UL 943

STANDARD FOR SAFETY

Ground-Fault Circuit-Interrupters

UL Standard for Safety for Ground-Fault Circuit-Interrupters, UL 943

Fifth Edition, Dated May 17, 2016

Summary of Topics

This revision of ANSI/UL 943 dated September 5, 2023, includes the following changes in requirements:

– Clarification of Auto-Monitoring Function Initiation and Detection; 5.16.2

– Clarification for Available Fault Current; Table 6.17.2.2, 6.18.3 – 6.18.5 and SA1.2

– Alternate Delivery Methods for Installation Instructions; 8.1.1

– Editorial Correction to Spacings; Table 5.12.2.1 and Table 5.12.2.2

– Revision of Requirements to Allow Remote ON and OFF switching of GFCIs; 3.19A, 5.14.8, 5.14.9, 7.2.8

– Update Annex A Ref 12 for Alternative Use of UL 60947-4-2•CSA C22.2 No 60947-4-1 for Motor Controllers; 6.14.9, 7.2.9 and Annex A

– Revised Marking Requirements in Supplement SA; SA3.1

– Open Neutral Protection – Extra Low Resistance Ground Fault Test and Short Circuit Test; 6.18.9 and 6.19.4

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated December 17, 2021 and October 7, 2022.

No Text on This Page

Association of Standardization and Certification
NMX-J-520-ANCE
Third Edition

CSA Group
CSA C22.2 No. 144.1-16
Second Edition

Underwriters Laboratories Inc.
UL 943
Fifth Edition

Ground-Fault Circuit-Interrupters

May 17, 2016

(Title Page Reprinted: September 5, 2023)

Approved American National Standard

ANSI/UL 943-2023

Commitment for Amendments

This standard is issued jointly by the Association of Standardization and Certification (ANCE), the Canadian Standards Association (operating as "CSA Group"), and ULSE Inc. (ULSE). Comments or proposals for revisions on any part of the standard may be submitted to ANCE, CSA Group, or ULSE at anytime. Revisions to this standard will be made only after processing according to the standards development procedures of ANCE, CSA Group, and ULSE. CSA Group and ULSE will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue. ANCE will incorporate the same revisions into a new edition of the standard bearing the same date of issue as the CSA Group and ULSE pages.

ISBN 978-1-77139-993-7 © 2016 Canadian Standards Association

This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

To purchase CSA Group Standards and related publications, visit CSA Group's Online Store at www.csagroup.org/store/ or call toll-free 1-800-463-6727 or 416-747-4044.

This ANSI/UL Standard for Safety consists of the Fifth edition including revisions through September 5, 2023. The most recent designation of ANSI/UL 943 as an American National Standard (ANSI) occurred on September 5, 2023. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface.

The Department of Defense (DoD) has adopted UL 943 on November 30, 1994. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

For information on ULSE Standards, visit http://www.shopulstandards.com, call toll free 1-888-853-3503 or email us at ClientService@shopULStandards.com.

CONTENTS

Preface

This is the harmonized ANCE, CSA Group, and ULSE standard for Ground-Fault Circuit-Interrupters. It is the third edition of NMX-J-520-ANCE, the second edition of CSA C22.2 No. 144.1, and the fifth edition of UL 943. This harmonized standard has been jointly revised on September 5, 2023. For this purpose, CSA Group and ULSE are issuing revision pages dated September 5, 2023, and ANCE is issuing a new edition dated September 5, 2023.

This harmonized Standard was prepared by the Association of Standardization and Certification (ANCE), CSA Group, and ULSE. The efforts and support of the CANENA Technical Harmonization Subcommittee 23E, Ground-Fault Circuit-Interrupters, are gratefully acknowledged.

This standard is considered suitable for use for conformity assessment within the stated scope of the standard.

The present Mexican standard was developed by the CT 23 Accesorios Electricos from the Comite de Normalizacion de la Asociacion de Normalizacion y Certificacion, A.C., CONANCE, with the collaboration of the ground fault circuit interrupters manufacturers and users.

This Standard was reviewed by the CSA Subcommittee on Ground-Fault Circuit-Interrupters, under the jurisdiction of the CSA Technical Committee on Industrial Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee.

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

Level of harmonization

This Standard uses the IEC format but is not based on, nor shall it be considered equivalent to, an IEC Standard.

This Standard is published as an identical Standard for ANCE, CSA Group, and ULSE.

An identical Standard is a Standard that is exactly the same in technical content except for national differences resulting from conflicts in codes and governmental regulations. Presentation is word for word except for editorial changes.

Reasons for differences from IEC

This Standard provides requirements for ground-fault circuit-interrupters for use in accordance with the electrical installation codes of Canada, Mexico, and the United States. At present there is no IEC Standard for ground-fault circuit-interrupters for use in accordance with these codes. Therefore, this Standard does not employ any IEC Standard for base requirements.

Interpretations

The interpretation by the standards development organization of an identical or equivalent Standard is based on the literal text to determine compliance with the Standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

1 Scope

1.1 This Standard applies to Class A, single- and three-phase, ground-fault circuit-interrupters intended for protection of personnel, for use only in grounded neutral systems in accordance with the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code, Part I, and Electrical Installations (Use), NOM-001-SEDE. These devices are intended for use on alternating current (AC) circuits of 120 V, 208Y/120 V, 120/240 V, 127 V, or 220Y/127 V, 60 Hz circuits.

Note: In Canada, the text “intended for protection of personnel” is excluded.

1.2 These requirements do not cover ground-fault circuit-interrupters intended for use in circuits served by a transformer having windings wholly insulated from each other.

1.3 This Standard applies to all Class A ground-fault circuit-interrupters. These Class A GFCIs are permitted to be integrated into other devices, in which case, besides complying with this Standard, these devices are to comply with the corresponding applicable Standard for the device in question.

1.4 This Standard includes minimum requirements for the function, construction, performance, and markings of ground-fault circuit-interrupters included in the scope.

1.5 This Standard is intended to cover only Class A GFCI devices.

1.6 This Standard also covers GFCIs of the self contained type that are intended for installation in a counter, such as would be suitable for installation in a kitchen or bathroom counter top.

2 Normative References

2.1 Any normative 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. See Annex A.

2.2 When a reference is made to another code or Standard, the product shall comply with the installation code or Standard of the country or countries in which the product is intended to be used.

2.3 For products intended for use in Canada general requirements are given in CSA Standard C22.2 No. 0, *Definitions and General Requirements – Canadian Electrical Code, Part II*.

3 Definitions

For the purposes of this Standard, the following definitions apply:

3.1 ACCESSIBLE PART – A part so located that it can be contacted by a person, either directly or by means of a probe or tool.

3.2 AUTOMATIC RECLOSURE – Denotes the act of a ground-fault circuit-interrupter resetting itself after having been tripped.

3.3 CLASS A – Class A, when applied to a ground-fault circuit-interrupter (GFCI), is an interrupter that will interrupt the circuit to the load when the ground-fault current is 6 mA or more but not when the ground-fault current is 4 mA or less.

3.4 CORD-CONNECTED – Denotes connection to a supply circuit by way of a flexible cord terminating in an attachment plug.

3.5 DOUBLE INSULATION – The insulation system resulting from a combination of functional and supplementary insulation.

3.6 ENCLOSURE – A surrounding case constructed to provide a degree of protection against incidental contact with the enclosed equipment and to provide a degree of protection to the enclosed equipment against specified environmental conditions.

3.7 ENERGIZED PART – A part at some potential with respect to another part, or to earth.

3.8 FUNCTIONAL INSULATION – The insulation necessary for the proper functioning of the device, and for basic protection against electrical shock hazard.

3.9 GFCI END OF LIFE – When a GFCI is incapable of providing ground fault protection and passing its internal test function it has reached its end of life.

3.10 GROUND FAULT – Denotes an unintentional electrical path between a part operating normally at some potential to ground, and ground.

3.11 GROUND-FAULT CIRCUIT-INTERRUPTER – In the US and Mexico, a device intended for the protection of personnel that functions to de-energize a circuit or portion of a circuit within an established period of time when a current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protective device of the supply circuit.

In Canada, a device whose function is to interrupt, within a predetermined time, the electrical circuit to the load when a current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protective device of the supply circuit.

3.12 HOUSING – The integral envelope directly surrounding the circuit components of the ground-fault circuit-interrupter.

3.13 LEAKAGE CURRENT – Denotes all currents including capacitively coupled currents which may be conveyed between energized parts of a circuit and (1) ground or (2) other parts.

3.13A MICROELECTRONICS – Monolithic, hybrid, or module circuits, where the internal circuit connections are not accessible exclusive of provided external connection pins or pads. The circuits are capable of functioning in the analogue mode, digital mode, or a combination of the two modes. Examples of microelectronics include: ASICs, ROMs, RAMs, PROMs, EPROMs, PALs, and PLDs. See 3.16A.

3.14 OUTLET-BOX TYPE GROUND-FAULT CIRCUIT INTERRUPTER – A permanently connected ground-fault circuit-interrupter provided with a mounting yoke for mounting in an outlet box; may or may not be provided with receptacle outlets. May be referred to as a receptacle-type GFCI.

3.15 PERMANENTLY CONNECTED – Denotes connection to a supply circuit by way of fixed electrical conductors (see cord-connected).

3.16 PORTABLE GROUND-FAULT CIRCUIT-INTERRUPTER – A plug-in type ground-fault circuit-interrupter provided with male blades for connection to a receptacle, or one that is cord-connected. (See cord-connected).

3.16A PROGRAMMABLE COMPONENT – Any microelectronic hardware that can be programmed in the design center, the factory, or in the field. Here the term "programmable" is taken to be "any manner in which one can alter the software wherein the behavior of the component can be altered". The microelectronics defined in 3.13A are examples of programmable components.

3.17 RATED CURRENT – The marked value of current.

3.18 RATED VOLTAGE – Voltage assigned by the manufacturer. See Table 7.2.1 for details and marked voltage.

3.19 REINFORCED INSULATION – An insulation providing protection against electrical shock hazard that is equivalent to double insulation.

3.19A REMOTE CONTROL – Denotes the use of a GFCI for switching purposes, to be actuated (on or off) from a location not at the GFCI. This does not anticipate for resetting when tripped in accordance with the provisions of 6.7.1.1 – 6.7.2.2.

3.20 ROOM TEMPERATURE – Air at 25.0 ±5.0°C (77.0 ±9.0°F).

3.21 SHOCK HAZARD – A shock hazard is considered to exist at a part of a ground-fault circuit-interrupter if:

a) There would be current of 6 mA or more in a resistance of 500 ohms connected between the part in question and the grounded supply conductor, and

b) The device would not operate to open the circuit to the 500-ohm resistor within the time allowed in 6.7.1.1.

3.22 SUPPLEMENTARY INSULATION – An independent insulation provided in addition to the functional insulation to insure protection against electric shock hazard in the event that functional insulation should fail.

3.23 TRIP – Denotes automatic interruption by the ground-fault circuit-interrupter of the electric circuit to the load.

4 General

4.1 Components

4.1.1 Except as indicated in 4.1.2, a component of a product covered by this Standard shall comply with the requirements for that component. See Annex A for a list of Standards covering components generally used in the products covered by this Standard and applicable Mexican Standards. A component shall comply with the ANCE, CSA, or UL Standards as appropriate for the country where the product is to be used. When a product is intended for use in more than one country, a component shall comply with the appropriate component Standard for the countries in which it is being used.

4.1.2 A component need not comply with a specific requirement that:

a) Involves a feature or characteristic not needed in the application of the component in the product covered by this Standard, or

b) Is superseded by a requirement in this Standard.

4.1.3 A component shall be used in accordance with its ratings for the intended conditions of use.

4.1.4 Specific components are accepted as being incomplete in construction features, or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as temperatures not exceeding specified limits, and shall be used only under those specified conditions for which they have been investigated.

4.2 Units of measurement

4.2.1 If a value for measurement is followed by a value in other units in parentheses, the second value may be only approximate. The first stated value is the requirement.

5 Construction

5.1 All types

5.1.1 A ground-fault circuit-interrupter which is intended to be connected to a supply circuit having more than one ungrounded conductor shall be so designed that their intended purpose will not be defeated if any of the ungrounded conductors is not energized in the normal way.

5.1.2 An interrupter having an adjustable circuit component, the setting of which affects the clearing time or the sensitivity, shall be constructed so that:

a) The component is not visible to the user when the interrupter is in normal use or when it is opened for connecting supply circuit and load circuit conductors; and

b) Any cover or other part which obscures the component from view requires a tool for removal and is so secured or sealed that the removal can be readily detected. The application of a sealing material directly to the component is considered to comply with the intent of Item (b) for sealing.

5.1.3 Except as specified in 5.1.4, male and female contact devices such as plugs, connectors, current taps, and receptacles provided with, or as an integral part of, a ground-fault circuit-interrupter shall also comply with the applicable construction and performance requirements in the Standards referenced in Annex A, Ref. No. 1.

5.1.4 For Canada, as an alternate to the Temperature Test in Clause 7.9 of the Standard for General Use Receptacles, Attachment Plugs, and Similar Wiring Devices, C22.2 No. 42, a receptacle type GFCI may be tested as described in Section 6.28 of this Standard.

For Mexico, as an alternate to the Temperature Test in Clause 6.2.5 of the Standard for Wiring Devices – Safety requirements – Specifications and Test Methods, NMX-J-508-ANCE, a receptacle type GFCI may be tested as described in Section 6.28 of this Standard.

For the US, as an alternate to the Temperature Test in Section 111 of the Standard for Attachment Plugs and Receptacles, UL 498, a receptacle type GFCI may be tested as described in Section 6.28 of this Standard.

5.1.5 In Canada, a portable ground-fault circuit-interrupter:

a) Is required to have a fixed grounding pin,

b) Of the direct plug-in type, other than one designed solely for use in a locking type receptacle, shall not include a mounting tab which is intended to connect with a screw retaining the cover of a duplex receptacle in place, or any other means for securing the interrupter to a receptacle or its cover.

5.2 Resistance to corrosion

5.2.1 Parts shall be protected against corrosion if failure of such parts would be likely to result in a hazardous condition, including failure to perform with high-resistance ground faults as provided in these requirements. To verify compliance with 5.2.1, see the Corrosion test, Clause 6.21.

5.3 Grounding and bonding

5.3.1 All accessible parts of a permanently connected ground-fault circuit-interrupter that are likely to become energized if there should be arc-over, insulation failure, or the like, shall be connected together and to the terminals intended for the equipment grounding conductor (see 5.11.1). The resistance of the circuit is not to exceed 0.1 ohm, and the circuit shall be capable of withstanding continuously a current of 25 A.

5.3.2 In Canada, the grounding and bonding shall comply with the requirements of Annex A, Ref. No. 2, except the screw size shall be permitted to comply with 5.3.3.

5.3.3 For devices rated 15 A or 20 A the minimum screw size is 4.5 mm (No. 8).

5.3.4 In considering the provisions of 5.3.1, a grounded or insulating barrier may be employed to reduce the likelihood that accessible parts will become energized.

5.3.5 If provided, the equipment grounding conductor of a portable or cord-connected ground-fault circuit-interrupter shall be conductively connected to the grounding contacts of the attachment plug and of the receptacles, and shall not be connected to accessible conductive parts.

5.3.6 A ground-fault circuit-interrupter shall operate normally if there is an open circuit in the grounding conductor.

Note: In Canada, equipment grounding conductors are referred to as bonding conductors.

5.4 Enclosure and housing

5.4.1 A ground-fault circuit-interrupter housing shall be capable of withstanding the abuses to which it might be subjected in normal use without affecting the GFCI to the extent that the GFCI would fail to comply with the requirements of this Standard. A ground-fault circuit-interrupter intended to be incorporated into equipment having an enclosure that is subject to the requirements of the end-product *Standard, shall be permitted to be constructed without enclosures.

*See Annex D for a list of possible end-product Standards.

5.4.2 A device which is capable of being used as a ground-fault circuit interrupter without being installed in an additional enclosure, shall comply with the enclosure requirements as referenced in Annex A, Ref. No. 3, and shall also comply with the applicable enclosure requirements for the intended environment as referenced in Annex A, Ref. No. 4. See 6.3.8.

5.4.3 Doors and covers shall have means for securing them firmly in place. If bare live parts are exposed by the opening of such doors or covers, means requiring the use of a tool to open, or provision for locking, shall be provided to hold them in the closed position.

5.5 Provision for connection to permanent wiring systems

5.5.1 There shall be provision at a permanently connected ground-fault circuit-interrupter for attachment of raceway or cable and grounding in accordance with the National Electrical Code (NEC), ANSI/NFPA 70, Canadian Electrical Code (CEC), C22.1 or Electrical Installations (Use), NOM-001-SEIE-1999.

5.5.2 Interrupters shall be so constructed that:

a) The position of the openings for conduit or cable connection is unlikely to cause confusion in connecting field-installed conductors;

b) Field-installed conductors will be separated by barriers from conductors of internal wiring; and from components of interrupters other than wiring terminals; and

c) Circuit components will be protected from damage during field installation. See Enclosure and housing – performance, Clause 6.3.

5.6 Insulation

5.6.1 Except as described in 5.6.2 and 5.6.3, a portable ground-fault circuit-interrupter shall have double insulation or reinforced insulation throughout its construction.

5.6.2 Functional insulation alone is acceptable in a portable device where, in the event that the functional insulation should fail, there would be no shock hazard at the ground-fault circuit-interrupter.

5.6.3 In performing the evaluation described in 5.6.2 at a manual switch in the supervisory circuit (described in 5.15.1), the device need not trip if the value of current available in the event that the functional insulation of the switch should fail would not exceed the value of current employed by the supervisory circuit.

5.6.4 Functional insulation shall be interposed between grounding conductors and accessible parts of a cord-connected ground-fault circuit-interrupter. If such insulation is inherent in a receptacle:

a) There shall be instructions visible when the receptacle is being removed for replacement to replace the receptacle with only an identical replacement, and how to obtain the replacement, and

b) It shall not be possible to use a standard grounding-type receptacle as a replacement without first performing a drilling or cutting operation.

5.6.5 Except where specifically acceptable for the purpose, the jacket of the power-supply cord of the ground-fault circuit-interrupter is not considered to provide insulation. See 5.10.5.

5.7 Accessibility of energized parts

5.7.1 Parts of a ground-fault circuit-interrupter shall not be accessible when they are energized.

5.7.2 In determining compliance with the provisions of 5.7.1:

a) Except at a contact of an attachment-plug receptacle, a part is considered to be accessible if it can be touched with a 2.4 mm (3/32-inch) diameter rod,

b) A permanently connected device shall be mounted as intended,

c) A door or cover that can be opened or removed without the use of a separate tool is to be open or removed,

d) A door or cover that must be opened or removed in order to use a ground-fault circuit-interrupter shall be opened or removed, and

e) Material that is not acceptable as insulation is considered to be conductive.

5.7.3 Access to the trip mechanism and electronics of a portable ground-fault circuit-interrupter, not intended to be repaired, shall not be attainable with ordinary tools. Access shall be limited by use of tamper-resistant screws, rivets, welding or other equivalent means.

5.8 Internal wiring

5.8.1 The gauge and insulation of wires shall withstand the mechanical and electrical stresses of service. Particular consideration should be given to the effect of vibration and user servicing where wire smaller than 0.205 mm^2 (24 AWG) is employed. Compliance shall be determined by completion of the impact test and drop test as described in Enclosure and housing – performance, Clause 6.3, and conducting the Visual inspection test, Clause 6.22.

5.8.2 In a portable cord-connected ground-fault circuit-interrupter, at a wire termination or splice there shall be at least one independent means provided which alone could prevent the conductor from becoming free to bridge supplementary or reinforced insulation in the event that the wire should break at the termination or splice. A wire-binding screw or nut shall be suitably prevented from loosening such as with a spring-type lockwasher or equivalent, if such loosening could allow the attached conductor to become free to bridge supplementary or reinforced insulation. Compliance shall be determined by conducting the Visual inspection test, Clause 6.22.

5.8.3 Insulated conductors shall be suitable for the temperature, voltage, and the intended use in accordance with the applicable requirements of relevant component Standards (see also Separation of circuits, subclause 5.12.4).

5.8.4 All joints and connections shall be made mechanically secure and shall provide adequate and reliable contact without strain on connections and terminals. Compliance shall be determined by conducting the Visual inspection test, Clause 6.22.

5.8.5 All joints shall be provided with insulation suitable for the temperature, voltage, and intended use of the conductors themselves, in accordance with applicable requirements of the relevant component Standards listed in Annex A, Ref. No. 5, or shall comply with Spacings, Clause 5.12, or Alternate spacings – clearances and creepage distances, Clause 5.13. Compliance shall be determined by conducting the Visual inspection test, Clause 6.22.

5.9 Field wiring

5.9.1 A ground-fault circuit-interrupter intended for permanent connection to the branch circuit shall be provided with means for the connection of wires having an ampacity in accordance with the National Electrical Code ANSI/NFPA 70, and the Canadian Electrical Code, C22.1, and Electrical Installations (Use), NOM-001-SEDE.

5.9.2 In a permanently connected ground-fault circuit-interrupter, either:

a) Acceptable barriers shall be employed to separate load-circuit conductors and terminals from terminals and conductors of any other circuit, or

b) All such parts shall be insulated for the maximum voltage of either circuit.

5.9.3 If a ground-fault circuit-interrupter is provided with leads for connection to the branch circuit, the leads shall not be more than two sizes smaller than the size referred to in 5.9.1 and shall not be smaller than 2.082 mm^2 (14 AWG).

5.9.4 A lead-type terminal shall be so constructed as to withstand the stress of normal handling without damage to the ground-fault circuit-interrupter. To determine compliance, each terminal lead shall be subjected to the force described in 6.1.5.

5.9.5 Green coloring with or without one or more yellow stripes and white or gray coloring shall not be used for the covering of a terminal lead unless intended for connection to grounding and grounded conductors respectively. See also 8.2.4.

In Canada, an equipment grounding conductor is referred to as a bonding conductor and the grounded conductor is referred to as the identified conductor.

5.9.6 The free length of a terminal lead shall be at least 100 mm (4 inches).

5.9.7 A terminal connector shall be prevented from moving so as to strain factory connections or reduce spacings to unacceptable values. Friction alone is not to be depended upon to prevent such movement.

5.9.8 At a terminal that is not considered to be a pressure terminal connector, it shall not be necessary to assemble or adjust parts other than loosening or tightening a screw, bolt, or nut. In order to determine compliance with the provisions of 5.9.8, a wire-binding screw or nut is to be tested in accordance with 6.1.8.

5.9.9 A terminal connector of the wire-binding type is permitted to terminate conductors no larger than 5.26 mm^2 (10 AWG).

5.10 Power-supply cord

5.10.1 A cord-connected ground-fault circuit-interrupter shall be provided with an attachment plug for connection to the supply circuit. The rating of the attachment plug is to be equal to the rating of the ground-fault circuit-interrupter.

5.10.2 The flexible cord shall be of a type, which complies with the requirements for:

a) Hard usage or extra-hard usage in accordance with Table 11 of the Canadian Electrical Code, Part I, or

b) Hard service or junior hard service cords in accordance with Flexible Cords and Cables, Table 400-4 of the National Electrical Code, ANSI/NFPA 70, or

c) Extra-hard service or hard service in accordance with Electrical Products, Wire and Cables, Heavy Duty and Extra Heavy Duty Flexible Cords, Up to 600 V, NMX-J-436.

5.10.3 Strain on the power-supply cord that may occur by way of pulling, twisting, or pushing into the ground-fault circuit-interrupter housing shall not be transmitted to cord-conductor terminations.

5.10.4 In order to determine that the strain of pulling on the supply cord will not be transmitted to the cord terminations as provided in 5.10.3, the power supply cord is to be subjected to be the test in 6.1.6.

5.10.5 A clamp or similar device of conductive material applied to the power-supply cord shall have supplementary insulation interposed between the cord and the clamping device or shall not be accessible.

5.10.6 A surface of a ground-fault circuit-interrupter against which a flexible cord is likely to bear shall be smooth and well-rounded.

5.10.7 Unless protection is provided in a ground-fault circuit-interrupter to prevent overloading of the supply-cord conductors, the current rating of the supply cord shall not be less than the current rating of the attachment plug on the supply cord.

5.10.8 The points within the ground-fault circuit-interrupter intended for the termination of power-supply-cord conductors shall be plainly identified as detailed in 7.4.3.

5.10.9 The attachment plug of a ground-fault circuit-interrupter shall be a molded-on type or shall have the cord-conductor terminations sealed, or shall be provided with other means to prevent accidental contact between the grounding conductor and either or both of the power conductors, within the attachment plug.

5.10.10 A portable ungrounded ground-fault circuit-interrupter shall be provided with a polarized attachment plug cap.

5.10.11 If a 3-wire grounding-type attachment plug or a 2-wire polarized attachment plug is provided, the attachment plug connections shall comply with Figure 5.10.1, and the polarity identification of the flexible cord shall comply with Table 5.10.1.

5.10.12 The power supply cord of a portable GFCI having a permanently attached cord shall be subjected to the test in 6.1.7.

5.10.13 The power-supply cord shall be separately insulated from exposed metal parts at the point where it enters the equipment. The jacket on a cord is not considered as supplementary insulation.