Bendix®

SPECIFICATION

BSC-C19J

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CONNECTORS, ELECTRIC, MINIATURE, CIRCULAR, QUICK DISCONNECT

TYPES JT-R AND JTS-R

ELECTRICAL COMPONENTS DIVISION
SIDNEY, NEW YORK 13838

THE Bendix CORPORATION

PRINTED IN U.S.A.

CONNECTORS, ELECTRIC, MINIATURE, CIRCULAR QUICK DISCONNECT, TYPES JT-R AND JTS-R.

1. SCOPE.

1.1. Scope:- This specification covers miniature, quick disconnect, circular, electric connectors, plugs and receptacles with removable crimp-type contacts and hermetically sealed receptacles with solder-type contacts. The maximim operating temperature shall be 150°C for JT assemblies and 200°C for JTS assemblies.

1.2. Classification:- This specification is applicable to plugs and receptacles for the following types, shell configurations, classes, arrangements, and styles, as well as any other connector which invokes this specification on its installation drawing.

1.2.1. Type:-

JT - 150°C (302°F) maximum operating temperature
JTS - 200°C (392°F) maximum operating temperature

1.2.2. Shell Configuration:-

1.2.2.1. Plugs:- Straight.

Procurement No.	Class
JT06RE-xx-xxx(xxx)	RE
JT06RE-xx-xxx(SR) or (xxx)	RE
JT06RP-xx-xxx(xxx)	RP
JTS06RE-xx-xxx(xxx)	RE
JTS06RE-xx-xxx(SR) or(xxx)	RE
JTS06RP-xx-xxx(xxx)	RP

1.2.2.2. Plugs:- Line (Cable Connecting).

Procurement No.	Class
JT01RE-xx-xxx(xxx)	RE
JT01RE-xx-xxx(SR) or (xxx)	RE
JT01RP-xx-xxx(xxx)	RP
JTS01RE-xx-xxx(xxx)	RE
JTS01RE-xx-xxx(SR) or (xxx)	RE
JTS01RP-xx-xx(xxx)	RP

1.2.2.3. Receptacles:- Wall Mounting

Procurement No.	Class
JT00RE-xx-xxx(xxx)	RE
JT00RE-xx-xxx(SR) or (xxx)	RE
JT00RP-xx-xxx(xxx)	RP
JTS00RE-xx-xxx(xxx)	RE
JTS00RE-xx-xxx(SR) or (xxx)	RE
JTS00RP-xx-xxx(xxx)	RP

1.2.2.4. Receptacles:- Box Mounting.

Procurement No.	Class
JT02RE-xx-xxx(xxx)	2
JT02RE-xx-xxx(SR) or (xxx)	
JT02RP-xx-xxx(xxx)	
JTS02RE-xx-xxx(xxx)	
JTS02RE-xx-xxx(SR) or (xxx)	
JTS02RP-xx-xxx(xxx)	

1.2.2.5. Receptacles:- Jam Nut Mounting.

Procurement No.	Class
JT07RE-xx-xxx(xxx)	RE
JT07RE-xx-xxx(SR) or (xxx)	RE
JT07RP-xx-xxx(xxx)	RP
JTS07RE-xx-xxx(xxx)	RE
JTS07RE-xx-xxx(SR) or (xxx)	RE
JTS07RP-xx-xxx(xxx)	RP
JT07Y-xx-xxx(xxx)	Y
JTS07Y-xx-xxx(xxx)	Y

1.2.2.6. Receptacles:- Solder Mounting.

Procurement No.	Class
JT1Y-xx-xxx	Y

NOTES. 1. See 3.6 for breakdown of procurement code.

2 These procurement numbers serve only to complete the series.

3 (SR) and other suffixes as shown in Table 1-1 indicate provision for strain relief.

1.2.3. Classes:-

RE - Environment resisting with sealing grommet.

RP - Environment resisting for potting.

Y - Hermetically sealed.

1.2.4. Arrangements:- As shown on drawings L-15208 through L-15224, except that alternate arrangements shall not be accomplished by rotating the insert but by rotating the master key or keyway as indicated on the applicable drawing.

1.2.5. Styles:-

Style P - Inserts intended for pin contacts.

Style S - Inserts intended for socket contacts.

1.2.6. Finishes:- A choice of finishes shall be available which shall include but not be limited to those indicated in Table 1-1.

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CODE 77820

SCINTILLA DIVISION
SIDNEY, N. Y., U. S. A.

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BSC-C19J

CHANGE A3

REL. NO. 43536-32 DATE 11-17-64

SHEET a

CHANGE RECORD			ENGINEERING CHG. APPROVAL
SYM.	CHANGE NO.	DATE	
A	36540-25	6-23-65	
A 1	36540-26	11-1-65	
A2	36540-29	12-19-66	
A3	36540-30	9-19-67	
A4			
A5			

LIST OF ACTIVE PAGES

PAGE	CHANGE SYM.	PAGE	CHANGE SYM.	PAGE	CHANGE SYM.	PAGE	CHANGE SYM.
i	A	12	A3	25	A3		
a	A3	13	A2	26	A3		
1	A3	14	A3	27	A1		
2	A3	15	A	28	A3		
3	A3	16	A3	29	A3		
4	A3	17	A3	30	A3		
5	A3	18	A	31	A3		
6	A3	19	A	32	A		
7	A2	20	A3	33	A2		
8	A3	21	A	34	A		
9	A3	22	A3	35	A3		
10	A2	23	A1				
11	A3	24	A3				

TABLE 1-1

Type & Class	Finish	Procurement No. Suffix: Without Strain Relief	Procurement No. Suffix: With Strain Relief
JT-RE & JT-RP	Cadmium over Nickel Plate	None	(SR)
	Bright Cadmium Plate	(001)	(304)
	Olive-drab Cadmium Plate	(003)	(301)
	Gray Anodize	(004)	(382)
	Hard Anodize	(005)	(300)
	Iridite	(011)	(344)
JT-Y	Tin Plate	None	N/A
JTS-RE & JTS-RP	Hard Anodize	None	(SR)
	Gray Anodize	(004)	(382)
JTS-Y	None (Stainless Steel)	None	N/A

1.3. Ratings:-

1.3.1. Temperature Rating:- The connectors of this specification are rated for continuous operation wherein any combination of ambient temperature and current loading of contacts does not produce an insert temperature in excess of the following limits:-

150°C (302°F) for Type JT.
200°C (392°F) for Type JTS.

1.3.2. Current Rating:- The maximum continuous current ratings for the individual contacts of the connectors of this specification shall be as specified in Table 1-2.

TABLE 1-2

Contact Continuous Current Rating		
Contact Size	Maximum Amperes	
	Non-hermetic	Hermetic
22M	3	2
22	5	3.5
20	7.5	5
16	13	10
12	23	17

NOTE: These ratings do not apply that all contacts in any of the respective insert arrangements can be simultaneously loaded with the current ratings specified. The ambient temperature plus the thermal rise of the insert, due to the power dissipated in the contacts of the insert arrangement and in the attached wire bundle, shall not produce an insert temperature in excess of that specified in 1.3.1.

1.3.3. Voltage Rating:- Actual observed minimum flashover values and recommended test voltage at altitude pressure equivalents are shown in Figure 5-1.

1.4. Wire Sealing:- Class RE and RT assemblies shall be designed to meet the environmental requirements of this specification using wire of outside diameter within the applicable range as shown below:

TABLE 1-3

Wire Sizes			
Contact Size	Wire Sizes (AWG)	Finished Wire OD (Inch)	
		Minimum	Maximum
22M	28, 26, 24	0.030	0.050
22	26, 24, 22	0.034	0.060
20	24, 22, 20	0.040	0.083
16	20, 18, 16	0.066	0.109
12	12, 14	0.097	0.142

Connectors shall meet the requirements specified when:

(a) A full complement of wire of the applicable minimum or maximum insulation diameter is installed.

(b) Any combination of wire diameters within the extremes of (a) above are used.

NOTE

For grommeted assemblies with followers, the total cumulative cross-sectional area of the wire bundle must not exceed the area resulting from a full complement of wires having the following diameters: .044", .052", .072", .095", and .126" for contact sizes 22M, 22, 20, 16, and 12 respectively.

2. APPLICABLE DOCUMENTS.

2.1. The following specifications, standards, and drawings, of the issue in effect on date of the latest revision of this specification, form a part of this specification to the extent specified herein:-

SPECIFICATIONS:-

Federal:-

QQ-P-416	Plating, Cadmium (Electro deposited)

Military:-

MIL-A-8625	Anodic Coatings for Aluminum and Aluminum Alloys
MIL-F-14072	Finishes for Ground Signal Equipment
MIL-C-5541	Chemical Films for Aluminum and Aluminum Alloys
MIL-D-1000	Drawings: Engineering and Associated Lists
MIL-L-9236	Lubricating Oil, Aircraft Turbine Engine, 400°F.
MIL-M-14	Molding Plastics and Molded Plastic Parts, Thermosetting
MIL-J-5624	Jet Fuel, Grades JP-4 and JP-5
MIL-S-7742	Screw Threads, Standard, Aeronautical
MIL-W-22759	Wire, Electric, Fluorocarbon Insulated, Copper
MIL-G-45204	Gold Plating (Electrodeposited)
MIL-T-10727	Tin Plating; Electrodeposited or Hot-dipped for Ferrous and Non-ferrous Metals

STANDARDS:-

Military:-

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-202	Test Methods for Electronic and Electric Component Parts
MS 33586	Metals, Definition of Dissimilar

2.2 Other Publications:- The following documents form a part of this specification. Unless otherwise indicated, the issue in effect on date of the latest revision of this specification shall apply.

National Bureau of Standards Publication

Handbook H28 - Screw-Thread Standards for Federal Services

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington 25, D.C.)

Aeronautical Materials Specification

AMS 2403. Nickel Plating.

3. REQUIREMENTS.

3.1. Qualification:- Any connector furnished under this specification shall be a product which has been tested and has passed the Qualification tests specified herein.

3.2. Materials:- Materials shall conform to applicable specifications and shall be as specified herein. Materials which are not covered by applicable specifications, or which are not specified herein, shall be of the best quality, of the lightest practicable weight, and suitable for the purpose intended. Dissimilar metals, as defined in Standard MS 33586, when employed in intimate contact with each other in a connector or in mated pairs of connectors, shall be suitably protected against electrolytic corrosion.

3.2.1. Nonmagnetic Materials:- Unless otherwise exempted by this specification, the relative permeability of the connector assembly shall be less than 2.0.

3.2.2. Shells and Coupling Rings:- Unless otherwise specified, shells and coupling rings shall be made from high-grade aluminum alloys. Shells for Class Y receptacles shall be steel and may be magnetic.

3.2.3. Inserts:- Rigid insert material for Classes RE & RP shall be glass filled epoxy or equivalent. Class Y inserts shall be vitreous. For pin contact inserts, a face gasket of fluorosilicone rubber shall be bonded to the front face of the rigid dielectric to effect a seal capable of meeting the performance requirements of this specification when the connector is mated with a suitable counterpart.

3.2.3.1. Grommets:- Wire and terminal sealing grommets shall be molded of a fluorosilicone elastomer of high dielectric quality such as to meet the performance requirements of this specification.

3.2.4. Contacts:- Contacts shall be made from a suitable conductive material and shall be gold plated over a suitable thickness of silver plate. Gold plate thickness shall be 50 microinch minimum for Type JT and 100 microinch minimum for Type JTS. Tin plating may be used for Class Y contacts.

3.2.5. Finish:- Plating or treatment shall be in accordance with the following:-

(a)	Cadmium over Nickel Plate	QQ-P-416, Type II; AMS 2403.
(b)	Bright Cadmium Plate	QQ-P-416, Type II, Class 3, except that a preliminary plating of other metal is permitted.
(c)	Olive-drab Cadmium Plate	
(d)	Gray Anodize	MIL-A-8625
(e)	Hard Anodize (Non-conductive)	MIL-F-14072, Finish E 516
(f)	Iridite 14-2 (Chromate Conversion)	MIL-C-5541
(g)	Tin Plate	MIL-T-10727
(h)	Gold Plate	MIL-G-45204

3.3. Design and Construction:- Connectors shall be designed and constructed to

conform to applicable drawings. Detail parts of plugs and receptacles shall be securely attached within their shells to ensure proper mating.

3.3.1. Contact Design:- Contact design shall be such that neither the pins nor the sockets will be damaged by any possible twisting or forcing during the process of mating connectors.

3.3.1.1. Pin-Engaging End:- The entering end of pin contacts shall be formed with a spherical radius approximately 1/2 the diameter of the pin for sizes 22, 22M and 20 and approximately 1/3 the diameter for size 16, allowing for a flat in the center of the spherical development not to exceed the value specified in Tables 3-1 or 3-2.

3.3.1.2. Socket Engaging End:- The entering end of the socket shall be rounded or chamfered to allow for directing and centering of the entering pin. The socket contact shall provide the spring action for maintaining the contacting pressure between the pin and the socket. All socket contacts shall be designed to exclude the entrance of a pin .0075 inch larger than the allowable maximum diameter of a mating pin and to pass the Resistance to Test Probe Damage Test specified in 4.9.4.

3.3.1.3. Dimensions:- Contact dimensions shall conform to Tables 3-1 or 3-2 and Figures 3-1 or 3-2 respectively. The illustrations are for dimensional purposes only and are not intended to indicate design. Dimensions are measured over plating.

TABLE 3-1

Crimp-type contacts - Controlled dimensions in inches

Size	B	C Max.	D	E	F	G	H	Y	L Max.
22M	.0305 .0295	.062	.062 .060	.030 .028	.008 Max.	.046 .044	.022 .018	.157 .141	.043
22	.0305 .0295	.062	.071 .069	.0375 .0355	.008 Max.	.052 .050	.022 .018	.157 .141	.043
20	.041 .039	.078	.094 .091	.048 .046	.011 Max.	.070 .068	.032 .026	.229 .209	.050
16	.0635 .0615	.113	.130 .127	.068 .066	.030 .020	.103 .101	.042 .036	.229 .209	.050
12	.095 .093	.161	.182 .179	.102 .098	.062 .052	.151 .148	.042 .036	.229 .209	.050

TABLE 3-2

Class Y Contacts - controlled dimensions in inches

Size	B	C Min.	E Min.	F	G	K	L	M
22M	.0305 .0295	.036	.028	.008 Max.	.046 .043	.114 .094	.080 .050	.067 .062
22	.0305 .0295	.036	.035	.008 Max.	.054 .051	.114 .094	.080 .050	.067 .062
20	.041 .039	.045	.042	.011 Max.	.066 .060	.145 .125	.100 .068	.076 .071
16	.0635 .0615	.067	.069	.030 .020	.103 .097	.161 .141	.100 .068	.109 .104
12	.095 .093	.099	.112	.062 .052	.142 .136	.161 .141	.100 .068	.145 .140

3.3.1.4. Contact Removal:- Contacts shall be removable except in Class Y receptacles.

3.3.1.5. Contact Material:- Contacts shall be fabricated from solid rod stock.

3.3.2. Insert Design:- For other than Class Y assemblies, the entire insert and wire sealing or wire supporting member shall be essentially one integral part designed to provide suitable sealing or support around the wires and to be non-removable. The design shall be such as to permit the removal and replacement of the individual contacts by means of the applicable tools. The contact locking device shall so retain the contacts as to meet the contact retention requirements of this specification. Inserts shall be secured to prevent rotation. Vitreous material shall be used to seal and insulate contacts in Class Y assemblies. Socket entry holes and pin "donut" rings shall conform to Fig. 3-3.

3.3.2.1. Contact Arrangement:- Contacts shall be arranged in accordance with the applicable drawing.

3.3.3. Coupling Connections:- Connector plugs shall be connected or coupled to their mating receptacles by means of coupling rings. Coupling rings shall be so designed that the pin and socket contacts will engage and disengage as the ring is respectively tightened or loosened. Coupling and uncoupling shall be accomplished by means of three pins, sliding in inclined slots in the coupling ring in accordance with dimensions on applicable drawings. Coupling rings shall be knurled or fluted. A positive lock for the coupling ring shall be provided when the plug is fully engaged with the mating receptacle. To provide for easy and quick inspection of the connector in fully mated condition with the coupling ring in the locked position, the coupling pins on receptacles shall be visible through suitable holes or slots in the coupling ring. The coupling method shall provide an audible sharp snap when the coupling ring is seated in the positive lock and connectors are fully engaged. The coupling method shall be so designed that safety wiring of the coupling ring will not be required.

3.3.4. Polarization:-Polarization of the plug with its receptacle shall be accomplished by integral keys and keyways. The design shall be such as to preclude

interference with the functioning of the coupling ring. The integral keys shall be of sufficient size that it will be impossible to assemble the connectors in more than one position. The keys and keyways shall be approximately rectangular in cross section. The polarization of the plug with its receptacle shall be accomplished before engaging the coupling ring.

3.3.4.1. Alternate Shell:- Shells shall be supplied with the master key or keyway rotated from the normal position if so specified in the connector part number. (See 3.6.1.) The relationship between insert arrangement center line and minor keys is always constant.

3.3.5. Screw Threads:- Screw threads shall be UNEF Class 2A or 2B, conforming to Specification MIL-S-7742.

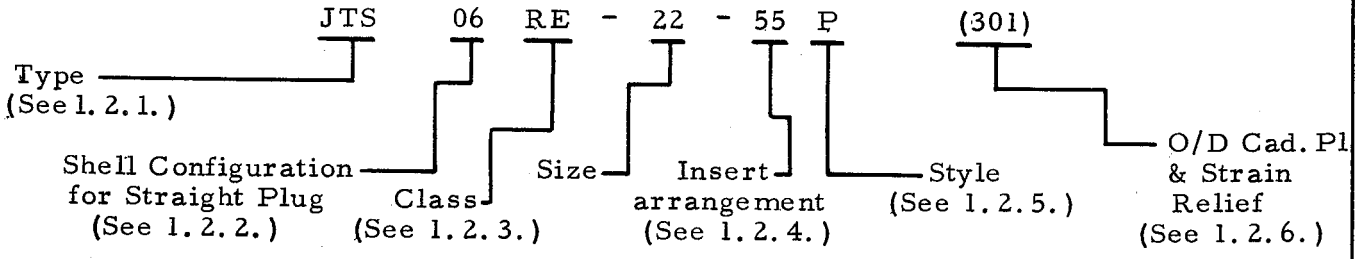
3.3.5.1. Gaging of Screw Threads:- Screw threads shall be checked after plating by means of ring and plug gages only in accordance with Handbook H28. Out-of-roundness beyond the tolerances of Specification MIL-S-7742 is not objectionable if the threads can be checked without forcing the thread gages.

3.3.5.2. Relief of Screw Threads:- Screw threads may be relieved provided such relief does not interfere with proper performance of the screw threads.

3.3.5.3. Lubrication:- Coupling ramps and coupling springs shall be coated with a suitable lubricant.

3.4. Part Number Changes:- Changes in manufacturer's part numbers shall be governed by the drawing number requirements of Specification MIL-D-1000.

3.5. Identification of Product:- Each connector shall be clearly and permanently marked on the shell or coupling ring with the manufacturer's name or trademark and with the appropriate procurement number, as in the following example:-



3.5.1. Alternate Shell Position Letter:- The letter A, B, C or D, as applicable, shall be added to the part number after the style letter when an alternate position is specified by the procuring activity. (See Fig. 3-4.)

Example:- JT06RP-22-55 PA (005).

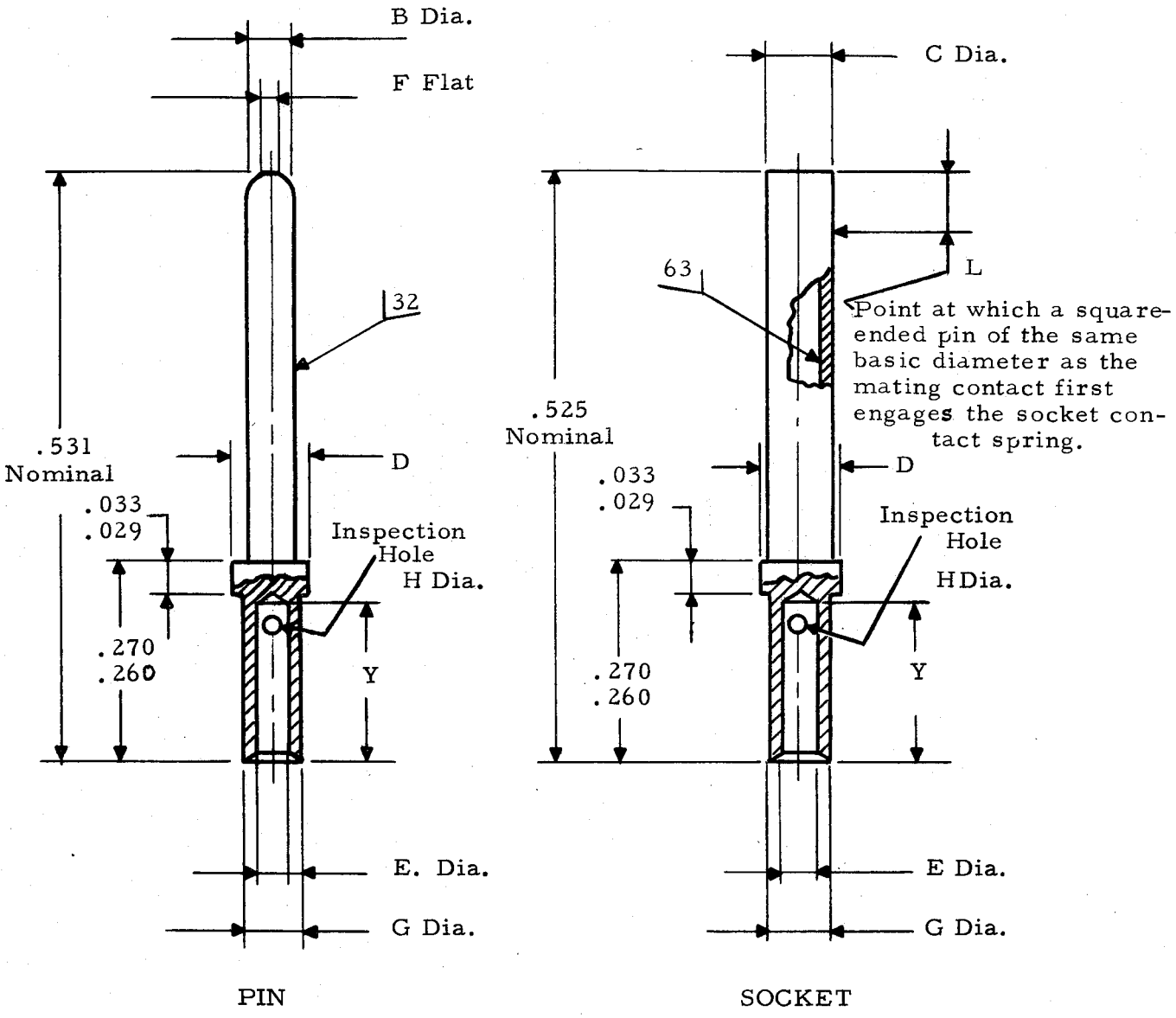

B Dia.
F Flat
32
.531
Nominal
.033
.029
D
Inspection
Hole
H Dia.
.270
.260
Y
E. Dia.
G Dia.
PIN
C Dia.
63
L
Point at which a square-ended pin of the same basic diameter as the mating contact first engages the socket contact spring.
.525
Nominal
.033
.029
D
Inspection
Hole
HDia.
.270
.260
Y
E Dia.
G Dia.
SOCKET

FIG. 3-1

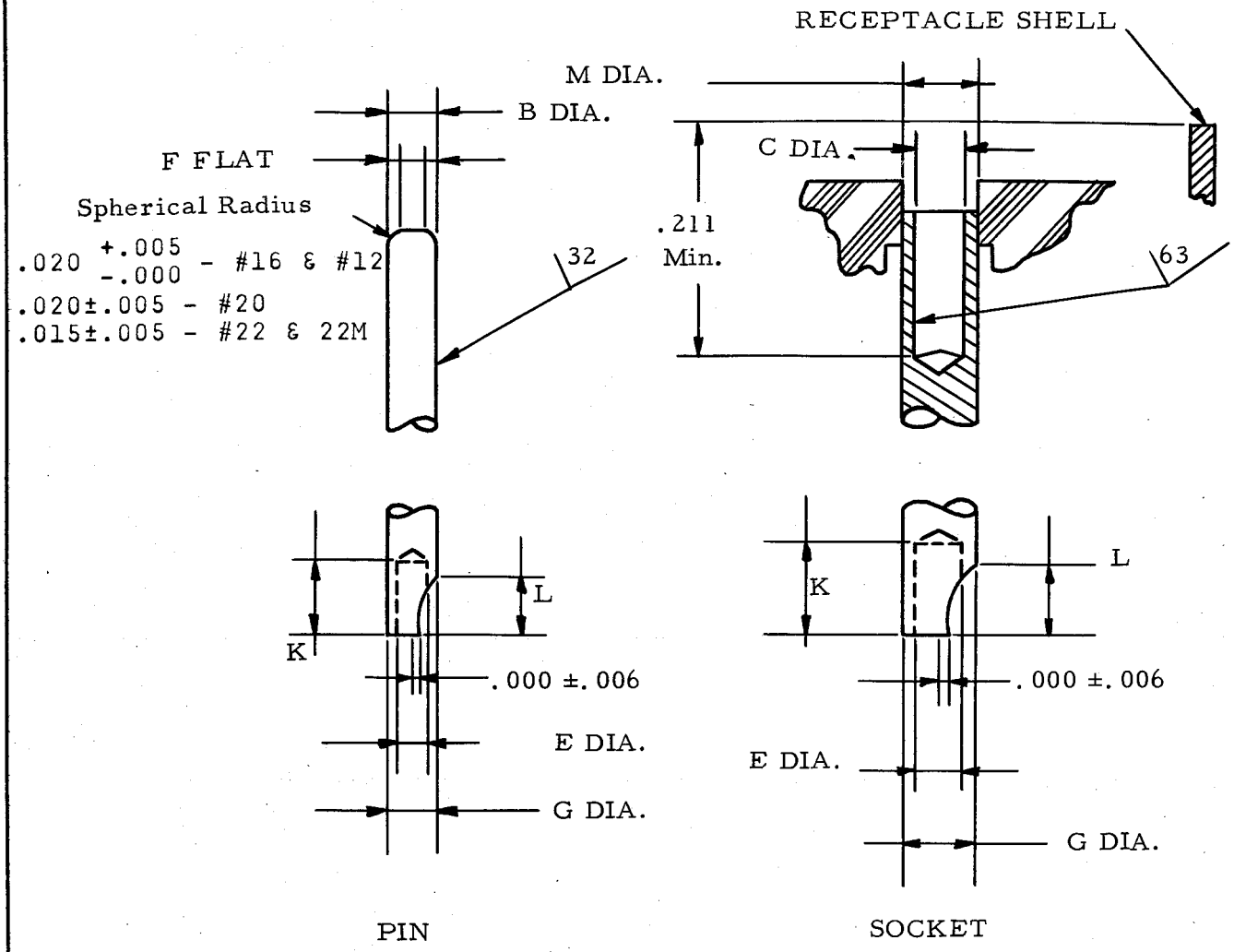

RECEPTACLE SHELL
M DIA.
B DIA.
F FLAT
Spherical Radius
.020 +.005 -.000 - #16 & #12
.020±.005 - #20
.015±.005 - #22 & 22M
32
C DIA.
.211 Min.
63
K
L
.000 ±.006
E DIA.
G DIA.
PIN
SOCKET

FIG. 3-2

3.6. Marking of Inserts:- Inserts shall be marked as shown on the applicable drawings.

3.6.1. Contact Identification:- Contact locations shall be designated by legible characters of contrasting color which shall all appear on the front face (except where space considerations do not permit without sacrifice of legibility) and as many as practicable on the rear face of each insert. Ambiguous identification of contacts shall be avoided by suitably positioning the characters, and letters or numerals tending to be confused with other letters or numerals may be omitted from sequence. Identification of socket insert shall agree with those of their mating pin insert counterparts.

3.7. Performance Characteristics:- Connectors shall perform as follows when subjected to the environments and tests specified:-

3.7.1. Maintenance Aging:- (Class Y excepted). Connectors shall be capable of meeting the performance requirements of this specification after having been subjected to several cycles of mating and unmating and insertion and withdrawal of contacts using the appropriate tools. To simulate accelerated service usage, the test of 4.7.1. shall be applied. The contact insertion force shall not exceed 10 pounds for size 22M and 22, 15 pounds for size 20 and 20 pounds for sizes 16 and 12 when used with maximum diameter wire.

3.7.2. Thermal Shock:- Unmated connectors, after having been tested in accordance with 4.7.2. to the extremes shown in Table 3-3, shall show no evidence of cracking, fracture or other damage detrimental to the operation of the connector.

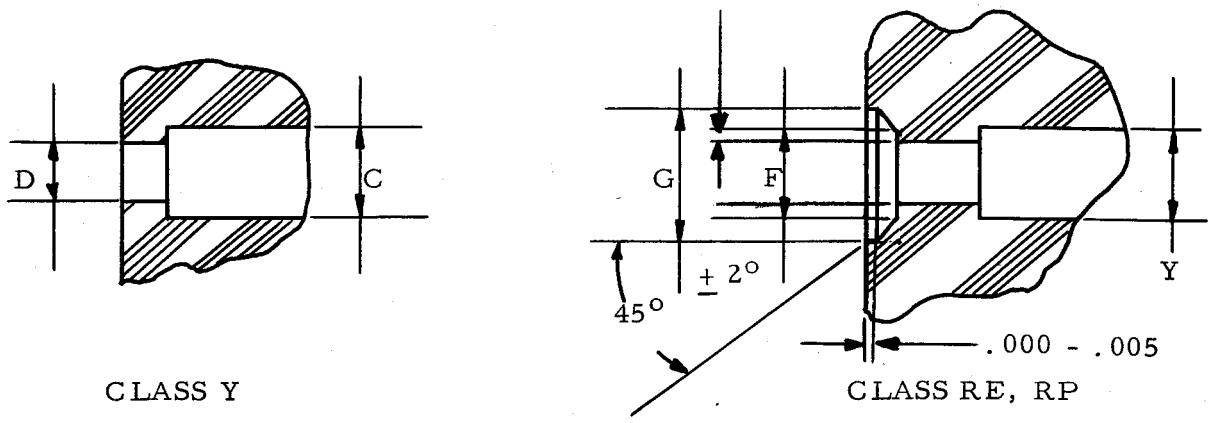
TABLE 3-3

Thermal Shock Cycling Extremes			
Type	Extremes	Degrees C	Degrees F
JT	Low	-65 +0 -3	-85 +0 -5
	High	150 +3 -0	302 +5 -0
JTS	Low	-65 +0 -3	-85 +0 -5
	High	200 +3 -0	392 +5 -0

3.7.3. Air Leakage (Class Y):- Receptacles, when subjected to the test of 4.7.3.1., shall not exhibit an air leakage greater than 0.01 micron cubic ft. per hour (1.02×10^{-7} cc/sec.)

3.7.4. Dielectric Withstanding Voltage:- Connectors shall show no evidence of flashover or breakdown when tested in accordance with 4.7.4. and when the applicable voltages of Table 3-4 are applied between any pair of contacts and between the shell and any contact.

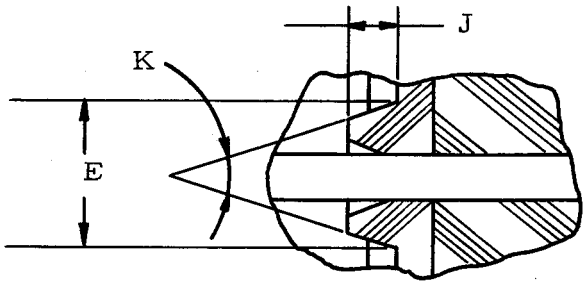
.000 - .005 ALL ROUND



CLASS Y

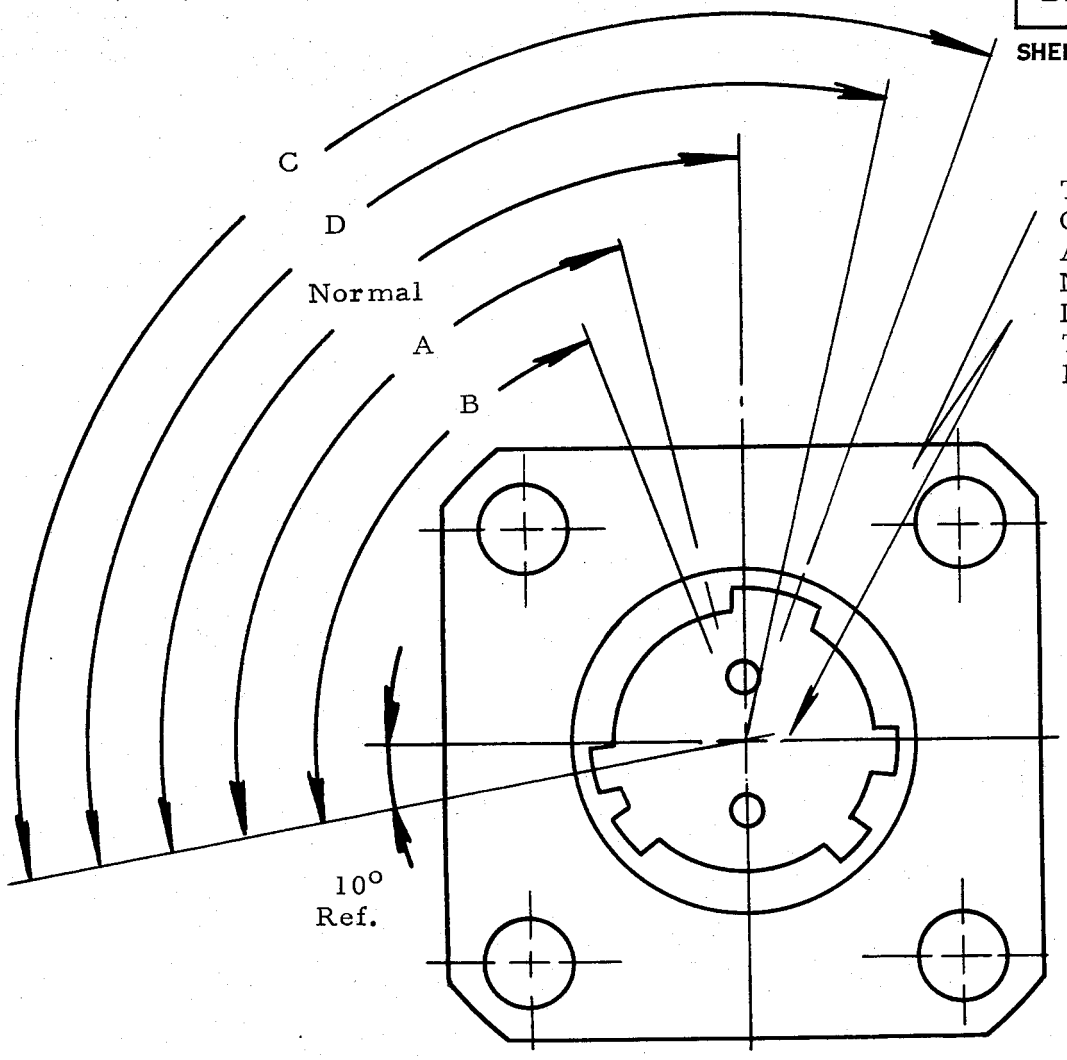
CLASS RE, RP

DETAIL A, SOCKET ENTRY



DETAIL B, PIN "DONUT"

Contact Size	Detail B			Detail A				
	E DIA.	J DIA.	K	F DIA.	G DIA.	Y DIA.	D DIA.	C DIA.
22 & 22M	.077 .069	.040 .030	28° 26°	.038 .035	.067 .063	.0665 .0640	.067 .062	.079 .077
20	.099 .091	.040 .030	28° 26°	.052 .049	.089 .085	.0860 .0830	.076 .071	.113 .110
16	.122 .114	.040 .030	28° 26°	.074 .071	.112 .108	.1210 .1180	.109 .104	.150 .147
12	.154 .146	.040 .030	28 26°	.106 .103	.144 .140	.1690 .1660	.145 .140	.212 .209



NOTE: FRONT FACE OF RECEPTACLE SHOWN. PLUG ROTATIONS ARE MIRROR IMAGE.

		SUFFIX LETTER DESIGNATION			
Shell	Normal	A	B	C	D
8	100°	82°	-	-	118°
10	100°	86°	72°	128°	114°
12	100°	80°	68°	132°	120°
14	100°	79°	66°	134°	121°
16	100°	82°	70°	130°	118°
18	100°	82°	70°	130°	118°
20	100°	82°	70°	130°	118°
22	100°	85°	74°	126°	115°
24	100°	85°	74°	126°	115°

FIG. 3-4 - MASTER KEYWAY ROTATIONS

TABLE 3-4

Test Voltages, AC rms

	Service Rating M		Service Rating I		Service Rating II	
	Mated	Unmated	Mated	Unmated	Mated	Unmated
Sea Level	1300	1300	1800	1800	2300	2300
50,000 ft.	800	550	1000	600	1000	800
70,000 ft.	800	350	1000	400	1000	500
110,000 ft.	800	200	1000	200	1000	200

3.7.5. Insulation Resistance:-

3.7.5.1. Insulation Resistance at Room Temperature:- When connectors are su subjected to the test of 4.7.5.1., the insulation resistance shall be greater than 150,000 megohms for Classes RE & RP, and 5,000 megohms for Class Y.

3.7.5.2. Insulation Resistance at Elevated Temperature (Class Y Excepted):- When measured in accordance with 4.7.5.2., the insulation resistance between any pair of contacts and between the shell and any contact shall be greater than 1000 megohms at 150°C (302°F) or 200 megohms at 200°C (392°F) for classes RE & RP.

3.7.6. Insert Retention:- Connectors, when tested in accordance with 4.7.6., and subjected to either an applied pressure of 100 psi or an equivalent axial load shall retain their inserts with no dislocation from normal position.

3.7.7. Contact Retention (Class Y Excepted):- When subjected to the contact retention test of 4.7.7., inserts assembled in connectors shall retain their contacts with applied axial loads of 10 pounds (size 22M and 22 contacts), 15 pounds (size 20 contacts) and 25 pounds (sizes 16 and 12 contacts) and the axial displacement shall not exceed 0.012 inch.

TABLE 3-5

Contact Resistance Limits

Class	Contact Size	Wire Size	Test Amps	Millivolt Drop Max. After Corrosion, Temperature Life, or Temperature Durability	Millivolt Drop Max. All Others
	12	12	23.0	40	25
	12	14	17.0	30	15
RE	16	16	13.0	40	25
	16	18	10.0	30	15
	16	20	7.5	30	15
&	20	20	7.5	50	35
	20	22	5.0	40	30
	20	24	3.0	35	25
RP	22	22	5.0	55	40
	22	24	3.0	45	30
	22	26	2.0	40	25
	22MD	24	3.0	45	30
	22M	26	2.0	40	25
	22M	28	1.5	35	20
	12	12	17.0	100	85
Y	16	16	10.0	100	85
	20	20	5.0	75	60
	22	22	3.5	95	85
	22M	24	2.0	75	60

3.7.8. Contact Resistance:- When subjected to the test of 4.7.8., the contacts in mated connectors shall meet the applicable values of contact resistance stipulated in Table 3-5 at the test currents specified therein.

3.7.9. Durability:- Mating pairs of connectors, when subjected to the test of 4.7.9., shall show no mechanical or electrical defects detrimental to the operation of the connectors after 250 cycles of mating and unmating.

3.7.10. Corrosion: Connectors, after subjection to the test conditions of 4.7.10., shall mate and unmate within the forces of 3.7.15., and shall conform to the contact resistance requirements of 3.7.8.

3.7.11. Vibration:- Completely wired and mated connectors, when subjected to the test of 4.7.11., shall not crack or break, and there shall not be loosening of parts. Receptacles shall maintain plugs in full engagement during vibration. There shall be no interruption of electrical continuity longer than 1 microsecond.

3.7.12. Shock:- Completely wired and mated connectors, when subjected to the test of 4.7.12., shall show no sign of damage. Circuit interruption shall not exceed 1 microsecond. The magnitude of the half-sine shock pulse shall be 300 gravity units and the duration shall be 3 ±1 milliseconds.

3.7.13. Moisture Resistance:- Mated connectors, when subjected to the test of 4.7.13., shall maintain an insulation resistance of 100 megohms or greater.

3.7.14. Solvent Immersion:- Unmated connectors, when subjected to the test of 4.7.14., shall mate within the torques specified in Table 3-6.

3.7.15. Operating Forces:- Connectors, when mated and unmated in accordance with the test of 4.7.15., shall comply with the torques of Table 3-6.

TABLE 3-6

Mating and Unmating Torques

Coupling Ring Size	Torque in Pound-Inches	
	Maximum Engagement	Minimum Disengagement.
8	8	1
10	12	1
12	16	2
14	20	4
16	24	4
18	28	5
20	32	6
22	36	7
24	36	7

3.7.16. Altitude Immersion:- When tested in accordance with 4.7.16., the mated connectors shall maintain an insulation resistance of at least 2,000 megohms and shall withstand a dielectric withstanding voltage of the applicable sea level value of Table 3-4.

3.7.17. Temperature Life:- When tested in accordance with 4.7.17., connectors shall perform satisfactorily and shall pass the succeeding tests in the sequence.

4. QUALITY ASSURANCE PROVISIONS.

4.1. Classification of Tests:- The inspection and testing of connectors shall be classified as follows:-

(a) Qualification Tests:- Qualification tests are those tests performed on samples submitted for approval as qualified products.

(b) Acceptance Tests:- Acceptance tests are those tests performed on individual lots which have been submitted for acceptance.

(c) Process Control Tests:- Process control tests are those tests performed at periodic intervals on representative samples of production connectors to assure that manufacturing processes are in control.

4.2. Qualification Tests:-

4.2.1. Qualification Test Samples:- Qualification test samples shall consist of the following:-

(a) Eighteen wall mounting receptacles, Class RE, with mating straight plugs, Class RE with strain relief, shall be provided. These shall consist of two samples of the densest contact arrangement of each service rating in three shell sizes.

(Number of samples for JT & JTS - 36)

(b) Eighteen jam nut receptacles, Class Y, with mating straight plugs, Class RE, shall be provided. These shall consist of two samples of the densest contact arrangement of each service rating in three shell sizes.

(Number of samples for JT & JTS - 36)

(c) Two mating connectors of each of the following:-

1. Straight plug and wall mount receptacle of each type, Class RE.

2. Straight plug, Class RE, and jam nut receptacle, Class Y, of each type.

The connectors shall be in two different shell sizes but all three service ratings shall be represented.

(Number of samples for JT & JTS - 8)

(d) Forty-five pin and socket contacts of each size and type.

(e) Two shells (i.e., without inserts and contacts) and two coupling rings (less springs) representing each finish for which qualification is sought.

4.2.2. Qualification Test Procedure:- Qualification tests shall consist of all the examinations and tests of this specification as described in 4.6 and 4.7. The procedure shall be as follows:-

(a) All connector samples shall be subjected to the Examination of Product, paragraph 4.6., and then wired in accordance with 4.5.1.

TABLE 4-1

Qualification and Process Control Test Procedure

Group 1 (JT-RE, JTS-RE, JT-Y, JTS-Y).	Requirement	Test
Maintenance Aging (Classes JT-RE & JTS-RE only)	3.7.1.	4.7.1.
Thermal Shock	3.7.2.	4.7.2.
Air Leakage (Class Y only)	3.7.3.	4.7.3.
Operating Forces	3.7.15.	4.7.15.
Altitude Immersion (Classes RE & RP Qualification only)	3.7.16.	4.7.16.
Insert Retention	3.7.6.	4.7.6.
Corrosion	3.7.10.	4.7.10.
Operating Forces	3.7.15.	4.7.15.
Contact Resistance	3.7.8.	4.7.8.
Solvent Immersion (Lubricating Oil Only)	3.7.14.	4.7.14.
Group 2 (JT-RE, JTS-RE)		
Maintenance Aging	3.7.1.	4.7.1.
Contact Retention	3.7.7.	4.7.7.
Insulation Resistance at Room Temperature	3.7.5.1.	4.7.5.1.
Thermal Shock	3.7.2.	4.7.2.
Operating Forces	3.7.15.	4.7.15.
Insulation Resistance at Elevated Temperature (Qualification Only)	3.7.5.2.	4.7.5.2.
Dielectric Withstanding Voltage, Sea Level	3.7.4.	4.7.4.1.
Dielectric Withstanding Voltage, Altitude (Qualification Only)	3.7.4.	4.7.4.2.
Durability	3.7.9.	4.7.9.
Vibration	3.7.11.	4.7.11.
Shock	3.7.12.	4.7.12.
Moisture Resistance	3.7.13.	4.7.13.
Solvent Immersion (JP-4 only)	3.7.14.	4.7.14.
Dielectric Withstanding Voltage, Sea Level	3.7.4.	4.7.4.1.
Contact Resistance	3.7.8.	4.7.8.
Group 3 (JT-Y, JTS-Y)		
Thermal Shock	3.7.2.	4.7.2.
Air Leakage	3.7.3.	4.7.3.
Durability	3.7.9.	4.7.9.
Operating Forces	3.7.15.	4.7.15.
Vibration	3.7.11.	4.7.11.
Shock	3.7.12.	4.7.12.
Dielectric Withstanding Voltage, Sea Level	3.7.4.	4.7.4.1.
Insultaion Resistance at Room Temperature	3.7.5.1.	4.7.5.1.
Moisture Resistance	3.7.13	4.7.13.
Contact Resistance	3.7.8.	4.7.8.
Solvent Immersion (JP-4 only)	3.7.14.	4.7.14.

TABLE 4-1 (Continued)

Group 4 (Qualification only) (JT-RE, JTS-RE, JT-Y, JTS-Y)

	Requirement	Test
Operating Forces	3.7.15.	4.7.15.
Dielectric Withstanding Voltage (Sea Level)	3.7.4.	4.7.4.1.
Insulation Resistance at Room Temperature	3.7.5.1.	4.7.5.1.
Temperature Life	3.7.17.	4.7.17.
Dielectric Withstanding Voltage (Sea Level)	3.7.4.	4.7.4.1.
Insulation Resistance at Room Temperature	3.7.5.1.	4.7.5.1.
Operating Forces	3.7.15.	4.7.15.
Contact Resistance	3.7.8.	4.7.8.

Group 5 Contacts

	Test	Subgroups		
		I	II	III
Examination of Contact	4.9.1.	x	x	x
Crimp Deformation	4.9.2.	x		x
Temperature Durability (Qualification only)	4.9.3.	x		
Contact Resistance	4.7.8.	x	x	
Probe Damage	4.9.4.		x	
Contact Engagement & Separation Forces	4.9.5.	x	x	x
Durability Conditioning (Qualification only)	4.9.6.		x	
Contact Resistance	4.7.8.		x	
Tensile Strength	4.9.7.			x
Examination of Contact	4.9.1.	x	x	x

(b) The samples selected under 4.2.1. (a) shall be divided into two similar groups for each type. These groups shall be designated Group 1 and Group 2 and each group shall be subjected to the appropriate tests of Table 4-1 in the sequence indicated.

(c) The samples selected under 4.2.1. (b) shall be divided into two similar groups for each type. These groups shall be designated Group 1 and Group 3 and each group shall be subjected to the appropriate tests of Table 4-1 in the sequence indicated.

(d) The samples selected under 4.2.1. (c) shall be subjected to the tests of Table 4-1, Group 4, in the sequence indicated.

(e) Forty-five crimp-type pin and socket contacts of each size and type selected under 4.2.1. (d) shall be wired and divided into subgroups in accordance with 4.8. and then subjected to the tests of Group 5, Table 4-1.

(f) The specimens selected under 4.2.1. (e) shall be subjected to the Corrosion test of 4.7.10. and no other test.

4.2.2.1. Qualification Testing Rejection and Retest:- There shall be no failures in any examination or test of the connectors or specimens submitted for qualification tests. After any failure, the activity responsible for qualification shall receive assurance and details of changes made in the connector before initiating any further tests deemed necessary to assure compliance of the connector.

4.3. Acceptance Tests:- Acceptance tests shall consist of the following tests performed on each inspection lot. An inspection lot shall consist of all connectors with the same part number presented for acceptance at one time. Statistical sampling shall be in accordance with MIL-STD-105 or equivalent.

(a) Examination of product.
(b) Air leakage (Class Y only)
(c) High potential (Sea Level) (Except Class Y)
(d) Insulation Resistance at Room Temperature (Except Class Y)
(e) Contact Engagement and Separation Forces-(Socket Contacts)

4.3.1. Examination of Product:- This test shall consist of a visual and mechanical inspection for compliance with requirements of 4.6. The acceptance quality levels (AQL) shall be 0.25 percent for major defects and 1.0 percent for minor defects. Major and minor defects shall be defined in Standard MIL-STD-105.

4.3.2. Air Leakage:- Class Y receptacles shall be mounted in a suitable test apparatus to detect a leakage in excess of 10^{-7} cc per second when pressurized on the front face with 15 psi differential of a gas containing not less than 10 percent helium. The acceptance quality level shall be 0.25 percent.

4.3.3. Electrical Tests:- The following electrical tests may be performed using contacts similar to standard contacts except with the retention shoulder removed. Alternatively, for the high potential test, smaller diameter pins may be used provided that the test is conducted in a helium atmosphere . Connectors with a grommet shall be tested with a simulated clamp assembly.

4.3.3.1. High Potential Test:- A potential, as indicated in Table 3-4, shall be applied between adjacent contacts and between the outer contacts and the shell or simulated clamp assembly. A leakage current of one milliampere or more constitutes failure. The acceptable quality level shall be 0.25 percent.

4.3.3.2. Insulation Resistance Test:- The insulation resistance shall be measured between contacts and between contacts and shell or simulated clamp assembly at points of least physical spacing. At least two circuits in each connector shall be tested. All circuits checked shall show insulation resistance in excess of 150,000 megohms at an applied potential of 500 volts DC. The acceptable quality level shall be 0.25 percent.

4.3.4. Contact Engagement and Separation Forces:- Socket contacts, before or after assembly into the connectors, shall be tested in accordance with 4.9.5. The acceptable quality level shall be 1.0 percent based on the number of contacts. For acceptance testing, the values need not be recorded.

4.3.5. Statistical Acceptance Inspection:- The statistical sampling and acceptance quality levels for acceptance testing shall be in accordance with the requirements specified herein. When a manufacturer employs an "in process" quality control that results in a finished connector that will comply with an equivalent or tighter quality level than that specified, the manufacturer's "in process" controls may be used in lieu of the acceptance testing procedure for each lot of connectors as specified herein.

4.4. Process Control Tests:- Process control tests shall consist of the following tests performed on representative production connectors. Tests shall be performed at least once every three months, tests being conducted alternately on JT and JTS samples during the period connectors are being manufactured to meet the requirements of this specification.

4.4.1. Sampling:-

(a) Eighteen wall mount receptacles, Class RE, with mating straight plugs, Class RE, shall be provided. Two samples of the densest contact arrangement in each service rating shall be submitted in three representative shell sizes of Type JT or JTS.

(b) Eighteen jam nut receptacles, Class Y, with mating straight plugs, Class RE, shall be provided. Two samples of the densest contact arrangement in each service rating shall be submitted in three representative shell sizes of Type JT or JTS.

(c) Forty-five crimp-type pin and socket contacts of each size for Types JT and JTS.

4.4.2. Tests:- Specimens, selected or prepared in accordance with 4.4.1., shall be tested as follows:-

(a) All connector samples shall be subjected to the Examination of Product test of 4.6., and then wired in accordance with 4.5.1.

(b) One sample (Plug and Receptacle) of 4.4.1. (a) and (b) of each shell size and class shall be subjected to the applicable tests of Group 1, Table 4-1.

(c) One sample (plug and receptacle) of 4.4.1. (a) of each shell size and class shall be subjected to the applicable tests of Group 2, Table 4-1.

(d) One sample (plug and receptacle) of 4.4.1. (b) of each shell size shall be subjected to the applicable tests of Group 3, Table 4-1.

(e) Forty-five crimp-type pin and socket contacts of each size shall be wired and divided into subgroups in accordance with 4.8. and subjected to the tests of Group 5, Table 4-1.

4.4.3. Modified Test Program:- Connectors produced under this specification must be capable of meeting the Process Control tests specified in 4.4.2. When a manufacturer employs an "in process" quality control and/or has conducted sufficient Process Control tests on these or similar connectors so that documentary proof exists that will demonstrate the connectors are capable of meeting a required test, that test may be omitted or modified at the discretion of the Quality Control Department with the written approval of the Engineering Department.

4.4.4. Rejection and Retest:- Connectors, components, or materials which have been rejected as a result of the Acceptance Tests 4.3., may be replaced or reworked to correct the defects and resubmitted for acceptance. Before resubmitting, full particulars concerning previous rejection and the action taken to correct the defects found in the original shall be furnished the inspector. Connectors rejected after retest shall not be resubmitted without the specific approval of the Engineering Department. Upon failure of the samples selected and tested in accordance with Process Control tests (4.4.), evidence of corrective action in current production will be required.

4.5. Test Conditions:- Unless otherwise specified, tests required by this specification shall be made under any combination of conditions within the following ranges: Temperature, 20° to 30°C (68° to 86°F), relative humidity, 30 to 80 percent; barometric pressure, 24 to 31 inches of mercury. Any specified modification of a condition shall not affect the ranges permitted for the other ambient test conditions.

4.5.1. Test Wires:- Wire used for all tests of Groups 1, 2 and 4 shall conform to MIL-W-22759 and shall have a smooth outer jacket of teflon which shall be of waterproof construction in order not to affect the insulation readings of the connectors. Wire used for RE connectors in the above groups shall be chosen with outside diameter within the extremes of Table 1-3. Each of these groups shall contain roughly the same number of samples with maximum diameter wire as with minimum diameter wire. Wire used for the remaining groups may be any wire suitable for the purpose intended. Where potting adherence is required, wire insulation shall be suitably treated.

4.6. Examination of Product :- The connectors and piece parts shall be examined or controlled to ensure conformance with all requirements of this specification and the applicable detail documents. Examination shall assure compliance with the following requirements:-

(a) Materials
(b) Design and construction
(c) Interchangeability
(d) Finish
(e) Identification of product
(f) Workmanship

4.7. Tests (Connectors):-

4.7.1. Maintenance Aging:- After installing all contacts, remove and insert at random a minimum of 20%, but not less than 3, of the contacts from each connector. Remove and reinsert the same contacts 4 additional times for a total of 5 removals and reinsertions using applicable tools. The contact insertion forces shall be measured during the third insertion cycle on the last 50%, but not less than 3, of the contacts selected for this test. The forces shall comply with the requirements of 3.7.1.

4.7.2. Thermal Shock Test:- Unmated connectors shall be subjected to five continuous cycles of temperature change as indicated in Table 3-3. The two temperature extremes specified shall form the limits of the cycle. The first exposure shall be from room temperature to the low extreme. The connectors shall be maintained at each extreme for a minimum period of 30 minutes in each cycle. The connectors shall be transferred from one chamber to the other for the temperature changes. The time of exposure to room temperature shall not exceed 2 minutes during each transfer. Exposure to low temperature, then high, shall form one cycle. At the completion of the last cycle, the connector shall be returned to room conditions for inspection.

4.7.3. Air Leakage (Class Y):- When subjected to a differential of one atmosphere, receptacles shall prevent the leakage of more than 0.01 micron cu. ft. per hour. The pressure shall be applied to either face of the sample. A suitable means shall be employed to determine the leakage of a pressurizing gas, containing not less than 10 percent helium by volume, through the connector while the specified pressure is applied.

4.7.4. Dielectric Withstanding Voltage Test:-

4.7.4.1. Dielectric Withstanding Voltage at Sea Level:- Unmated connectors shall be tested in accordance with MIL-STD-202, Method 301. The applicable test voltage shown in Table 3-4 shall be applied between any three pairs of adjacent contacts and between the shell and three contacts adjacent to the shell. If an insert contains more than one voltage or service rating, similar connections shall be made for the different test voltages necessary.

4.7.4.2. Dielectric Withstanding Voltage at Altitude:-Mated connectors and unmated connectors with pin contacts shall be placed in a suitable chamber capable of simulating altitudes of 50,000 ft., 70,000 ft., and 110,000 ft. The test shall be in accordance with MIL-STD-202, Method 301. The applicable test voltage of Table 3-4, shall be applied between any three pairs of adjacent contacts and between the shell and any three contacts adjacent to the shell. Electrification time shall be 2 seconds minimum. The leads of all test circuits shall be taken out through the walls of the chamber and shall be unsealed.

4.7.5. Insulation Resistance Test:-

4.7.5.1. Insulation Resistance at Room Temperature:- Connectors shall be tested in accordance with MIL-STD-202, Method 302, Test Condition B. The resistance shall be measured between three pairs of adjacent contacts and between the shell and three peripheral contacts.

4.7.5.2. Insulation Resistance at Elevated Temperature:- The insulation resistance between three pairs of adjacent contacts and between the shell and any three contacts adjacent to the shell of unmated connectors shall be measured in accordance with 4.7.5.1. except that the connector shall have been exposed to an ambient temperature as shown below for a period of 30 minutes. The resistance measurement shall be made while the connector is still in the temperature chamber at the elevated temperature.

Type JT	150°C (302°F)
Type JTS	200°C (392°F)

4.7.6. Insert Retention Test:- Connectors shall be subjected to axial loads without their inserts being dislocated from their normal position in the connector shell. Loading shall be accomplished by applying pressure or the equivalent axial load to the front face of the insert. The pressure shall be increased gradually at a rate of approximately 10 pounds per second until the specified pressure is reached. The insert shall retain its normal location in the shell for 5 seconds at the specified pressure.

4.7.7. Contact Retention Test:- Axial loads shall be applied to crimp contacts in connectors from the engaging end. The rate of application shall be approximately 1 pound per second after the slack of the contact has been taken up. The grommet follower shall be removed for this test.

4.7.8. Contact Resistance Test:- Resistance of contacts shall be determined in accordance with Standard MIL-STD-202, Method 307, and the following details:-

(a) Voltmeter-ammeter method shall be employed.

(b) Voltage probes shall be placed on the contacts at their extremities. To facilitate testing, voltage probes may be so positioned as to include a reasonable length of wire, if the resistance of the wire is subtracted from the value so obtained.

(c) Removable crimp-type contacts tested uninstalled in connectors shall be mated to normal service depth.

4.7.9. Durability Test:- Connectors shall be subjected to 250 cycles of mating and unmating at a rate not exceeding 200 cycles per hour. The coupling rings shall be operated is such a manner as to simulate actual service.

4.7.10. Corrosion Test:- Unmated plugs and receptacles shall be subjected to a salt spray test in accordance with MIL-STD-202, Method 101, Test Condition B. Shell components for qualification testing shall be subjected to Test Condition A. Immediately after exposure, the exterior surface of the connectors and all surfaces of other specimens shall be thoroughly washed in tap water and dried in a circulating air oven at a temperature of 38°C ±3° (100°F ±5°) for a period of 12 hours. The specimen shall then be removed and inspected. There shall be no exposure of basic metal due to corrosion.

4.7.11. Vibration Test:- Connectors shall be tested in accordance with MIL-STD-202, Method 204, Condition B, and the following details. Class Y receptacles shall be potted for this test. A receptacle shall be mounted on a suitable fixture. The receptacle and fixture shall be mounted on a vibration table. The vibration of the receptacle shall be monitored by a suitable sensor at a point on the fixture near a receptacle support point or on the receptacle itself. Counterpart plugs shall be engaged with the mounted receptacles and held by normal locking means only. No safety wire shall be used. All contacts shall be wired in a series circuit and a

current of at least 100 milliamperes shall be arranged to flow through the series circuit during vibration. A means shall be employed to monitor the current flow and to indicate any discontinuity of 1 microsecond interruption of current flow. The wire bundles shall be clamped to non-vibratory points at least 8 inches from the rear of the connectors. The clamping length may be selected, or changed, to avoid resonance of the wire bundle.

4.7.12. Shock Test:- Connectors shall be subjected to transient shock pulses as specified in 3.7.12. One shock shall be applied in each of the three major axes. At least one shock shall be applied in the major axis of the connector such that the resultant force tends to disengage the connectors. Receptacles shall be mounted on the shock device or carriage. Plugs shall be engaged with the receptacles and held by normal locking means only. The connectors shall be fully wired and the wire bundle clamped to points that move with the connector. A minimum of 8 inches of wire shall be unsupported behind the rear of each connector. Using the method described in 4.7.11., discontinuities of current flow in excess of 1 microsecond shall be monitored.

4.7.13. Moisture Resistance Test:- Mated and wired connectors shall be subjected to the moisture resistance test of MIL-STD-202, Method 106, with the following exceptions and details:-

(a) Class Y receptacles shall be potted or otherwise protected at the rear end.

(b) Steps 7a and 7b not required.

(c) There shall be no drip loops in the wire.

(d) Wires shall be brought out of the chamber through vapor-tight seals.

(e) There shall be no wire splices in the chamber.

(f) Upon completion of step 6 of the final cycle, and while the connectors are still subjected to high humidity, the insulation resistance shall be measured in accordance with 4.7.5.1.

4.7.14. Immersion Test:- Unmated connectors shall be immersed fully in the fluids specified below for the required period. At least one connector shall be immersed in each fluid. After removal from the fluid, each connector shall remain for one hour in free air at room conditions. The connector shall then be mated with a counterpart connector.

(a) Jet Fuel JP-4 conforming to MIL-J-5624 - 20 hours.

(b) Aircraft lubricating oil conforming to MIL-L-9236 - 20 hours.

4.7.15. Operating Forces Test:- Receptacles shall be suitably mounted to accept counterpart plugs. Plugs shall be positioned to allow engagement with receptacles. A torque shall be applied to the coupling ring tending to engage the mating connectors. Measurement shall be made of the torque required for full engagement. Torque in the direction reversed from that of the engaging operation shall then be applied to disengage the connector and the torques shall be measured.

4.7.16. Altitude Immersion:- Mated connectors shall be immersed in a container of water at approximately 20°C and placed in a chamber. All wire ends shall be terminated within the altitude chamber, exposed to the chamber atmosphere, but not submerged. The exposed wire ends shall not be sealed. A quantity of salt, 5 percent by weight, shall be added to make the water conductive. The chamber pressure shall be reduced to approximately 1 inch of mercury and maintained for 30 minutes. The chamber pressure shall then be slowly returned to atmospheric. This shall be considered to be one cycle. Two additional cycles shall be performed. At the end of the last cycle and while the connector is still submerged, the insulation resistance test of 4.7.5.1. shall be performed. A dielectric withstanding voltage of the applicable sea level value of Table 3-4 shall be applied between the same points as those used for insulation resistance measurements. The voltage shall be applied while the connectors are still immersed, but at sea level.

4.7.17. Temperature Life:- Wired and mated connectors shall be subjected to the indicated ambient temperature for a period of 1,000 hours.

Type JT	150°C +3 -0	(302°F +5 -0)
Type JTS	200°C +3 -0	(392°F +5 -0)

4.8. Individual Contact Specimens:- Crimping of individual contact specimens shall be performed prior to submission to the test sequence of Table 4-1, Group 5. The wire used shall be to MIL-W-22759 except that nickel plated wire shall not be used. The following wire/contact combinations shall be prepared using the appropriate tools.

Number	Contact Size	Wire Size AWG
15	22M	24
15	22M	26
15	22M	28
15	22	22
15	22	24
15	22	26
15	20	20
15	20	22
15	20	24
15	16	16
15	16	18
15	16	20
15	12	12
15	12	14

The specimens shall be divided into three subgroups, designated I, II, III, Each subgroup shall have 5 samples of each contact/wire combination.

4.9. Tests (Contacts):-

4.9.1. Examination of Contact:- The crimped contact shall be carefully examined to determine conformance with this and applicable portions of referenced specifications which are not covered by other specific tests herein. Examination of the contact shall include inspection to determine if the required identification marking is legible, if the contact is free of mechanical defects and cracks around the external crimp area, and if the contact meets the physical requirements herein. The contacts shall be inspected through a device having a magnification power of approximately 3 diameters.

4.9.2. Crimp Deformation:- Crimp contacts, wired as specified in 4.8., shall comply with the following requirements:

The maximum deformation which includes the maximum out-of-roundness, the axial bending due to crimping, and the maximum TIR eccentricity permitted the contact during its manufacture shall not exceed a total value of .015 inch T.I.R. This shall be measured by chucking the pin contact on the "B" dia. and the socket contact on the "C" dia. (See Fig. 3-1), and indicating the deformation run-out by means of a dial indicator. The probe of the indicator shall be located on the crimp barrel in such a way as to indicate the maximum deformation possible. Probe shape should be suitable for the purpose intended.

4.9.3. Temperature Durability:- Mated, wired contacts shall be subjected to an ambient temperature of 150°C + 3° -0° for Type JT and 200°C +3°-0° for Type JTS contacts for a minimum of 1000 hours. Following this test, the mated contacts shall be allowed to return to room temperature prior to performing the subsequent tests.

4.9.4. Resistance to Test-Probe Damage:- The socket contacts shall be installed into an insert and a means employed to prevent their rotation relative to the insert during the test. A test probe shall be inserted into each contact to a nominal depth as given, measured from the face of the insert. The socket contacts shall be maintained in a horizontal position with the test-probe free and unsupported. A constant bending moment, as indicated in Table 4-2, shall be applied and the insert assembly shall be slowly rotated one complete revolution. The test probe for each size socket contact shall consist of a hardened steel pin with a spherical radius tip having a nominal diameter equal to the mating pin contact.

TABLE 4-2

Contact	Depth of Insertion (inch)	Bending Moment (pound-inches)
22 & 22M	5/32	1/8
20	5/32	1/2
16	3/16	2
12	7/32	2

4.9.5. Contact Engagement and Separation:- Socket contacts shall be mounted in a suitable position or fixture for applying gradually increasing loads for the engagement and separation of test pins from the sockets. Maximum and minimum test pins shall be in accordance with 4.9.5.1. Insertion of test pins shall be to a depth of 0.105 inch minimum. The test pin shall not bottom in the socket. The sequence of operations shall be as follows:-

(a) Insert and separate a maximum diameter pin into and from each socket contact. Measure and record engagement forces.

(b) Insert and separate a minimum diameter pin in and from each socket contact. During separation of the minimum test pin, the forces should be measured and recorded.

The values so obtained shall comply with the forces of Table 4-3.

4.9.5.1. Test Pins:- The insertion tips of test pins for contact engagement and separation tests of sockets shall be as follows:-

(a) Hardened steel.

(b). Engaging tip - spherical radius of 1/2 the pin diameter.

(c) Finish - 3 rms. Mircoinches surface roughness maximum.

(d) O.D. - maximum pin - Size 22 & 22M -0.0305 +.0002 -.0000
Size 20 -0.041 +.0002 -.0000
Size 16 -0.0635 +.0002 -.0000
Size 12 -0.095 +.0002 -.0000

(e) O.D. - minimum pin - Size 22 & 22M -0.0295 +.0000 -.0002
Size 20 -0.039 +.0000 -.0002
Size 16 -0.0615 +.0000 -.0002
Size 12 -0.093 +.0000 -.0002

TABLE 4-3

Contact Engagement and Separation Forces - Ounces

	Size 22 & 22M	Size 20	Size 16	Size 12
Minimum (with min dia. pin)	0.75	0.75	2.0	3.0
Maximum (with max. dia. pin)	12.0	18.0	24.0	30.0

4.9.6. Durability Conditioning:- Mated, wired contacts shall be subjected to 250 cycles of engagement and separation at a rate not to exceed 200 cycles per hour. Engagement and separation shall be similar to that encountered in actual service. After 250 cycles, the unmated pins and sockets shall be subjected to a Salt Spray test in accordance with MIL-STD-202, Method 101, Test Condition B. The contacts shall not be in connectors during the Salt Spray test. Immediately following exposure, all exposed surfaces shall be washed thoroughly with tap water and dried in a circulatory air oven at a temperature of 38° ±3°C. The contacts shall be removed from the oven and mated.

4.9.7. Tensile Strength:- Contacts shall be placed in a suitable tensile testing machine and sufficient axial load applied to pull the wire out of the contact or break the wire. The wire shall not pull out nor shall the wire or contact break or become distorted to the extent of being unfit for further use before the minimum tensile strength as specified in Table 4-4 is reached. The rate of travel of the head of the tensile machine shall be approximately 1 inch per minute. Wire breakage, not due to crimping, at less than the tensile loads specified in Table 4-4 shall not constitute a failure.

TABLE 4-4

Wire Size	Tensile Strength (lbs. min.)
28	3
26	5
24	8
22	12
20	20
18	40
16	50
14	70
12	110

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5. NOTES.

5.1. Definitions:-

5.1.1. Connector Assembly:- A complete connector assembly consists of a mated plug and receptacle.

5.1.2. Receptacle:- A connector receptacle is that portion of the connector assembly which is normally "fixed", that is, rigidly attached to a supporting surface. It may be provided with either pin or socket contacts.

5.1.3. Plug:- A connector plug is that portion of the connector assembly which is normally "removable" after disengagement of the coupling ring. The plug may be provided with either pin or socket contacts.

5.1.4. Shell:- A connector shell is the outside case into which the insert and contacts are assembled.

5.1.5. Insert:- A connector insert is that part which holds the contacts in their proper arrangement and electrically insulates them from each other and from the shell.

5.1.6. Pin:- A connector pin is a male contact. It is normally connected to the "dead" side of a circuit.

5.1.7. Socket:- A connector socket is a female contact. It is normally connected to the "live" side of a circuit.

5.2. Intended Use:- The various shell configurations and classes of connectors are intended for use as follows:-

(a) A straight plug is intended for use at the end of a cable and mates with a receptacle.

(b) A cable connecting plug is actually a receptacle intended for use at the end of a cable and has no mounting provisions. It mates with a straight plug.

(c) A wall mounting receptacle is intended for wall or bulkhead mounting.

(d) A box mounting receptacle is intended for use on shielding boxes or equipment cases.

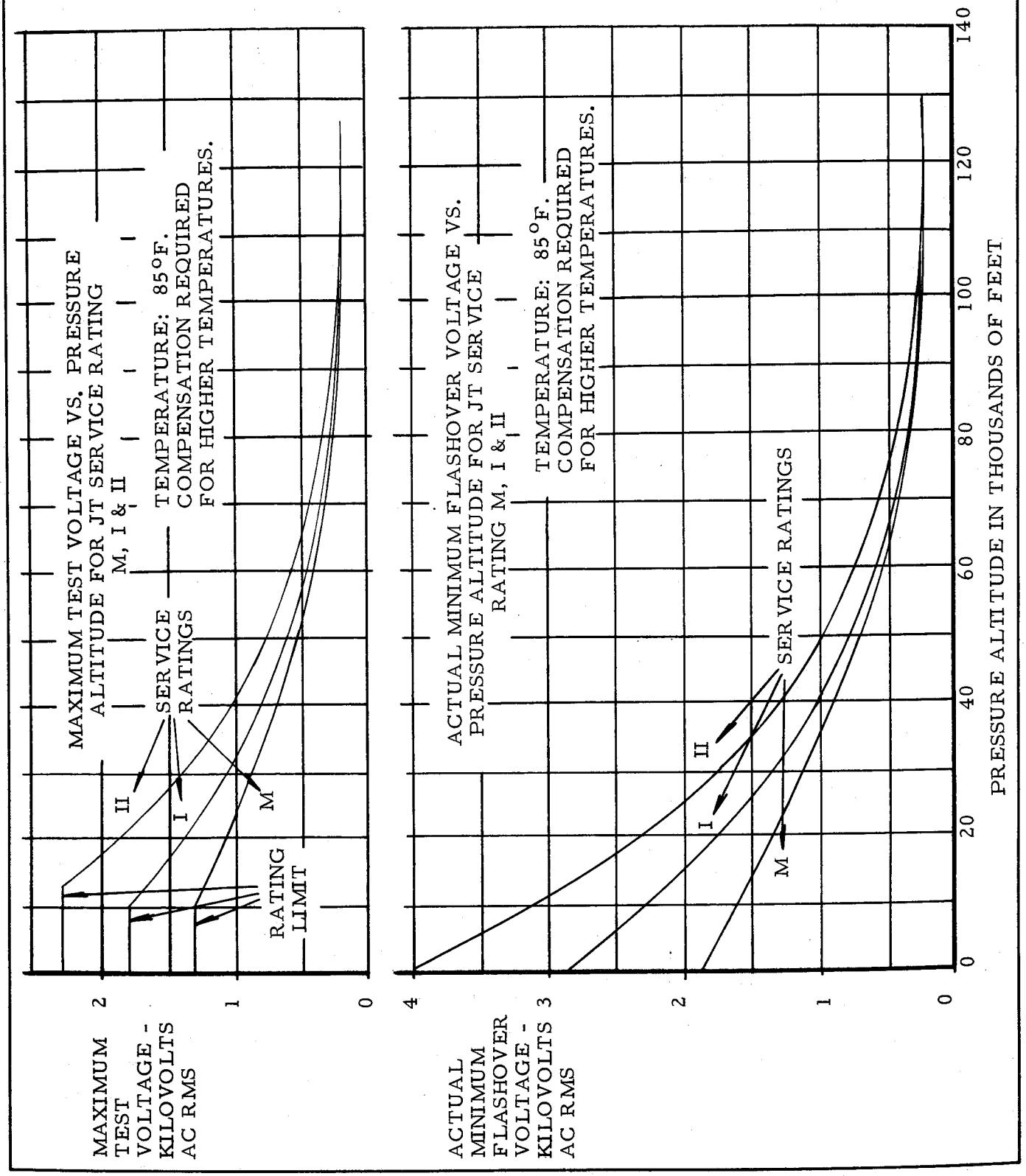
(e) A solder mount receptacle is similar to a box mount except for shell configuration. It is available only in Class Y.

(f) A jam nut receptacle is similar to a wall mount except that it is installed through a D hole in the bulkhead.

(g) Class RP connectors are intended for potting. To ensure proper adhesion, the wire insulation in the potting area should be suitably treated.

5.3. Use of Alternate Key and Keyway Positions:- When connectors of the same size and arrangement are installed sufficiently adjacent to one another to provide a danger of mating a plug with the wrong receptacle, it is intended that alternate key and keyway positions should be employed, as provided by 3.6.1.

FIG. 5-1


MAXIMUM TEST VOLTAGE VS. PRESSURE ALTITUDE FOR JT SERVICE RATING M, I & II
TEMPERATURE: 85°F. COMPENSATION REQUIRED FOR HIGHER TEMPERATURES.
SERVICE RATINGS
II
I
M
RATING LIMIT
MAXIMUM TEST VOLTAGE - KILOVOLTS AC RMS
0
1
2
ACTUAL MINIMUM FLASHOVER VOLTAGE VS. PRESSURE ALTITUDE FOR JT SERVICE RATING M, I & II
TEMPERATURE: 85°F. COMPENSATION REQUIRED FOR HIGHER TEMPERATURES.
SERVICE RATINGS
II
I
M
ACTUAL MINIMUM FLASHOVER VOLTAGE - KILOVOLTS AC RMS
0
1
2
3
4
0
20
40
60
80
100
120
140
PRESSURE ALTITUDE IN THOUSANDS OF FEET

5.4. Ordering Data:- Procurement documents should specify title, number and date of this specification, type, classes, sizes, and styles of connectors required (see 1.2.).

5.4.1. Variants:-For variants on finishes, accessories, etc, outside the scope of this specification, consult factory for availability and procurement information.

5.5. Performance:- The tests of mated connectors covered in the Dielectric Withstanding at Altitude and the Altitude Immersion tests of this specification are overstress tests, intended to demonstrate the sealing capabilities of mated connectors. They are not to be taken as indicative of recommended service usage. Operating voltages for unmated connectors with suitable allowances for transients, switching surges, safety factor, etc, appropriate to the particular circuit in which the connector is to be used.

5.5.1. Altitude Performance:- Figure 5-1 illustrates typical observed altitude flashover values obtained at simulated altitudes with the connectors unmated. It is recommended that this data be used as a guide to establish operating voltage limitations.