CONTACTS, ELECTRICAL, CRIMP FOR 3401/052 AND /056 CONNECTORS

ESCC Detail Specification No. 3401/058

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1. GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for Contacts, Electrical, Crimp, Gauge 22, 20, 16, 12, 8 and 4 for 3401/052 and /056 Connectors.

These contacts shall be packed separately from the connectors and may be procured either with the connectors or separately.

The specification shall be read in conjunction with:

- ESCC Generic Specification No. 3401, Connectors, Electrical, Non-Filtered, Circular and Rectangular.
- ESCC Detail Specification No. 3401/052, Connectors, Electrical, Circular, Bayonet Coupling, Scoop-Proof, Removable Crimp Contacts based on MIL-C-38999 Series I.
- ESCC Detail Specification No. 3401/056, Connectors, Electrical, Circular, Triple-Start Self-Locking Coupling, Scoop-Proof, Removable Crimp Contacts based on MIL-C-38999 Series III.

the requirements of which are supplemented herein.

1.2 COMPONENT TYPE VARIANTS

Variants of the different sizes of contacts specified herein, which are also covered by this specification are scheduled in Table 1(a).

1.3 MAXIMUM RATINGS

The maximum ratings, which shall not be exceeded at any time during use or storage, applicable to the contacts specified herein, are scheduled in Table 1(b).

1.4 PARAMETER DERATING INFORMATION (FIGURE 1)

Not applicable.

1.5 PHYSICAL DIMENSIONS

The physical dimensions of the contacts specified herein are shown in Figure 2.

TABLE 1(a) - TYPE VARIANTS

VAR-IANT	TYPE	MATING END SIZE	CRIMP BARREL SIZE	RATED CUR-RENT	ACCEPT WIRE	MAX WEIGHT	ENGAGEMENT & SEPARATION			CONTACT CAPABILITY				CON-TACT RETENT. FORCE MAX	CONTACT INSERT WITHDR. FORCES MAX	PROBE DAMAGE			OVERSIZE PIN EXCL.		
										TEST PIN DIA mm		WEIGHT				MO-MENT	PROBE DIA mm		FORCE MAX	TEST PIN DIA mm	
							ENGAG. max	SEPAR. min		min	max	Pick-up	Drop				min	max		min	max
				A	AWG	g	N (1)	N (1)				g (2)	g (3)	N	N	N.cm			N		
01	Male	22	22	5.0	22	0.08	-	-		-	-	-	-	44	44	-	-	-	-	-	-
					24																
					26	0.26	3.33	0.19		0.773	0.775	-	340.2	44	44	1.34	0.749	0.774	2.45	0.905	0.907
							2.22	0.19		0.749	0.751	19.84	-								
02	Female	20	20	7.5	20	0.16	-	-		-	-	-	-	67	89	-	-	-	-	-	-
					22																
					24	0.48	5.01	0.19		1.039	1.041	-	510.3	67	89	5.64	1.003	1.029	3.33	1.180	1.182
							2.22	0.19		0.990	0.993	19.84	-								
03	Male	16	16	13	16	0.33	-	-		-	-	-	-	111	89	-	-	-	-	-	-
					18																
					20	0.87	8.34	0.56		1.611	1.613	-	850.5	111	89	22.56	1.575	1.60	5.49	1.738	1.740
							3.50	0.56		1.562	1.564	56.71	-								
04	Female	12	12	23	12	0.68	-	-		-	-	-	-	111	133	-	-	-	-	-	-
					14																
						1.6	8.34	0.83		2.411	2.413	-	850.5	111	133	22.56	2.375	2.40	8.24	2.550	2.552
							6.34	0.83		2.362	2.364	85.05	-								
05	Male	12	12	23	12	1.6	8.34	0.83		2.411	2.413	-	850.5	111	133	22.56	2.375	2.40	8.24	2.550	2.552
					14		6.34	0.83		2.362	2.364	85.05	-								
06	Female	12	12	23	12	1.6	8.34	0.83		2.411	2.413	-	850.5	111	133	22.56	2.375	2.40	8.24	2.550	2.552
					14		6.34	0.83		2.362	2.364	85.05	-								

VARIANT	TYPE	MATING END SIZE	CRIMP BARREL SIZE	RATED CURRENT A	ACCEPT WIRE AWG	MAX WEIGHT g	ENGAGEMENT & SEPARATION		CONTACT CAPABILITY				CONTACT RETENT. FORCE MAX N	CONTACT INSERT WITHDR. FORCES MAX N	PROBE DAMAGE			OVERSIZE PIN EXCL.		
							ENGAG. max N (1)	SEPAR. min N (1)	TEST PIN DIA mm		WEIGHT				MOMENT N.cm	PROBE DIA mm		FORCE MAX N	TEST PIN DIA mm	
									min	max	Pick-up g (2)	Drop g (3)				min	max		min	max
09	Male	8	8	46	8 10	3.5	-	-	-	-	-	-	111	150	-	-	-	-	-	-
10	Female					5.0	9.9 8.0	1.1 1.1	3.629 3.581	3.632 2.583	- 110	800 -	111	150	50	3.594	3.619	10	4.00	4.01
11	Male	4	4	80	6 4	6.0	-	-	-	-	-	-	180	190	-	-	-	-	-	-
12	Female					7.5	20.4 16.0	2.2 2.2	5.737 5.689	5.740 5.692	- 220	1600 -	180	190	50	5.702	5.727	15	6.10	6.11
13	Male	4	8	46	8 10	6.5	-	-	-	-	-	-	180	190	-	-	-	-	-	-
14	Female					8.0	20.4 16.0	2.2 2.2	5.737 5.689	5.740 5.692	- 220	1600 -	180	190	50	5.702	5.727	15	6.10	6.11

NOTES:
1. 1st line with maximum diameter test pin; 2nd line with minimum diameter test pin.
2. With minimum diameter test pin and minimum insertion depth of 4mm.
3. With maximum diameter test pin and minimum insertion depth of 4mm..

TABLE 1(b) - MAXIMUM RATINGS

No.	Characteristics	Symbol	Maximum Rating	Unit
1	Rated Current	Icr	See Table 1(a)	A
2	Operating Temperature Range	T_{op}	-65 to +200	˚C
3	Storage Temperature Range	T_{stg}	-65 to +200	˚C

FIGURE 1- PARAMETER DERATING INFORMATION
Not applicable.

2. APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:

(a) ESCC Generic Specification No. 3401 for Connectors, Electrical, Non-Filtered, Circular and Rectangular.
(b) ESCC Detail Specification No. 3401/052, Connectors, Electrical, Circular, Bayonet Coupling, Scoop-Proof, Removable Crimp Contacts based on MIL-C-38999 Series I.
(c) ESCC Detail Specification No. 3401/056, Connectors, Electrical, Circular, Triple-Start Self-Locking Coupling, Scoop-Proof, Removable Crimp Contacts based on MIL-C-38999 Series III.

3. TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. 21300 shall apply.

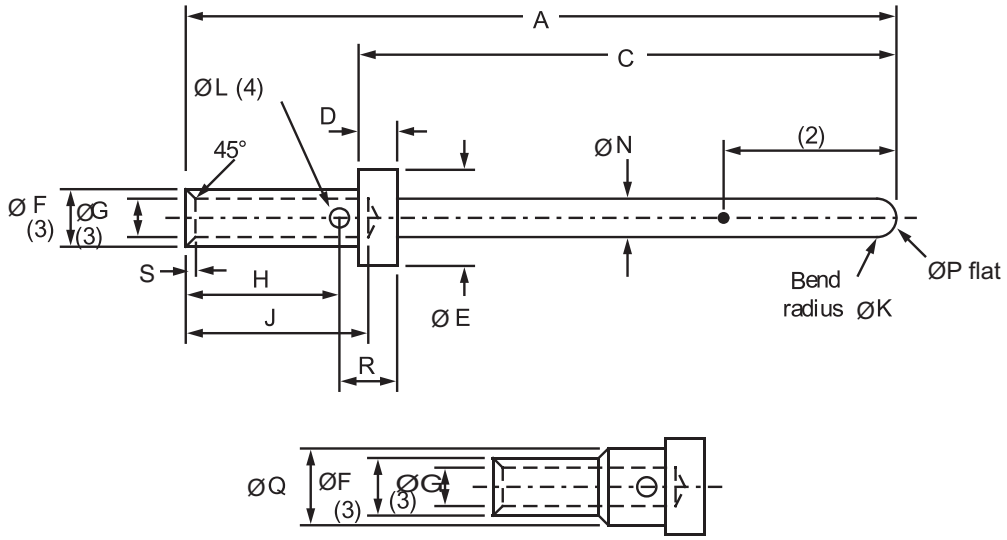
4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the contacts specified herein are stated in this specification and ESCC Generic Specification No. 3401. Deviations from the Generic Specification, applicable to this specification only, are detailed in Para. 4.2.

Deviations from the applicable Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirements and do not affect the components' reliability, are listed in the appendices attached to this specification.

FIGURE 2 - PHYSICAL DIMENSIONS
Variants with Uneven Numbers - Male Contact

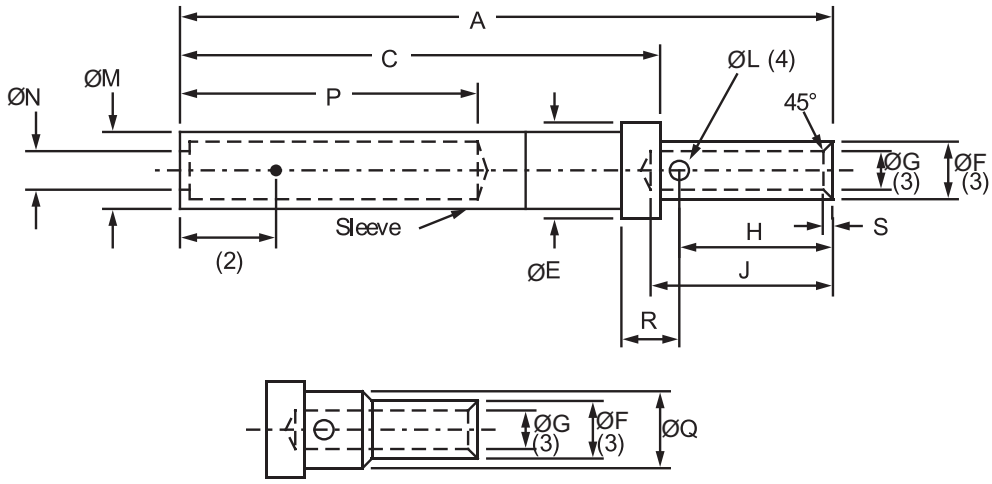


Crimp barrel configuration for Variants 09, 11 and 13

Type Variant		A	C	D	ØE	ØF	ØG	H	J	ØK	ØL	ØN	ØP	ØQ	R	S
01	Min	-	7.49	0.74	1.52	1.17	0.85	3.09	3.58	0.25	0.46	0.75	-	-	-	0.08
	Max	13.64	7.62	0.84	1.57	1.22	0.9	3.27	3.99	0.51	0.56	0.77	0.28	-	-	0.13
03	Min	-	7.49	0.74	2.31	1.73	1.17	-	5.31	0.38	0.66	0.99	-	-	1.82	0.13
	Max	13.64	7.62	0.84	2.39	1.78	1.22	-	5.82	0.64	0.81	1.04	0.38	-	1.98	0.25
05	Min	-	7.49	0.74	3.23	2.57	1.68	-	5.31	0.51	0.91	1.56	0.28	-	2.08	0.13
	Max	13.64	7.62	0.84	3.30	2.26	1.73	-	5.82	0.64	1.07	1.61	0.76	-	2.24	0.25
07	Min	-	7.49	0.74	4.55	3.76	2.49	-	5.31	0.51	0.91	2.36	1.09	-	2.08	0.14
	Max	13.64	7.62	0.84	4.62	3.84	2.59	-	5.82	0.64	1.02	2.41	1.57	-	2.24	0.4
09	Min	-	11.75	0.74	7.69	6.65	4.54	-	12.2	1.8	1.7	3.58	1.5	6.9	2.3	0.4
	Max	26.2	11.95	0.84	7.79	6.73	4.65	-	12.8	1	1.85	3.64	2	7	2.4	0.6
11	Min	-	12.75	0.74	10.5	9.47	7.08	-	12.2	1	1.7	5.68	2	9.68	2.3	0.4
	Max	26.2	12.95	0.84	10.6	9.55	7.19	-	12.8	1.1	1.85	5.74	2.5	9.8	2.4	0.6
13	Min	-	12.75	0.74	10.5	6.65	4.54	-	14.8	1	1.7	5.68	2	9.68	2.3	0.4
	Max	28.8	12.95	0.84	10.6	6.73	4.65	-	15.1	1.1	1.85	5.74	2.5	9.8	2.4	0.6

NOTES:
1. All dimensions are in millimetres.
2. Measurement point for plating thickness: 4±1.
3. ØF and ØG to be concentric within 0.05 TIR.
4. Inspection hole shall only penetrate one wall of the crimp barrel.

Variants with Even Numbers - Female Contact



Crimp barrel configuration for Variants 10, 12 and 14

Type Variant		A	C	ØE	ØF	ØG	H	J	ØL	ØM	ØN	P	ØQ	R	S
02	Min	-	15.64	1.52	1.17	0.85	3.09	3.58	0.46	-	0.78	4.22	-	-	0.08
	Max	21.92	15.9	1.57	1.22	0.9	3.27	3.99	0.56	1.57	-	-	-	-	0.13
04	Min	-	15.64	2.31	1.73	1.17	-	5.31	0.66	-	1.05	4.22	-	1.82	0.13
	Max	21.92	15.9	2.39	1.78	1.22	-	5.82	0.81	1.98	-	-	-	1.98	0.25
06	Min	-	15.64	3.23	2.57	1.68	-	5.31	0.91	-	1.63	4.22	-	2.08	0.13
	Max	21.92	15.9	3.3	2.62	1.73	-	5.82	1.02	2.87	-	-	-	2.24	0.25
08	Min	-	15.64	4.55	3.76	2.49	-	5.31	0.91	-	2.42	4.22	-	2.08	0.14
	Max	21.92	15.9	4.62	3.84	2.59	-	5.82	1.02	4.09	-	-	-	2.24	0.4
10	Min	-	16.4	7	6.65	4.54	-	12.2	1.7	-	3.85	13.1	6.9	2.3	0.4
	Max	30	16.75	7.1	6.73	4.65	-	12.8	1.85	6.53	-	-	7	2.4	0.6
12	Min	-	16.4	9	9.47	7.08	-	12.2	1.7	-	5.95	13.1	9.68	2.3	0.4
	Max	30	16.75	9.1	9.55	7.19	-	12.8	1.85	8.54	-	-	9.8	2.4	0.6
14	Min	-	16.4	9	6.65	4.54	-	14.8	1.7	-	5.95	13.1	9.68	2.3	0.4
	Max	32.6	16.75	9.1	6.73	4.65	-	15.1	1.85	8.54	-	-	9.8	2.4	0.6

NOTES:

1. All dimensions are in millimetres.
2. Measurement point for plating thickness: 2±1.
3. ØF and ØG to be concentric within 0.05 TIR.
4. Inspection hole shall only penetrate one wall of the crimp barrel.

4.2 DEVIATIONS FROM GENERIC SPECIFICATION

4.2.1 Deviations from Special In-Process Controls

None.

4.2.2 Deviations from Final Production Tests (Chart II)

None.

4.2.3 Deviations from Burn-in and Electrical Measurements (Chart III)

Not applicable.

4.2.4 Deviations from Qualification Tests (Chart IV)

(a) Para. 9.31, Solderability: Not applicable.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

(a) Para. 9.31, Solderability: Not applicable.

4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the contacts specified herein shall be verified in accordance with the requirements set out in Para. 9.6 of ESCC Generic Specification No. 3401 and they shall conform to those shown in Figure 2 of this specification.

4.3.2 Weight

The maximum weight of the contacts specified herein shall be as given in Table 1(a).

4.3.3 Contact Capability

For the purpose of this test, the pick-up and drop weights shall be as specified in Table 1(a).

4.3.4 Contact Retention (in Insert)

The contact retention force shall be as specified in Table 1(a).

4.3.5 Mating and Unmating Forces

As specified in ESCC Detail Specification No. 3401/052 or /056.

4.3.6 Insert Retention (in Shell)

As specified in ESCC Detail Specification No. 3401/052 or /056.

4.3.7 Jackscrew Retention

As specified in ESCC Detail Specification No. 3401/052 or /056.

4.3.8 Contact Insertion and Withdrawal Forces

The contact insertion and withdrawal forces shall be as specified in Table 1(a).

4.3.9 Engagement and Separation Forces

The diameter of the test pin and the contact engagement and separation forces of the female contacts shall be as specified in Table 1(a).

4.3.10 Oversize Pin Exclusion

The diameter of the test pin and the force applied to it shall be as specified in Table 1(a).

4.3.11 Probe Damage

The probe diameter and the moment at the end of the probe shall be as specified in Table 1(a).

4.4 MATERIALS AND FINISHES

The materials and finishes shall be as specified herein. Where a definite material is not specified, a material which will enable the contacts specified herein to meet the performance requirements of this specification shall be used. Acceptance or approval of any constituent material does not guarantee acceptance of the finished product.

4.4.1 Shell, Coupling Ring and Nuts

As specified in ESCC Detail Specification No. 3401/052 or 3401/056.

4.4.2 Inserts

As specified in ESCC Detail Specification No. 3401/052 or 3401/056.

4.4.3 Contacts

The contact body shall be made of copper base alloy selected from raw materials with a minimum of impurities. The contacts shall be plated as follows:

– 2µm±20% nickel underplate.
– 1.27µm minimum gold plate.

4.4.4 Contact Retaining Clip

As specified in ESCC Detail Specification No. 3401/052 or 3401/056.

4.4.5 Guiding and Locking Devices

Not applicable.

4.4.6 Magnetism Level

As specified in ESCC Detail Specification No. 3401/052 or 3401/056.

4.5 MARKING

4.5.1 General

The marking of all components delivered to this specification shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and the following paragraphs. These components being too small to accommodate the marking specified hereafter, the full marking information shall accompany the component in its primary package.

Such marking shall comprise:

(a) The ESCC Component Number.
(b) Traceability Information.

4.5.2 The ESCC Component Number

The ESCC Component Number shall be constituted and marked as follows:

340105801B

- Detail Specification Number: 3401058
- Type Variant (See Table 1(a)): 01
- Testing Level: B

4.5.3 Traceability Information

Traceability information shall be marked in accordance with ESCC Basic Specification No. 21700.

4.6 ELECTRICAL MEASUREMENTS

4.6.1 Electrical Measurements at Room Temperature

The parameters to be measured in respect of electrical characteristics are scheduled in Table 2. Unless otherwise specified these measurements shall be performed at T_{amb}=+22±3˚C.

4.6.2 Electrical Measurements at High and Low Temperatures (Table 3)

Not applicable.

4.6.3 Circuits for Electrical Measurements (Figure 4)

Not applicable

4.7 BURN-IN TESTS (TABLES 4 AND 5)

Not applicable.

TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	Characteristics	Symbol	ESCC 3401 Test Method	Test Conditions	Variants	Limits		Unit
						Min	Max	
1	Contact Resistance (Low Level Current)	Rcl	Para. 9.1.1.3	Para. 9.1.1.3	All	-	8	mΩ
2	Contact Resistance (Rated Current)	Rcr	Para. 9.1.1.3	Para. 9.1.1.3 5A 7.5A 13A 23A 46A 80A	 01, 02 03, 04 05, 06 07, 08 03, 10, 13, 14 11, 12	 - - - - - -	 14 7 4 3.5 3 2.5	mΩ

TABLES 3, 4 AND 5

Not applicable.

4.8 ENVIRONMENTAL AND ENDURANCE TESTS

4.8.1 Measurements and Inspections on Completion of Environmental Tests

The parameters to be measured and inspections to be performed on completion of environmental tests are scheduled in Table 6. Unless otherwise specified, the measurements shall be performed at T_{amb}=+22±3˚C.

4.8.2 Measurements and Inspections at Intermediate Points During Endurance Tests

Not applicable.

4.8.3 Measurements and Inspections on Completion of Endurance Tests

The parameters to be measured and inspections to be performed on completion of endurance tests shall be those specified in Table 6. Unless otherwise specified, these measurements shall be performed at T_{amb}=+22±3˚C.

4.8.4 Conditions for Operating Life Test (Part of Endurance Testing)

Not applicable.

4.8.5 Electrical Circuit for Operating Life Test

Not applicable.

4.8.6 Conditions for High Temperature Storage Test (Part of Endurance Testing)

The requirements for the high temperature storage test are specified in Section 9 of ESCC Generic Specification No. 3401. The conditions for high temperature storage testing shall be the maximum storage temperature specified in Table 1(b) of this specification.

TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL AND ENDURANCE TESTING

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Methods and Conditions	Identification	Conditions		Min	Max	
01	Wiring	Para. 9.10 & Table 1(a) of this spec.	Low Level Contact Resistance	Table 2 Item 1	Rcl	Table 2 Item 1		
02	Vibration	Para. 9.11	ESCC 3401/052 or 3401/056		-	-	-	-
03	Shock or Bump	Para. 9.12	ESCC 3401/052 or 3401/056		-	-	-	-
04	Climatic Sequence	Para. 9.13	ESCC 3401/052 or 3401/056		-	-	-	-
05	Seal Test	Para. 9.9	ESCC 3401/052 or 3401/056		-	-	-	-
06	Plating Thickness	Para. 9.14	Thickness	-	-	Para. 4.4.3 of this spec.		-
07	Joint Strength	Para. 9.15	ESCC 3401 Para. 9.15	-	-	-	-	-
08	Rapid Change of Temperature	Para. 9.16	ESCC 3401/052 or 3401/056		-	-	-	-

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Methods and Conditions	Identification	Conditions		Min	Max	
09	Contact Retention (in Insert)	Para. 9.17 & Para. 4.3.4 of this spec.	Contact Displacement	-	-	ESCC 3401 Para. 9.17		-
10	Endurance	Para. 9.18	**Initial**					
			Low Level Contact Resistance	Table 2 Item 1	Rcl	Record Values		-
			Final					
			Low Level Contact Resistance Drift	Table 2 Item 1	ΔRcl	-	3	mΩ
11	Permanence of Marking	Para. 9.19	Not applicable	-	-	-	-	-
12	Mating/Unmating Forces	Para. 9.20	ESCC 3401/052 or 3401/056		-	-	-	-
13	High Temperature Storage	Para. 9.21	**Initial**					
			Low Level Contact Resistance	Table 2 Item 1	Rcl	Record Values		-
			Final					-
			Low Level Contact Resistance Drift	Table 2 Item 1	ΔRcl	-	3	mΩ
			Rated Current Contact Resistance	Table 2 Item 2	Rcr	Table 2 Item 2		-
			Contact Retention (in Insert)	Para. 4.3.4 of this spec.	-	ESCC 3401 Para. 9.17		-
14	Corrosion	Para. 9.22	Visual Examination	-	-	-	-	-
15	Insert Retention (in Shell)	Para. 9.23 & Para. 4.3.6 of this spec.	ESCC 3401/052 or 3401/056		-	-	-	-
16	Jackscrew Retention	Para. 9.24 & Para. 4.3.7 of this spec.	ESCC 3401/052 or 3401/056		-	Not applicable		-
17	High Temperature Measurements	Para. 9.25	ESCC 3401/052 or 3401/056		-	-	-	-
18	Overload Test	Para. 9.26	Rated Current Contact Resistance	Table 2 item 2	Rcr	Table 2 Item 2		-
19	Maintenance Aging	Para. 9.27	Visual Examination		-	-	-	-
			Contact Retention (in Insert)	Para. 4.3.4 of this spec.	-	ESCC 3401 Para. 9.17		-
			Contact Insertion & Withdrawal Forces	Para. 4.3.8 of this spec.	-	Para. 4.3.8 of this spec		-
20	Engagement and Separation Forces	Para. 9.28 & para. 4.3.9 of this spec.	Force	-	-	Para. 4.3.9 of this spec.		-
21	Oversize Pin Exclusion	Para. 9.29 & para. 4.3.10 of this spec.	-	-	-	ESCC 3401 Para. 9.29		-
22	Probe Damage	Para. 9.30 & para. 4.3.11 of this spec.	Contact Separation Force	Para. 4.3.9 of this spec.	-	Para. 4.3.9 of this spec.		-

No.	ESCC Generic Spec. No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Methods and Conditions	Identification	Conditions		Min	Max	
23	Solderability	Para. 9.31 & para. 4.3.12 of this spec.	Not applicable	-	-	-	-	-

NOTES:

1. The tests in this table refer to either Chart IV or V and shall be used as applicable.