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SUPERSEDING
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FEDERAL SPECIFICATION

CIRCUIT BREAKERS, MOLDED CASE; BRANCH CIRCUIT AND SERVICE

(GENERAL SPECIFICATION)

This specification was approved by the Commissioner, Federal Supply Service. General Services Administration, for use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers molded case circuit breakers which fall within the general parameters specified in table XV which are specifically designed to provide service-entrance, feeder, meter-service, or branch circuit protection and rated at not more than 4,000 amperes and 600 volts ac, 60 hertz (Hz).

1.2 Classification. Circuit breakers furnished under this specification shall be of the following types, as specified, (see 3.1 and 6.7.5):

Types:
- I - Uncompensating thermal magnetic
- II - Ambient compensating thermal magnetic
- III - Magnetic
- IV - Fused

1.2.1 Part number. The circuit breakers shall be identified by a part number constructed as follows:

WC375/01-001 (Specification number, slash sheet, and dash number)

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issues in effect on date of invitation for bid or request for proposal, form a part of this specification to the extent specified herein.

Federal Specifications:

NN-P-71	-	Pallets, Material Handling, Wood, Double Faced, Stringer Construction.
QQ-S-781	-	Strapping, Steel, Flat and Seals.
PPP-B-566	-	Boxes, Folding, Paperboard.
PPP-B-585	-	Boxes, Wood, Wirebound.
PPP-B-601	-	Boxes, Wood, Cleated-Plywood.
PPP-B-621	-	Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636	-	Boxes, Shipping, Fiberboard.
PPP-B-640	-	Boxes, Fiberboard, Corrugated, Triple-Wall.
PPP-B-676	-	Boxes, Setup.
PPP-T-60	-	Tape: Packaging, Waterproof.
PPP-T-76	-	Tape, Pressure-Sensitive Adhesive Paper (For Carton Sealing).

Federal Standard:

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Fed. Std. No. 123 - Marking for Shipment (Civil Agencies).

FSC 5925

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(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

MIL-P-116 - Preservation-Packaging, Methods of.
MIL-B-43014 - Boxes, Water Resistant Paperboard, Folding, Set-up and Metal-Stayed.
MIL-C-45662 - Calibration System Requirements.

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-147 - Palletized Unit Loads on 40" x 48" Pallets.
MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.

(Copies of Military Specifications and Standards, required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

Underwriters' Laboratories, Inc. (UL) Standard:

UL489 - Standard for Safety, Molded Case Circuit Breakers and Circuit Breaker Enclosures.

(Application for copies should be addressed to the Underwriters' Laboratories, Inc., Walt Whitman Road, Melville, NY 11745, 207 E. Ohio Street, Chicago, IL 60611; and 1655 Scott Blvd., Santa Clara, CA 95050.)

Institute of Electrical and Electronic Engineers, Inc.

Standard No. 1 - Temperature Limits in the Rating of Electronic Equipment, Principals for.

(Application for copies shall be addressed to the Institute of Electrical and Electronic Engineers Inc., 345 East 47th Street, New York, NY 10017.)

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3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of any conflict between requirements of this specification and the specification sheets, the latter shall govern (see 6.7.5).

3.1.1 Circuit breaker ratings not listed in specification sheets. The specification shall be applicable to circuit breakers not covered by specification sheets which fall within the requirements of tables XIV and XV.

3.2 Qualification. Circuit breakers under this specification shall conform to the applicable requirements of UL489 or the requirements specified herein (see 4.5.1). Those circuit breakers approved by Underwriters' Laboratories, Inc. per UL489 shall be considered qualified for inclusion on the qualified products list upon the supplier's request accompanied by evidence of current approval of Underwriters' Laboratories, Inc. The label, or listing mark of Underwriters' Laboratories shall be accepted as evidence that the circuit breakers conform to this requirement. In lieu of the label, or listing mark, the bidder shall perform the inspection specified in 4.5.1.

3.3 Material. Material shall be as specified herein. However, when a definite material is not specified, a suitable material shall be used that will enable the circuit breakers to conform to the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.3.1 Current carrying parts. Current-carrying parts shall be of silver, a silver alloy, copper, a copper alloy or other metal suitable for the application, however, iron and steel may be used in multimetallic thermal elements.

3.3.2 Restricted material. Flammable or explosive material, or material which can produce toxic or suffocating fumes when the circuit breakers are in service shall not be used in construction of the circuit breakers.

3.3.3 Corrosion. Iron and steel parts, except for thermal elements, magnet-pole faces, hardened and polished parts such as latching surfaces, etc., where such protection is impractical, shall be adequately protected against corrosion.

3.3.4 Dissimilar metals. When dissimilar metals are used in intimate contact with each other, protection against electrolysis and corrosion shall be provided. The use of dissimilar metals in contact, which tend toward active electrolytic corrosion (particularly brass, copper, or steel used in contact with aluminum or aluminum alloy) is not acceptable. However, metal plating or metal spraying of dissimilar base metals to provide similar or suitable abutting surfaces is permitted. The use of dissimilar metals separated by a suitable insulating material is also permitted. Dissimilar metals are defined in 6.7 through 6.7.4 and table XVI, except that the use of corrosion-resistant steel in contact with cadmium plating shall be allowed.

3.4 Design and construction. Circuit breakers shall be of the design, construction and physical dimensions specified (see 3.1), except circuit breakers not covered by specification sheets (see 3.1.1) shall be UL listed or meet the requirements of this specification prior to inclusion into a specification sheet.

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3.4.1 Trip elements. An overcurrent trip element shall be provided in each pole. All overcurrent tripping devices, whether interchangeable or noninterchangeable, shall be sealed against tampering.

3.4.2 Trip-free feature. Circuit breakers shall be designed so that the circuit cannot be maintained closed when any pole is carrying overload currents that would normally automatically trip the circuit breaker to the open position.

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3.4.3 Trip indication. Circuit breakers shall be designed to provide positive indication of the main contract position.

3.4.4 Interchangeable trips. An interchangeable trip unit shall not be capable of being installed in any frame having a current rating less than that of the trip unit.

3.4.5 Adjustable magnetic trip units. If a circuit breaker has a magnetic means for tripping, in addition to and entirely independent of a time-delay means for tripping which complies with all the calibration requirements of this specification, the magnetic trip may be adjustable, see 3.1. However, circuit breakers not specifically designed for adjustable magnetic trip shall not be adjustable thermally or magnetically without dismantling of the circuit breaker or trip unit or breaking of a seal.

3.4.6 Housings. A circuit breaker shall have an integral housing for all the mechanism and live parts except the operating handle and the wiring terminals, and shall be manually operable without opening this housing.

3.4.7 Operating handles. An operating handle of conducting material extending into the housing shall be grounded.

3.4.8 Sealing. Any means for sealing shall be such that breaking or removing it will be plainly evident. Paper or cloth may be used as a seal indicator, but shall not be used as a means for holding parts together.

3.4.9 Plug-in design. A plug-in circuit breaker shall be retained on the stabs without depending on the trim or cover of the enclosure.

3.4.10 Terminals. Unless otherwise specified (see 3.1), the line terminals of a circuit breaker rated at 40 amperes or less shall be capable of accommodating No. 8 AWG conductors.

3.4.11 Multi-Pole circuit breakers. A multi-pole circuit breaker (having two or more poles controlled by a single, manually operated actuating member) shall be so designed that all poles will make and break simultaneously when operated manually or automatically in the intended manner; except that in a two- or three-wire circuit breaker rated at 120/240 volts or less and having two operating poles designed for use on the outside (ungrounded) wires of a three-wire, single-phase alternating current system having a solid neutral, the automatic tripping of either pole may be independent of the other, provided that the independent tripping is indicated.

3.4.12 Interlock. If fused circuit breaker current limiters or fuses are housed within the circuit-breaker frame, the circuit breaker shall be so interlocked that when the cover over the limiters or fuses, or the limiter pack, is removed, the circuit breaker will automatically trip.

3.4.13 Multi-Limiter characteristics. If fused circuit breakers are designed to use two or more current limiters with different let-thru characteristics for different ranges of ratings within a frame size, it shall be difficult to install a limiter in any lower rated circuit breaker where it is not intended, if such installation could result in a hazard.

3.4.14 Trip indication on limiter opening. Fused circuit breakers shall be so designed that opening of the limiter or fuse will trip the circuit breaker mechanism.

3.4.15 Accessories. Accessories shall be in accordance with the

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applicable requirements of UL489.

3.4.16 Spacings. The spacings between circuit breaker components shall be not less than those indicated in table I. Soldering lugs or pressure wire connectors shall be prevented from turning so as not to reduce the spacings specified, except that if such minimum or greater spacings are maintained when lugs are turned 30 degrees toward each other or toward other uninsulated live or grounded parts, no means to prevent turning need be provided.

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TABLE I. Minimum spacings

Voltage between parts	Minimum spacing in inches									
	At terminals				Other than at terminals					
	Between terminals of opposite polarity		Between terminals and any grounded metal [1]		Between uninsulated live parts of opposite polarity		Between uninsulated live parts and any grounded metal [1]			
	A		B		C		D [2]		E [3]	
	Thru air	Over surface	Thru air	Over surface	Thru air	Over surface	Thru air	Over surface	Thru air	Over surface
0-125	1/2	3/4	1/2	1/2	1/4	3/8	1/2	1/2	1/4	3/8
126-300	3/4	1-1/4	1/2	1/2	1/4	3/8	1/2	1/2	1/4	3/8
301-600	1	2	1/2	1	3/8	1/2	1/2	1	3/8	1/2

[1] The spacing to the enclosure or circuit breaker mounting means may be reduced if an acceptable liner of insulating material, not less than 1/32 inch in thickness, is used to provide the required spacing through air.

[2] If indentation or deformation of the overall enclosure or circuit breaker mounting means may reduce spacings to less than those indicated in column E.

[3] If indentation or deformation of the overall enclosure or circuit breaker mounting means will not affect spacings.

3.4.17 Standard ampere ratings. Standard ampere ratings for circuit breakers are 15, 20, 25, 30, 35 40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600, 700, 800, 1,000, 1,200, 1,600, 2,000, 2,500, 3,000, and 4,000 amperes.

3.4.18 Ganging provisions. A single-pole circuit breaker rated at 120/240 volts ac, shall be designed to permit simultaneous operation with a similar adjacent circuit breaker, and shall have provision for the connection of the handle with that of a similar breaker.

3.5 Calibration. When circuit breakers are tested as specified in 4.7.2, the tripping times (see 6.6.1), shall not exceed the limits shown in table II for the applicable current and temperature specified (see 3.1 and table VIII).

TABLE II. Calibration tripping times

Current rating in amperes	Maximum tripping time in minutes at 200% rated current	Maximum tripping time in hours at 125% or 135% rated current
0-30	2	1
31-50	4	1
51-100	6	2

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101-225	8	2
226-400	10	2
401-600	12	2
601-800	14	2
801-1000	16	2
1001-1200	18	2
1201-1600	20	2
1601-2000	22	2
Over 2000	24	2

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3.5.1 <UT> specified in 4.7.2.1, automatic tripping <UT> occur at the highest adjustment and still be within the range of the marked current. Tripping at the lowest setting shall be no greater than the tripping current at the highest setting (unless otherwise specified, see 3.1).

3.6 Overload. When circuit breakers are tested as specified in 4.7.3, there shall be no electrical failure, evidence of mechanical damage and the fuse used to indicate arc-over shall not be ruptured.

3.7 Tungsten filament lamp load. When tested as specified in 4.7.4, circuit breakers shall not trip automatically nor freeze in the "ON" position.

3.8 100 percent calibration at 40 deg. +/- 3 deg. C. When tested as specified in 4.7.5, circuit breakers shall not trip automatically.

3.9 Temperature and 100 percent calibration at 25 deg. +/- 3 deg. C. When tested as specified in 4.7.6, circuit breakers shall not trip automatically and the temperature rise at the wiring terminals or lugs shall not exceed 50 deg. C. In addition, the temperature rise of materials used in construction shall not exceed those specified in table III. The temperature rise at the terminals and casing of limiters in fused circuit breakers shall not exceed 85 deg. C.

TABLE III. Maximum temperature rise of construction materials in degrees centigrade

Thermoplastic or rubber-insulated conductors	35
Plain or plated copper or copper-alloy separable contacts	40
Conductors having varnished-cloth insulation	60
Conductors having slow-burning insulation	65
Fiber employed as electrical insulation	65
Wood or other combustible material	65
Urea composition	75
Melamine	125
Phenolic composition employed as electrical insulation	125
The softening point minus 40 deg. C on any sealing compound	...
Wire wound coils	
Class 90 insulation [1]	
Thermocouple method	50
Resistance method	70
Class 105 insulation [1]	
Thermocouple method	65
Resistance method	85
Class 130 insulation [1]	
Thermocouple method	85
Resistance method	105

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Class "over 220" insulation [1]	No limit specified
Single-layer series coils with exposed surfaces uninsulated or enameled	
Class 105 insulation [1]	
Thermocouple method	90

[1] Defined in Standard No. 1 of the Institute of Electrical and Electronic Engineers.

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3.10 Endurance. When tested as specified in 4.7.7, there shall be no electrical or mechanical failure of the device and the fuse shall not be ruptured. In addition, circuit breakers shall meet the requirements of 3.5 during the calibration check following the endurance test.

3.11 Short circuit. When tested as specified in 4.7.8, there shall be no electrical or mechanical failure of the circuit breaker and the fuse specified in 4.7.3 shall not be ruptured. The case shall not be cracked or broken, cotton or cloth indicators shall not be ignited and the insulation of the conductors used to wire the device shall show no evidence of damage. After the final operation, the circuit breaker shall have conductivity in the closed position at rated voltage. During the 200 percent rated current test, the circuit breaker shall trip automatically within the maximum time specified in table II.

3.12 Dielectric withstanding voltage. When circuit breakers are tested as specified in 4.7.9, the leakage current shall not exceed 1.0 milliampere and there shall be no evidence of lashover, mechanical damage, arcing, or breakdown.

3.13 Calibration 200 percent at 25 deg +/- 3 deg. C. When tested as specified in 4.7.11, circuit breakers shall clear the test circuit. The insulation of conductors used to wire the device shall not be damaged, the wire shall not be ejected from the wire connector and the leads shall not be burned off, shunts, bi-metals or heaters shall not be burned out. The case shall not be broken, however, hairline cracks are acceptable, but cracks where a portion of the case is deflected outward (or inward) are not acceptable. Any hole or opening in the case caused by the short circuit operator is not acceptable. A crack which would permit separation of two sections of the case is acceptable only if the two sections are caused to maintain their proper relative positions because of securing means such as mounting bolts, cover screws, etc. Contacts shall not be welded and the fuse indicated in 4.7.3 shall not be ruptured.

3.15 250 percent calibration at 25 deg. +/- 3 deg. C. When tested as specified in 4.7.12, each pole of the circuit breaker shall trip within the time specified in table II for the 200 percent rated current test. Circuit breakers shall also meet the requirements of the dielectric withstanding voltage test (see 3.12).

3.16 Crossover (current limiters or fuses). When tested as specified in 4.7.13, the current limiter or fuse shall remain intact and permanently open the circuit. The cotton or cheese cloth shall not be ignited, there shall be no evidence of damage to the circuit breaker enclosure and the fuse shall not be ruptured.

3.17 Crossover (dummy fuses). When tested as specified in 4.7.14, there shall be no evidence of damage to the circuit breaker case, ejection of wire or burn off of leads, all poles shall trip automatically, shunts, bimetals and heaters shall not be burned open and circuit breakers shall be capable of being reclosed.

3.18 Maximum interrupting capacity. When tested as specified in 4.7.15, the circuit breaker case shall show no evidence of damage, the current limiter or fuse within the circuit breaker shall remain intact and permanently open, the cotton shall not be ignited and fuse as specified in 4.7.3 shall not be open.

3.19 Maximum energy (applicable only if tests in 4.7.15(b) were not required). When tested as specified in 4.7.16, current limiters shall

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remain intact and permanently open, the circuit breaker shall show no evidence of physical damage, there shall be no ejection of wire or burned off leads and the fuse as specified in 4.7.3 shall not be open.

3.20 250 percent calibration at 25 deg. +/- 3 deg. C. When tested as specified in 4.7.17, the tripping time shall not exceed the limits shown in table II for the 200 percent rated current test. Circuit breakers must also meet the requirements of the dielectric withstanding voltage test (see 3.12).

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3.21 Marking. Circuit breaker marking shall include the manufacturers part or catalog number, name or symbol, the current rating, voltage rating and interrupt rating in rms symmetrical amperes regardless of whether it is a standard or high interrupt rating (see tables XII and XIV). When multiple interrupt and voltage ratings apply (see table XV), all the ratings shall be marked on the device. Additional circuit breaker and accessory marking shall be in accordance with UL489. In addition, the government part number (see 3.1) shall be marked on the device.

3.21.1 Underwriters' listing mark. Circuit breakers which conform to UL489 (see 4.5(b)) shall have the listing mark or label on each circuit breaker furnished on a contract or purchase order.

3.22 Workmanship. Circuit breakers shall be manufactured and processed in such a manner as to be uniform in quality and shall be free from loose terminals, cracked or displaced parts, sharp edges, burrs, and other defects that will affect life, serviceability, or appearance.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality, and quantity to permit performance of the required inspection shall be established and maintained by the supplier. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with MIL-C-45662.

4.2 Classification of inspection. The inspections specified herein are classified as follows:

(a) Qualification inspection (see 4.5).
(b) Quality conformance inspection (see 4.6).

4.3 Inspection of materials and components. In accordance with 4.1, the supplier is responsible for insuring that materials and components used were manufactured and inspected in accordance with the requirements of this specification and of referenced subsidiary specifications and standards to the extent specified, or if none, in accordance with this specification (see 3.3).

4.4 Inspection conditions. All inspections, examinations, and tests shall be performed in accordance with this specification and the applicable portion of UL489.

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4.5 Qualification inspection. Qualification shall be obtained by either of the following:

(a) By testing the circuit breakers in accordance with 4.5.1; qualification inspection shall be performed at a laboratory acceptable to the Government (see 6.3), on sample units produced with equipment and procedures normally used in production.

(b) By having Underwriters' Laboratory label in accordance with UL489, manufacturers electing this option shall submit a letter of certification to the qualifying activity (see 6.3) listing the Underwriters' file number, the government part number and the manufacturer's part number for each circuit breaker rating for which qualification is desired.

NOTE: Extension of qualification. For circuit breaker ratings marked "Not for new design" (see 3.1), qualification is waived, however, procurement shall be made from a source qualified for the remainder of values on that specification sheet.

4.5.1 Inspection routine. Circuit breakers shall be subjected to the tests specified in table IV in the order shown, for that circuit breaker design. Sample size shall be as specified in UL489 for both the minimum and maximum current rating of each specification sheet. In the event of an internal design change, the minimum and maximum rating of each design shall be tested.

4.5.1.1 High available fault current ratings. Circuit breaker types which have been qualified for use in limited available fault current circuits via successfully passing group I testing may also be qualified for use on high available fault current circuits by passing the test specified in group II. Group II tests will be run on a new set of samples of the same type that has passed group I and shall be marked with one or more of the interrupting ratings specified in table XIV to signify its capabilities. Sample size shall be as specified in UL489.

4.5.1.2 Fused circuit breakers. Group III tests apply only to fused circuit breakers and may, at the option of the manufacturer, be performed on a new set or sets of samples as specified in UL489.

4.5.2 Failures. One or more failures shall be cause for refusal to grant qualification approval.

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TABLE IV. Qualification inspection

Examination or test	Circuit breaker design [1]					Rqrment paragraph	Method paragraph
	Fully magnetic breakers [2]	Uncomp. thermal magnetic breakers[3]		Cmpnsatd thermal magnetic breakers	Fused uncomp. thermal magnetic breakers		
		25 deg. C	40 deg. C [4]	40 deg. C [5]	40 deg. C		
Group I [6]							
Visual and mechanical examination - - - - - - -	X	X	X	X	X	3.1 thru 3.4.12, 3.21, and 3.22	4.7.1
						3.5	4.7.2
Calibration							
200% at 25 deg. C - - - -	X	X	X	X	X		
125% at 25 deg. C - - - -	X	X	-	-	-		
135% at 25 deg. C - - - -	-	-	X	X	X		
200% at 40 deg. C - - - -	-	-	-	X	-		
125% at 40 deg. C (after carrying rated current)- - - - -	-	-	-	X	-		
Calibration of adjustable magnet trip (when applicable)- -	X	X	X	X	X	3.5.1	4.7.2.1
Overload - - - - - - - - - -	X	X	X	X	X	3.6	4.7.3
Tungsten lamp load [7] - -	X	X	X	X	-	3.7	4.7.4
100% calibration at 40 deg. C [8] - - - - - -	-	-	X	X	X	3.8	4.7.5
Temperature and 100% calibration at 25 deg. C-	X	X	X	X	X	3.9	4.7.6
Endurance- - - - - - - - - -	X	X	X	X	X	3.10	4.7.7
Short circuit- - - - - - -	X	X	X	X	X	3.11	4.7.8
Dielectric withstanding voltage- - -	X	X	X	X	X	3.12	4.7.9.1
Group II [6]							
200% calibration at 25 deg. C- - - - - - -	X	X	X	X	-	3.13	4.7.10
Short circuit interruption- - - - - - -	X	X	X	X	-	3.14	4.7.11
250% calibration at 25 deg. C- - - - - - -	X	X	X	X	-	3.15	4.7.12
Dielectric withstanding voltage - - - - - - - - - -	X	X	X	X	-	3.12	4.7.9.2

See footnotes at end of table.

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TABLE IV. Qualification inspection - Continued

Examination or test	Circuit breaker design [1]					Rqrment paragraph	Method paragraph
	Fully magnetic breakers [2]	Uncomp. thermal magnetic breakers[3]		Cmpnsatd thermal magnetic breakers	Fused uncomp. thermal magnetic breakers		
		25 deg. C	40 deg. C [4]	40 deg. C [5]	40 deg. C		
Group III [6]							
Special short circuit							
Crossover (current limiters or fuses) [9] -	-	-	-	-	X	3.16	4.7.13
Crossover (dummy fuses) [10]- - - - - - -	-	-	-	-	X	3.17	4.7.14
Maximum IC [11]- - - - - -	-	-	-	-	X	3.18	4.7.15
Maximum energy (when applicable) [11]- -	-	-	-	-	X	3.19	4.7.16
250% calibration at 25 deg. C - - - - - - - - -	-	-	-	-	X	3.15	4.7.12
Dielectric withstanding voltage - - - - - - - - - -	-	-	-	-	X	3.12	4.7.9.2

[1] X - Indicates test required.

[2] Circuit breakers whose automatic operation does not depend on the heating effect of current and is not affected by changes in ambient temperature.

[3] Circuit breakers whose automatic operation depends on the heating effect of current and is affected by changes in ambient temperature.

[4] If a circuit breaker includes any thermal compensation in its tripping mechanism, and if the manufacturer desires to have the circuit breaker marked "40 deg. C", it shall be subjected to the tests for a compensated thermal breaker.

[5] Circuit breakers whose automatic operation depends on the heating effect of current, and which incorporate means for counteracting the effects of change in ambient temperature.

[6] Group I tests apply to all circuit breaker designs, secondary sample group II tests apply to circuit breaker designs with high interrupting capacity ratings (see 4.5.1.1), and group III tests apply to fused circuit breakers (see 4.5.1.2).

[7] Tests made only on breakers rated at 50 amperes or less, rated 120 or 120-24 volts or less.

[8] This test may be performed after the temperature and 100 percent calibration tests at 25 deg. C.

[9] "0" operation (see 6.6.2), conducted slightly above crossover to ensure operation of current limiters or fuses. Cotton and cheesecloth (see UL489) indicators shall be used when crossover current is less than short circuit current.

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[10] With dummy fuses, "0" and "CO" (see 6.4) operation, no cheesecloth or cotton indicators used.

[11] No cheesecloth or cotton indicators used in circuit breaker area. Cotton used to cover openings in current limiter area.

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4.5.3 Retention of qualification. To retain qualification, the supplier shall utilize the applicable procedure as follows:

(a) Those suppliers that used the inspection requirements of 4.5.1, and when applicable, 4.5.1.1, or 4.5.1.2 to obtain qualification shall forward a report at 12-month intervals to the qualifying activity. The qualifying activity shall establish the initial reporting date. The report shall consist of:

(1) A summary of the results of tests performed for inspection of product for delivery, groups A and B, indicating as a minimum the number of lots that have passed and the number that have failed. The results of tests of all reworked lots shall be identified and accounted for.

(2) A summary of the results of tests performed for qualification verification inspection, group C, including the number and mode of failures. The summary shall include results of all qualification verification inspection tests performed and completed during the 12-month period. If the summary of the test results indicates non-conformance with specification requirements, and corrective action acceptable to the qualifying activity has been taken, action may be taken to remove the failing product from the qualified products list.

Failure to submit the report within 30 days after the end of each 12-month period may result in loss of qualification for the product. In addition to the periodic submission of inspection data, the supplier shall immediately notify the qualifying activity at any time during the 12-month period that the inspection data indicates failure of the qualified products to meet the requirements of this specification.

In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the items. If during two consecutive reporting periods there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit a representative product of each specification sheet to testing in accordance with the qualification inspection requirements.

(b) Those suppliers that used the Underwriters' Laboratories Listing Mark to obtain qualification shall submit certification that the qualified circuit breakers retain the UL Listing Mark, at 12-month intervals, to the qualifying activity. The initial reporting date shall be established by the qualifying activity.

Failure to submit the above within 30 days after the end of each 12-month period may result in loss of qualification for the product. Suppliers shall notify the qualifying activity immediately of inspection data that indicates failure of the product to meet the requirements of UL489.

4.6 Quality conformance inspection. For circuit breakers qualified in accordance with 4.5.2 quality conformance inspection shall consist of groups A, B, an C inspections for circuit breakers qualified in accordance with 4.5(b), the Underwriters' Laboratories label shall be evidence of compliance.

4.6.1 Inspection of product for delivery. Inspection of product for

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delivery shall consist of groups A and B inspections.

4.6.1.1 Inspection lot. An inspection lot shall consist of all circuit breakers of the same specification sheet and current rating produced under essentially the same conditions, and offered for inspection at one time.

4.6.1.2 Group A inspection. Group A inspection shall consist of the tests specified in table V and is applicable to all circuit breaker designs.

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4.6.1.2.1 Sampling plan. Statistical sampling and inspection shall be in accordance with MIL-STD-105 for general inspection level II. The acceptable quality level (AQL) shall be as specified in table V. Major and minor defects shall be as defined in MIL-STD-105.

TABLE V. Group A inspection

Examination or test	Requirement paragraph	Method paragraph	AQL (percent defective) Maximum acceptable	
			Major	Minor
Visual and mechanical examination:				
Dimensions - - - -	3.1, 3.4			
Marking- - - - - -	3.21	4.7.1	1.0	4.0
Workmanship- - - -	3.22			

4.6.1.2.2 Rejected lots. If an inspection lot is rejected, the supplier may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.6.1.3 Group B inspection. Group B inspection shall consist of the tests specified in table VI, in the order shown and shall be made on sample units which have been subjected to and have passed the group A inspection. The applicability of a test listed for a particular design of circuit breaker shall be as specified in table IV.

4.6.1.3.1 Sampling plan. Sampling for group B inspection shall be in accordance with MIL-STD-105, inspection level S-4. The AWL shall be 1 percent defective.

4.6.1.3.2 Rejected lots. If an inspection lot is rejected, the supplier may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.6.1.3.3 Disposition of sample units. Sample units which have been subjected to group B inspection shall not be delivered on the contract or order.

TABLE VI. Group B inspection

Examination or test	Requirement paragraph	Method paragraph
Calibration		
125% at 25 deg. C- - - - - - - - - -		
135% at 25 deg. C- - - - - - - - - -	3.5	4.7.2
200% at 40 deg. C- - - - - - - - - -		
125% at 40 deg. C (after carrying rated current) - - - - - - - - - -		
Calibration of adjustable magnetic		

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trip (when applicable) - - - - - -	3.5.1	4.7.2.1
Overload - - - - - - - - - - - - - - -	3.6	4.7.3
Tungsten lamp load - - - - - - - - - -	3.7	4.7.4
100% calibration at 40 deg. C- - - -	3.8	4.7.5
Temperature and 100% calibration at 25 deg. C - - - - - - - - - - - -	3.9	4.7.6

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4.6.2 Qualification verification inspection. Qualification verification inspection shall consist of the tests specified in table VII. Except where the results of this inspection show noncompliance with the applicable requirement (see 4.6.2.1.4), delivery of products which have passed groups A and B shall not be delayed pending the results of this qualification verification inspection.

TABLE VII. Group C inspection

Examination or test [1]	Requirement paragraph	Method paragraph
Group I [2]		
Overload- - - - - - - - - - - - - - -	3.6	4.7.3
Tungsten lamp load [3]- - - - - - -	3.7	4.7.4
Temperature and 100% calibration at 25 deg. C- - - - - - - - - - - -	3.9	4.7.6
Endurance - - - - - - - - - - - - - -	3.10	4.7.7
Short circuit - - - - - - - - - - - -	3.11	4.7.8
Dielectric withstanding voltage - -	3.12	4.7.9.1
Group II [2]		
200% calibration at 25 deg. C - - -	3.13	4.7.10
Short circuit interruption- - - - -	3.14	4.7.11
250% calibration at 25 deg. C - - -	3.15	4.7.12
Dielectric withstanding voltage - -	3.12	4.7.9.2
Group III [2]		
Special short circuit		
Crossover (current limiters or fuses) [4] - - - - - - - - - -	3.16	4.7.13
Crossover (dummy fuses) - - - - -	3.17	4.7.14
Maximum IC [5]- - - - - - - - - - -	3.18	4.7.15
Maximum energy- - - - - - - - - - -	3.19	4.7.16
250% calibration at 25 deg. C - - -	3.15	4.7.12
Dielectric withstanding voltage - -	3.12	4.7.9.2

[1] Group I tests shall be conducted on all sample units, group II tests shall be conducted on sample units with the high fault currents of table XIV. Fused type sample units shall be tested to the requirements of groups I and III.

[2] Group I tests apply to all circuit breaker designs, secondary sample group II tests apply to circuit breaker designs with high interrupting capacity ratings (see 4.5.1.1) and group III tests apply to fused circuit breakers (see 4.5.1.2).

[3] Tests made only on breakers rated at 50 amperes or less, rated 125 or 125-250 volts or less.

[4] "0" operation conducted slightly above crossover to ensure operation of current limiters or fuses. Cotton and cheesecloth indicators shall be used when crossover current is less than short circuit current.

[5] No cheesecloth or cotton indicators used in circuit breaker area. Cotton used to cover openings in current limiter area. Test shall be conducted with one half of the current limiters in the "as received" condition and the other half shall be conditioned at (90 deg. C for 24

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hours) then subjected to (95 +/- percent relative humidity at 20-25 deg. C for 5 days). Conditioned sample shall be tested no later than 1 hour after removal from the conditioned environment.

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4.6.2.1 Group C inspection. Group C inspection shall consist of the tests specified in table VII in the order shown and shall be made on sample units selected from lots which have passed the groups A and B inspections, unless the Government considers it more practical to select a sample from current production. A manufacturer's normal quality control and production tests may be used to fulfill group C inspection. The applicability of a test listed for a particular design of circuit breaker shall be as specified in table IV.

4.6.2.1.1 Sampling plan. Samples shall be selected at random. The sample size shall be as for qualification (see 4.5.1) for each specification sheet, 12 months after the date of notification of qualification and after each subsequent 12-month period.

4.6.2.1.2 Failures. If one or more sample units fail to pass group C inspection, the sample shall be considered to have failed.

4.6.2.1.3 Disposition of sample units. Sample units which have been subjected to group C inspection shall not be delivered on the contract or order.

4.6.2.1.4 Noncompliance. If a sample fails to pass group C inspection, the supplier shall take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions with essentially the same materials, processes, etc., and which are considered subject to the same failure. Acceptance of the product shall be discontinued until corrective action, acceptable to the Government, has been taken. After the corrective action has been taken, group C inspection shall be repeated on additional sample units (all inspection, or the inspection which the original sample failed at the option of the Government). Groups A and B inspections may be reinstituted, however, final acceptance shall be withheld until group C reinspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and the corrective action taken shall be furnished to the cognizant inspection activity and the qualifying activity.

4.6.3 Inspection of preparation for delivery. Except for commercial packaging, the sampling and inspection of the preservation-packaging and interior package marking shall be in accordance with the groups A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing and marking for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification and the marking requirements of Fed. Std. No. 123 or MIL-STD-129, as applicable. The inspection of commercial packaging shall be as specified in the contract or purchase order (see 6.2).

4.7 Methods of examination and test. For the purpose of testing multi-pole circuit breakers having independent trip, the operation of each pole shall be tested as individual circuit breakers. No conditioning of the circuit breakers shall take place during or between test unless otherwise specified. The test frequency shall be 60 Hz unless otherwise specified (see 3.1).

4.7.1 Visual and mechanical examination. Circuit breakers shall be examined to verify that the material, design and construction, physical dimensions, marking, and workmanship are in accordance with applicable requirements (see 3.1, 3.4, 3.21 and 3.22).

4.7.2 Calibration (see 3.5). Circuit breakers shall be mounted in a

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vertical position without an enclosure, other than the molded case and wired per the requirements of UL489. Devices shall be stabilized (see 6.6.3) at the applicable ambient temperature (see 6.6.4), and subjected to the percent of rated current specified in table VIII for the particular design of circuit breaker under test. The 200 percent test shall be conducted separately on each pole of multi-pole circuit breakers and 125-135 percent test shall be conducted with each pole of multi-pole breakers simultaneously carrying the applicable current. Tests shall be conducted in the order shown reading the X's from left to right.

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TABLE VIII. Calibration tests sequence

Circuit breaker design	Percent of rated current and ambient temperature +/- 3 deg. C				
	200% at 25 deg. C	125% at 25 deg. C	135% at 25 deg. C	200% at 40 deg. C	125% at 40 deg. C
Fully magnetic breakers- - - -	X	X	-	-	-
Uncompensated thermal breakers calibrated at 25 C- - - - - -	X	X	-	-	-
Uncompensated thermal and fused breakers calibrated at 40 C- - - - - -	X	-	X	-	-
Compensated thermal breakers	X	-	X	X	X [1]

[1] This 125 percent test shall be conducted immediately after the breaker has carried its rated current until constant temperatures have been reached (see 4.7.6).

4.7.2.1 Adjustable magnetic trip calibration (see 3.5.1). All circuit breakers with adjustable magnetic trip units shall be tested at the maximum and minimum setting. At the maximum setting, the test current at the beginning of the test is to be 70 percent of the current setting, and is then to be increased rapidly until the circuit breaker trips by means of the magnetic trip. At the minimum setting, the test current is to be increased slowly (but not so that the thermal trip operates) from zero until the circuit breaker trips by means of the magnetic trip. Each pole is to be tested separately three times at both maximum and minimum settings, and the average of the three tests on any pole in either case is to be considered to be the tripping current of that pole.

4.7.3 Overload (see 3.6). Circuit breakers shall be mounted in the enclosure specified (see 3.1), wired and connected to a supply circuit as specified in the applicable portions of UL489. A 30 ampere non-time delay fuse shall be connected between the enclosure or mounting surface and one line to indicate are over to the enclosure or grounded dead metal. Circuit breakers shall be subjected to 600 percent of their rated current but not less than 150 amperes, for the total number of close-open operations specified in table IX. The power supply open circuit voltage shall be between 100 and 105 percent of the rated circuit breaker voltage. Upon application of power, the test circuit voltage shall remain within 15 percent of the rated voltage. Circuit breakers shall be tested with an inductive load. The power factor of the load shall be from 0.45 to 0.50 except, following the 35 cycles of manual operation, a two-pole independent trip (see 6.6.5), and single-pole independent trip) shall be tested by operating each pole separately for 15 cycles of automatic operation, and with both the line and load terminals of the other pole connected to the line wire of opposite polarity to that of the pole under test. The breaker shall be tested at a power factor of 0.75-0.80 for these automatic operations only.

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TABLE IX. Overload test operations

Frame size in amperes	Total number to open-close operations	Number of operations		Number of cycles of operation per minute
		Manually	Automatically	
0 to 100	50	35	15	6
101 to 225	50	50	-	5
226 to 600	50	50	-	4
601 to 600 [1]	50	50	-	1
1601 to 2500 [1]	25	25	-	1
2501 to 4000 [1][2]	28	28	-	1

[1] Operations may be conducted in groups of 5 with 15 minutes maximum between groups.
[2] For 3,000 ampere ratings and up. Three operations at 600 percent of rating followed by 25 operations at 200 percent of rating (may be conducted in groups of 5 with 15 minutes maximum between groups.)

4.7.4 Tungsten-filament lamp load (see 3.7). Circuit breakers rated 50 amperes and less and 120 or 120/240 volts or less shall be subjected to 100 percent of rated current and voltage it room temperature using tungsten filament lamps as a load. The current shall be measured when the filaments are hot. 200 watt lamps shall be used except for those which may be required for final current adjustment. Circuit breakers shall be operated at room temperature being closed for two seconds and then opened for two minutes allowing the lamps to cool. Each pole of a circuit breaker shall carry the rated load. The close-open cycle shall be repeated three times. The capacity of the supply circuit shall be ten times the rated circuit breaker current and within 2-1/2 percent of the rated voltage.

4.7.5 100 percent calibration at 40 deg. +/- 3 deg. C (see 3.8). Circuit breakers shall be mounted on a vertical surface, with leads attached, in a 40 deg. C ambient temperature. The ambient temperature is to be measured by means of thermocouples located 6 inches from the sides of the circuit breaker and adjacent to the center of the circuit breaker. 100 percent of the rated current shall be passed through each pole of the circuit breaker simultaneously until the temperature at the terminals stabilizes.

4.7.6 Temperature and 100 percent calibration at 25 deg. +/- 3 deg. C (see 3.9). Circuit breakers shall be mounted in a vertical position without an enclosure other than the molded case. They shall be wired and thermal couples placed on the terminals at a point to which the insulation is brought up as in actual service and at points of anticipated highest temperatures for each material used in the circuit breaker as specified in the applicable portions of UL489. Circuit breakers shall be stabilized in an ambient temperature of 25 deg. +/- 3 deg. C. All poles shall be continuously subjected to 100 percent of rated current at any convenient voltage until all temperatures have restabilized. The temperature rise of each measurement shall be recorded. In addition the limiter, terminals, and casings temperature of fused circuit breakers shall be measured and recorded.

4.7.7 Endurance (see 3.10). Circuit breakers shall be mounted and wired as specified in the applicable portions of UL489 in the enclosure specified (see 3.1). A fuse shall be connected as specified in 4.7.3. Circuit breakers shall be operate in such a manner that all poles make and break a current equal to their rated current at rated voltage and frequency and with a lagging power factor of 0.75 to 0.80 for operations requiring current.

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During this operation the circuit breaker is to be closed then opened immediately. The number and rate of load and no-load operations shall be as specified in table X. Two-pole independent trip circuity breakers shall be tested with both poles operating simultaneously. Following the endurance test, the calibration test specified in 4.7.2 shall be repeated, however, note 1 of table VIII does not apply for this test and the 200 percent test at 40 deg. C applicable to compensated circuit breakers need not be conducted.

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TABLE X. Endurance test operations

Frame size in amperes	Number of cycles of operation per minute [1]	Number of cycles of operation [2]		
		With current	Without current	Total
50	6	6,000	4,000	10,000
100	6	6,000	4,000	10,000
125	5	4,000 [3]	4,000	8,000 [3]
150	5	4,000 [3]	4,000	8,000 [3]
200	5	4,000	4,000	8,000
225	5	4,000	4,000	8,000
400	4	1,000	5,000	6,000
600	4	1,000	5,000	6,000
800	1	500	3,000	3,500
1,200	1	500	2,000	2,500
1,600	1	500	2,000	2,500
2,000	1	500	2,000	2,500
2,500	1	500	2,000	2,500
3,000	1 [4]	400	1,100	1,500
4,000	1 [4]	400	1,100	1,500

[1] Rate of operation may be increased to a maximum of 20 per minute.

[2] For circuit breakers rated more than 800 amperes the endurance test may, at the option of the manufacturer, be conducted in groups of 100 load operations. No-load operations may be conducted between groups of load operations.

[3] Where tests are required on samples having ratings of 100 amperes or less, the number of operations shall be the same as for the 100 ampere frame.

[4] Rate of operation: 1 cycle per minute for first 10 operations; thereafter in groups of 5 (at 1 cycle per minute) with an interval between groups that is agreeable to all concerned.

4.7.8 Short circuit (see 3.11). The power source, loading, instrumentation, calibration, wiring and preparation for test shall be in accordance with the applicable portions of UL489. Circuit breakers shall be tested in the enclosure specified (see 3.1). Circuit breakers shall be mounted as in actual service with the door or cover and any other openings, including unused knockout openings, closed. The knockout openings shall be closed on the outside of the enclosure by means of tape. Three thicknesses of cloth [1] are to be taped to the inside sidewalls of the enclosure so as to cover the entire sidewall within 1/2 inch of front and rear vertical edges. A cotton pad [2] at least 1/2 inch thick, and having a length and width four times the handle opening but not less than 3 inches in either dimension is to be centered and secured not more than 1/2 inch from the end of the circuit breaker handle. A small opening is permitted in a cotton pad to pass the plunger to operate a push-type circuit breaker. The circuit breaker shall be tested with alternating current at rated frequency. The power factor of the test circuit with required current of the test circuit

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[1] The cloth employed is to be bleached cheesecloth, 36 inches wide,

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running 14 to 15 yards per pound, and having what is known to the trade as a "count of 32 by 28". In placing the cloth in position for the short-circuit test, the material is to be folded in such a manner that cut or torn edges will not be exposed directly to the arc or flash resulting from the opening of the circuit breaker.

[2] The cotton is to be surgical cotton such as is commonly used for medical purposes.

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with required current flowing shall be as tabulated in table XI, except that a lower power factor may be employed. The capacity of the circuit together with the total limiting impedance shall be such as to permit the applicable current specified in table XII. The open-circuit voltage shall be not less than 100 percent nor more than 105 percent of the rated voltage of the circuit breaker. The minimum point on the voltage wave is not to be less than 90 percent of the rated voltage of the circuit breaker. A fuse shall be connected as specified in 4.7.3 for operations conducted on the individual poles. For common operations the fuse shall be connected to the side of the supply least likely to arc to grounded metal.

Circuit breakers shall be subjected to the number and type of short circuit operations indicated in table XIII. Successive operations shall be conducted by alternating between the "O" and "CO" operations (see 6.6.2). The time interval between the short-circuit operations of a circuit breaker shall be two minutes, except that the time interval may be extended to whatever is necessary to allow the circuit breaker to be reset, but not more than 1 hour. Each circuit breaker is to be subjected to all the operations of the short-circuit test with one set of line and load leads, i.e, without replacement of any lead during the test.

Following the short circuit test, circuit breakers shall be closed, subjected to 100 percent of the rated voltage and checked for continuity, then the 200 percent rated current test at 25 deg. C shall be conducted as specified in 4.7.2.

TABLE XI. Power factor of test circuits

Test circuit in amperes	Power factor
10,000 or less	0.45-0.50
10,001-20,000	0.25-0.30
Over 20,000	0.15-0.20

TABLE XI. Available current in test circuits

Frame rating	RMS symmetrical				
	1 Pole	2 Pole		3 Pole	
		Individual	Common	Individual	Common
100A maximum 250V maximum	5,000	5,000	5,000	4,330 [1]	5,000
100A maximum 251-600V	10,000	10,000	10,000	8,660 [1][2]	10,000
101-800A any voltage	10,000	10,000	10,000	8,660 [1][2]	10,000
801-1,200 any voltage	---	14,000	14,000	12,120 [1][2]	14,000
1,201-1,600	---	14,000	20,000	14,000	20,000
1,601-2,000	---	14,000	25,000	14,000	25,000
2,001-2,500	---	20,000	30,000	20,000	30,000
2,501-3,000	---	25,000	30,000	25,000	35,000
3,001-4,000	---	30,000	45,000	30,000	45,000

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[1] This value is the current available when using two legs of the 3-phase circuit indicated under "Common".

[2] For the 277/480 volt rating the current indicated for 2-pole under "Individual" shall be used.

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TABLE XIII. Short-circuit operations

Poles	Frame rating	Circuit breaker-AC voltage rating	Operations on each pole			Common operations			Total number of operations
			O	CO	O(see 6.6.2)	O	CO	O	
1	All	120, 240, 277, 480, or 600	X	X	X	-	-	-	3
1	All	120/240 (tested in pairs)	-	-	-	X	X	X	3
2	All	240, 480, or 600	X	X	-	X	-	-	5
2	All	120/240	-	-	-	X	X	X	3
2	0-1200A	277/480	X	X	-	X	-	-	5
2	All	10/30	X	X	-	X	-	-	5
3	0-1200A	240, 480, or 600	X	X	-	X	-	-	7
3	1201-Up	240, 480, or 600	X	X	-	X	X	-	8
3	All	120/240	-	-	-	X	X	X	3
3	0-1200A	277/480	X	X	-	X	-	-	7
3	1201-Up	277/480	X	X	-	X	X	-	8

4.7.9 Dielectric withstanding voltage.

4.7.9.1 Method I (see 3.12). Circuit breakers shall be tested in accordance with Method 301, MIL-STD-202. The following details shall apply:

(a) Magnitude of test voltage - 1,000 volts (rms) plus twice the voltage which may be applied between the parts specified below when the circuit breaker is connected to a circuit of its maximum voltage rating.
(b) Nature of potential - AC 60 Hz.
(c) Points of application of test voltage:
  (1) Between line and load terminals with the breaker open - With the breaker in the "tripped" or the "off" positions.
  (2) Between terminals of opposite polarity with the breaker closed.
  (3) Between live parts and the overall enclosure with the breaker both open and closed.
(d) Measurement during test - Leakage current.
(e) Examination after test - Circuit breakers shall be examined for evidence of flashover, mechanical damage, arcing and breakdown.

4.7.9.2 Method II (see 3.12). Circuit breakers shall be tested as specified in 4.7.9.1, except the magnitude of the test voltage shall be two times the rated voltage of the circuit breaker but not less than 900 volts.

4.7.10 200 percent calibration at 25 deg. +/- 3 deg. C (see 3.13). Circuit breakers shall be subjected to the 200 percent calibration test at 25 deg. +/- 3 deg. C as specified in 4.7.2.

4.7.11 Short-circuit interruption (see 3.14). The power source, loading, instrumentation, calibration, wiring and preparation for test shall be in accordance with the applicable portions of UL489. Circuit breakers shall be tested in the enclosure specified (see 3.1). Openings may be provided in the enclosure if the combined area of all openings does not exceed 10 percent of the total external enclosure area and if no opening is

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directly opposite a vent in the circuit breaker case. The test enclosure shall be connected through a fuse as indicated in 4.7.3 to the line lead least likely to arc to the enclosure, or the neutral, if the circuit breakers are rated 120/240 or 277/480 volts ac. The connection is to be made to the load side of the limiting impedance by means of No. 10 AWG copper wire no more than 6 feet in length. The capacity of the supply circuit together with the total limiting impedance of the circuit shall be such such as to permit the applicable current indicated in table XIV. The open circuit voltage shall be not less than 100 percent nor more than 105 percent of the rated voltage of the circuit breaker under test, and the power factor of the test circuit with the required current flowing shall be in accordance with table XI. The

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operation shall consist of closing the short-circuit on the circuit breaker by means of a suitable switching device, using random closing. After a 2-minute interval, or the time necessary to allow the circuit breaker to reset, but not more than 1 hour, the circuit breaker is to be closed on the short circuit. Circuit breakers tested under "bus bar conditions" require only one operation, that being closing of the test circuit on the circuit breaker. Following the test, circuit breakers shall be checked for damage to the circuit breaker case, ejection of wire from the wire connector or burn off of leads, failure of a pole to trip, burned out shunts, bimetals or heaters, mechanical failures which do not permit relatching or reclosing of the circuit breaker and other similar failures.

TABLE XIV. Current-interrupting rating - RMS symmetrical amperes applicable to circuit breakers rated for high available fault current circuits

7,500 [1]	25,000	65,000
10,000 [1]	30,000	85,000
14,000	35,000	100,000
18,000	42,000	125,000
22,000	50,000	150,000
		200,000

[1] Applicable only to circuit breakers having current ratings of 100 amperes or less (frame size) and voltage ratings of 250 volts or less.

4.7.12 250 percent calibration at 25 deg. +/- 3 deg. C (see 3.15). Each pole of the circuit breaker shall be subjected to the first test specified in 4.7.2, except the test current shall be 250 percent of rated current. Following the test, circuit breakers shall be subjected to the dielectric withstanding voltage test specified in 4.7.9.2.

4.7.13 Crossover (current limiters or fuses) (see 3.16). Circuit breakers shall be prepared for test in accordance with 4.7.11, (except cotton and cloth indicators shall be used (see tables IV and VII) and subjected to an "O" operation at a current level slightly above the crossover point. Following the test, limiters or fuses shall be visually examined, cotton and cheesecloth shall be examined for evidence of burning and the circuit breaker enclosure shall be examined for evidence of damage.

4.7.14 Crossover (dummy fuses) (see 3.17). With dummy fuses installed, the circuit breaker shall be prepared for test in accordance with 4.7.11. Circuit breakers hall be subjected to one "O" and one "CO" operation at a current equal to the crossover value. Following the test, circuit breakers shall be checked for damage to the circuit breaker case, ejection of wire from the wire connector or burn off of leads, failure of a pole to trip, burned out shunts, bimetals or heaters, mechanical failures which do not permit relatching or reclosing of the circuit breaker or other similar failures.

4.7.15 Maximum interrupting capacity (see 3.18). Circuit breakers shall be prepared for test in accordance with 4.7.11, except cotton shall be placed directly over openings in the current limiter area and the power factor of the test circuit shall be not higher than .20. Test shall be conducted on one half of the current limiters in the "as received" condition and the other half shall be conditioned at 90 deg. C for 24 hours then subjected to 95 +/- 5 percent relative humidity at 20-25 deg. C for 5 days. Conditioned samples

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shall be tested no later than 1 hour after removal from the conditioned environment. One "O" operation (or as specified, see 4.7.15 (a) and (b)) and one "CO" operation shall be performed in a circuit of rated interrupting capacity.

(a) During the "O" operation a full current off-set condition is to be present in one phase upon closing the test circuit. It is the intent to initiate limiter or fuse arcing within 30 electrical degrees prior to maximum voltage in that phase. If such arcing initiates prior to maximum voltage, a repeat test is to be made in which closing is delayed in order to obtain the desired condition.

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(b) If the closing angle in item (a) is zero degrees and if arcing, within the limiter or fuse, commenced after 90 degrees on the voltage wave, the sample is to be subjected to a test in which closing occurs at maximum voltage (no current off-set). Individual poles may be used for such testing in order to avoid destroying current limiters or fuses unnecessarily.

Then an "O" operation is to be made where closure is at a point on the voltage wave 45 degrees after a voltage zero.

Following the test, the circuit breaker case and leads and the limiters or fuses shall be examined.

4.7.16 Maximum energy (applicable only if tests in 4.7.15(b) were not required) (see 3.19). Current limiters shall be installed in a circuit breaker and prepared for test as specified in 4.7.11. One half of the current limiters shall be in the "as received" condition and the other half shall be conditioned at 90 deg. C for 24 hours then subjected to 95 +/- 5 percent relative humidity at 20-25 deg. C for 5 days. Conditioned samples shall be tested no later than 1 hour after removal from the conditioned environment. The limiter shall be subjected to a value of symmetrical, rms current such that the current limiter permits a peak current of 70-100 percent of the peak symmetrical component of the alternating current of the test circuit. The closing angle is to be at voltage zero of the phase where the current is to be considered. These tests may be conducted on a three phase circuit with one phase meeting these conditions. The power factor shall be 0.20 maximum. Following the test, limiters and circuit breakers shall be examined.

4.7.17 250 percent calibration at 25 deg. +/- 3 deg. C (see 3.20). Circuit breakers shall be subjected to the calibration test specified in 4.7.2 at a temperature of 25 deg. +/- 3 deg. C and 250 percent of the rated current. Following the test, circuit breakers shall be subjected to the dielectric withstanding voltage test specified in 4.7.9.2.

5. PREPARATION FOR DELIVERY

5.1 Preservation-packaging. Preservation-packaging shall be level A or C, or as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Cleaning. Circuit breakers shall be cleaned in accordance with MIL-P-116; process C-1.

5.1.1.2 Drying. Circuit breakers shall be dried in accordance with MIL-P-116.

5.1.1.3 Preservative application. Preservatives shall not be used.

5.1.1.4 Unit packaging. Circuit breakers shall be individually unit packaged in accordance with the submethods of MIL-P-116 specified herein insuring compliance with the applicable requirements of that specification.

5.1.1.4.1 Circuit breakers not exceeding 3 pounds. Unless otherwise specified, these circuit breakers shall be unit packaged in accordance with submethod IA-8. Each packaged circuit breaker shall be placed within a supplementary container conforming to PPP-B-566 or PPP-B-676.

5.1.1.4.2 Circuit breakers, 3 through 10 pounds. These circuit breakers

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shall be unit packaged in accordance with submethod IIc. Each packaged circuit breaker shall be placed within a supplementary container conforming to PPP-B-636. However, supplementary containers conforming to PPP-B-566 or PPP-B-676 may be used for circuit breakers not exceeding 6 pounds.

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5.1.1.4.3 Circuit breakers, over 10 through 70 pounds. These circuit breakers shall be unit packaged in accordance with submethod IIb. The unit container shall conform to PPP-B-636, class weather-resistant. When specified (see 6.2), fiberboard containers shall conform to Grade V3c.

5.1.1.4.4 Circuit breakers, over 70 pounds. These circuit breakers shall be unit packaged in accordance with submethod IIb. The unit container shall conform to PPP-B-636, class weather-resistant or PPP-B-640, class 2. When specified (see 6.2), the fiberboard box conforming to PPP-B-636, shall be Grade V3c.

5.1.1.5 Intermediate packaging. Not required.

5.1.2 Level C. Circuit breakers shall be clean, dry and packaged in a manner that will afford adequate protection against corrosion, deterioration and physical damage during shipment from supply source to the first receiving activity. This level may conform to the supplier's commercial practice when such meets the requirements of this level.

5.2 Packing. Packing shall be level A, B, or C, or as specified (see 6.2). Packing may be omitted for unit containers over 10 pounds conforming to PPP-B-636 or PPP-B-640 provided the requirements for closure, waterproofing and banding, commensurate with the level of packing specified, are met.

5.2.1 Level A. The packaged circuit breakers shall be packed in fiberboard containers conforming to PPP-B-636, class weather-resistant, style optional, special requirements. When specified (see 6.2), packaging shall be in accordance with 5.4.2.2 and 5.4.2.3. In lieu of the closure and waterproofing requirement in the appendix of PPP-B-636, closure and waterproofing shall be accomplished by sealing all seams, corners and manufacturer's joint with tape, 2 inches minimum width, conforming to PPP-T-60, class 1 of PPP-T-76. Banding (reinforcement requirements) shall be applied in accordance with the appendix to PPP-B-636 using nonmetallic or tape banding only.

5.2.2 Level B. The packaged circuit breakers shall be packed in fiberboard containers conforming to PPP-B-636, class domestic, style optional, special requirements. When specified (see 6.2), the fiberboard boxes shall conform to PPP-B-636, class weather-resistant. Closures shall be in accordance with the appendix thereto.

5.2.3 Level C. The packaged circuit breakers shall be packaged in shipping containers in a manner that will afford adequate protection against damage during direct shipment from the supply source to the first receiving activity. These packs shall conform to the applicable carrier freight classification rules and regulations and may be the supplier's commercial practice when such meets the requirements of this level.

5.2.4 Unitized loads. Unitized loads, commensurate with the level of packing specified in the contract or order, shall be used whenever total quantities for shipment to one destination equal 40 cubic feet or more. Quantities less than 40 cubic feet need not unitized. Unitized loads shall be uniform in size and quantities to the greatest extent practicable.

5.2.4.1 Level A. Circuit breakers, packed as specified in 5.2.1, shall be unitized on pallets in conformance with MIL-STD-147, load type I, with a fiberboard cap (storage aid 4) positioned over the load.

5.2.4.2 Level B. Circuit breakers, packed as specified in 5.2.2, shall

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be unitized as specified in 5.2.4.1, except that the fiberboard caps shall be class domestic.

5.2.4.3 Level C. Circuit breakers, packed as specified in 5.2.3, shall be unitized with pallets and caps of the type, size and kind commonly used for the purpose and shall conform to the applicable carrier rules and regulations.

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5.3 Marking. In addition to any special marking required by the contract or purchase order (see 6.2), each unit package, supplementary and exterior container and unitized load shall be marked as specified in 5.3.1 and 5.3.2. The identification marking of the unit package shall also include the Government and supplier's part number.

5.3.1 Civil agency procurements. For civil agency procurements marking shall be in accordance with Fed. Std. No. 123.

5.3.2 Military procurements. For military procurements marking shall be in accordance with MIL-STD-129.

5.4 General.

5.4.1 Exterior containers. Exterior containers (see 5.2.1, 5.2.2 and 5.2.3) shall be of a minimum tare and cube consistent with the protection required and shall contain equal quantities of identical stock numbered items to the greatest extent practicable.

5.4.2 Army procurements.

5.4.2.1 Level A (maximum military protection) unit packaging. MIL-P-116 submethod IC-1 shall be used in lieu of submethod IA-8. All supplementary containers shall either be weather (or water) resistant or overwrapped with waterproof barrier materials. Containers conforming to PPP-B-566 or PPP-B-676 shall be overwrapped with waterproof barrier materials or shall conform to MIL-B-43014 (see 5.1.1.4.1 and 5.1.1.4.2).

5.4.2.2 Level A (maximum military protection) and level B (minimum military protection) packaging. For level A packing, when quantities per destination are less than a unitized load, the fiberboard containers shall not be handed but shall be placed in a close fitting box conforming to PPP-B-601, overseas type PPP-B-621, class 2, style 4 or PPP-B-585, class 3 style 2 or 3. Closure and strapping shall be in accordance with applicable container specification except that metal strapping shall conform to QQ-S-781, type I, finish A. When the gross weight exceeds 200 pounds or the container length and width is 48 x 24 inches or more and the weight exceeds 100 pounds, 3 x 4 inch skids (laid flat) shall be applied in accordance with the requirements of the container specification. If not described in the container specification, the skids shall be applied in a manner which will adequately support the item and facilitate the use of material handling equipment. For level 8 packing, fiberboard boxes shall be weather resistant as specified in level A and the containers shall be banded (see 5.2.1 and 5.2.2).

5.4.2.3 Level A and B unitization. For level A and B unitization, the fiberboard caps shall be weather resistant and softwood pallets conforming to NN-P-71, type IV, size 2 shall be used. The loads shall be bonded to the pallets by strapping conforming to QQ-S-781, type I, finish A or shrink film (see 5.2.4.1 and 5.2.4.2).

5.4.2.4 Commercial unit packaging and packing and marking. Commercial unit packaging and packing and marking shall conform to the requirements of Federal Standard 356.

5.4.2.5 Commercial marking. All unit, supplementary and exterior containers shall, as a minimum, be marked with the following: Noun nomenclature, National stock number (or part number when the NSN is not given), Government contract or purchase order number, quantity, contractor's name and any additional marking which may be required by the contract or the

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contractor's policy or procedures. Exterior containers shall also be marked with the appropriate address. All markings shall be applied by any means providing legibility.

6. NOTES

6.1 Intended use.

6.1.1 Thermal magnetic circuit breakers.

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6.1.1.1 Thermal magnetic uncompensated circuit breakers. Thermal magnet circuit breakers are especially well suited for overload protection of conductors when circuit breakers are exposed to similar ambient temperatures because the circuit breaker continuous current rating changes in about the same ratio as the average conductor rating changes with the ambient temperatures. The magnetic trip portion of the circuit breaker offers short circuit protection.

6.1.1.2 Thermal magnetic compensating breakers. Ambient compensating circuit breakers provide overload and short circuit protection but has temperature compensating elements which counteract the effect of ambient temperature changes thereby maintaining the calibrated current setting throughout a temperature range. Typical applications are a circuit breaker located outside and protecting wire in a temperature controlled building; circuit breaker is exposed to changing temperature conditions and is protecting underground cable; overload protection of conductors are not of prime importance or protection of a portable generator designed to operate through out varied temperature extremes.

6.1.2 Magnetic circuit breakers. Magnetic circuit breakers are available in the same operating characteristics as ambient compensating. The intended use is the same as 6.1.1.1 and 6.1.1.2.

6.1.3 Fused circuit breakers. Fused circuit breakers incorporate fuses or current limiters in series with the circuit breaker elements to increase the interrupting capacity of a circuit breaker.

6.2. Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification.
(b) Title, number, and date of the applicable specification sheet with the government circuit breaker part number (see 3.1).
(c) Inspection of commercial packaging (see 4.6.3).
(d) Levels of preservation-packaging and packing required (see 5.1, 5.2 and 5.4.2.4).
(e) Method of preservation, if other than submethod IA-8 (see 5.1.1.4.1 and 5.4.2.1).
(f) Special marking, is required (see 5.3).
(g) If fiberboard containers hall conform to grade V3c (see 5.1.1.4.3 and 5.1.1.4.4).
(h) If packaging shall be in accordance with 5.4.2.2 and 5.4.2.3 (see 5.2.1).
(i) If fiberboard containers shall conform to class weather resistant (see 5.2.2).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable qualified products list whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer the Federal Government tested for qualification, in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the qualified products list is the Defense Electronics Supply Center, ATTN: DESC-E, Dayton, OH 45444 and information pertaining to qualification of products may be obtained from that activity.

6.3.1 Copies of "Provisions Governing Qualification" may be obtained upon application to Commanding Officer, Naval Publications and Forms Center,

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5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

6.4 Background. Previous designations of class, current rating, numbers of poles interrupting capacity and voltage rating did not insure interchangeability of devices procured under a single NSN. A major part numbering change was devised in W-F-791E and has been utilized in this specification. Table XV expands on table I of W-C-375 and provides a list of circuit breaker ratings covered by this specification but is not necessarily limited to the values specified. It is the intent that the class numbers assigned in the table be used to specify the interrupting rating requirements in contracts, etc., but should not be assigned a federal stock number.

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6.5 Warning. Potentially hazardous situations are inherent in some of the test procedures specified in this specification. Precautions should therefore be taken to insure that test personnel are adequately protected and observe the necessary safety measures at all times.

6.6 Definitions.

6.6.1 Tripping time. Tripping time is the total interval of elapsed time from the instant of applying a given overcurrent to the circuit breaker to the completion of the interruption of the circuit.

6.6.2 "O" and "CO" operation. The "O" and "CO" operations are defined as "O" closing the short circuit on the closed circuit breaker and "CO" closing the circuit breaker on the short circuit.

6.6.3 Stabilize. The temperature of a device is considered to be stable when three successive temperature readings taken at not less than 10 minute nor more than 20 minute intervals indicate no temperature change.

6.6.4 Ambient temperature. Ambient temperature is considered to be the temperature of the air surrounding the device under test. Measurements shall be taken by thermocouples or thermometers placed not more than 12 inches from and in a plane horizontal to the center of the device under test.

6.6.5 Independent trip. A multi-pole circuit breaker so designed that one pole trips independently of the other.

TABLE XV. Classification of ratings.

Class	Interrupting rating		Poles	Range of current trip [4]
	Symmetrical amperes [1]	Volts ac 60 Hz		
10a [2]	5,000	120/240	1 or 2	15-100
10b	5,000	240	2 or 3	15-100
11a	7,500	120	1	15-100
11b	7,500	240	2 or 3	15-100
12a [2]	10,000	120/240	1 or 2	15-100
12b	10,000	240	2 or 3	15-225
12c	10,000	277	1	15-100
13a	14,000	277	1	15-100
13b	14,000	277/480	1, 2, or 3	15-100
14a [2]	22,000	120/240	1 or 2	15-100
14b	22,000	240	2 or 3	70-400
15a [2]	65,000	120/240	1 or 2	15-100
15b	65,000	240	2 or 3	15-225
16a [3]	100,000	480	2 or 3	15-225
16b [3]	100,000	480	2 or 3	15-600
17a [3]	200,000	600	2 or 3	70-2000
18a	18,000	240	2 or 3	15-100
	14,000	480		
	14,000	600		
19a	22,000	240	2 or 3	70-225
	18,000	480		
	14,000	600		
20a	25,000	240	2 or 3	70-225
	22,000	480		
	22,000	600		

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21a	42,000	240	2 or 3	70-800
	30,000	480		
	22,000	600		

See footnotes at end of table.

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TABLE XV. Classification of ratings - Continued

Class	Interrupting rating		Poles	Range of current trip [4]
	Symmetrical amperes [1]	Volts ac 60 Hz		
22a	65,000	240	2 or 3	15-100
	25,000	480		
	18,000	600		
23a	65,000	240	2 or 3	70-1200
	35,000	480		
	25,000	600		
24a	65,000	240	2 or 3	600-2000
	50,000	480		
	42,000	600		
25a	125,000	240	2 or 3	600-4000
	80,000	480		
	65,000	600		
26a [3]	200,000	240	2 or 3	15-800
	200,000	480		
	200,000	600		

[1] Interrupting ratings are not limited to the values or groups of values listed, however, the values listed are minimum values for the class specified.
[2] Single-unit or duplex construction must be specified.
[3] This class may incorporate a current limiting device within the breaker case.
[4] Use minimum frame size for ampere rating.

6.7 Intermetallic contact. This finishing of metallic areas to be placed in intimate contact by assemble presents a special problem, since intermetallic contact of dissimilar metals results in electrolytic couples which promote corrosion through galvanic action. To provide the required corrosion protection, intermetallic couples are restricted to those permitted by table XVI. Table XVI shows metals and alloys (or plates) by groups which have common electromotive forces (EMF) within 0.05 volt when coupled with a saturated calomel electrode in sea-water at room ambient temperatures. All members of a group are considered as completely compatible, one with the other. Compatible couples between groups have been specified in table XVI based on a potential difference of 0.25 volt maximum. To simplify any arithmetic involved, table XVI shows, in addition to EMF against a calomel electrode, a derived "anodic index" with group 1 (gold, etc.) as 0 and group 18 (magnesium, etc.) as 175. Subtraction of a lower group anodic index gives the EMF difference in hundredths of a volt.

6.7.1 Groups. Table XVI sets up 18 primary groups. It may be noted that neither the metallurgical similarity or dissimilarity of metals is the parameter for selection of compatible couples. All members within a group, regardless of metallurgical similarity, are considered inherently nonsusceptible to galvanic action when coupled with any member within the group; for example, such dissimilar metals as platinum and gold. Similarly, such basically dissimilar alloys as austenitic stainless steel, silver-solder, and low brass (all members of group 5) are inherently nonsusceptible when coupled together.

6.7.2 Compatibility graphs. Permissible couple series are shown in

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table XVI by the graphs at the right. Members of groups connected by lines will form permissible couples. A O indicates the most cathode member of each series, a O an anodic member, and the arrow indicates the anodic direction.

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TABLE XVI. Compatible couples (see 6.7) 1/

Group No.	Metallurgical category	EMF (volt)	Anodic index (0.01 v)	Compatible couples
1	Gold, solid and plated; gold-platinum alloys; wrought platinum (most cathodic)	+ 0.15	0	
2	Rhodium plated on silver-plated copper	+ 0.05	10	
3	Silver, solid or plated; high silver alloys	0	15	
4	Nickel, solid or plated; monel metal, high nickel-copper alloys	- 0.15	30	
5	Copper, solid or plated; low brasses or bronzes; silver solder; German silver; high copper-nickel alloys; nickel-chromium alloys; austenitic corrosion-resistant steels	- 0.20	35	
6	Commercial yellow brasses and bronzes	- 0.25	40	
7	High brasses and bronzes; naval brass; Muntz metal	- 0.30	45	
8	18 percent chromium type corrosion-resistant steels	- 0.35	50	
9	Chromium, plated; tin, plated; 12 percent chromium type corrosion-resistant steels	- 0.45	60	
10	Tin-plate; terneplate; tin-lead solder	- 0.50	65	
11	Lead, solid or plated; high lead alloys	- 0.55	70	
12	Aluminum, wrought alloys of the duralumin type	- 0.60	75	
13	Iron, wrought, gray, or malleable; plain carbon and low alloy steels, armco iron	- 0.70	85	
14	Aluminum, wrought alloys other than duralumin type; aluminum, case alloys of the silicon type	- 0.75	90	
15	Aluminum, cast alloys other than silicon type; cadmium, plated and chromated	- 0.80	95	
16	Hot-dip-zinc plate; galvanized steel	- 1.05	120	
17	Zinc, wrought; zinc-base die-casting alloys; zinc, plated	- 1.10	125	
18	Magnesium and magnesium-base alloys, cast or wrought (most anodic)	- 1.60	175	

1/ Compatible couples - potential difference of 0.25 volt maximum between groups.

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6.7.3 Selection of compatible couples. Proper selection of metals in the design of equipment will result in fewer intermetallic contact problems. for example, for sheltered exposure, neither silver nor tin requires protective finishes. However, since silver has an anodic index of 15 and tin 65, the EMF generated as a couple is 0.50 volt, which is not allowable by table XVI. In this case, other metals or plates will be required. It should be noted that, in intermetallic couples, the member with the higher anodic index is anodic to the member with the lower anodic index and will be susceptible to corrosion in the presence of an electrolytic medium. If the surface area of the cathodic part is significantly greater than that of the anodic part, the corrosive attack on the contact area of the anodic part may be greatly intensified. Material selection for intermetallic contact parts, therefore, should establish the smaller part as the cathodic member of the couple, whenever practicable.

6.7.4 Plating. When base metals intended for intermetallic contact form couples not allowed by table XVI, they are to be plated with those metals which will reduce the potential difference to that allowed by table XVI.

6.7.5 The following specification sheets forms a part of W-C-375B/GEN. (see 3.1).

W-C-375/1 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Single Pole (10 thru 70 Amperes).
W-C-375/2 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Two Pole (15 thru 70 Amperes).
W-C-375/3 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Three Pole (15 thru 60 Amperes).
W-C-375/4 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Three Pole (70 thru 100 Amperes).
W-C-375/5 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type II, Series Trip, Single Pole (15 thru 50 Amperes).
W-C-375/6 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type II, Series Trip, Two Pole (15 thru 70 Amperes).
W-C-375/7 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type II, Series Trip, Three Pole (15 thru 70 Amperes).
W-C-375/8 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type II, Series Trip, Two Pole (90 thru 100 Amperes).
W-C-375/9 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type II, Series Trip, Three Pole (90 thru 100 Amperes).
W-C-375/10 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Single Pole (10 thru 100 Amperes).
W-C-375/11 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Two Pole (10 thru 100 Amperes).
W-C-375/12 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Three Pole (10 thru 100 Amperes).
W-C-375/13 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Single Pole (15 thru 50 Amperes).
W-C-375/14 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Two Pole (15 thru 125 Amperes).
W-C-375/15 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Three Pole (15 thru 100 amperes).
W-C-375/16 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Single Pole (10 thru 100 Amperes).
W-C-375/17 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Two Pole (10 thru 100 Amperes).
W-C-375/18 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type I, Series Trip, Three Pole (10 thru 100 Amperes).
W-C-375/19 - Circuit Breakers, Molded Case, Branch Circuit and Service, Type III, Series Trip, Single Pole (10 thru 100 Amperes).

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WC-375B/GEN

MILITARY CUSTODIANS:

Navy - YD
Air Force - 85

Review activities:

Air Force - 80
DSA - ES

User activities:

Navy - OS, MC

Civil Agency Coordinating Activities:

DC GOVT - DCG
GSA - FSS, PCD, PBO
DOT - ACO
HEW - FEC
HUD - TCS
Interior - BPA
Justice - FPI
Postal - POS
VA - DMS

Preparing activity:

DSA - ES

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NOTICE
OF VALIDATION

W-C-375B/GEN
NOTICE 1
November 19, 1986

FEDERAL SPECIFICATION SHEET

CIRCUIT BREAKERS, MOLDED CASE, BRANCH CIRCUIT AND SERVICE

W-C-375B/GEN, dated July 22, 1975 has been reviewed and determined to be current.

Custodians:
Navy-YD
Air Force-85

Civil Agency Coordinating Activities:
DC GOVT-DCG
GSA-FSS, PCD, PBO
DOT-ACO
HHS-FEC
HUD-HEP
Interior-BPA
Justice-FPI
Postal-POS
VA-OSS

Review Activities:
Air Force-99
DLA-ES

Preparing Activity:
DLA-ES

User Activities:
Navy-OS, MC

AMSC N/A

FSC 5925

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