CONTACTS, ELECTRICAL, CRIMP, FOR 3401/044 CONNECTORS

ESCC Detail Specification No. 3401/045

Issue 3	February 2013

Document Custodian: European Space Agency – see https://escies.org

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DOCUMENTATION CHANGE NOTICE

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DCR No.	CHANGE DESCRIPTION
750	Specification updated to incorporate editorial changes per DCR.

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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 for 3401/044 Connectors.

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

This specification shall be read in conjunction with:

- ESCC Generic Specification No. 3401, Connectors, Electrical, Non-Filtered, Circular and Rectangular,
- ESCC Detail Specification No. 3401/044, Connectors, Electrical, Circular, Bayonet Coupling, Removable Crimp Contacts, Based on MIL-C-38999 Series II,

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

Variant	Type	Mating End Size	Crimp Barrel Size	Rated Current	Accept Wire	Max. Weight	Engagement & Separation		Test Pins Dia. mm		Contact Capability Weight	
							Engag. Forces N (1)	Separ. Forces N (1)			Pick-up (2)	Drop (3)
				A	AWG	g			Min.	Max.	g	g
01	Male	22	22	5	22	0.08	-	-	-	-	-	-
02	Female				24	0.11	3.33	0.19	0.773	0.775	-	340.2
					26		2.22	0.19	0.749	0.751	19.84	-
03	Male	20	20	7.5	20	0.16	-	-	-	-	-	-
04	Female				22	0.21	5.01	0.19	1.039	1.041	-	510.3
					24		2.22	0.19	0.99	0.993	19.84	-
05	Male	16	16	13	16	0.33	-	-	-	-	-	-
06	Female				18	0.42	8.34	0.56	1.611	1.613	-	850.5
					20		3.5	0.56	1.562	1.564	56.71	-
07	Male	12	12	23	12	0.68	-	-	-	-	-	-
08	Female				14	0.82	8.34	0.83	2.411	2.413	-	850.5
							6.34	0.83	2.362	2.364	85.05	-

Variant	Contact Retention Force Max.	Contact Insertion and Withdrawal Forces Max.	Probe Damage			Oversize Pin Excl.		
			Moment	Probe Dia. mm		Force Max.	Test Pin Dia. mm	
	N	N	N.cm	Min.	Max.	N	Min.	Max.
01	44	44	-	-	-	-	-	-
02	44	44	1.34	0.749	0.774	2.45	0.905	0.907
03	67	89	-	-	-	-	-	-
04	67	89	5.64	1.003	1.029	3.33	1.18	1.182
05	111	89	-	-	-	-	-	-
06	111	89	22.56	1.575	1.6	5.49	1.738	1.74
07	111	133	-	-	-	-	-	-
08	111	133	22.56	2.375	2.4	8.24	2.55	2.552

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 Ratings	Unit
1	Rated Current	I_{CR}	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, Connectors, Electrical, Non-Filtered, Circular and Rectangular.
(b) ESCC Detail Specification No. 3401/044, Connectors, Electrical, Circular, Bayonet Coupling, Removable Crimp Contacts, Based on MIL-C-38999 Series II.

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

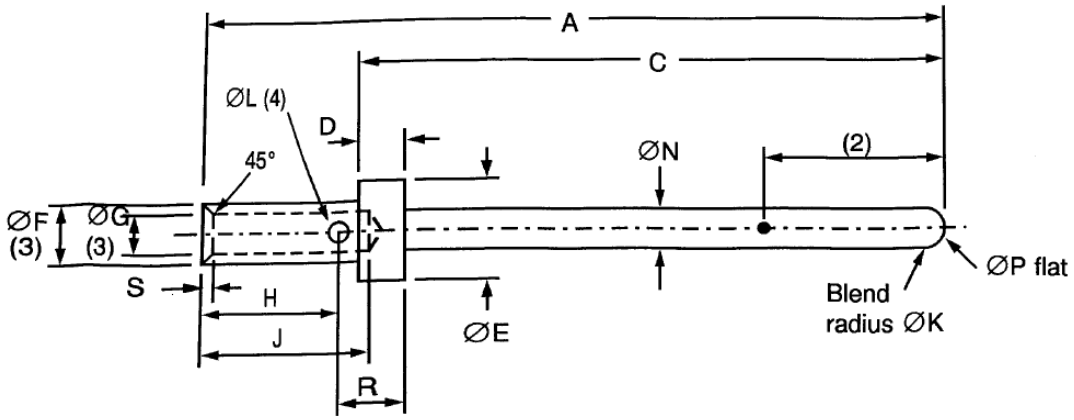
4.1 GENERAL

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 listed 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

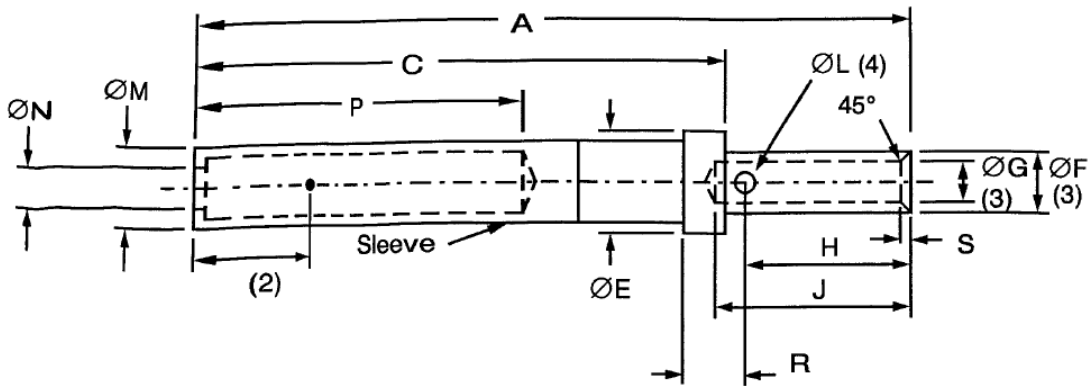


Type Variant		A	C	D	ØE	ØF	ØG	H	J	ØK	ØL	ØN	ØP	R	S
01	Min.	-	7.49	0.74	1.52	1.17	0.85	3.09	3.58	0.25	0.46	0.75	-	-	0.08
	Max.	13.64	7.62	0.84	1.57	1.22	0.9	3.27	3.99	0.51	0.56	0.77	0.2	-	0.13
03	Min.	-	7.49	0.74	2.31	1.73	1.17	-	5.31	0.38	0.66	0.99	-	1.82	0.13
	Max.	13.64	7.62	0.84	2.39	1.78	1.22	-	5.82	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	3.3	2.62	1.73	-	5.82	0.61	1.02	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	0.13
	Max.	13.64	7.62	0.84	4.62	3.84	2.59	-	5.82	0.64	1.07	2.41	1.57	2.24	0.25

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



Type Variant		A	C	ØE	ØF	ØG	H	J	ØL	ØM	ØN	P	R	S
02	Min.	-	7.08	1.52	1.17	0.85	3.09	3.58	0.46	-	0.78	4.22	-	0.08
	Max.	13.41	7.34	1.57	1.22	0.9	3.27	3.99	0.56	1.57	-	-	-	0.13
04	Min.	-	7.08	2.31	1.73	1.17	-	5.31	0.66	-	1.05	4.22	1.82	0.13
	Max.	13.41	7.34	2.39	1.78	1.22	-	5.82	0.81	1.98	-	-	1.98	0.25
06	Min.	-	7.08	3.23	2.57	1.68	-	5.31	0.91	-	1.63	4.22	2.08	0.13
	Max.	13.41	7.34	3.3	2.62	1.73	-	5.82	1.02	2.87	-	-	2.24	0.25
08	Min.	-	7.08	4.55	3.76	2.49	-	5.31	0.91	-	2.42	4.22	2.08	0.13
	Max.	13.41	7.34	4.62	3.84	2.59	-	5.82	1.07	4.09	-	-	2.24	0.25

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)
Chart III is 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 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 specified 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. 3401/044.

4.3.6 Insert Retention (In Shell)
As specified in ESCC Detail Specification No. 3401/044.

4.3.7 Jackscrew Retention
As specified in ESCC Detail Specification No. 3401/044.

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 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 components 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. 3401/044.

4.4.2 Inserts
As specified in ESCC Detail Specification No. 3401/044.

4.4.3 Contacts

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

- 1µm minimum nickel underplate.
- 1.27µm minimum gold plate.

4.4.4 Contact Retaining Clip

As specified in ESCC Detail Specification No. 3401/044.

4.4.5 Guiding and Locking Devices

Not applicable.

4.4.6 Magnetism Level

As specified in ESCC Detail Specification No. 3401/044.

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 subparagraphs.

These components being too small to accommodate the marking as specified hereafter, the full marking information shall accompany each lot of components in its primary package. Such marking shall comprise:

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

4.5.2 The ESCC Component Number

Each component shall bear the ESCC Component Number which shall be constituted and marked as follows:

Example: 340104501B

- Detail Specification Number: 3401045
- Type Variant (see Table 1(a)): 01
- Testing Level: B.

4.5.3 Traceability Information

Traceability information shall be marked in accordance with the requirements of 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	Specification and/or Test Method	Test Condition	Variants	Limits		Unit
						Min.	Max.	
1	Contact Resistance (Low Level Current)	Rcl	ESCC No. 3401 Para. 9.1.1.3	Para. 9.1.1.3	All	-	8	mΩ
2	Contact Resistance (Rated Current)	Rcr	ESCC No. 3401 Para. 9.1.1.3	Para. 9.1.1.3				mΩ
				5A	01, 02	-	14	
				7.5A	03, 04	-	7	
				13A	05, 06	-	4	
				23A	07, 08	-	3.5	

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 testing are scheduled in Table 6. Unless otherwise specified, these 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 Circuits 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 TESTS

No.	ESCC Generic No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Method 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 3401/044					
03	Shock or Bump	Para. 9.12	ESCC 3401/044					
04	Climatic Sequence	Para. 9.13	ESCC 3401/044					
05	Seal Test	Para. 9.9	ESCC 3401/044					
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 3401/044					
09	Contact Retention (in Insert)	Para. 9.17 & Para. 4.3.4 of spec.	Contact Displacement	-	-	ESCC 3401 Para. 9.17		
10	Endurance	Para. 9.18	**Initial Measurements**					
			Low Level Contact Resistance	Table 2 Item 1	Rcl	Record Values		mΩ
			Final Measurements					
			Low Level Contact Resistance Drift	Table 2 Item 1	ΔRcl	-	3	mΩ
11	Permanence of Marking	Para. 9.19	As applicable					
12	Mating/Unmating Forces	Para. 9.20	ESCC 3401/044					
13	High Temperature Storage	Para. 9.21	**Initial Measurements**					
			Low Level Contact Resistance	Table 2 Item 1	Rcl	Record Values		mΩ
			Final Measurements					
			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 3401/044					
16	Jackscrew Retention	Para. 9.24 & Para. 4.3.7 of this spec.	ESCC 3401/044					

No.	ESCC Generic No. 3401		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Tests (1)	Test Method and Conditions	Identification	Conditions		Min.	Max.	
17	High Temperature Measurements	Para. 9.25	ESCC 3401/044					
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	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		
20	Engage/Separation Forces	Para. 9.28 & Para. 4.3.9 of this spec.	Force	-	-	Para. 4.3.9		
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		
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.