MIL-C-27715(USAF)
22 May 1962

MILITARY SPECIFICATION

CIRCUIT BREAKER, TRIP-FREE, HIGH TEMPERATURE, AIRCRAFT

GENERAL SPECIFICATION FOR

1. SCOPE

1.1 This specification covers the general requirements of push-pull type single pole, trip-free circuit breakers for use in protecting circuits with a rating of 115/200 volts at 400 cycles per second alternating current and 28 volts direct current, in ambient temperatures to 121.1°C (250°F).

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on the date of invitation for bids, form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

PPP-B-566	Boxes, Folding Paperboard
PPP-B-636	Box, Fiberboard
PPP-B-676	Boxes, Set-up, Paperboard
PPP-T-60	Tape, Pressure Sensitive Adhesive, Waterproof - For Packaging and Sealing

Military

JAN-P-100	Packaging and Packing For Overseas Shipment General Specification
MIL-P-116	Preservation, Methods Of
MIL-P-997	Plastic Material; Laminated, Thermo-setting, Electrical Insulating; Sheets Glass Cloth, Silicone Resin
MIL-W-5086	Wire, Electrical, 600-Volt, Copper, Aircraft
MIL-N-25027	Nut, Self-Locking, 250°F, 500°F, and 800°F.

FSC 5925

MIL-E-5272	Environmental Testing; Aeronautical and Associated Equipment, General Specification For
MIL-S-7742	Screw Threads; Standard, Aeronautical
MIL-T-9107	Test Reports, Preparation Of
MIL-C-9435	Chamber, Explosion-Proof Testing
MIL-P-15037	Plastic Material; Laminated Thermo-setting, Sheets, Glass Cloth, Melamine-Resin
MIL-M-19833	Molding Plastic and Molded Plastic Parts, Glass Fiber Filled, Diallyl Phthalate Resin
MIL-D-70327	Drawings, Engineering and Associated Lists

STANDARDS

Federal

FED STD 595	Colors

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of U. S. Military Property
MIL-STD-143	Specifications and Standards, Order of Precedence for the Selection Of
MIL-STD-704	Electric Power, Aircraft, Characteristics and Utilization Of
MS20659	Terminal, Lug, Crimp Style, Copper Uninsulated
MS25036	Terminal, Lug, Crimp Style, Copper Insulated

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

3. REQUIREMENTS

3.1 Qualification. The circuit breakers furnished under this specification shall be a product which has been tested, and passed the qualification tests specified herein, and has been listed on, or approved for listing on the applicable qualified products list.

3.2 Selection of specifications and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected according to MIL-STD-143 except as specified in 3.2.1 and 3.2.2.

3.2.1 Commercial parts. Commercial parts having suitable properties may be used where, on the date of invitation for bids, there are no suitable standard parts. In any case, commercial utility parts such as screws, bolts, nuts, and cotter pins having suitable properties may be used provided:

a. They can be replaced by the standard parts (MS and AN) without alteration.

b. The corresponding standard part numbers are referenced in the parts list and on the contractor's drawings.

3.2.2 Standard parts. With the exception specified in 3.3.1, MS and AN standard parts shall be used where they suit the purpose. They shall be identified on the drawings by their part numbers.

3.3 Materials. Materials shall conform to applicable specifications and shall be as specified herein. Materials not covered by applicable specifications or not specifically described herein shall be of the best quality, of the lightest practicable weight, and suitable for the purpose intended. Materials shall be inherently fungus resistant.

3.3.1 Metals. Metals shall be corrosion-resistant or suitably treated to resist corrosion due to fuels, salt spray, or atmospheric conditions that may be encountered in storage or normal service.

3.3.1.1 Dissimilar metals. Unless otherwise suitably protected, dissimilar metals, such as brass, copper, or steel, shall not be used in intimate contact with magnesium, aluminum, or their alloys. Where contact between dissimilar metals is unavoidable, the metals shall be protected against electrolytic corrosion. When thermostatic bimetals and trimetals are used, corrosion resulting from tests specified herein shall not adversely affect the performance of the breaker.

3.3.2 Plastics. Plastic materials used in the housing, insulator base, and any internal parts exposed to arcing or surface creepage shall conform to Specification MIL-P-997, MIL-P-15037, or MIL-M-19833. Other types of plastic materials may be used provided the manufacturer submits satisfactory evidence to the activity responsible for qualification that the materials are suitable for the purpose intended. The plastic materials used shall neither support combustion nor give off noxious gas when subjected to arcs, such as those caused by interrupting heavy short-circuit currents, or explosions of gaseous vapors to which the materials may be subjected in service. Plastic materials with cellulose fillers shall not be permitted in parts that may be subjected to arcing or surface creepage.

3.3.2.1 Color. The color of the plastic case for the circuit breaker shall be in accordance with FED-STD-595, color 11136 or 21136.

3.3.3 Protective treatment. When materials are used in the construction of the circuit breaker that are subject to corrosion in salt air or other atmospheric conditions likely to occur during service usage, they shall be protected against such corrosion in a manner that will in no way prevent compliance with the performance requirements of this specification. The use of any protective coating that will crack, chip or scale with age or extremes of atmospheric conditions shall be avoided.

3.4 Design and construction. The design and construction of the circuit breaker shall conform to the applicable MS standard. If this specification and the MS standard conflict, the MS standard shall govern.

3.4.1 Mounting means. The circuit breaker shall be provided with a suitable mounting means as shown on the applicable MS standard. Self-locking nuts shall meet the performance requirements of Specification MIL-N-25027.

3.4.1.1 Mounting screw clearance. The mounting screws shall be screwable into the circuit breaker to a minimum depth, as shown on the applicable MS standard.

3.4.2 Actuator. The portion of the actuator visible when the circuit breaker is in the closed position shall be black and shall expose a white band when in the open or tripped position. The exterior portion of the actuator shall be insulated from all current carrying parts. The actuator shall not work out to an intermediate position, give a false trip indication, or be removable from the breaker.

3.4.2.1 Manual circuit opening. The circuit breakers defined herein all be designed to permit manual opening of the circuit by pulling out the actuator.

3.4.2.2 Trip indication and reset. The circuit breakers shall be so designed that when the breaker contacts open automatically on overload, the actuator shall indicate the operation by moving to the tripped position as shown on the applicable MS standard. Resetting shall be accomplished in accordance with the applicable MS standard.

3.4.3 Attitude. The circuit breaker performance shall be unaffected by mounting position.

3.4.4 Terminals. Terminal construction shall be as specified in the applicable MS standard and shall be designed for use with terminal lugs conforming to Standard MS25036 or MS20659.

3.4.5 Housing. The circuit breaker mechanism shall be enclosed in a housing securely attached to the insulator base and to the mounting plate when one is used. The housing may be integral with the insulator base.

3.4.5.1 Strength of housing. The mounting nuts shall be backed or provided with other means to prevent mounting screws of excess length from interfering with the operation of the breaker. Screws of excess length shall not fracture the housing or the explosion-proofing seal.

3.4.6 Screw threads. Screw threads on removable or replaceable threaded parts shall be as specified in Specification MIL-S-7742. Threading on non-metallic parts is not permitted.

3.4.7 Tamper-proof calibration. Circuit breakers shall be so sealed that tampering with the calibration is not possible without dismantling the device or breaking the seal.

3.4.8 Environmental conditions. The unit shall perform satisfactorily when subjected to any one or any combination of the following environmental conditions. There shall be no breakage, malfunction, or evidence of any damage which would impair the ability of the circuit breakers to meet the requirements of subsequent tests.

a. Temperature. Temperatures from -53.9°C (-65°F) to 121°C (250°F).

b. Altitude. Pressure altitude from sea level to 60,000 feet.

c. Explosion-proof. Operation in an explosive atmosphere.

d. Humidity. Relative humidity to 95 percent.

e. Salt spray. Exposure to salt laden atmosphere.

f. Sand and dust. Exposure to sand and dust.

g. Vibration. Vibration incident to use in jet powered aircraft.

h. Shock. Mechanical shock of 25g.

i. Fungus. Moist fungi as encountered in tropical climates.

j. Acceleration. Acceleration of 10g for one minute.

3.5 Performance. The circuit breakers shall be designed to perform satisfactorily in accordance with the following requirements:

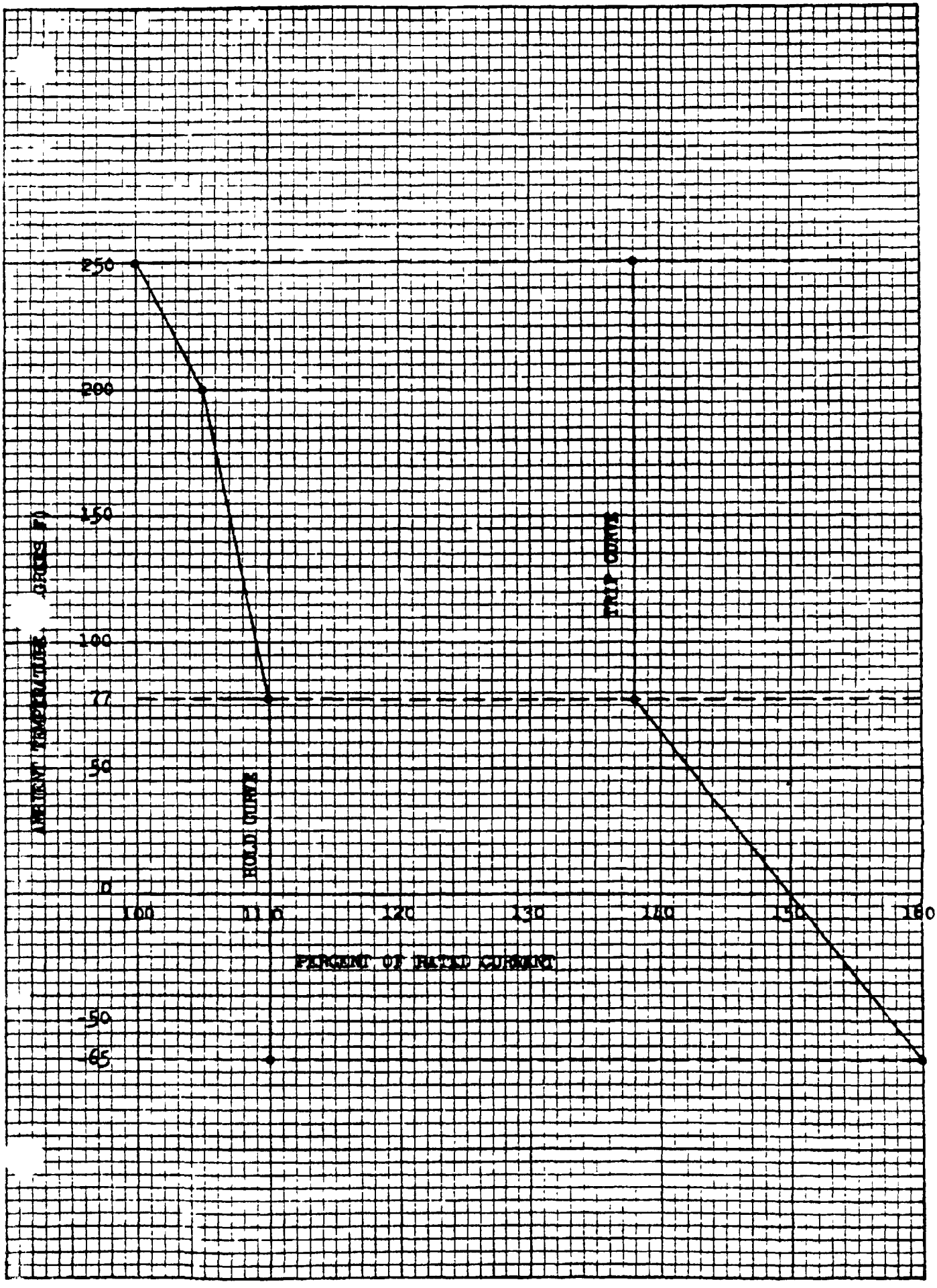
3.5.1 Dielectric strength. Each circuit breaker shall withstand without damage, at sea level pressure, a potential of 1500 volts RMS alternating current at commercial frequency for 1 minute for each of the conditions as specified in section 4 herein.

3.5.2 Insulation resistance. The insulation resistance between mutually insulated metal parts shall be 100 megohms or more.

3.5.3 Ultimate trip. At ambient temperatures from -53.9°C (-65°F) to 121.1°C (250°F), the circuit breaker shall trip in less than 60 minutes while carrying currents indicated by the trip curve, and shall not trip within 60 minutes while carrying currents indicated by the hold curve as shown in figure 1. When tripped in accordance with any condition shown by the trip curve, the breaker shall be resettable within 1 minute and with no load current.

3.5.4 Calibration. The circuit breaker shall trip within the limits defined on the applicable MS standard.

3.5.5 Electrical losses. The voltage drop across the terminals [illegible] circuit breakers in carrying rated current shall not exceed



3.5.6 Reclosing. After automatic tripping with the actuator manually held in the reset or closed position, or with the actuator in the normally open position, the circuit breaker shall not automatically reclose when subjected to any temperature from -53.9°C (-65°F) to 121.1°C (250°F).

3.5.7 Rupture capacity

3.5.7.1 Alternating current rupture capacity. The circuit breaker shall be capable of interrupting line-to-line and line-to-neutral faults on a 200-volt, three-phase, 400 CPS system defined by the applicable MS standard.

3.5.7.2 Direct current rupture capacity. The circuit breaker shall be capable of interrupting direct current faults on a DC system defined by the applicable MS standard.

3.5.8 Coordination. When any sustained overload or fault current within the coverage of these circuit breakers is applied to two breakers in series, with a ratio of current ratings of at least 2 to 1, the breaker with higher rating shall hold closed and the breaker with the lower rating shall trip.

3.5.9 Ratings. The ratings of the circuit breakers shall be as specified on the applicable MS standards.

3.5.10 Trip free. The circuit breaker shall be so designed that the circuit cannot be maintained closed when carrying overload currents which normally would automatically trip them to the open position. Contacts shall not reclose nor be resettable until the actuator is first moved to the full open position.

3.5.11 Overload cycling. The circuit breakers shall be capable of withstanding 100 cycles of manual make and automatic break of an inductive load of 200 percent of rated A.C. current at 0.75 power factor.

3.5.12 Strength of threaded parts

3.5.12.1 Strength of terminals. The terminals shall be capable of withstanding the tensile load specified in Table I applied perpendicularly to the mounting plate of the circuit breaker for one minute. The terminals shall also be capable of withstanding a torque as specified in Table I applied to the screw heads and about the thread axis for 1 minute.

TABLE I

STRENGTH OF THREADED PARTS

TERMINALS		
SCREW THREADS	TENSILE LOAD (LB)	TORQUE (LB-IN)
8-32 UNC-2A 5/16-24 UNF-2A	25 70	20 80
MOUNTING MEANS		
SCREW THREADS	TENSILE LOAD (LB)	TORQUE (LB-IN)
6-32 UNC-3B 8-32 UNC-3B	30 35	10 20

3.5.12.2 Strength of mounting provisions. The mounting nuts shall be capable of withstanding an axial load as specified in Table I for 1 minute. They shall also be able to withstand the torque specified in Table I applied to a screw tightened in the nuts for 1 minute.

3.5.13 Operating force. The force required to manually open and close the breaker contacts, by means of the actuator, shall be as specified on the applicable MS standard.

3.5.14 Strength of actuator. The unit shall be designed to withstand a 25 pound force applied to the push button in both direction applied along the axis of travel for 1 minute. The unit shall withstand a 40 pound force applied to the end of the extended push button in any direction for 1 minute.

3.5.15 Durability. The circuit breaker shall perform the number of cycles of mechanical operation specified by the applicable MS standard. Half of these cycles shall be at no load and half shall be at 100 percent of rated current at rated voltage and frequency.

3.6 Interchangeability. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The drawing number requirements of Specification MIL-D-70327 shall govern changes in the manufacturer's part numbers.

3.7 Markings

3.7.1 Nominal current rating. The nominal current rating of the circuit breaker, in whole numbers, shall be permanently and legibly marked on the button of the breaker as shown on the applicable MS standard.

3.7.2 Caution. A caution marking shall be included on the unit in accordance with the applicable MS standard.

3.8 Identification of product. Each unit shall be permanently and legibly marked for identification in accordance with MIL-STD-130.

3.9 Workmanship. The circuit breaker, including all parts and accessories, shall be constructed and finished in a careful and workmanlike manner in accordance with good design and sound practice Particular attention shall be given to neatness and thoroughness of soldering, wiring, impregnation of coils, marking of parts and assemblies, welding and brazing, painting, riveting, machine-screw assemblies, and freedom of parts from burrs and sharp edges.

3.9.1 Cleaning. The circuit breaker shall be thoroughly cleaned and loose spattered, or excess solder, metal chips, and other foreign material removed during and after final assembly.

3.9.2 Screw assemblies. Assembly screws and bolts shall be tight. The word tight means that the screw or bolt cannot be appreciably tightened further without damage or injury to the screw, bolt, or threads.

4. QUALITY ASSURANCE PROVISIONS

4.1 The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. 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.

4.2 Classification of tests. The inspection and testing of the circuit breakers shall be classified as follows:

a. Qualification testing
b. Acceptance testing

4.3 Test conditions

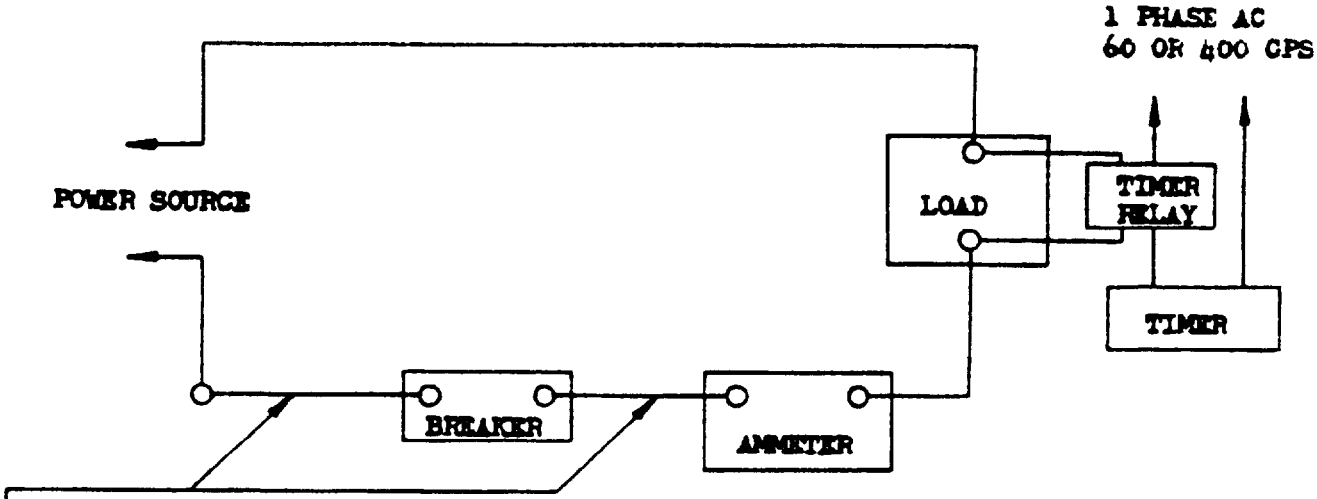
4.3.1 Standard conditions. Unless otherwise specified all tests shall be conducted in still air at a temperature of 25 ±3°C (77 ±5.4°F) which shall be considered room ambient and at sea level pressure. The atmospheric pressure at the test facility may be used in lieu of sea level pressure, if the elevation of the test facility is not greater than 3000 feet above sea level.

4.3.2 Power supply. Unless otherwise specified, the power source for all tests, when required, shall be 118 ±3 volts at a frequency of 400 ±20 CPS with waveform and recovery voltage characteristics harmonic content in accordance with the requirements of MIL-STD-704.

4.3.3 Test cables. Unless otherwise specified, test cables in accordance with figure 2 shall be used for all tests which require circuit breakers to carry current.

4.4 Qualification testing

4.4.1 Qualification test sample. The qualification test sample shall consist of 24 circuit breakers representative of the production equipment. The samples shall be identified with the manufacturer's part number and such other information as required by the procuring activity.



24 INCH MINIMUM WIRES OF APPLICABLE SIZE SHOWN BELOW FOR CURRENTS OF 1000% AND 3000% OF RATING, LARGER CABLES MAY BE USED AND AN OSCILLOGRAPH MAY BE USED TO MEASURE THE CURRENT AND TRIP TIME

(a) CIRCUIT-BREAKER CAPACITY (AMPERES)	WIRE SIZE (AN DESIGNATION)	UNINSULATED TERM. LUG (MS PART NR)	INSULATED LUG (MS PART NR)
LESS THAN 6	18	MS20659-2	MS25036-3
7 TO 10 INCL	16	MS20659-4	MS25036-8
11 TO 15 INCL	14	MS20659-4	MS25036-8
16 TO 20 INCL	12	MS20659-5	MS25036-12
21 TO 25 INCL	10	MS20659-5	MS25036-12
26 TO 40 INCL	8	MS20659-7	MS25036-15
41 TO 50 INCL	6	MS20659-30	MS25036-19
51 TO 60 INCL	6	MS20659-31	MS25036-21
61 TO 90 INCL	4	MS20659-32	MS25036-24
91 TO 120 INCL	2	MS20659-14	MS25036-27
121 TO 150 INCL	0	MS20659-18	MS25036-33
151 TO 200 INCL	00		MS25036-36

TEST WIRES AND TERMINALS SHALL CONFORM TO SPECIFICATION MIL-W-5086

AMMETER: ACCURACY WITHIN .5 OF 1 PERCENT

(a) FOR CIRCUIT BREAKERS BETWEEN STEPS OF THE ABOVE TABLE, USE THE AN TYPE WIRE OF THE NEXT SMALLER SIZE.

FIGURE 2 Test Cables

4.4.2 Test report. The contractor shall furnish three copies of a test report in accordance with Specification MIL-T-9107.

4.4.3 Tests. Qualification test sample circuit breakers shall be subjected to the tests in the sequence shown in table II with the tests being conducted as described under 4.6 Test Methods.

4.5 Acceptance tests. Acceptance tests shall consist of individual tests and sampling plans and tests.

4.5.1 Individual tests. Each circuit breaker shall be subjected to examination of product as described under 4.6.1.

4.5.2 Sampling plans and tests

4.5.2.1 Lot. The lot definition, formation, and size shall be in accordance with MIL-STD-105.

4.5.2.1.1 MIL-STD-105. When MIL-STD-105 specifies action by the Government it shall, at the option of the Government, be performed either by the Government or by the contractor under the supervision of the Government Inspector.

4.5.2.2 Sampling plan A tests. Unless otherwise specified by the procuring activity, a sufficient number of samples necessary for conducting the tests under this plan shall be selected from the first 50 circuit breakers fabricated during initial production and shall be subjected to all the tests specified in table II.

4.5.2.2.1 Rejection and retest. Rejection and retest shall be as specified in 4.5.2.5.

TABLE II (SHEET 1 OF 2) QUALIFICATION TEST SEQUENCE

QUALIFICATION TEST	TEST PARAGRAPH	TEST SAMPLES											
		1	2	3	4	5	6	7	8	9	10	11	12
Examination of product	4.6.1	X	X	X	X	X	X	X	X	X	X	X	X
Dielectric strength	4.6.2	X	X	X	X	X	X	X	X	X	X	X	X
Insulation resistance	4.6.3	X	X	X	X	X	X	X	X	X	X	X	X
Ultimate trip	4.6.4	X	X	X	X	X	X	X	X	X	X	X	X
Calibration	4.6.5	X	X	X	X	X	X	X	X	X	X	X	X
Electrical losses	4.6.6	X	X	X	X								
AC rupture	4.6.7	X	X	X	X								
Reclosing	4.6.8					X							
DC rupture	4.6.9					X							
Explosion proof	4.6.10.2						X	X	X	X			
Humidity	4.6.10.1.1										X		
Salt spray	4.6.10.1.2											X	
Sand and dust	4.6.10.1.3												X
Vibration	4.6.10.1.4												
Coordination	4.6.11												
Shock	4.6.10.1.5												
Trip free	4.6.12												
Overload cycling	4.6.13												
Fungus resistance	4.6.10.1.6												
Strength of terminals	4.6.14.1												
Strength of mounting provisions	4.6.14.2												
Operating force	4.6.15												
Strength of actuator	4.6.16												
Acceleration	4.6.10.3												
Durability	4.6.17												

TABLE II (SHEET 2 OF 2) QUALIFICATION TEST SEQUENCE

QUALIFICATION TEST	TEST PARAGRAPH	TEST SAMPLES											
		13	14	15	16	17	18	19	20	21	22	23	24
Examination of product	4.6.1	X	X	X	X	X	X	X	X	X	X	X	X
Dielectric strength	4.6.2	X	X	X	X	X	X	X	X	X	X	X	X
Insulation resistance	4.6.3	X	X	X	X	X	X	X	X	X	X	X	X
Ultimate trip	4.6.4	X	X	X	X	X	X	X	X	X	X	X	X
Calibration	4.6.5	X	X	X	X	X	X	X	X	X	X	X	X
Electrical losses	4.6.6												
AC rupture	4.6.7												
Reclosing	4.6.8												
DC rupture	4.6.9												
Explosion proof	4.6.10.2												
Humidity	4.6.10.1.1												
Salt spray	4.6.10.1.2												
Sand and dust	4.6.10.1.3												
Vibration	4.6.10.1.4	X	X	X									
Coordination	4.6.11				X	X							
Shock	4.6.10.1.5						X						
Trip free	4.6.12							X	X				
Overload cycling	4.6.13							X	X				
Fungus resistance	4.6.10.1.6									X			
Strength of terminals	4.6.14.1										X		
Strength of mounting provisions	4.6.14.2										X		
Operating force	4.6.15										X	X	X
Strength of actuator	4.6.16										X		
Acceleration	4.6.10.3										X		
Durability	4.6.17											X	X

4.5.2.3 Sampling plan B tests. Sampling plan B tests shall consist of those specified in table III, which shall be performed in the order shown. Sampling plan B tests shall be performed by either of the following methods or a combination of both. (The acceptable quality levels (AQL) shall be as specified in table III, major and minor defects shall be as defined in MIL-STD-105).

a. 100 percent inspection.

b. Statistical sampling and inspection in accordance with MIL-STD-105.

TABLE III

SAMPLING PLAN B TESTS

TEST	TEST PARAGRAPH	AQL (PERCENT DEFECTIVE)	
		MAJOR	MINOR
Dielectric Strength	4.6.2	0	0
Minimum Limit of Ultimate Trip at 25°C (77°F), -53.9°C (-65°F), 93.3°C (200°F), and 121.1°C (250°F)	4.6.4	0	1.0
Calibration (200 percent of rated current at 25°C (77°F))	4.6.5	0	1.0

4.5.2.3.1 Rejection and retest. Rejection and retest shall be as specified in 4.5.2.5.

4.5.2.4 Sampling plan C tests. Three circuit breakers selected at random out of every 1000 units, or for every 3-month period, whichever amount is greater, of each manufacturer's part number manufactured, shall be subjected to the tests specified in table IV, in the order shown. They shall be performed on sample units that have been subjected to and have passed sampling plan B tests, unless the Government considers it more practical to select a separate sample from the lot for sampling plan C inspection.

TABLE IV

SAMPLING PLAN C TESTS

TEST	TEST PARAGRAPH
Insulation resistance	4.6.3
Maximum Limit of Ultimate Trip at 25°C (77°F), -53.9°C (-65°F), 93.3°C (200°F), and 121.1°C (250°F)	4.6.4
Trip-free	4.6.12
Operating force (at room ambient temperature)	4.6.15

4.5.2.4.1 Rejection and retest. Rejection and retest shall be as specified in 4.5.2.5.

4.5.2.5 Rejection and retest. When one or more items from a lot fail to meet the specification, acceptance of all items in the lot shall be withheld until the extent and cause of failure have been determined. The contractor shall explain fully to the Government representative the cause of failure and the action taken to preclude recurrence. After correction, all of the sampling tests shall be repeated.

4.5.2.6 Continuance of individual tests. For operational reasons, individual tests may be continued pending the investigation of a sampling test failure. However, final acceptance of items on hand or produced later shall not be made until it is determined that items meet all the requirements of the specification.

4.5.3 Defects in items already accepted. The investigation of a test failure could indicate that defects may exist in items already accepted. If this occurs, the contractor shall fully advise the procuring activity of all defects likely to be found and methods of correcting them.

4.6 Test methods

4.6.1 Examination of product. Circuit breakers shall be inspected to verify that the materials, design, construction, weight, physical dimensions, marking and workmanship conform to the applicable requirements.

4.6.2 Dielectric strength. The circuit breaker shall be subjected to a potential of 1500 volts RMS alternating current at commercial frequency for one minute between each of the following:

a. The two terminals with the circuit breaker in the open or tripped position.

b. Normally energized parts and normally grounded parts with the circuit breaker in the open position.

c. The normally energized parts and normally grounded parts with the circuit breaker in the closed position.

Breakdown of insulation or current flow in excess of 1.0 milliampere shall constitute failure. When the actuator contains exposed metal parts, such exposed metal parts shall be connected by test lead to the normally grounded mounting plate when this test is conducted.

4.6.3 Insulation resistance. The insulation resistance shall be measured between mutually insulated metal parts, by means of a megohm bridge or other suitable method, at a DC potential of 500 volts. Any measurement of less than 100 megohms shall constitute failure. When the actuator contains exposed metal parts, such exposed metal parts shall be connected by test lead to the normally grounded mounting plate when this test is conducted.

4.6.4 Ultimate trip. At each ambient temperature of -53.9°C (-65°F), and 25°C (77°F), the circuit breaker shall not trip when carrying 110 percent of rated current for 60 minutes. At the ambient temperature of 93.3°C (200°F) the breaker shall not trip while carrying 105 percent of rated current for 60 minutes. The breaker shall trip in less than 60 minutes while carrying 138 percent of rated current at 25°C (77°F) and at 93.3°C (200°F). At a temperature of -53.9°C (-65°F) the breaker shall trip in less than 60 minutes when carrying 160 percent of rated current. At the ambient temperature of 121.1°C (250°F), the breaker shall not trip when carrying 100 percent of rated current for 60 minutes, and shall trip in less than 60 minutes while carrying 138 percent of rated current. At a simulated altitude of 60,000 feet and an ambient temperature of 45°C (113°F),

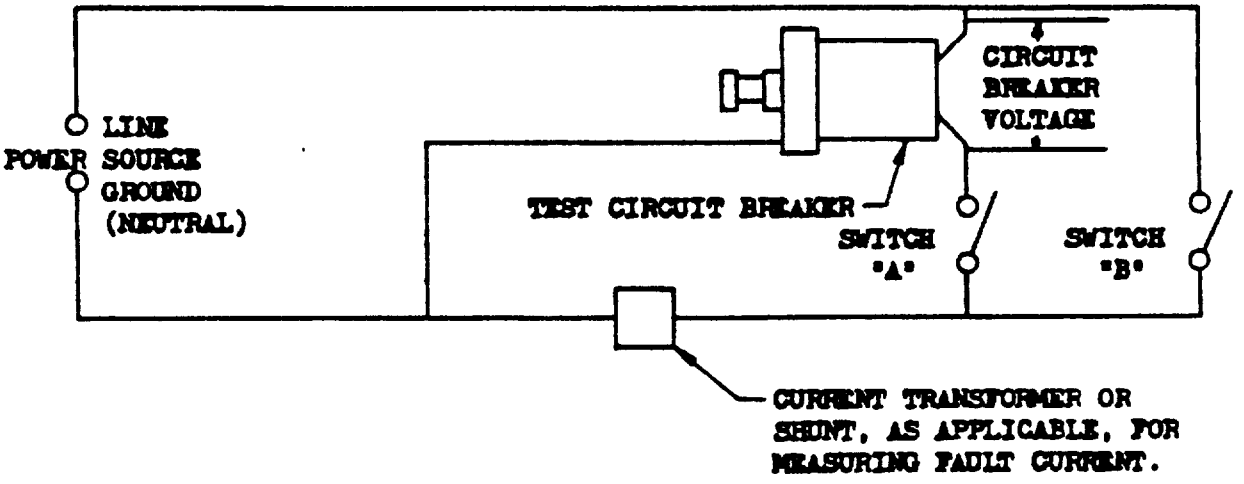
the breaker shall not trip when carrying 108 percent of rated current for 60 minutes, and shall trip in less than 60 minutes while carrying 138 percent of rated current. The breaker shall be held at the test ambient temperature for at least 60 minutes before the application of any current. Thermocouples shall be attached to the terminals to determine that the temperature rise does not exceed the requirement of 75°C (167°F) for any of the tests of this paragraph.

4.6.5 Calibration. The circuit breaker with leads attached shall be held in the specified ambient temperature for a minimum of 60 minutes prior to the application of any current. Using the circuit of figure 2, the tripping times shall be determined for loads of 200 percent, 400 percent, 1000 percent and 3000 percent of rated current, at the ambient temperatures of -53.9°C (-65°F), 25°C (77°F), and 93.3°C (200°F). The trip time for 200 percent of rated current at 25°C (77°F) shall be determined twice using a 400 CPS source and twice using a direct current source of power. The trip times shall be within the limits specified by the applicable MS standard.

4.6.6 Electrical losses. While carrying rated current, the voltage drop from terminal to terminal of the curcuit breaker shall be measured and shall not exceed the value specified by the applicable MS standard.

4.6.7 Alternating current rupture. The rupture tests shall be conducted with the circuit breaker connected as shown in figure 3 for the line-to-line tests. These tests shall use the current available from the three-phase system defined on the applicable MS standard. A minimum cooling period of 10 minutes shall be allowed after each rupture before the next fault is applied. After each rupture, the open circuit voltage shall be maintained across the breaker for a minimum of 5 seconds. The four sample circuit breakers, designated 1, 2, 3 and 4 shall be subjected to the tests of table V. Any electrical or mechanical malfunction during these tests shall constitute failure. Following the second, fourth and sixth fault tests, the room ambient tripping time for 200 percent of rated current shall be determined for each test sample and shall not be faster than 90 percent of the lower limit nor slower than 110 percent of the upper limit specified on the applicable MS standard. At the conclusion of the above tests, the dielectric test shall be applied except 2.0 milliamperes shall be used in lieu of 1.0 milliampere. Also, at room ambient, the breaker shall not trip within 1 hour when subjected to 100 percent of rated current and shall trip within 1 hour when subjected to 150 percent of rated current. The interruption times for each fault application shall be recorded.

CURRENT LEADS SHALL BE AS LARGE AS PRACTICAL. WHEN TESTING 2-1/2 AMPERE BREAKERS, THREE 30 FT. #10 CONDUCTORS IN PARALLEL MAY BE INSERTED IN THE LINE.



RUPTURE CURRENT SHALL BE MEASURED BY A CURRENT TRANSFORMER OR SHUNT AS INDICATED AND A RECORDING OSCILLOGRAPH HAVING A RESPONSE TO AT LEAST 3000 CYCLES PER SECOND. THE VOLTAGE ACROSS THE BREAKER INCLUDING THE TRANSIENT RECOVERY VOLTAGE AFTER THE INTERRUPTION OF CURRENT SHALL ALSO BE RECORDED.

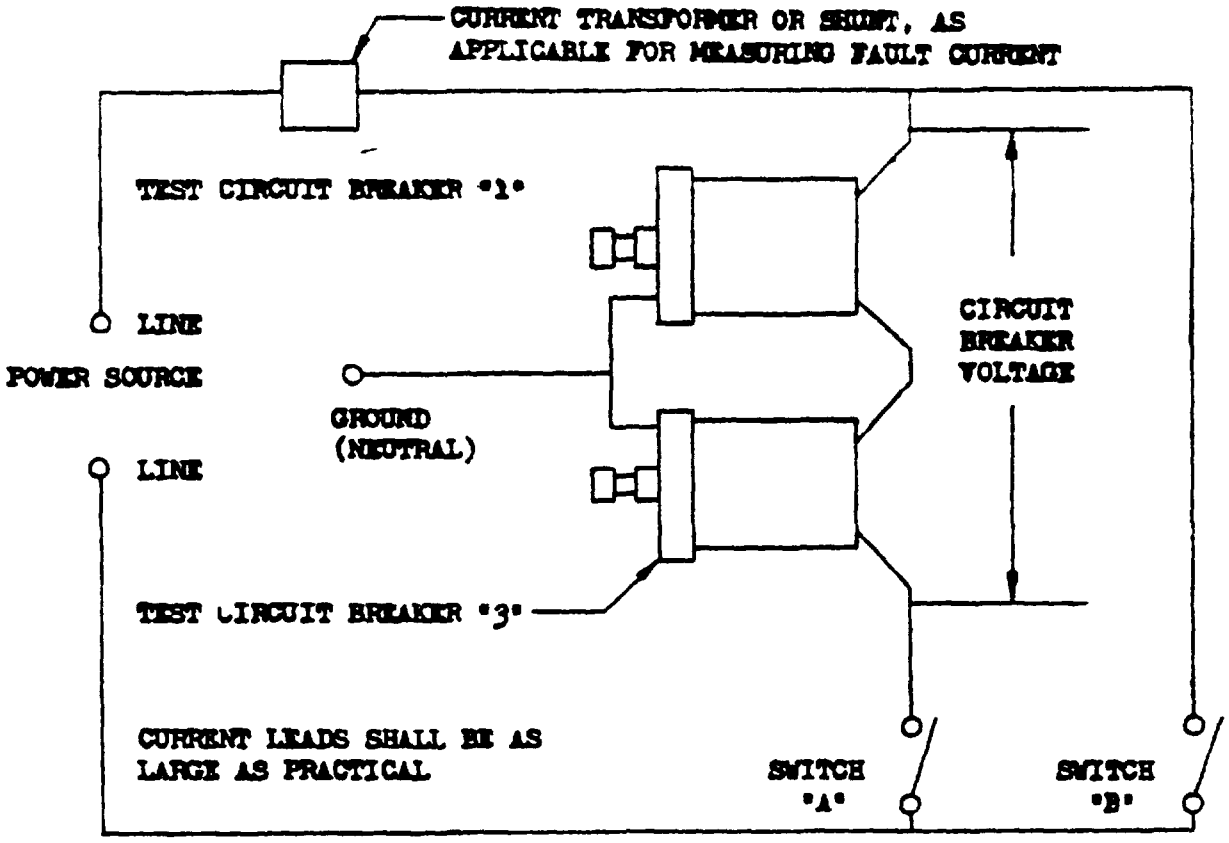
1. SHORT-CIRCUIT RUPTURE TEST

   (a) OPEN TEST CIRCUIT BREAKER AND SWITCH "A".
   (b) CLOSE SWITCH "B" AND DETERMINE IF CURRENT CAPACITY OF CIRCUIT IS IN ACCORDANCE WITH REQUIREMENT.
   (c) OPEN SWITCH "B".
   (d) CLOSE TEST CIRCUIT BREAKER.
   (e) CLOSE SWITCH "A".

2. CLOSE-IN RUPTURE TEST

   (a) OPEN TEST CIRCUIT BREAKER AND SWITCH "A".
   (b) CLOSE SWITCH "B" AND DETERMINE IF CURRENT CAPACITY OF CIRCUIT IS IN ACCORDANCE WITH REQUIREMENT.
   (c) OPEN SWITCH "B".
   (d) CLOSE SWITCH "A".
   (e) CLOSE TEST CIRCUIT BREAKER

FIGURE 3 Line-To-Line Neutral Test



RUPTURE CURRENT SHALL BE MEASURED BY A CURRENT TRANSFORMER OR SHUNT AS INDICATED AND RECORDING OSCILLOGRAPH HAVING A RESPONSE TO AT LEAST 3000 CYCLES PER SECOND. THE VOLTAGE ACROSS THE BREAKERS INCLUDING THE TRANSIENT RECOVERY VOLTAGE AFTER THE INTERRUPTION OF CURRENT SHALL ALSO BE RECORDED.

LINE-TO-LINE RUPTURE TEST

(a) OPEN TEST CIRCUIT BREAKERS "1" AND "3", AND SWITCH "A".

(b) CLOSE SWITCH "B" AND DETERMINE IF CURRENT CAPACITY OF CIRCUIT IS IN ACCORDANCE WITH REQUIREMENT.

(c) OPEN SWITCH "B".

(d) CLOSE TEST CIRCUIT BREAKER "1".

(e) CLOSE SWITCH "A".

(f) CLOSE TEST CIRCUIT BREAKER "3".

FIGURE 4 Line-To-Line Rupture Test

TABLE V

AC RUPTURE TEST PROCEDURES

TEST NR	PRESSURE ALTITUDE	TEST CONDITION	TEST UNITS	TEST CONDITIONS
1 2	Sea Level	Line-To-Neutral	1,2,3 and 4	1. Units 1 & 2 closed before fault initiation. 2. Units 3 & 4 complete fault circuit by closing in on fault.
3 4	60,000 Ft.	Line-To-Neutral	1,2,3 and 4	1. Units 1 & 2 closed before fault initiation. 2. Units 3 & 4 complete fault circuit by closing in on fault.
5 6	Sea Level	Line-To-Line	1,2,3 and 4	1. Units 1 & 2 closed before fault initiation. 2. Units 3 & 4 complete fault circuit by closing in on fault 3. Units 1 & 3 connected in series. 4. Units 2 & 4 connected in series.

4.6.8 Reclosing. After being tripped automatically in normal manner, with 200 percent of rated current, the circuit breaker shall not automatically reclose for 1 hour. This test shall be conducted at each of the following ambient temperatures, after a conditioning period of 1 hour minimum at the temperature:

a. -53.9°C (-65°F)
b. 25°C (77°F)
c. 121.1°C (250°F)

Subsequent performance shall not be affected.

4.6.9 Direct current rupture. The circuit breaker shall be subjected to the direct current fault specified by the applicable MS standard using the circuit of figure 3 for the following four operations: The first two operations shall be at sea level pressure with the breaker already closed when the first fault is applied and with the breaker being closed in on the fault when the second fault is applied. This procedure shall be repeated at a simulated altitude of 60,000 feet. A minimum cooling period of 10 minutes shall be allowed after each rupture, before the next fault is applied. At the conclusion of this test, the room ambient tripping time for 200 percent direct current shall be determined and shall not be faster than 90 percent of the lower limit nor slower than 110 percent of the upper limit specified by the applicable MS standard. The dielectric test shall be applied except 2.0 milliamperes shall be used in lieu of 1.0 milliampere. The interruption times for such fault application shall be recorded.

4.6.10 Environmental tests. The circuit breaker shall be subjected to the environmental tests as specified herein.

4.6.10.1 The following environmental tests shall be conducted in accordance with the indicated procedures of Specification MIL-E-5272 with the following additions or exceptions to the paragraphs of Specification MIL-E-5272. When the requirements of Specification MIL-E-5272 and this specification conflict, the requirements of this specification shall govern.

4.6.10.1.1 Humidity, procedure I with the circuit breaker in the "on" position. Within 1 hour after removal from the test chamber and without forced drying, the breaker shall be subjected to 500 percent of rated load. Failure to trip within 10 seconds shall result in disqualification. Following the 500 percent-rated-load test, the circuit breaker shall trip free when closed at 300 percent

of rated load and shall then meet the requirement of calibration at 200 percent of rated load, except that the tripping time shall be within 90 percent of the lower limit and 110 percent of the upper limit specified by the applicable NS standard. The circuit breaker shall show no evidence of breaking, cracking, spalling, excessive corrosion, or loosening of terminals. The breaker shall also be subjected to the dielectric test within 1 hour after removal from the test chamber and without forced drying; however, a leakage of 2.0 milliamperes shall be allowed in lieu of one milliampere.

4.6.10.1.2 Salt spray, procedure I with the circuit breaker in the "on" position. The test shall be conducted for a minimum of 50 hours. Within 10 minutes after the test, the breakers shall be washed for 5 minutes under running water not warmer than 37.8°C (100°F) accompanied by a slight brushing, and dried for 6 hours in a forced-draft oven at approximately 57°C (134.6°F). The breaker shall be subjected to and satisfactorily clear an overload equal to 200 percent of rated current and shall then meet the requirements for calibration at room ambient with 200 percent of rated current, except that the tripping time shall be within 80 percent of the lower limit and 120 percent of the upper limit specified.

4.6.10.1.3 Sand and dust, procedure I, part I and part II. The circuit breaker shall be in the "on" position and mounted on a dummy panel. At the conclusion of the test the breaker shall be held in on a 300 percent rated load and the breaker shall trip free. The circuit breaker shall then be tested for calibration at room ambient and 200 percent of rated current and shall meet the specified limits.

4.6.10.1.4 Vibration, procedure XII

a. Three like samples of the circuit breaker shall be submitted to the entire vibration test with the first sample carrying 100 percent of rated load, the second sample carrying no load with the contacts closed, and the third sample with the contacts open.

b. Suitable test circuitry with indicating provisions shall be connected to the terminals of the breaker to establish that vibration does not cause closed contacts to open, nor cause open contacts to close at any time during the test.

c. The breaker shall be subjected to the ambient temperature for at least 30 minutes prior to the vibration test. For those tests requiring that the breaker carry current during vibration, the test current shall be applied for at least 30 minutes prior to the vibration test.

d. The test schedule of table VI shall be followed in lieu of the table I test schedule of MIL-E-5272.

TABLE VI

VIBRATION TEST SCHEDULE

PROCEDURE	AMBIENT TEMPERATURE		
	25°C (77°F)	121°C (205°F)	-54°C (-65°F)
Frequency Scanning	Perform	Perform	Perform
Resonance Endurance	0.667×10^6 Cycles, but not more than 5.33 Hours	0.167×10^6 Cycles, but not more than 1.33 Hours	0.167×10^6 Cycles, but not more than 1.33 Hours
Cycling Endurance	1.5 Hours	----------	----------

e. The figure 5 range curve for vibration test shall be used for the frequency scan, resonance endurance and cycling endurance tests in lieu of the range curve of MIL-E-5272.

f. The circuit breaker shall not suffer any electrical or mechanical damage as a result of these tests. Following the vibration tests, the breaker shall meet the room ambient calibration requirements for 200 percent of rated load and the room ambient ultimate trip requirements except 105 percent may be used in the trip test.

4.6.10.1.5 Shock, procedure IV, in each of the three principal axis in turn. The sample being tested shall be secured to sufficient mass, and the carriage dropped through sufficient distance, to result in a deceleration of 25g with a duration of 11 ±1 milliseconds when decelerated by resilient impact. Three separate shocks shall be applied to each of the three principal axis with the breaker contacts in the closed position, and three separate shocks shall be applied

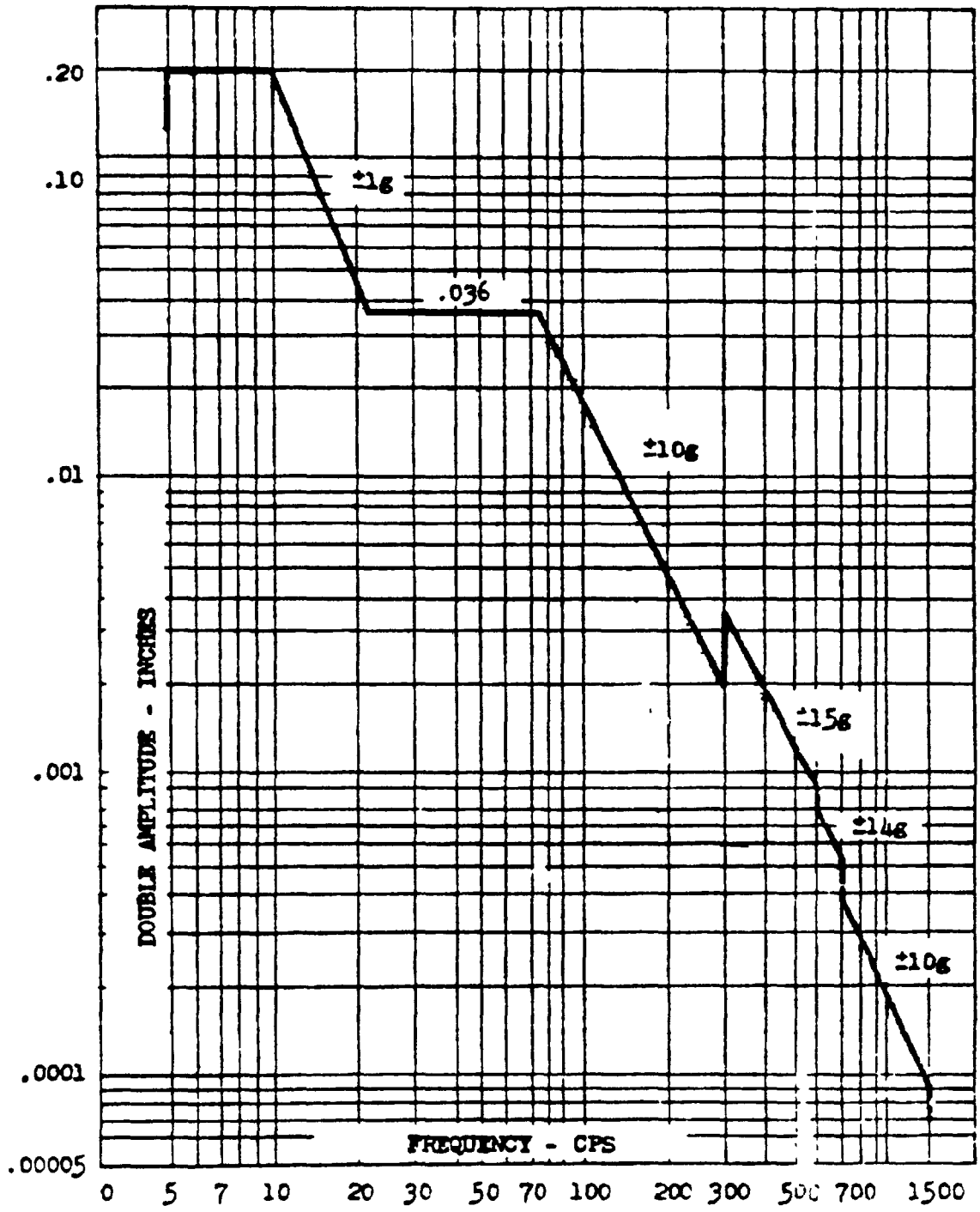


FIGURE 5 Vibration Curve Sheet

to each of the axis with the breaker contacts in the open position. The breaker shall be carrying rated current during the test and for 30 minutes prior to it. A chronoscope, an oscilloscope, or other device, capable of detecting momentary opening or closing periods not exceeding 0.5 millisecond duration, shall be used to determine that the breaker contacts in the open position remain open. Following the test, the breaker shall be subjected to 200 percent rated current at room ambient and the tripping time shall be within 60 percent of the lower value and 120 percent of the higher value of trip time determined in the calibration test of 4.6.5 for 25°C (77°F).

4.6.10.1.6 Fungus, procedure I with the circuit breaker in the "on" position. Within 1 hour after the test period, the breaker shall be subjected and shall pass the following tests:

a. Shall be subjected to and shall clear an overload equal to 200 percent of rated current.

b. Shall then meet the requirements for calibration at room ambient with 200 percent of rated current except the tripping time shall be within 60 percent of the lower limit and within 120 percent of the upper specified limit.

c. Shall be subjected to the dielectric test as specified in 4.6.2 except that 2.0 milliamperes leakage shall be allowed in lieu of 1.0 milliampere .

Inability to meet these requirements shall constitute failure.

4.6.10.2 Explosion proof. The explosion chamber shall be equal to the chamber specified in Specification MIL-C-9435, and shall have provisions for the following tests:

a. A circulating fan shall be provided to insure adequate mixing of the explosive atmosphere.

b. Suitable provisions for heating the explosion chamber shall be provided.

c. A vacuum pump capable of evacuating the explosion chamber to 0.5 inch of mercury absolute pressure shall be provided.

d. A breaker shall be installed in the chamber in such a manner as to permit the required electrical operation and to permit the actuator button to be manually operated through the pressure seals from the outside of the chamber. It shall be permissible for circuit breakers to be installed in the chamber with parallel connections. In such case, all breakers shall be "open" while not being required to carry current for the test.

e. The explosive atmosphere shall consist of propane gas C_3H_8, having a purity of 99 percent and certified by dry air. The mixing cycle shall be closely controlled to insure repeatability of results.

f. For each condition of explosive mixture and altitude, the explosion chamber shall first be evacuated to 0.5 inch of mercury before admission of the explosive mixture.

g. After the test conditions within the chamber have been achieved and stabilized for the explosive atmosphere, the circulating fan shall be turned off to allow turbulence to subside.

h. The test currents used shall be those specified by the applicable MS standard for the AC rupture tests. A minimum of 10 minutes of cooling time shall be allowed for each application of current.

i. No breaker shall be submitted to more than one of the following procedures:

Procedure I: The breaker shall be closed, followed by an application of line-to-neutral fault current specified for AC rupture. The ambient temperature within the chamber shall be 93.3°C (200°F). One application of the fault current shall be made at each of the following conditions and in the sequence listed.

Altitude	Explosive Mixture Percent Propane by Volume
(1) Sea Level	5%
(2) Sea Level	4.5%
(3) Sea Level	5.5%
(4) 15,000 Ft.	5%

The atmosphere within the chamber shall be verified as explosive after tests at each condition.

Procedure II: This procedure shall be the same as procedure I except that the breaker shall be closed in on the fault for each application of fault current.

Procedure III: Two breakers of like rating shall be connected in series. One breaker shall be closed. The other shall be closed in on the line-to-line fault current specified for AC rupture. The ambient temperature within the chamber shall be 93.3°C (200°F). One application of the fault current shall be made at each of the following conditions and in the sequence listed.

Altitude	Explosive Mixture Percent Propane by Volume
(1) Sea Level	5%
(2) Sea Level	4.5%
(3) Sea Level	5.5%

The atmosphere within the chamber shall be verified as explosive after tests at each condition.

j. Failure of this test shall be constituted by any of the following:

(1) Ignition of the explosive atmosphere caused by circuit breaker operation at any time during the test.

(2) Electrical or mechanical malfunction of the breaker during the test.

(3) Inability of the breaker to be opened and closed at room ambient following the test.

(4) Inability to trip automatically within 60 minutes, with 150 percent of rated current applied at room ambient.

4.6.10.3 Acceleration. When mounted on a centrifuge in the position considered most likely to cause malfunctioning, the circuit breaker shall be subjected to a continuous acceleration of 10g for a minimum of 1 minute. The breaker shall be carrying 100 percent rated current during and for 60 minutes prior to this test. The test shall be repeated with the breaker carrying no current, first with the contacts open and next with the contacts closed. Suitable monitoring equipment capable of detecting momentary opening or closing periods not exceeding 0.5 millisecond shall be employed.

Any electrical or mechanical malfunction shall be cause for failure. Following the test, the breaker shall meet the requirements of the room ambient 200 percent of rated load calibration test of 4.6.5. A satisfactory statement with supporting information shall be required to substantiate that the acceleration was applied in the position required for this test.

4.6.11 Coordination. This test shall be conducted in two parts as follows:

a. Coordination at overload conditions. This test shall be applied to the circuit breaker to determine if it will hold closed when subjected to a specified current for a time period of 75 to 85 percent of the fastest trip time specified by the calibration curve for the current used. This test shall be conducted with apparatus and test methods similar to those used for calibration except that a current interruption device shall be added to break the circuit after predetermined intervals of current flow. The currents to be used shall be 400, 1000, and 2000 percent of rated. This test shall be conducted at each of the ambient temperatures of -53.9°C (-65°F), 25°C (77°F), and 93.3°C (200°F). Two test samples of each rating except for the 2-1/2 ampere and 50 ampere, shall be used.

b. Coordination at maximum fault condition. The maximum line-to-neutral fault current as shown on the applicable MS standard shall be applied to series connected combinations of circuit breakers as shown on the MS standard, using the circuit of figure 4. Prior to the application of the fault current, the breaker with the highest rating, shall be subjected for a minimum period of 30 minutes to the test ambient temperature of -17.8°C (0°F). These tests shall be conducted on two similar combinations for each of the combinations required. The test for each combination shall consist of applying the fault current three successive times with the breakers held in the respective test ambient temperatures, and with a minimum period of 10 minutes allowed between applications of current.

4.6.11.1 Failure shall be indicated by any of the following:

a. Opening of the breaker with the higher rating.
b. Failure of the breaker with the low rating to open.
c. Any electrical malfunction.
d. Any mechanical malfunction.

4.6.11.2 Tests shall be conducted on the 400 CPS source specified for the AC rupture test.

4.6.11.3 In the event that breakers of one type or part number have been previously qualified to this specification, any additional types of part numbers shall also be required to demonstrate coordination for each possible inter-type combination of the required ratings for this test.

4.6.12 Trip free. The circuit breaker shall be held in the closed or reset position and subjected to 138 percent of rated current until tripping occurs and for 600 seconds afterwards. The test shall be repeated using 200 percent of rated current. The breaker shall automatically trip within the limits specified by the applicable MS standard and shall not reclose of its own accord. The breaker shall be reclosable only after moving the actuator to the full open position. This test shall be conducted at each of the following ambient temperatures after conditioning the breaker for a minimum of 60 minutes in the test ambient:

a. 25°C (77°F)

b. 121.1°C (250°F)

c. -53.9°C (-65°F) - At this test temperature, a test current of 160 percent of rated current may be used in lieu of 138 percent of rated current.

4.6.13 Overload cycling. The circuit breaker shall be subjected to 100 cycles of manual make and automatic break of 200 percent of rated current at a lagging power factor of not greater than 0.75. The first 50 cycles shall be performed at 2 minute intervals by applying the test current to the breaker while in a closed or reset condition. The second 50 cycles shall be performed at 2 minute intervals by closing the breaker in on the test current and holding the actuator in until after a trip-free trip out. At the end of this test, the breaker shall be subjected to and pass each of the following tests:

a. Shall carry 115 percent of rated current for one hour.

b. Shall trip automatically within one hour when carrying 138 percent rated current.

c. The operating force test of 4.6.15.

d. The dielectric test of 4.6.2.

e. The 200 percent rated current trip time at 25°C of 4.6.5.

Inability to meet these requirements shall constitute failure.

4.6.14 Strength of threaded parts

4.6.14.1 Strength of terminals. A tensile load as specified by table I shall be applied to each terminal for 1 minute, perpendicularly to the mounting plate of the breaker. A torque as specified in table I shall then be applied to the screw head about the thread axis for 1 minute. Loosening or breaking of the housing about the terminals, stripping of the screw threads, or deterioration of the seal to such an extent that the explosion resistance is affected shall constitute failure.

4.6.14.2 Strength of mounting provisions. An axial load as specified in table I shall be applied to the mounting nuts for a period of 1 minute. The torque specified in table I shall then be applied to the screw head about the thread axis for 1 minute without damage to the mounting means.

4.6.14.2.1 Strength of housing. Screws long enough to bottom within the mounting means shall be torqued with the value shown in table I. Loosening or breaking of either the nut or the mounting provisions shall constitute failure.

4.6.15 Operating force. The force necessary for operation of the circuit breaker shall be determined. The force shall be applied parallel to the line of travel of the actuator. The forces required for operation of the breakers either during or as a result of the tests shall not exceed the values specified on the applicable MS standard.

4.6.16 Strength of actuator. A 25-pound force shall be applied for 1 minute in both directions, along the line of push-button travel. With the push-button in the fully extended position, a force of 40 pounds shall be applied at the extremity for 1 minute in two mutually perpendicular directions, each normal to the line of push-button travel. Malfunction or mecnanical breakage shall constitute failure.

4.6.17 Durability. The circuit breaker shall be subject to the number of cycles as specified by the applicable MS standard of make and break operation, simulating manual operation, including over-travel forces, etc. No load cycles shall be at the uniform rate of 60 cycles per minute. Load cycles shall be at the uniform rate of 2 cycles per minute when current is carried, except that the cycling rate may be faster if the manufacturer agrees to the use of such faster rate. The time-on to time-off ratio shall be

within the limits of 1 to 3 and 1 to 4. The resistive load cycles shall be performed with 100 percent of rated current at 0.95 ±0.05 power factor and the inductive load cycles shall be performed with 100 percent rated current at a lagging power factor of not greater than 0.75. The tests shall be conducted in the following sequence, repeated until a total number of cycles specified by the MS standard have been performed.

a. Resistive load 1000 cycles
b. No load 1000 cycles
c. Inductive load 1000 cycles
d. No load 1000 cycles

At the end of each 4000 cycles, the trip time shall be determined for 200 percent of rated current and shall neither be faster than 95 percent of the lower limit nor slower than 105 percent of the higher limit as shown on the MS standard. After the above tests, the circuit breaker shall carry 105 percent of rated current for one hour, shall trip automatically within one hour when carrying 145 percent of rated current, and shall meet the operating force requirements shown on the MS standard. Any mechanical or electrical malfunction during the cycling or post-cycling tests shall constitute failure.

5. PREPARATION FOR DELIVERY

5.1 Levels of preservation and packaging

5.1.1 Level A- circuit breakers shall be individually preserved in accordance with Specification MIL-P-116, method IA-8. Unit quantities shall be one each.

5.1.2 Level C- circuit breakers shall be individually preserved and packaged in accordance with method III. Unit quantities shall be one each.

5.1.3 Unless otherwise specified by the procuring activity, the quantity of unit packages to be included in each intermediate package shall be at the option of the contractor and as governed by the limitations of the containers being used. Only identical items shall be included in an intermediate package. Circuit breakers preserved and packaged to meet 5.1.1 or 5.1.2 shall be packaged in containers meeting Specification PPP-B-556 or PPP-B-676.

5.2 Levels of packing

5.2.1 Level A- circuit breakers preserved and packaged to meet 5.1.1 and 5.1.3 shall be packed in exterior type shipping containers meeting Specification PPP-B-636, type I, class 2 or type II, class 2. As far as practical, exterior containers shall be of uniform shape and size, be of minimum cube and tare consistent with the protection required, and contain identical quantities. The gross weight of each pack shall be limited to approximately 70 pounds. Containers shall be closed and strapped in accordance with the applicable container specification or appendix thereto. Exterior container shall be sealed at all joints and seams, including manufacturer's joint, with tape conforming to Specification PPP-T-60.

5.2.2 Level B- circuit breakers preserved and packaged to meet 5.1.1 or 5.1.2 and 5.1.3 shall be packed in domestic type exterior containers meeting Specification PPP-B-636. Exterior containers shall be of minimum cube and tare consistent with the protection required. As far as practical, exterior containers shall be of uniform shape and size and contain identical quantities. The gross weight of each pack shall be limited to approximately 70 pounds. Containers shall be closed and strapped in accordance with the applicable container specification or appendix thereto. The fiberboard container shall meet the special requirements table of Specification PPP-B-636.

5.2.3 Level C- packages which require over-packing for acceptance by the carrier shall be packed in exterior type shipping containers in a manner that will insure safe transportation at the lowest rate to the point of delivery. Containers shall meet Consolidated Freight Classification Rules or Regulations of other common carriers as applicable to the mode of transportation.

5.3 Physical protection. Cushioning, blocking, bracing and bolting as required shall be in accordance with Specification JAN-P-100 except that for domestic shipments, water-proofing requirements for cushioning materials and containers shall be waived. Drop tests of Specification JAN-P-100 shall be waived when preservation, packaging, and packing of the item is for immediate use or when drop tests of Specification MIL-P-116 are applicable.

5.4 Marking. Interior and exterior containers shall be marked in accordance with Standard MIL-STD-129.

6. NOTES

6.1 Intended use. The circuit breakers covered by this specification are intended for use in ambients to 250°F to provide overload and short circuit protection for DC or AC circuits in B-52 aircraft which require a breaker that cannot be manually maintained closed when an overload condition exists.

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number, and date of this specification.
b. MS part number and title.
c. If sampling plan A tests (see 4.5.2.2) are required.
d. Selection of applicable levels of preservation and packaging, and packing.

6.3 With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved 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 to 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 Headquarters, Aeronautical Systems Division, Attn: ASNSPE, Wright-Patterson Air Force Base, Ohio, and information pertaining to qualification of products may be obtained from that activity.

6.4 Definitions

6.4.1 Ultimate trip current. Ultimate trip current is the smallest value of current that will cause tripping of the circuit breaker under a given set of ambient conditions.

6.4.1.1 Ultimate trip limits. The specified limits for ultimate trip current are maximum trip current and minimum ultimate trip current. At the maximum specified ultimate trip current the breaker will open within the specified time, and at the minimum specified ultimate trip current the breaker will not open.

6.4.2 Push-pull circuit breaker. Push-pull circuit breakers are those which may be manually actuated by an actuator moving in a direction perpendicular to the plane of the mounting plate.

6.4.3 Trip free. A trip-free circuit breaker is a breaker so designed that the circuit cannot be maintained closed when carrying overload currents that would automatically trip the breaker to the open position.

NOTICE. When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

LEE/ckc/klh
ASNSPE

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No 119-M004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner and send to preparing activity (as indicated on reverse hereof).

SPECIFICATION

ORGANIZATION (Of submitter)

CITY AND STATE

CONTRACT NO

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT
$

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1 HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A GIVE PARAGRAPH NUMBER AND WORDING

B RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2 COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)

SUBMITTED BY (Printed or typed name and activity)

DATE

DD FORM 1 APR 83 1426 REPLACES NAVSHIPS FORM 4883 WHICH IS OBSOLETE PLATT 152-6

FOLD

DEPARTMENT OF THE NAVY

POSTAGE AND FEES PAID
NAVY DEPARTMENT

OFFICIAL BUSINESS

COMMANDER
RESEARCH & TECHNOLOGY DIV. AND.
AERONAUTICAL SYSTEMS DIV.
SYSTEMS ENGINEERING GROUP (AFSC,SEP)
WRIGHT-PATTERSON AFB, OHIO 45433

FOLD

PLATE NO. 19419 (BACK