 6.2.4. The temperature rise at the joint during the 500th cycle shall not be more than 15°C (27°F) higher than the temperature rise at the 25th cycle.

Exception: Constructions described in 6.2.2 (a), (b), or (c), need not comply with this requirement.

Figure 4.1
Typical switchgear layout



SC1177-2

A. Utility Metering, see 13.2.5.

B. GFP Sensor (Zero Sequence Type), see 13.1.5 – 13.1.13.

C. GFP Sensor (Residual Type), see 13.1.5 – 13.1.13.

D. GFP Sensor (Ground Return Type), see 13.1.5 – 13.1.13.

E. Neutral Disconnect Link, see 7.11, 13.1.5 – 13.1.13, and 13.2.1 – 13.2.5. (For other than ground return type GFP, the neutral disconnect link may be located on the line or load side of the GFP sensor.)

F. Main Bonding Jumper, see 7.6.

G. Ground Bus, see 7.1 – 7.8.

H. Frame and Structure Grounding, see 7.2.

I. Grounding Electrode Conductor, see 7.4 and 13.1.5 – 13.1.13.