

Detail specification for

**Multi-contact circular
electrical connectors for
d.c. and low frequency
applications —
Bayonet coupling
non-barrier sealed,
environment resistant
with rear insertable, rear
release, rear removable
crimp contacts also
barrier sealed with
non-removable solder
contact styles —
Full plus airframe fit
assessment**

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 120 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date	Comments

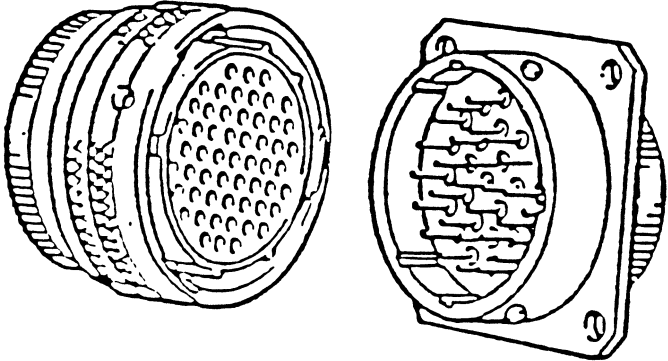
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Specification obtainable from: BRITISH STANDARDS INSTITUTION LINFORD WOOD MILTON KEYNES MK14 6LE TELEPHONE 0908 220022: TELEX 825777	Page 1 of 120
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH BS 9520	MANUFACTURER'S TYPE NUMBER: See PD 9002 For ordering information see clause 5
TYPICAL CONNECTORS  For marking information see clause 4 For outline drawings see A.2	MULTI-CONTACT CIRCULAR ELECTRICAL CONNECTOR Bayonet coupling non-barrier sealed, environment resistant with rear insertable, rear release, rear removable crimp contacts also barrier sealed with non-removable solder contact styles ENVIRONMENTAL CATEGORY 65/175/56 FULL PLUS AIRFRAME FIT ASSESSMENT

* Refer to Qualified Products list PD 9002 for details of manufacturers approved to this specification.

1 Pattern number

The specification number without the letters BS is used as the pattern number. This range of connectors is known as Pattern 9522 N0003.

2 Related documents

BS 2011, *Environmental testing — Part 2.1T: Test T. Soldering.*

BS 5772, *Basic testing procedures and measuring methods for electromechanical components for electronic equipment.*

BS 6001, *Sampling procedures for inspection by attributes.*

BS 9000, *General requirements for a system for electronic components of assessed quality.*

BS 9520:1983, *Specification for electrical connectors of assessed quality for d.c. and low frequency application: generic data, methods of test and capability approval procedures.*

BS 9521 F0003, *Detail specification, removable contacts, low frequency.*

BS 9521 F0004, *Detail specification, removable contacts, low frequency.*
BS 9522, *Rules for the preparation of detail specifications for circular electrical connectors of assessed quality for d.c. and low frequency applications. Full and basic assessment levels.*
BS 4G 178, *Crimped joints for aircraft electrical cables and wires.*
BS 3G 198, *Sleeves for aircraft electric cables and equipment wires — Part 1: Specification for elastomeric sleeves for binding and identification.*
BS 2G 202, *Specification for design and performance requirements for airframe-fit electrical connectors for d.c. and low frequency a.c. applications.*
BS G 210, *Specification for PTFE insulated equipment wires (with silver plated copper conductors).*
BS 2G 223, *Specification for screen terminating devices for aircraft electric cables.*
PD 9002, BS 9000, BS CECC and IECQ qualified products list.
PD 9004, BS 9000, CECC and IECQ UK administrative guide.

3 Description of connector and intended application

Multi-contact circular connector with bayonet coupling for d.c. and a.c. applications.

- a) Non-barrier sealed, environment resistant, with removable crimp contacts.
- b) Barrier and panel sealed, environment resistant with non-removable solder contacts.

Crimp type contacts are rear insertable, rear release and rear removable using the appropriate insertion and removal tools. This is indicated by a blue circumferential band marked on the housing (shell).

To ensure compliance with this specification connectors shall always have a full complement of contacts fitted (with filler plugs behind unwired contacts).

Polarization is achieved by housing (shell) keys and keyways and there are five different polarizations, designated N (normal), A, B, C and D. The polarization available for each connector is shown in A.1. See Appendix A for polarization arrangement drawings.

Housing (shell) material is aluminium alloy with a standard finish of olive drab chromate conversion over cadmium plate. Other finishes are available. See 4.2.

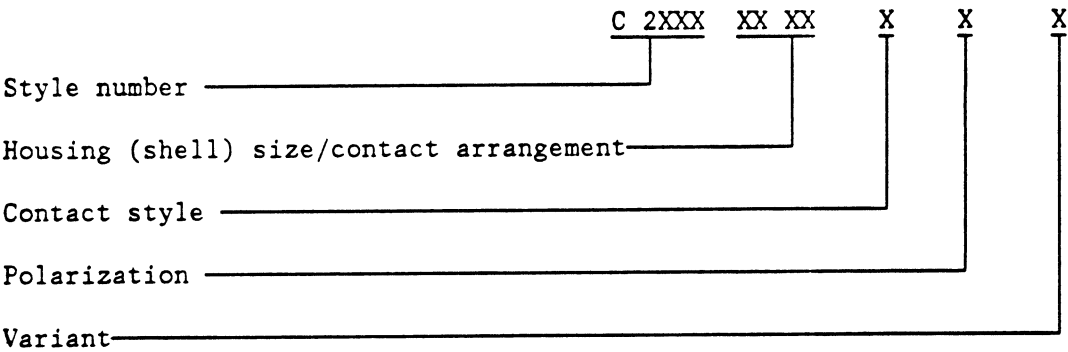
NOTE 1 Galvanic corrosion may occur if connectors with dissimilar metal finishes are intermated.
NOTE 2 The performance of connectors to this specification is only assessed with mated pairs from the same manufacturer.
NOTE 3 Contact arrangements containing 22 or 22M contacts are non-preferred and are inactive for new design. Most arrangements containing 22M contacts can be replaced by similar arrangements using 22D contacts, see Appendix A.1.

4 Marking of the component and package

4.1 General

The marking shall be in accordance with 1.1.6 of BS 9520:1983, with additional housing (shell) marking as in clause 3 of this specification. The individual reference number required by 1.1.6 c) of BS 9520:1983 consists of abbreviations to identify individual connectors, accessories or tools in accordance with 4.2 and 4.3 of this specification.

4.2 Connector reference numbers



Style number:	C2XXX as shown in A.2 of this specification
Housing (shell) size/contact arrangement:	Two plus digits as shown on the appropriate outline drawing in Appendix A
Contact style:	M = male contact. F = female contact.
Polarization:	N, A, B, C or D availability for a particular arrangement of housing (shell) keys and keyways (see Appendix A)
Variant:	A digit denoting any variation from the basic specification: 0 = standard finish of olive drab chromate conversion over cadmium plate; 1 = clear chromate conversion over cadmium plate; 2 = electroless nickel; (limited salt version) 3 = hard anodize (black) (non-conductive)

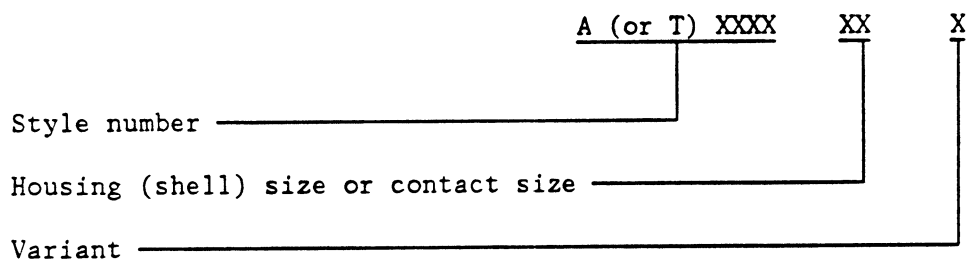
Example reference number: C 2021 18 35 MNO

Where the connector is supplied complete with an accessory, the reference number shall also include the applicable accessory style number (see also **4.3** and **A.3**).

Example reference number: C 2021 18 35 MNO A 2028

4.3 Accessory and tool reference numbers

The individual reference numbers consist of abbreviations as follows:



Style number:	As shown in A.3 for accessories and A.4 for tools. (A = accessory, T = tool).
Housing (shell) size:	Quoted only for accessories. Two digits as in A.1 .
Contact size:	Quoted only for filler plugs or tools ^a . Two digits as in A.3 or A.4 .
Variant:	Quoted for accessories. Digit as for connector (see A.2).
Example reference numbers:	A 2027 18 0 T 2260 20

^a Add letter suffix where applicable, e.g. 22D.

4.4 Packaging

Packaging shall be in accordance with the requirements of clause **11** of BS 2G 202:1988 and shall include the manufacturer's full instructions, including wire preparation, crimping and contact insertion, if requested. [See **5 d**) of this specification.]

5 Ordering information

The following information shall be given when ordering components complying with the requirements of this specification.

- a) The number of this detail specification, i.e. BS 9522 N0003 plus issue number and date.
- b) The individual (type) reference number as described in clause **4** of this detail specification and manufacturer's type number.
- c) Details of marking that may be required in addition or as an alternative to that specified in clause **4** of this detail specification.
- d) Requirements for the provision of assembly instructions.

6 Drawings

See Appendix A of this specification for the following.

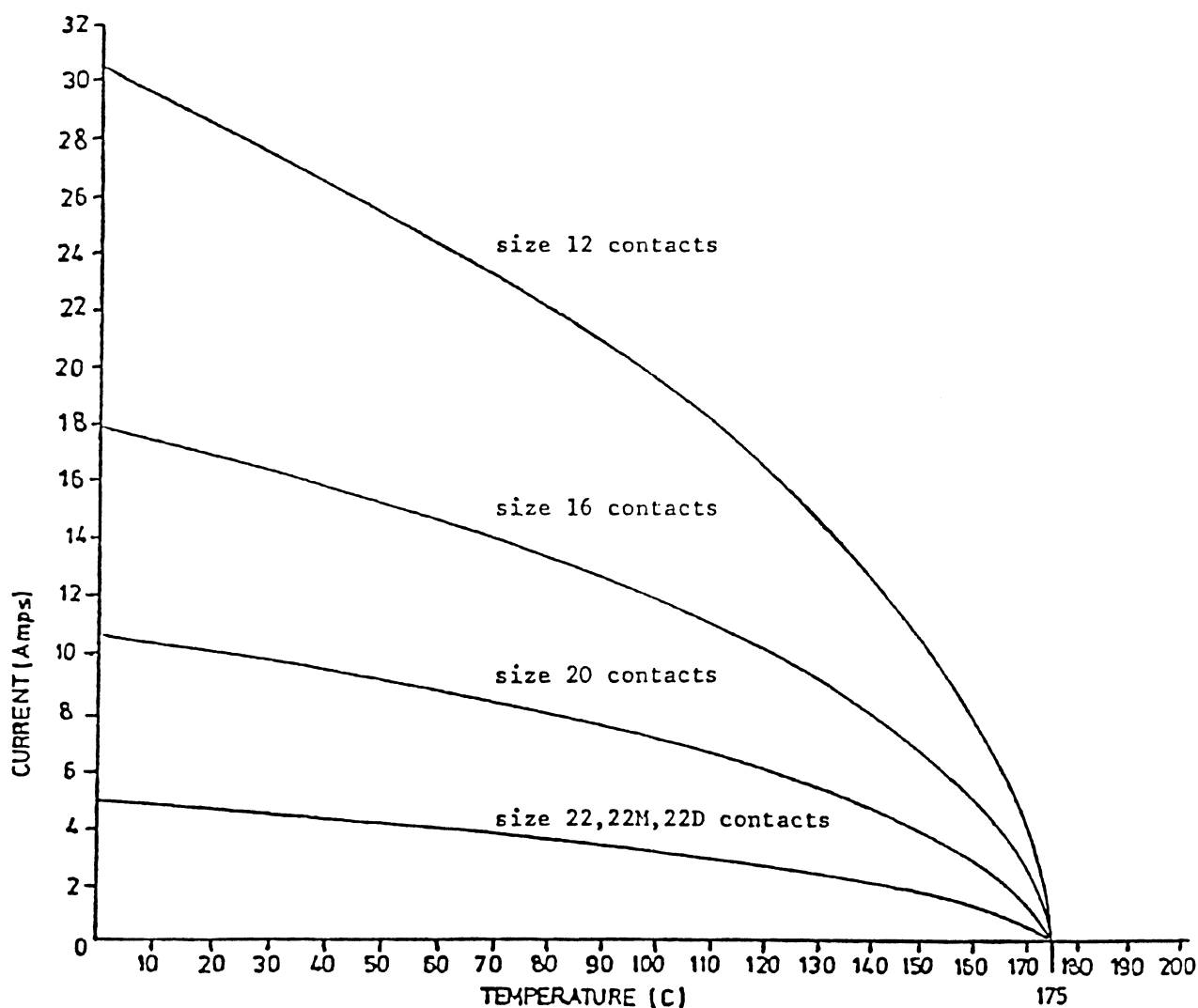
- A.0 Mechanical compatibility information
- A.1 Contact arrangements (mating faces)
- A.2 Connector outline dimensions, panel cut outs and mass
- A.3 Accessories and contacts, outline dimensions and mass
- A.4 Assembly tools
- A.5 Gauges

7 Ratings

7.1 Electrical

7.1.1 Current

a) Maximum current-temperature derating curves¹⁾ (established by test 5b of BS 5772-3).



NOTE The user is responsible for ensuring that connectors operate within the limitations shown.

¹⁾ These curves are also included in Part 1 of Appendix A of the declaration of design and performance as prescribed in clause 13 of BS 2G 202:1988.

b) Maximum current per contact through all contacts simultaneously at an ambient temperature of 125 °C.

Contact size	Current (A)
22, 22M, 22D	3
20	6
16	10
12	16

c) Overload current per contact applied for 0.35 s (+ 0.05 s – 0.0 s) at between 15 °C and 35 °C.

Contact size	Current (A)
22, 22M, 22D	100
20	180
16	380
12	900

7.1.2 Voltage

Voltage rating ^a	M		I		II	
	Mated	Unmated	Mated	Unmated	Mated	Unmated
Working voltage ^b (nominal) d.c. or a.c. peak Sea level (1 013 mbar) ^c 21 340 m (70 000 ft) (44 mbar) ^c	550 250	550 170	850 300	850 200	1 250 380	1 250 230
Voltage proof d.c. or a.c. peak Sea level (1 013 mbar) ^c 21 340 m (70 000 ft) (44 mbar) ^c	1 825 1 100	1 825 500	2 525 1 400	2 525 600	3 250 1 400	3 250 600

^a See A.1 for voltage rating of each contact arrangement.

^b Establishment of electrical safety factors is the responsibility of the user.

^c 1 mbar = 100 N/m² = 100 Pa.

7.2 Environmental

Climatic classification	65/175/56
Low air pressure (sealing)	44 mbar
Vibration severity	In accordance with test 1.2.6.3.2.2 and 1.2.6.3.2.3 of BS 9520:1983
Shock severity	981 m/s ² (100g _n) for 6 ms
Acceleration severity	981 m/s ² (100g _n)
Bump severity	390 m/s ² (40g _n) for 6 ms 4 000 ± 10 bumps

7.3 Endurance

Mechanical operation	500 operations (except style C 2021) 250 operations (style C 2021 only)
Electrical load and temperature long term [current as in 7.1.1 b)]	1 000 h at 125 °C
Electrical load and temperature short term (no electrical load)	250 h at 175 °C
Mechanical load and temperature test 1.2.7.3 of BS 9520:1983	1 000 h at 175 °C

8 Characteristics

8.1 Connector and accessory range

See A.1, A.2 and A.3 of this specification.

8.2 Electrical

Maximum contact resistance (initially)	5 mΩ
Maximum contact resistance (after conditioning)	10 mΩ
Minimum insulation resistance (initially)	5 000 MΩ method A or B ^a (see 1.2.4.4 of BS 9520)
Minimum insulation resistance (after conditioning)	100 MΩ method A or B ^a (see 1.2.4.4 of BS 9520)
Minimum insulation resistance (hot, mated pair)	100 MΩ method A or B ^a (see 1.2.4.4 of BS 9520)
Housing (shell) electrical continuity (style C 2021 only)	
(initially)	5 mΩ max.
(after conditioning)	10 mΩ max.
Housing (shell) electrical continuity (except style C 2021) (initially and after conditioning)	200 mΩ max.

^a Method B values shall be recorded.

8.3 Mechanical

8.3.1 Maximum engaging and maximum and minimum separating forces connector

Housing (shell)	Engaging and separating forces (maximum)		Separating force (minimum)	
	N·m	lbf·in	N·m	lbf·in
08	0.90	8	0.22	2
10	1.36	12	0.22	2
12	1.80	16	0.45	4
14	2.26	20	0.90	8
16	2.71	24	0.90	8
18	3.16	28	0.90	8
20	3.61	32	1.13	10
22	4.06	36	1.36	12
24	4.97	44	1.58	14

8.3.2 Insert retention in housing (shell), axial. Minimum 690 kN/m² (100 lbf/in²) or 111 N minimum force (25 lbf).

8.3.3 Contact retention (in insert)

Contact size	N min.	lbf min.
22, 22M, 22D	44	9.9
20	67	15.0
16	112	25.2
12	112	25.2

8.3.4 Contact holding force

Contact size	N min.	lbf min.
22, 22M, 22D	0.20	0.04
20	0.20	0.04
16	0.56	0.13
12	0.83	0.19

8.3.5 Insert retention in housing (shell), torsional

Housing (shell) size	N·m min.	lbf·in min.
8	0.90	8
10	1.13	10
12	1.36	12
14	1.58	14
16	1.80	16
18	2.04	18
20	2.26	20
22	2.48	22
24	2.71	24

8.3.6 Coupling pin strength. 222 N (50 lbf) min.

8.3.7 Pressure sealing (air leakage). Applicable only to style C 2025. Initially and after conditioning 1 cm³/h max.

8.3.8 Grounding contact spring holding force²⁾

Housing (shell) size	N min.	lbf min.
08	1.77	.40
10	1.97	.44
12	2.17	.49
14	2.36	.53
16	2.56	.58
18	2.75	.62
20	2.95	.66
22	3.05	.69
24	3.34	.75

8.3.9 Male contact stability

Contact size	Force		Total displacement (max.)	
	N	lbf	mm	in
22, 22M, 22D	1.2	0.27	0.76	0.030
20	2.4	0.54	1.37	0.054
16	4.9	1.10	1.91	0.075
12	4.9	1.10	1.91	0.075

²⁾ Applicable only to C 2021.

8.3.10 External bending moment

Housing (shell) size	N·m	lbf·in
08	11.3	100
10	33.9	300
12	45.2	400
14	56.5	500
16	67.8	600
18	79.1	700
20	90.4	800
22	101.7	900
24	113.0	1 000

8.3.11 Accessory thread strength

Housing (shell) size	N·m	lbf·in
08	11.3 (± 1.1)	100 (± 10)
10	11.3 (± 1.1)	100 (± 10)
12	17.0 (± 1.7)	150 (± 15)
14	17.0 (± 1.7)	150 (± 15)
16	22.6 (± 2.3)	200 (± 20)
18	22.6 (± 2.3)	200 (± 20)
20	28.3 (± 2.8)	250 (± 25)
22	28.3 (± 2.8)	250 (± 25)
24	28.3 (± 2.8)	250 (± 25)

8.3.12 Cable clamping³⁾

Housing (shell) size	Cable/wire bunch o.d. mm	Force			
		Bend		Pull	
		N (min.)	lbf (min.)	N	lbf
08	6.35	222	50	55.6	12.5
10	9.52	334	75	55.6	12.5
12	12.70	334	75	55.6	12.5
14	15.88	445	100	111.2	25.0
16	19.05	556	125	111.2	25.0
18	22.22	556	125	166.8	37.5
20	25.40	556	125	166.8	37.5
22	28.58	556	125	166.8	37.5
24	31.75	667	150	166.8	37.5

Permanent cable displacement:

- a) After any individual test = 3 mm (0.12 in) max.
- b) After all tests = 5 mm (0.20 in) max.

³⁾ Test specified in 1.2.5.8 of BS 9520:1983 applicable only where cable clamping accessories are provided.

8.3.13 Wire seal and conductor accommodation

Contact size	Wire insulation				Conductor			
	min. o.d.		max. o.d.		min. o.d.		max. o.d.	
	mm	in	mm	in	mm	in	mm	in
22D	0.76	0.030	1.37	0.054	0.33	0.013	0.64	0.025
22M	0.76	0.030	1.22	0.048	0.33	0.013	0.50	0.020
22	0.83	0.033	1.37	0.054	0.40	0.016	0.64	0.025
20	1.00	0.040	2.11	0.083	0.51	0.020	0.81	0.032
16	1.65	0.065	2.77	0.109	0.81	0.032	1.30	0.051
12	2.46	0.097	3.61	0.142	1.63	0.064	2.06	0.081

8.3.14 Mounting nut tightening torque⁴⁾

Housing (shell) size	Torque			
	N·m		lbf·t	
	max.	min.	max.	min.
08	6.10	2.71	4.5	2.0
10	7.45	3.39	5.5	2.5
12	8.81	4.07	6.5	3.0
14	9.49	4.07	7.0	3.0
16	10.17	4.41	7.5	3.25
18	10.85	4.41	8.0	3.25
20	11.52	4.75	8.5	3.50
22	12.20	5.42	9.0	4.00
24	12.88	8.76	9.5	4.25

8.4 Resistance to fluids

The connectors shall be resistant to the fluids listed in Table 1 of BS 2G 202:1988 as follows:

Isopropyl alcohol, 1,1,1-trichloroethane, aircraft fuel, hydraulic fluids (mineral and silicone⁵⁾ based), lubricating oils (mineral and ester based), de-icing fluids⁶⁾ and sullage.

9 Certified test records (CTRs)

Certified test records prepared in accordance with 1.1.11 of BS 9520:1983 shall be available if requested.

10 Quality assessment procedure

Group C tests are not applicable. Group D tests shall be carried out for initial qualification approval only and group C-D combined sequential test procedure shall be carried out for maintenance of qualification approval.

11 Inspection requirements

Samples subjected to tests in subgroups marked “(D)” shall not be accepted for release under BS 9000 (see 5.2 of BS 9000-5:1989).

Unless otherwise specified, tests shall be performed at an ambient temperature of between 15 °C and 35 °C.

Fitting (and wiring) of contacts shall be in accordance with the manufacturer's instructions. PTFE extruded insulation equipment wire complying with the requirements of BS G 210 shall be used. To ensure that the wiring operation has been carried out satisfactorily it is advisable to apply insulation resistance and contact resistance tests.

⁴⁾ Applicable to single hole panel mounting styles for test 1.2.6.19.1 of BS 9520:1983 as appropriate.

⁵⁾ This fluid has an insulative effect on contact surfaces.

⁶⁾ This de-icing fluid is electrically conductive.

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Pre-final assembly</u> Coupling pin strength	To be applied on a sampling basis lot-by-lot <u>Inspection level S-3 AQL 1.5 %</u> 1.2.5.15 Force as in 8.3.6 of this specification 15 lbf/s max. rate of application (one pin per connector)	As in 1.2.5.15
<u>Group A</u>	To be applied on a sampling basis lot-by-lot except subgroup A0. Subgroups A2, A3 and A4 are not applicable.	
<u>Subgroup A0</u> Voltage proof Visual examination Pressure sealing (Air leakage) ^a	<u>100 % Inspection</u> Unless required for tests contacts need not be fitted. 1.2.4.5 Method B Voltage as in 7.1.2 of this specification. 5 s duration. (This requirement may be demonstrated immediately prior to final assembly) 1.2.2 a) 1.2.6.19.1 a) 100 kN/m ² duration 5 s applied to termination side only.	As in 1.2.4.5 . As in 1.2.2 a) 1 cm ³ /h max. leakage
<u>Subgroup A1</u> Visual examination Pressure sealing (Air leakage) ^a	<u>Inspection level S-3 AQL 1.5 %</u> Contacts need not be fitted 1.2.2 b) 1.2.6.19.1 b) All seals, using normal method of mounting, pressure 100 kN/m ² duration 5 s applied to termination side only. Mounting nut tightening torques as in 8.3.14 of this specification.	1 cm ³ /h max. leakage
<u>Subgroup A5</u>	1.1.11 The results from the tests of subgroup A1 shall be reported as attributes information	
<u>Group B</u>	To be applied on a sampling basis lot-by-lot. Subgroups B3 to B7 are not applicable. Contacts shall be fitted and wired as required for tests.	
<u>Subgroup B1</u> Mechanical compatibility compliance Insulation resistance Engaging and separating force, connector Contact holding force	<u>Inspection level S-4, AQL 1 %</u> 1.2.3.3.2 1.2.4.4 Method A or B ^b , (500 ± 50 V) 1.2.5.3 Forces as specified in 8.3.1 of this specification 1.2.5.9 With 3 sizings using gauges as prescribed in A.5 of this specification	As in 1.2.3.3.2 5 000 MΩ min As in 1.2.5.3 As in 1.2.5.9

^a Applicable only to C 2025.^b Method B values shall be recorded.

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Subgroup B2</u>	<u>Inspection level S-4, AQL 4 %</u>	
Solderability ^a	Specimens from subgroup B1 may be used. Only contacts required for tests other than solderability need be fitted. 1.2.6.7.1 Soldering iron method Size B Application time 3 s Recovery period 1 h	Satisfactory tinning
Contact resistance	1.2.4.2 a)	5 mΩ max.
Housing (shell) electrical continuity	1.2.4.3 Mated specimens that include C 2021 Mated specimens that include C 2020	5 mΩ max. 200 mΩ max.
Contact retention (in insert)	1.2.5.4 Forces as specified in 8.3.3 of this specification	As in 1.2.5.4 . Maximum axial displacement under load = 0.3 mm
Insert retention in housing (shell) axial	1.2.5.5 Pressure as specified in 8.3.2 of this specification	As in 1.2.5.5
Insert retention in housing (shell), torsional ^b	1.2.5.6 25 % of torque as specified in 8.3.5	As in 1.2.5.6
Grounding contact spring holding force ^c	1.2.5.16 Using gauges as prescribed in A.5.4 and A.5.5 and the holding force as in 8.3.8 of this specification	As in 1.2.5.16
<u>Subgroup B8</u>		
CTR information	1.1.11 Results from the tests in subgroup B1 shall be reported as attributes information. Results from the following tests in subgroup B2: solderability, contact resistance, housing (shell), electrical continuity, and contact retention (in insert) shall be reported as attributes information.	
<u>Group C</u>	Group C tests are not applicable	
<u>Group D</u>	To be carried out for initial qualification approval only (see group CD test for maintenance of qualification approval) For sampling plan see Appendix B of this specification. The issue number of the manufacturing drawing shall be checked and recorded.	
^a Applicable only to C 2025; contacts which have been soldered are considered (D). ^b Not applicable to C 2025. ^c Applicable only to C 2021.		

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Group D (continued)</u> Wiring of specimens ^a	1.2.1.2 Divide specimens into approximately three equal groups (A, B and C). A. All contacts shall be wired with cable as near as possible to the maximum insulation diameter and maximum conductor diameter that can be accommodated, respectively, by the grommet seals and by the contact buckets. See 8.3.13 . B. All contacts shall be wired with cable as near as possible to the minimum insulation diameter and minimum conductor diameter that can be accommodated, respectively, by the grommet seals and by the contact buckets ^b . See 8.3.13 . C. Approximately 25 % of the contacts shall be unwired and their grommet aperture shall be sealed with filler plugs. The remaining contacts shall be wired as for group A and group B equally ^b .	
<u>Subgroup D0</u> Dimensions, detail and materials	Sample size: one set of piece parts for the connector range submitted for approval. Identical piece parts used in different style number connectors need not be rechecked. No failure allowed. 1.2.3.2 When available, an inspection record made at the time of production of the parts and certified by the manufacturer and National Supervising Inspectorate (NSI) shall discharge this requirement within a period of two years.	As in 1.2.3.2
<u>Subgroup D1</u> Dimensions, outline Mass Gauging procedure	For samples see Appendix B of this specification. No failure allowed. 1.2.3.1 1.2.5.2 Including contacts 1.2.3.3 See Appendix C of this specification for the selection of samples of types within the range for compatibility control 1.2.3.3.2 1.2.3.3.3	As in A.2 of this specification As in A.2 and A.3 of this specification As in 1.2.3.3.2 As in 1.2.3.3.3
^a Specimens for 1.2.7.2 and similar current tests shall be wired in accordance with group A. ^b Specimens wired in groups B and C should not be used for test 1.2.7.2 .		

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Subgroup D1 (continued)</u>		
Compass safe distance	1.2.5.12 Use one mated pair of each of the largest and smallest connectors including accessories	As in 1.2.5.12
<u>Subgroup D2 (D)</u>	For samples see Appendix B of this specification. One failure allowed.	
Male contact protection	1.2.5.25	As in 1.2.5.25
Insert ageing ^a	1.2.5.11 Contact retention forces as specified in 8.3.3 of this specification Nine insertions and withdrawals using the manufacturer's recommended tools in A.5 of this specification Contact retention forces as specified in 8.3.3 of this specification	As in 1.2.5.4 . Maximum axial displacement under load = 0.3 mm As in 1.2.5.4 . Maximum axial displacement under load = 0.3 mm
Insert retention in housing (shell) torsional ^c	1.2.5.6 Torque as specified in 8.3.5 of this specification	As in 1.2.5.6
Male contact ^a stability	1.2.5.26 Using gauges as prescribed in A.5.6 of this specification. Applied forces as in 8.3.9 of this specification	Maximum displacement as in 8.3.9 of this specification
Contact ^a dislodgement by cable nutation	1.2.5.17	As in 1.2.5.17
Probe damage	1.2.5.10 Use tools and test specified in A.5.2 and A.5.3 of this specification.	As in 1.2.5.10
Cable clamping ^b	1.2.5.8.1 Specimens shall be fitted with 0.3 ± 0.1 m of wire/cable (as in 8.3.13 of this specification) using the cable clamp indicated in A.3.2 of this specification. Specimens shall be mounted horizontally unless otherwise stated. 1.2.5.8.2 One rotation through 360° in each direction of rotation ten times 1.2.5.8.3 Tensile forces as in 8.3.12 of this specification. Rate of application = 2 N/s max. 1.2.5.8.4 Forces as in 8.3.12 of this specification. Applied at wire/cable exit of cable clamp (A.3.2 of this specification). Rate of application = 20 N/s max.	As in 1.2.5.8.2 As in 1.2.5.8.3 . Maximum permissible displacement of wire bunch/cable as in 8.3.12 of this specification. As in 1.2.5.8.4 . Maximum permissible displacement of wire bunch/cable as in 8.3.12 of this specification.
^a Applicable only to connectors having removable contacts. ^b Where cable clamps are provided. ^c Not applicable to C 2025.		

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520															
<u>Subgroup D2 (D)</u> (continued)	Applied force shall be maintained for 1 min and removed. (This constitutes one application.) Prior to each successive application, specimen shall be rotated through 90° about horizontal axis. Total number of applications = 4.																
Mechanical impact ^a	1.2.5.8.5 Not applicable 1.2.5.7 Five impacts Drop height 1 m	As in 1.2.5.7															
Resistance to soldering heat ^b	1.2.6.7.2 Test Tb Method 2 Size A for contact size 12 Size B for contact sizes 16 to 22 Recovery period 1 h	No loosening of parts or other damage such as would impair performance															
Contact retention (in insert) ^b	1.2.5.4 Forces as specified in 8.3.3 of this specification	As in 1.2.5.4 . Maximum axial displacement under load = 0.3 mm															
Robustness of termination ^b	1.2.6.6.3 <table><tr><th>Contact size</th><th>N</th><th>(lbf)</th></tr><tr><td>22, 22M, 22D</td><td>89.0</td><td>(20)</td></tr><tr><td>20</td><td>133.5</td><td>(30)</td></tr><tr><td>16</td><td>222.5</td><td>(50)</td></tr><tr><td>12</td><td>222.5</td><td>(50)</td></tr></table>	Contact size	N	(lbf)	22, 22M, 22D	89.0	(20)	20	133.5	(30)	16	222.5	(50)	12	222.5	(50)	As in 1.2.6.6.3
Contact size	N	(lbf)															
22, 22M, 22D	89.0	(20)															
20	133.5	(30)															
16	222.5	(50)															
12	222.5	(50)															
Misuse of contact insertion/extraction tools ^c	1.2.5.30 Use the recommended tools as in A.5.3 of this specification <table><tr><th>Contact size</th><th>Force</th></tr><tr><td>22, 22M, 22D</td><td>3 lb</td></tr><tr><td>20, 16 & 12</td><td>10 lb</td></tr></table>	Contact size	Force	22, 22M, 22D	3 lb	20, 16 & 12	10 lb	As in 1.2.5.30									
Contact size	Force																
22, 22M, 22D	3 lb																
20, 16 & 12	10 lb																
External bending moment	1.2.5.22 Bending moments as in 8.3.10 of this specification	As in 1.2.5.22															
Accessory thread strength	1.2.5.21 Torque as in 8.3.11 of this specification	As in 1.2.5.21															
Locking wire pull out ^d	1.2.5.33	As in 1.2.5.33															
<u>Subgroup D3 (D)</u>	For samples see Appendix B of this specification. One failure allowed. For the following tests, specimens use their normal mounting feature and tests are applied both in line and perpendicular to the connector axis unless otherwise stated.																
Bump	1.2.6.2 390 m/s² (40gn) 4 000 ± 10 bumps divided between horizontal and vertical axes in each direction	As in 1.2.6.2															

^a Where used in a free connector application.^b Applicable only to C 2025.^c Applicable only to connectors having removable contacts.^d Applicable to C 2024 and C 2025 connectors only.

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Subgroup D3 (D) (continued)</u>		
Vibration, airframe fit	Specimens shall be divided into two groups for the following vibration tests. No failure allowed in either group 1.2.6.3.2.2 Sinusoidal excitation test applied to eight mated pairs; minimum temperature – 55 °C, maximum temperature 150 °C. Monitoring of contact resistance in accordance with test 2c of BS 5772-2 1.2.6.3.2.3 Random motion excitation test applied to remaining seven mated pairs; minimum temperature – 55 °C, maximum temperature 150 °C. Monitoring of contact resistance in accordance with test 2c of BS 5772-2	As in 1.2.6.3.2.2 and 1.2.6.3.2.3 . Continuity variation shall not exceed 100 mΩ per contact chain of up to six contacts max.
Shock	All specimens submitted to the following tests (one failure allowed) 1.2.6.4 981 m/s² (100gn) Duration 6 ms Trapezoidal pulse three shocks in each direction of each three axes (total 18 shocks)	As in 1.2.6.4
Acceleration (steady state)	1.2.6.5 981 m/s² (100gn) In each direction of each three axes	As in 1.2.6.5
<u>Final measurements</u>		
Visual examination		
Pressure sealing ^a (air leakage)	1.2.2 d) 1.2.6.19.1 b)	As in 1.2.2 d)
<u>Subgroup D4 (D)</u>	Samples from D3 shall be used	
<u>Subgroup D4(i)</u>	One failure allowed	
Rapid change of temperature	1.2.6.8 – 65 °C to 175 °C	
Climatic sequence general ^b	1.2.6.12.1 Severity 65/175/56 a) At – 25 °C on completion of the cold cycle b) 44 mbar Method A or B Voltage as in 7.1.2 of this specification Duration 5 s After 1½ h to 2 h recovery Specimens shall remain mated unless otherwise stated	As in 1.2.6.12.1 By hand As in 1.2.4.5

^a Applicable only to C 2025.^b C 2025 style is not rear sealed and must be mounted in a suitable fixture for this test.

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Subgroup D4(i) (continued)</u>		
<u>Final measurements</u>	1.2.6.12.2 a) Method A (500 ± 50 V) or Method B ^a (500 ± 50 V) b) Method A or B Voltage as in 7.1.2 of this specification. Duration 5 s c) As in 1.2.4.2 a) d) Mated specimens that include C 2021 Mated specimens that include C 2020 e) f) Without dismantling g) Not applicable	100 M Ω min (Method A) As in 1.2.4.5 10 m Ω max. 10 m Ω max. 200 m Ω max. By hand As in 1.2.6.12.2 f)
Pressure sealing Air leakage	1.2.6.19.1 b) All seals, using normal method of mounting pressure 100 kN/m ² duration 5 s applied to termination side only. Mounting nut tightening torques as in 8.3.14 of this specification	1 cm ³ /h max. leakage
<u>Subgroup D4(ii)</u>	Sample size: one fixed and one free (mating) connector of the largest shell size for which approval is sought. Sample may be taken from D4(i). No failure allowed	
Flammability	1.2.6.9 Direct flame against: a) mating face and b) unprotected rear of each connector (accessories removed)	As in 1.2.6.9
<u>Subgroup D5 (D)</u>	For samples see Appendix B of this specification. One failure allowed	
Damp heat, steady state ^b	1.2.6.15.1 Severity 56 days working voltage as in 7.1.2 of this specification. Polarizing voltage 60 V d.c. 1.2.6.15.2 After 1½ h to 2 h recovery, specimens shall remain mated unless otherwise stated	As in 1.2.6.15.1 As in 1.2.6.15.2
<u>Final measurements</u>	1.2.6.15.3 a) Method A or B ^a (500 ± 50 V) b) Mated specimens that include C 2021 Mated specimens that include C 2020 c) As in 1.2.4.2 a)	100 M Ω min. 10 m Ω max. 200 m Ω max. 10 m Ω max.
^a Method B values shall be recorded. ^b C 2025 style is not rear sealed and must be mounted in a suitable fixture for this test.		

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
Subgroup D5 (D) (<i>continued</i>)		
	d) e) f) As in 1.2.6.19.1 a) for C 2025 only. 100 kN/m ² . Duration 15 s. Applied to termination side only g) Not applicable h) Method A or B Voltage as in 7.1.2 of this specification. Duration 5 s	By hand As in 1.2.6.15.3 e) 1 cm ³ /h max. leakage As in 1.2.6.15.3 h)
Solderability ^a	1.2.6.7.1 Soldering from method Size B Application time 3 s Recovery period 1 h	Satisfactory tinning
Immersion (at low air pressure) ^b	1.2.6.13 a) Cable as specified in 8.3.13 of this specification b) As in 1.2.4.4 Before immersion: Method A or B ^c (500 ± 50 V) Whilst immersed: Method A or B ^c (500 ± 50 V) c) 44 hPa (44 mbar) d) Method A or B ^c Voltage as in 7.1.2 of this specification	5 000 MΩ min. 100 MΩ min. As in 1.2.6.13 d)
Subgroup D6(i) (D)		
Mechanical operation	For samples see Appendix B of this specification. One failure allowed Except for 1.2.7.2 and 1.2.7.3 where no failure allowed 1.2.7.1 500 operations for all styles with the exception of C 2021 which has 250 only Rate of operation 15 per minute maximum Specimens shall be divided into two groups for the following tests ten specimens for 1.2.7.2 five specimens for 1.2.7.3 (at least two specimens fitted with 22D contacts shall be used for this test)	
Electrical load and temperature, long term	1.2.7.2 1 000 h Current as in 7.1.1 b) of this specification	As in 1.2.7.2
Insulation resistance	1.2.4.4 Method B ^c (500 ± 50 V) mated at 175 °C To be carried out only on specimens from the 1.2.7.2 test group	100 MΩ min.
^a Applicable only to C 2025. ^b C 2025 style is not rear sealed and must be mounted in a suitable fixture for this test. ^c Method B values shall be recorded.		

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520										
<u>Subgroup D6(i) (D) (continued)</u>												
Mechanical load and temperature ^a	1.2.7.3 1 000 h at 175 °C <table><tr><th>Contact size</th><th>Mass Kg</th></tr><tr><td>22, 22M, 22D</td><td>2.24</td></tr><tr><td>20</td><td>3.42</td></tr><tr><td>16</td><td>5.71</td></tr><tr><td>12</td><td>5.71</td></tr></table> All specimens shall be submitted to the remaining tests. After 1½ h to 2 h recovery. Specimens shall remain mated unless otherwise stated.	Contact size	Mass Kg	22, 22M, 22D	2.24	20	3.42	16	5.71	12	5.71	As in 1.2.7.3
Contact size	Mass Kg											
22, 22M, 22D	2.24											
20	3.42											
16	5.71											
12	5.71											
<u>Final measurements</u>												
Voltage proof	1.2.4.5 Method B. Voltage as in 7.1.2 of this specification. Duration 5 s	As in 1.2.4.5										
Housing (shell) electrical continuity	1.2.4.3 Mated specimens that include C 2021 Mated specimens that include C 2020	10 mΩ max.										
Contact resistance	1.2.4.2 a)	200 mΩ max.										
Engaging and separating force, connector	1.2.5.3 Forces as in 8.3.1 of this specification	10 mΩ max.										
Grounding contact spring holding force ^b	1.2.5.16 Using gauges prescribed in A.5.4 and A.5.5 of this specification	As in 1.2.5.3										
Visual examination	1.2.2 c) 1.2.2 d)	As in 1.2.5.16										
Pressure sealing (air leakage) ^c	1.2.6.19.1 a) Specimens unmated 100 kN/m². Duration 15 s. Applied to termination side only	As in 1.2.2 c)										
Pressure sealing ^c	1.2.6.19.1 a) At 175 °C unmated 100 kN/m². Duration 15 s. Applied to termination side only	As in 1.2.2 d)										
		1 cm³/h max. leakage										
		1 cm³/h max. leakage										
<u>Subgroup D6(ii) (D)</u>	Using specimens from subgroup D6(i). Three mated pairs to cover each contact size one failure allowed											
Current overload	1.2.4.6 Current as in 7.1.1 c) of this specification After 1½ h to 2 h recovery. Specimens shall remain mated unless otherwise stated	As in 1.2.4.6										
<u>Final measurements</u>												
Insulation resistance	1.2.4.4 Method A, (500 ± 50 V)	100 MΩ min.										
Contact resistance	1.2.4.2 a)	10 mΩ max.										
^a Applicable only to connectors having removable contacts. ^b Applicable only to C 2021. ^c Applicable only to C 2025.												

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Subgroup D7 (D)</u> Mould growth <u>Final measurements</u>	For samples see Appendix B of this specification. No failure allowed. 1.2.6.16 28 days duration 1.2.6.16 a) Method A or B ^a (500 ± 50 V) b) Applicable only to C 2025 c) As in 1.2.6.16 c)	100 MΩ min. (Method A) 1 cm ³ /h max. leakage As in 1.2.6.16 c)
<u>Subgroup D8 (D)</u> <u>Subgroup D8(i)</u> Corrosion, salt, mist ^b <u>Final measurements</u>	For samples see Appendix B of this specification. No failure allowed. Sample size: two mated pairs, plus one unmated pair fitted with protective covers 1.2.6.17 Severity 1 Severity 2 for variant styles 1.2.6.17 a) b) As in 1.2.4.2 a) c) Mated specimens that include C 2021 Mated specimens that include C 2020 d) e) Method A or B ^a (500 ± 50 V) f) Voltage as in 7.1.2 of this specification. g)	By hand 10 mΩ max. 10 mΩ max. 200 mΩ max. By hand 100 MΩ min. (Method A) As in 1.2.6.17 f) As in 1.2.6.17 g)
<u>Subgroup D8(ii)</u> Dust <u>Final measurements</u>	Sample size: one mated pair, plus one unmated pair fitted with protective covers 1.2.6.18 1.2.6.18 a) b)	As in 1.2.6.18 a) By hand
<u>Subgroup D9 (D)</u> Resistance to fluids Test fluids	For samples see Appendix B of this specification, sample size: one mated pair for each fluid; additional specimens required may be taken from those used in subgroup D5. No failure allowed. 1.2.6.20 Connectors are to be unmated. 1.2.6.20 a) Test fluids are as listed in BS 2G 202:1988, Table 1 a, b, c, d, e, f, g, h and i. NOTE Fluids e and g are solvents. Fluid f is conductive. Fluid i is insulative.	
^a Method B values shall be recorded. ^b C 2025 style is not rear sealed and must be mounted in a suitable fixture for this test.		

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
Subgroup D9 (D) (continued)		
Immersion temperature	1.2.6.20 b) as in BS 2G 202:1988, Table 1.	
Immersion period	c) as in BS 2G 202:1988, Table 1.	
Number of cycles	d) 5 cycles.	
Exposure temperature	e) Upper test temperature of component or temperature listed in BS 2G 202:1988, Table 1, whichever is the lower.	
Final measurements		
Visual examination	1.2.6.20.3 a) and b)	1.2.6.20.3
Engaging and separating force, connector	1.2.5.3	By hand
Contact resistance	1.2.4.2 a) Light current method	10 mΩ max.
Insulation resistance	1.2.4.4 Method A, (500 ± 50 V) or B ^a	100 mΩ min.
Contact retention	1.2.5.4 Forces as specified in 8.3.3 of this specification	As in 1.2.5.4 Max. axial displacement under load 0.3 mm
Subgroup D10 (D)		
CTR Information	1.1.11 The results from the final measurements in subgroups D3, D4, D5, D6, D7, D8 and D9 shall be reported as attributes information. The final contact resistance and insulation resistance results of the tests in subgroups D5 and D6 and the insulation resistance at upper category temperature in subgroup D6, shall be reported as measurements information.	
Group CD		
Wiring of specimens ^b	To be applied on a sampling basis at intervals as specified 1.2.1.2 Divide specimens into approximately two equal groups (A and B). A. All contacts shall be wired with cable as near as possible to the maximum insulation diameter and maximum conductor diameter that can be accommodated, respectively, by the grommet seals and by the contact buckets. See 8.3.13 . B. All contacts shall be wired with cable as near as possible to the minimum insulation diameter and minimum conductor diameter that can be accommodated, respectively, by the grommet seals and by the contact buckets ^c See 8.3.13 .	
^a Method B values shall be recorded. ^b Specimens for 1.2.7.2 and similar current tests shall be wired in accordance with group A. ^c Specimens wired as group B should not be used for test 1.2.7.2 .		

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Subgroup CD 1(i) (D)</u>	<u>Inspection level S-3, AQL 4 %</u> (Maximum of 15 mated pairs, one failure allowed). To be applied six months after approval then at three-yearly intervals	
Dimensions, outline	1.2.3.1 No failure allowed	As specified in A.2 of this specification
Contact resistance	1.2.4.2 a)	5 mΩ max.
Rapid change of temperature	1.2.6.8 – 65 °C to + 175 °C	
Climatic sequence general ^a	1.2.6.12.1 Severity 65/175/56 a) At – 25 °C on completion of the cold cycle b) Method A or B Voltage as in 7.1.2 of this specification. Duration 5 s After 1½ h to 2 h recovery Specimens shall remain mated unless otherwise stated	By hand As in 1.2.4.5
<u>Final measurements</u>	1.2.6.12.2 a) Method A or B ^b (500 ± 50 V) b) Method A or B. Voltage as in 7.1.2 of this specification. Duration 5 s c) As in 1.2.4.2 a) d) Mated specimens that include C 2021 e) Mated specimens that include C 2020 f) Without dismantling g) Not applicable	10 MΩ max. (Method A) 10 mΩ max. 10 mΩ max. 200 mΩ max. As in 1.2.6.12.2 f)
Solderability ^c	As in 1.2.6.7.1 Soldering iron method Size B Application time 3 s Recovery period 1 h	Satisfactory tinning
<u>Subgroup CD 1 (ii)</u>		
Gauging procedure	1.2.3.3 Sample size shall be 10 % of the qualification approval sample or three mated pairs, whichever is the greater. Selection of samples of types within the range for compatibility control shall be agreed with the NSI representative.	

^a C 2025 style is not rear sealed and must be mounted in a suitable fixture for this test.

^b Method B values shall be recorded.

^c Applicable only to C 2025.

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Subgroup CD 1 (ii) (continued)</u>	1.2.3.3.2	As in 1.2.3.3.2
	1.2.3.3.3	As in 1.2.3.3.3
<u>Subgroup CD 2 (i) (D)</u>	<u>Inspection level S-3, AQL 4 %</u> (Maximum of 15 mated pairs, one failure allowed). Except for 1.2.3.1 , 1.2.7.2 and 1.2.7.3 where no failure allowed To be applied twelve months after approval and then at three-yearly intervals	
Dimensions, outline	1.2.3.1	As specified in A.2 of this specification
Mechanical operation	1.2.7.1 50 operations at 15 operations per min. During conditioning the following measurement shall be made on the specimens, which shall remain mated throughout.	
Insulation resistance	1.2.4.4 Method B ^a (500 ± 50 V) mated at 175 °C Measured eight times at intervals of not less than 24 h	100 MΩ min.
Electrical load and temperature (short term)	1.2.7.2 250 h at 175 °C After 1½ h to 2 h recovery	As in 1.2.7.2
<u>Final measurements</u>	Specimens shall remain mated unless otherwise stated	
Voltage proof	1.2.4.5 Method B. Voltage as in 7.1.2 of this specification.	As in 1.2.4.5
Housing (shell) electrical continuity	1.2.4.3 Mated specimens that include C 2021 Mated specimens that include C 2020	10 mΩ max. 200 mΩ max.
Contact resistance	1.2.4.2 a)	10 mΩ max.
Engaging and separating force, connector	1.2.5.3 Forces as in 8.3.1 of this specification	As in 1.2.5.3
Grounding, contact spring, holding force ^b	1.2.5.16 Using gauges prescribed in A.5.4 and A.5.5 of this specification	As in 1.2.5.16
Visual examination	1.2.2 c) 1.2.2 d)	As in 1.2.2 c) As in 1.2.2 d)
Pressure sealing (air leakage) ^c	1.2.6.19.1 b) Specimens unmated 100 kN/m ² . Duration 15 s. Applied to termination side only	1 cm ³ /h max. leakage
Pressure sealing (air leakage) ^c	1.2.6.19.1 b) At 175 °C unmated 100 kN/m ² . Duration 15 s. Applied to termination side only	1 cm ³ /h max. leakage

^a Method B values shall be recorded.^b Applicable only to C 2021.^c Applicable only to C 2025.

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Subgroup CD 2 (ii) (D)</u> Corrosion, salt, mist <u>Final measurements</u>	Samples may be taken from CD 2 (i) (D). Sample size: two mated pairs, plus one unmated pair fitted with protective covers No failure allowed. 1.2.6.17 Severity 1. Severity 2 for variant styles 1.2.6.17 a) b) As in 1.2.4.2 a) c) Mated specimens that include C 2021 Mated specimens that include C 2020 d) e) Method A or B ^a (500 ± 50 V) f) Voltage as in 7.1.2 of this specification. g)	By hand 10 mΩ max. 10 mΩ max. 200 mΩ max. By hand 100 mΩ min. (Method A) As in 1.2.6.17 f) As in 1.2.6.17 g)
<u>Subgroup CD 2 (iii)</u> Gauging procedure	1.2.3.3 Sample size shall be 10 % of the qualification approval sample or three mated pairs, whichever is the greater. Selection of samples of types within the range for compatibility control shall be agreed with the NSI representative. 1.2.3.3.2 1.2.3.3.3	 As in 1.2.3.3.2 As in 1.2.3.3.3
<u>Subgroup CD 3 (i) (D)</u> Dimensions, outline Insert ageing ^b Contact resistance Rapid change of temperature	<u>Inspection level S-3, AQL 4 %</u> (Maximum of 15 mated pairs, one failure allowed). To be applied eighteen months after approval and then at three-yearly intervals 1.2.3.1 No failure allowed 1.2.5.11 Contact retention forces as specified in 8.3.3 of this specification Nine insertions and withdrawals using the manufacturer's recommended tools in A.4 of this specification Contact retention forces as specified in 8.3.3 of this specification 1.2.4.2 a) 1.2.6.8 – 65 °C to + 175 °C	 As in A.2 of this specification As in 1.2.5.4 . Maximum axial displacement under load = 0.3 mm 10 mΩ max.
^a Method B values shall be recorded. ^b Applicable only to connectors having removable contacts.		

Inspection	BS 9522 reference and conditions of test	Requirements as in BS 9522
<u>Subgroup CD 3 (i) (D) (continued)</u> Damp heat, steady state <u>Final measurements</u> Solderability ^b	1.2.6.15.1 21 days. Working voltage as in 7.1.2 of this specification. Polarizing voltage 60 V d.c. 1.2.6.15.2 After 1½ h to 2 h recovery. Specimens shall remain mated unless otherwise stated 1.2.6.15.3 a) Method A or B ^a (500 ± 50 V) b) Mated specimens that include C 2021 Mated specimens that include C 2020 c) As in 1.2.4.2 a) d) e) f) As in 1.2.6.19.1 b) . All seals using normal method of mounting. Pressure 100 kN/m ² mounting nut tightening torque as 8.3.14 of this specification ^b g) Not applicable h) Method A or B Voltage as in 7.1.2 of this specification, 5 s duration 1.2.6.7.1 Soldering iron method Size B Application time 3 s Recovery period 1 h	As in 1.2.6.15.1 As in 1.2.6.15.2 100 MΩ min. ^a (Method A) 10 mΩ max. 200 mΩ max. 10 mΩ max. By hand As in 1.2.6.15.3 e) 1.2.6.19.1 b) 1 cm ³ /h max. As in 1.2.6.15.3 h) Satisfactory tinning
<u>Subgroup CD 3 (ii)</u> Gauging procedure	1.2.3.3 Sample size shall be 10 % of the qualification approval sample or three mated pairs, whichever is the greater. Selection of samples of types within the range for compatibility control shall be agreed with the NSI representative. 1.2.3.3.2 1.2.3.3.3	As in 1.2.3.3.2 As in 1.2.3.3.3
<u>Subgroup CD 4 (i) (D)</u> Dimensions, outline	<u>Inspection level S-3, AQL 4 %</u> (Maximum of 15 mated pairs, one failure allowed). To be applied 24 months after approval and then at three-yearly intervals 1.2.3.1 No failure allowed	As in A.2 of this specification

^a Method B values shall be recorded.^b Applicable only to C 2025.

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520										
<u>Subgroup CD 4 (i) (D)</u> (continued)												
Mechanical operation	1.2.7.1 500 operations for all styles with the exception of C 2021 which has 250 only. Rate of operation 15 per minute maximum. Specimens shall be divided into two groups proportional to the arrangements in subgroup D6 for the following tests											
Electrical load and temperature	1.2.7.2 1 000 h Current as in 7.1.1 b)	As in 1.2.7.2										
Insulation resistance	1.2.4.4 Method B ^a (500 ± 50 V) mated at 175 °C To be carried out only on specimens from the 1.2.7.2 test group	100 MΩ min.										
Mechanical load and temperature ^b	1.2.7.3 1 000 h at 175 °C <table border="1"><thead><tr><th>Contact size</th><th>Mass kg</th></tr></thead><tbody><tr><td>22, 22M, 22D</td><td>2.24</td></tr><tr><td>20</td><td>3.42</td></tr><tr><td>16</td><td>5.71</td></tr><tr><td>12</td><td>5.71</td></tr></tbody></table> All specimens are to be subjected to the remaining tests	Contact size	Mass kg	22, 22M, 22D	2.24	20	3.42	16	5.71	12	5.71	
Contact size	Mass kg											
22, 22M, 22D	2.24											
20	3.42											
16	5.71											
12	5.71											
<u>Final measurements</u>	After 1½ h to 2 h recovery specimens shall remain mated unless otherwise stated.											
Voltage proof	1.2.4.5 Method B. Voltage as in 7.1.2 of this specification. Duration 5 s.	As in 1.2.4.5										
Housing (shell) electrical continuity	1.2.4.3 Mated specimens that include C 2021 Mated specimens that include C 2020	10 mΩ max. 200 mΩ max.										
Contact resistance	1.2.4.2 a)	10 mΩ max.										
Engaging and separating force, connector	1.2.5.3 Forces as in 8.3.1 of this specification	As in 1.2.5.3										
Visual examination	1.2.2 c) 1.2.2 d)	As in 1.2.2 c) As in 1.2.2 d)										
Pressure sealing (air leakage) ^c	1.2.6.19.1 b) All seals using normal method of mounting. Pressure 100 kN/m ² mounting nut tightening torque as 8.3.14 of this specification	1.2.6.19.1 b) 1 cm ³ /h max.										
Pressure sealing (air leakage) ^c	1.2.6.19.1 b) at 175 °C. All seals using normal method of mounting. Pressure 100 kN/m ² mounting nut tightening torque as 8.3.14 of this specification	1.2.6.19.1 b) 1 cm ³ /h max.										

^a Method B values shall be recorded.
^b Applicable only to connectors having removable contacts.
^c Applicable only to C 2025.

Documents

^a Method B values shall be recorded.^b Applicable only to connectors having removable contacts.^c Applicable only to C 2025.

Inspection	BS 9520 reference end conditions of test	Requirements as in BS 9520
<u>Subgroup CD 4 (ii)</u> Gauging procedure	1.2.3.3 Sample size shall be 10 % of the qualification approval sample or three mated pairs, whichever is the greater. Selection of samples of types within the range for compatibility control shall be agreed with the NSI representative. 1.2.3.3.2 1.2.3.3.3	 As in 1.2.3.3.2 As in 1.2.3.3.3
<u>Subgroup CD 5 (i) (D)</u> Dimensions, outline Rapid change of temperature Damp heat, steady state <u>Final measurements</u> Solderability ^b	<u>Inspection level S-3, AQL 4 %</u> (Maximum of 15 mated pairs, one failure allowed). To be applied 30 months after approval and then at three-yearly intervals 1.2.3.1 No failure allowed 1.2.6.8 – 65 °C to + 175 °C 1.2.6.15.1 Severity 56 days. Working voltage as in 7.1.2 of this specification. Polarizing voltage 60 V d.c. 1.2.6.15.2 After 1½ h to 2 h recovery. Specimens shall remain mated unless otherwise stated 1.2.6.15.2 a) Method A or B ^a (500 ± 50 V) b) Mated specimens that include C 2021 Mated specimens that include C 2020 c) As in 1.2.4.2 a) d) e) f) As in 1.2.6.19.1 b). All seals using normal method of mounting. Pressure 100 kN/m ² mounting nut tightening torque as 8.3.14 of this specification g) Not applicable h) Method A or B Voltage as in 7.1.2 of this specification, 5 s duration 1.2.6.7.1 Soldering iron method Size B Application time 3 s Recovery period 1 h	 As in A.2 of this specification As in 1.2.6.15.1 As in 1.2.6.15.2 100 MΩ min. (Method A) 10 mΩ max. 200 mΩ max. 10 mΩ max. By hand As in 1.2.6.15.3 e) 1.2.6.19.1 b) 1 cm ³ /h max. As in 1.2.6.15.3 h) Satisfactory tinning
^a Method B values shall be recorded. ^b Applicable only to C 2025.		

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Subgroup CD 5 (i) (D)</u> <i>(continued)</i> Immersion (at low air pressure) ^a	1.2.6.13 a) Cable as specified in 8.3.13 of this specification. As in 1.2.4.4 b) Before immersion: Method A or B ^b (500 ± 50 V) Whilst immersed: (500 ± 50 V) c) 44 mbar (44 hPa) d) Method A or B Voltage as in 7.1.2 of this specification	5 000 MΩ min. (Method A) As in 1.2.6.13 d)
<u>Subgroup CD 5 (ii)</u> Gauging procedure	1.2.3.3 Sample size shall be 10 % of the qualification approval sample or three mated pairs, whichever is the greater. Selection of samples of types within the range for compatibility control shall be agreed with the NSI representative. 1.2.3.3.2 1.2.3.3.3	 As in 1.2.3.3.2 As in 1.2.3.3.3
<u>Subgroup CD 6 (i) (D)</u> Dimensions, outline Bump Vibration general Shock Acceleration (steady state) Mechanical operation	<u>Inspection level S-3, AQL 4 %</u> (Maximum of 15 mated pairs, one failure allowed). To be applied 36 months after approval and then at three-yearly intervals 1.2.3.1 No failure allowed 1.2.6.2 390 m/s ² (40gn) 4 000 ± 10 bumps divided between horizontal and vertical axes in each direction 1.2.6.3.1 10 Hz to 2 000 Hz, 1.5 mm/20gn. Duration 30 h (including 1 h at – 55 °C and 3 h at + 150 °C) with continuous monitoring. Monitoring of contact resistance in accordance with test 2 c) of BS 5772-2 1.2.6.4 981 m/s ² (100gn) Duration 6 ms Trapezoidal pulse three shocks in each direction of each three axes (total 18 shocks) 1.2.6.5 981 m/s ² (100gn) In each direction of each 3 axes 1.2.7.1 50 operations at 15 operations per min maximum	 As in A.2 of this specification As in 1.2.6.2 As in 1.2.6.4 As in 1.2.6.5 As in 1.2.7.1
^a C 2025 style is not rear sealed and must be mounted in a suitable fixture for this test. ^b Method B values shall be recorded.		

Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Subgroup CD 6 (i) (D)</u> (continued)		
Electrical load and temperature (short term)	1.2.7.2 250 h duration at 175 °C No electrical load. During the conditioning the following measurements shall be made on the specimens, which shall remain mated throughout.	As in 1.2.7.2
Insulation resistance	1.2.4.4 Method A or B ^a (500 ± 50 V) at 175 °C, measured eight times at intervals of not less than 24 h After 1½ h to 2 h recovery	100 MΩ min. ^a
<u>Final measurements</u>		
Voltage proof	1.2.4.5 Method A or B. Voltage as in 7.1.2 of this specification. Duration 5 s.	As in 1.2.4.5
Housing (shell)	Mated specimens that include C 2021	10 mΩ max.
Electrical continuity	Mated specimens that include C 2020	200 mΩ max.
Contact resistance	1.2.4.2 a)	10 mΩ max.
Engaging and separating force, connector	1.2.5.3 Forces as in 8.3.1 of this specification	As in 1.2.5.3
Visual examination	1.2.2 c) 1.2.2 d)	As in 1.2.2 c) As in 1.2.2 d)
Pressure sealing (air leakage) ^b	1.2.6.19.1 b) All seals using normal method of mounting. Pressure 100 kN/m ² mounting nut tightening torque as 8.3.14 of this specification	1.2.6.19.1 b) 1 cm ³ /h max.
Pressure sealing (air leakage) ^b	1.2.6.19.1 b) at 175 °C All seals using normal method of mounting. Pressure 100 kN/m ² mounting nut tightening torque as 8.3.14 of this specification	1.2.6.19.1 b) 1 cm ³ /h max.
<u>Subgroup CD 6 (ii)</u>		
Gauging procedure	1.2.3.3 Sample size shall be 10 % of the qualification approval sample or three mated pairs, whichever is the greater. Selection of samples of types within the range for compatibility control shall be agreed with the NSI representative. 1.2.3.3.2 1.2.3.3.3	As in 1.2.3.3.2 As in 1.2.3.3.3
^a Method B values shall be recorded. ^b Applicable only to C 2025.		

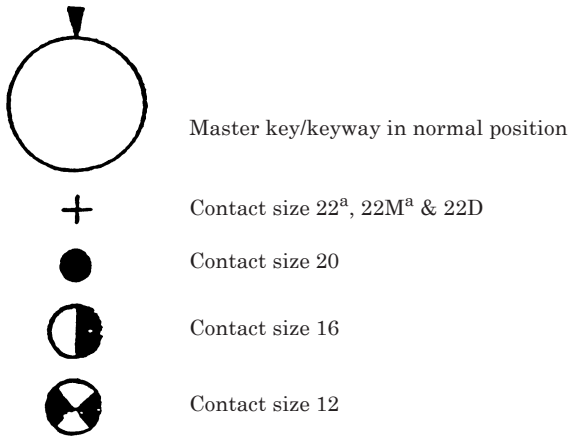
Inspection	BS 9520 reference and conditions of test	Requirements as in BS 9520
<u>Subgroup CD 6 (iii)</u> Dimensions, detail and material	1.2.3.2 Sample size: one set of piece parts for the connector range. Common piece parts need not be duplicated. When available an inspection record made at the time of the production of parts and certified by both the manufacturer and NSI shall be deemed to have discharged this requirement within a period of two years. No failure allowed.	As in 1.2.3.2
<u>All subgroups</u> CTR information	1.1.11 To be compiled at the conclusion of each six-monthly test sequence. The results of the final measurements in subgroups CD 1(i), CD 2(i), CD 3(i), CD 4(i) and (ii), CD 5(i) and CD 6(i), shall be reported as attributes information. The final contact resistance results of the tests in subgroups CD 2(i), CD 3(i), CD 4(i), CD 5(i) and CD 6(i) and the insulation resistance at upper category temperature in subgroups CD 2(i), CD 4(i) and CD 6(i) shall be reported as measurements information.	

Appendix A

Contents

- A.0 Mechanical compatibility information
- A.1 Contact arrangements (mating faces)
- A.2 Connector outline dimensions, panel cut outs and mass
- A.3 Accessories and contacts, outline dimensions and mass
- A.4 Assembly tools
- A.5 Gauges

NOTE 1 For explanation of dimensions see BS 308.
NOTE 2 Third angle projection is used.
NOTE 3 Metric dimensions are derived from the original inch dimensions rounded within practical limits.
NOTE 4 All dimensions are maxima unless otherwise stated.
NOTE 5 Mass values are for assemblies with contacts and are maxima unless otherwise stated.
NOTE 6 Contact arrangements are shown for mating faces with male contacts. Corresponding arrangements with female contacts are mirror image configurations.
NOTE 7 Symbols:

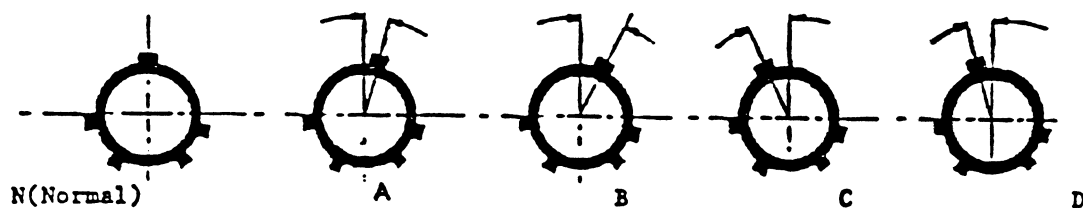


^a inactive for new design

NOTE 8 Polarization availability is given in the table below.

This information is for the guidance of the user and is not for user inspection purposes.

Housing (shell) keys and keyways. Housing (shell) keys and keyways relate to free and fixed connectors respectively. The diagrams below show the clockwise angular variation of the major key to the initial minor key for each polarization in this connector range. Corresponding keyway arrangements are mirror-image configurations.

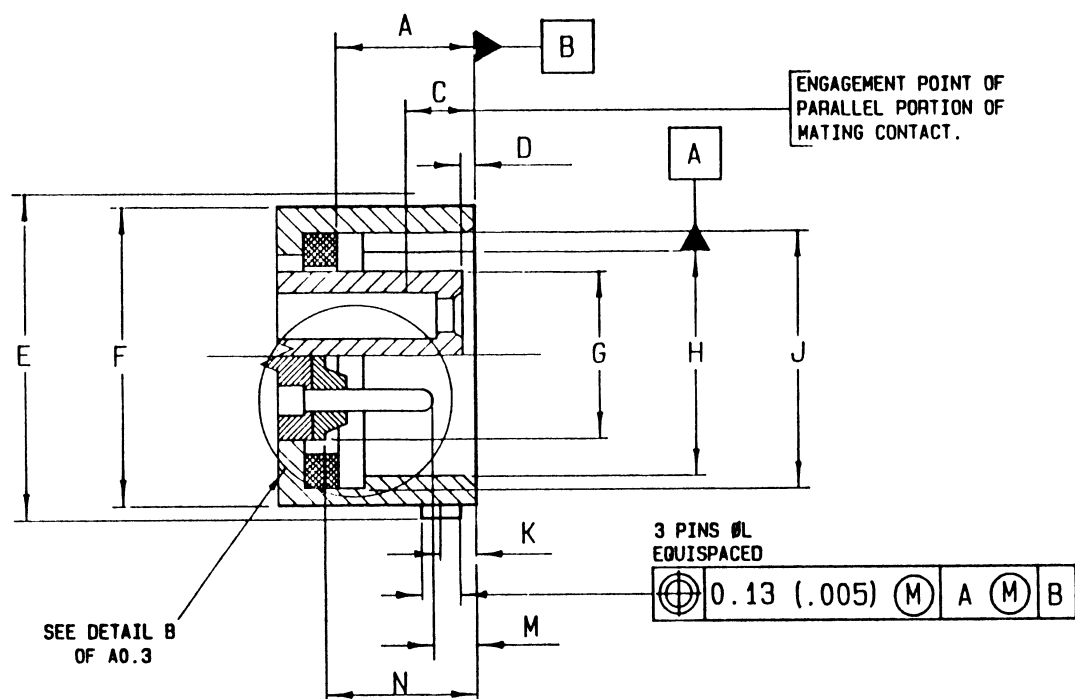


Shell size	Normal	A	B	C	D	Shell size
8	100°	82°	—	—	118°	8
10	100°	86°	72°	128°	114°	10
12	100°	80°	68°	132°	120°	12
14	100°	79°	66°	134°	121°	14
16	100°	82°	70°	130°	118°	16
18	100°	82°	70°	130°	118°	18
20	100°	82°	70°	130°	118°	20
22	100°	85°	74°	126°	115°	22
24	100°	85°	74°	126°	115°	24

NOTE 9 Insert orientation. Not applicable to this connector range.

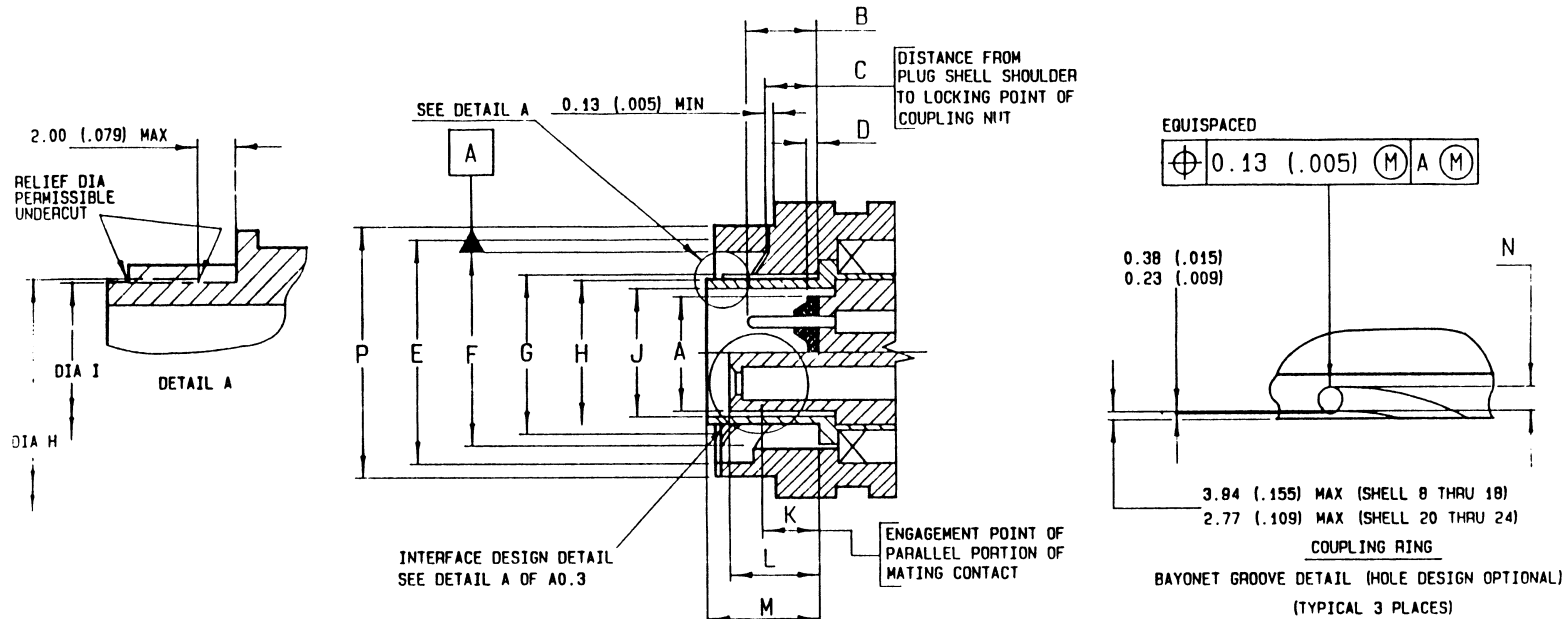
A.0 Mechanical compatibility information

A.0.1 Connector, fixed



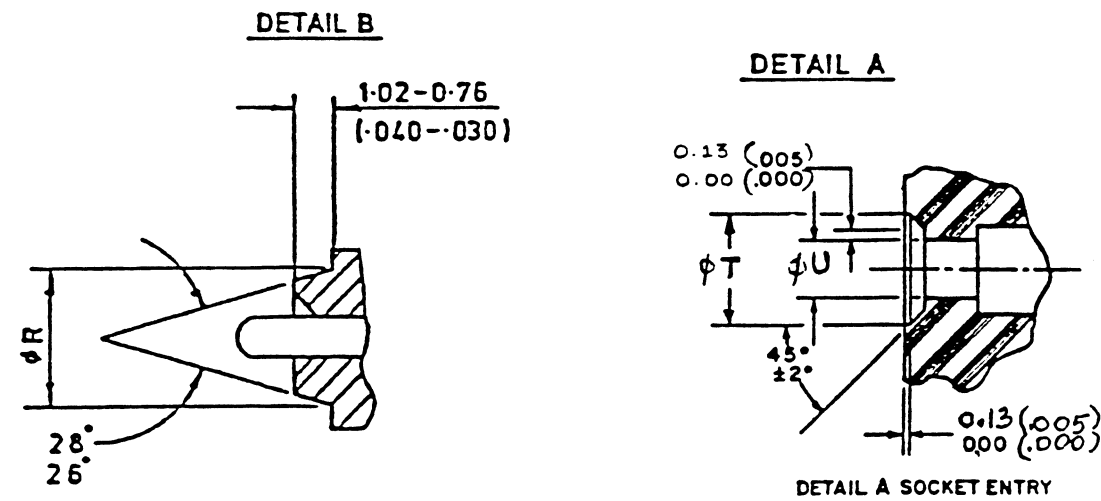
Shell size	A Gasket location		C max.		D		ϕE 0.00 + .000 0.41 - .018		ϕF 0.02 + .001 0.13 - .005		ϕG 0.13 + .005 0.25 - .010		ϕH 0.13 + .005 0.02 - .001		ϕJ 0.13 + .005 0.15 - .008		K True position		ϕL 0.15 + .006 0.05 - .002		M		N	
	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins
8							14.30	.583	12.01	.473	7.24	.285	9.19	.382	10.48	.412	1.98	.078	1.98	.078	1.70	.067	6.12	.241
10							17.27	.880	14.97	.590	10.49	.413	12.45	.490	13.72	.540								
12							21.82	.859	18.04	.750	13.39	.527	15.42	.607	17.05	.889								
14	5.90	.232	2.82	.111	0.58	.023	21.99	.984	22.21	.875	16.58	.652	18.59	.732	20.68	.814								
16	5.49	.216			0.28	.015	28.12	1.108	25.40	1.000	19.74	.777	21.77	.857	23.85	.939								
18							31.30	1.233	28.55	1.125	21.00	.666	24.43	.982	26.37	1.039								
20							34.50	1.358	31.73	1.250	25.17	.991	27.59	1.087	29.54	1.184								
22							37.84	1.483	34.90	1.375	28.32	1.116	30.80	1.212	32.72	1.289	3.18	.125						
24							40.90	1.610	38.01	1.500	31.50	1.241	33.96	1.337	35.92	1.414								

A.0.2 Connector, free



Shell size	ϕA 0.13 + .005 0.25 - .010		B		C		D		ϕE 0.13 + .005 0.15 - .008		ϕF 0.13 + .005 0.02 - .001		ϕG 0.02 + .001 0.25 - .010		ϕH 0.02 + .001 0.13 - .005		I min		ϕJ min		K min		L		M		N		ϕP 0.00 + .000 0.20 - .008	
	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins
8	7.24	.285							14.63	.576	12.22	.481	10.21	.402	9.07	.357	8.56	.337	7.77	.306									18.00	.630
10	10.49	.413							17.70	.697	15.29	.602	13.46	.530	12.32	.485	11.81	.485	10.74	.422									19.10	.752
12	13.39	.527			2.95	.116			22.12	.871	19.33	.761	17.25	.679	15.16	.597	14.15	.557	13.64	.537							2.29	.090	23.50	.925
14	18.58	.852			1.93	0.76			25.27	.995	22.48	.885	20.42	.804	18.34	.722	17.83	.702	16.81	.662									26.65	1.050
16	19.74	.777	5.78 4.83	.228 .190			0.79 0.41	.031 .016	28.43	1.120	25.63	1.010	23.60	.928	21.51	.847	21.00	.827	19.99	.787	3.70	.146	6.20 5.94	.244 .234	6.60 6.50	.280 .256			29.75	1.172
18	21.00	.886							31.60	1.245	28.83	1.138	26.12	1.029	24.05	.947	23.54	.927	22.25	.876									33.15	1.304
20	25.17	.991							34.77	1.370	31.98	1.260	29.29	1.154	27.21	1.072	26.70	1.052	25.41	1.001									33.10	1.435
22	28.32	1.118			3.83	.143			37.94	1.495	35.15	1.385	32.46	1.279	30.38	1.197	29.87	1.177	28.58	1.126							3.48	.137	39.59	1.560
24	31.52	1.241			2.82	.103			41.22	1.624	38.32	1.510	35.63	1.404	33.55	1.322	33.05	1.302	31.75	1.251									42.84	1.688

A.0.3 Interface details



Ref. used on A.0.1 and A.0.2

Contact size		ϕR		ϕT		ϕU	
		mm	ins	mm	ins	mm	ins
22D	22M,	1.96	.077	1.70	.067	0.97	.038
	22	1.75	.069	1.60	.063	0.89	.035
20		2.52	.099	2.26	.089	1.32	.052
		2.31	.091	2.16	.085	1.25	.049
16		3.10	.122	2.85	.112	1.88	.074
		2.90	.114	2.74	.107	1.80	.070
12		3.91	.154	3.66	.144	2.69	.106
		3.71	.146	3.56	.140	2.62	.103