

**VALIDATION CRIMP OF CONTACT MDMA  
- TEST RESULTS -****Object:**

- Validation crimp of contact SKT MDMA AWG 24 & 2x AWG 28
  - > AWG 24 locator MDMA-S selector pince M22520/2-01 Position 2
  - > 2x AWG 28 locator MDMA-S selector pince M22520/2-01 Position 2
- Contact reference: C252-8844-000 (C&K P/N) (Variant 3401/078 to be assigned)

**Description of tests:**

- Joint Strength
- Cross Section
- Gold Plate Thickness

**Applicable documents :**

- Generic specification : ESCC 3401 - Issue 1 - October 2002
- Detail specification : ESCC 3401/078 - Issue 3 - February 2010
- ECSS Q-ST-70-26 RevC
- Appendix - Modified pages of ESCC 3401/078 (DCR to be submitted)

**Conclusion :**

- Joint Strength of AWG24 : **In accordance with value proposed for ESCC 3401/078 (but not with requirement of ECSS Q-ST-70-26 RevC).**  
Minimum value proposed in ESCC 3401/078 is **30N**  
Minimum value required in ECSS Q-ST-70-26 RevC is **60N**  
Minimum value measured is **41,80 N**
- Joint Strength of 2xAWG28 : **In accordance with value defined in ESCC 3401/078 and with requirement of ECSS Q-ST-70-26 RevC.**  
Minimum value defined in ESCC 3401/078 is **75% of 2x13N = 20N**  
Minimum value required in ECSS Q-ST-70-26 RevC is **75% of 2x30N = 45N**  
Minimum value measured is **53,4 N (Joint strength for 2 wires)**  
Minimum value measured is **27,9 N (Joint strength for 1 out of 2 wires)**
- Cross Section: **No crack observed in crimping area for the two versions tested.**
- Measurements of Gold Plating Thickness: **OK, in accordance with ESCC 3401/078**

**Remark :**

Selector of crimping tool M22520/2-01 on position 2 for this test report.  
Comparison between position 2, 3 and 4 performed in complementary test report 639-12C

**Laboratory Technician**  
**E. HAUSWIRTH**

**Chief inspector**  
**O. MASSON**

TEST : JOINT STRENGTH

Report N° 483-12C

Test Group :

Spécifications : ESCC 3401 Generic Specification § 9.15.3

Requirements : ESCC 3401/077 tab 6- ESCC 3401/078 tab 6 Appendix "A"

Test environment or special conditions :

Test equipment :

TEST PROCEDURE :

Crimp contacts :

The crimped contact-wire assemblies shall be placed in a tensile testing device and an axial load shall be applied.

The connection shall be loaded until failure occurs. The value at failure shall be recorded , together with the information as to whether the failure was 'pull-out', 'broke in crimp' or break in wire.

TEST REQUIREMENTS :

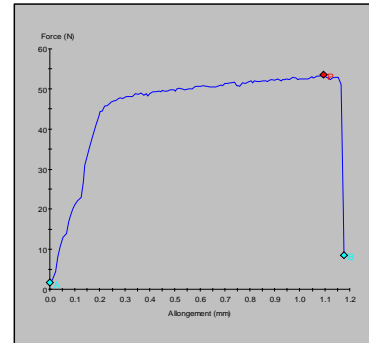
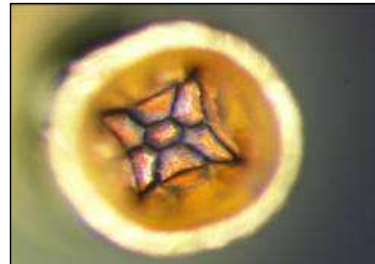
Crimp contacts :

wire size	axial strength (N) minimum value
AWG 24	30
AWG 28	20

TEST SAMPLES : ref. Contact SKT AWG 24 & 2x AWG 28 Crimped with locator MDMA-S /Tool M22520/2-01 and Crimp tool position 2

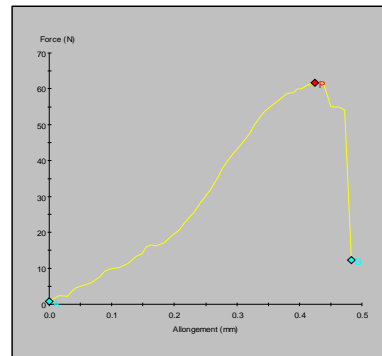
ct type	wiring	ct N°	Axial Strength (N)	separation mode *	result	
					pass	fail
Skt cts	AWG 24	1	53,50	b	√	
		2	48,80	b	√	
		3	53,20	b	√	
		4	54,10	b	√	
		5	53,90	b	√	
		6	41,80	b	√	
		7	50,40	b	√	
		8	54,00	b	√	
		9	46,90	b	√	
		10	55,20	b	√	
		11	47,60	b	√	
		12	53,80	b	√	
		13	43,40	b	√	
		14	52,50	b	√	
		15	49,50	b	√	
		16	53,20	b	√	
		17	45,20	b	√	
		18	54,90	b	√	
Mini			41,80			
Maxi			55,20			
Average			50,66			

Force applied on the 2 cables AWG 28



ct type	wiring	ct N°	Axial Strength (N)	separation mode *	result	
					pass	fail
Skt cts	2 x AWG 28	1	62,40	b	√	
		2	63,30	b	√	
		3	56,00	b	√	
		4	61,70	b	√	
		5	53,40	b	√	
		6	58,20	b	√	
Skt cts	2 x AWG 28	7	32,10	b	√	
		8	31,30	b	√	
		9	28,70	b	√	
		10	30,20	b	√	
		11	29,50	b	√	
		12	27,90	b	√	
Mini			53,40			
Maxi			63,30			
Average			59,17			
Mini			27,90			
Maxi			32,10			
Average			29,95			

Force applied on only 1 out of the 2 cables AWG 28



a : pull-out  
b : broke in crimp  
c : broke in wire

TEST : CROSS SECTION

Report N° 483-12C

Test Group :

Spécifications : ESCC 3401 Generic Specification

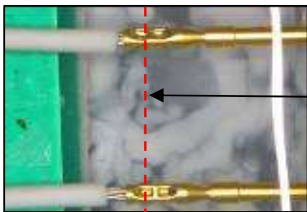
Requirements : ESCC 3401/005 tab 6

Test environment or special conditions :  
Crimped contacts shall be subjected to cross section

Test equipment :

TEST PROCEDURE :

TEST REQUIREMENTS :



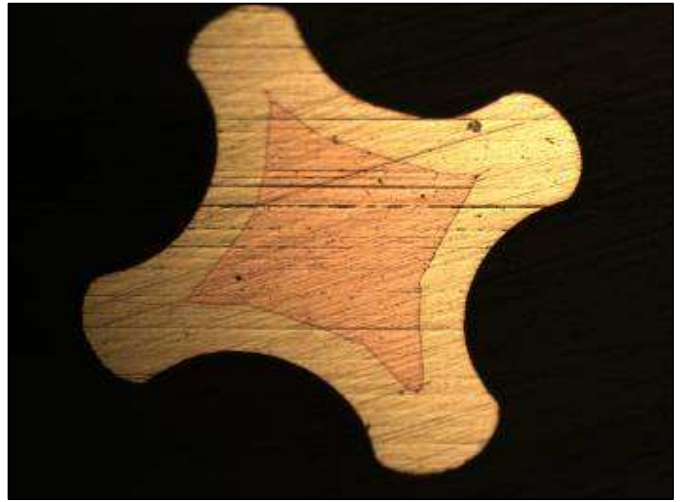
Cross section AWG24

Final measurements :  
- visual examinationTEST SAMPLES : ref. Contact SKT AWG 24 & 2x AWG 28 Crimped with locator MDMA-S /Tool M22520/2-01  
and Crimp tool position 2Cross section of crimp contact AWG24

N°1



N°2

Remarks :Crimp tool on position 2 seems to be a little bit too heavy :  
Evaluation of 3 different positions performed (see test report 639-12C)

TEST : CROSS SECTION

Report N° 483-12C

Test Group :

Spécifications : ESCC 3401 Generic Specification

Requirements : ESCC 3401/005 tab 6

Test environment or special conditions :  
Crimped contacts shall be subjected to cross section

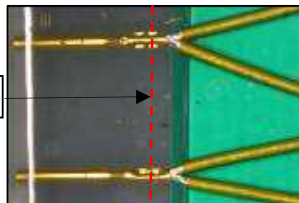
Test equipment :

TEST PROCEDURE :

TEST REQUIREMENTS :

Final measurements :  
- visual examination

Cross section 2x AWG28

TEST SAMPLES : ref. Contact SKT 2x AWG 28 Crimped with locator MDMA-S /Tool M22520/2-01  
and Crimp tool position 2Cross section of crimp contact 2x AWG28

N°1



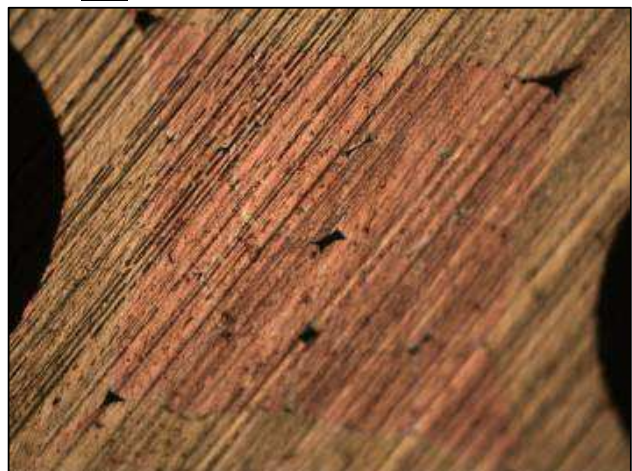
N°2



N°1



N°2

Remarks :Crimp tool on position 2 seems to be a little bit too heavy :  
Evaluation of 3 different positions performed (see test report 639-12C)

TEST : GOLD PLATE THICKNESS

Report N° 483-12C

Test Group :

Specifications : ESCC 3401 Generic Specification

Requirements : ESCC 3401/005 tab 6

Test environment or special conditions :

Test equipment :

**TEST PROCEDURE :**

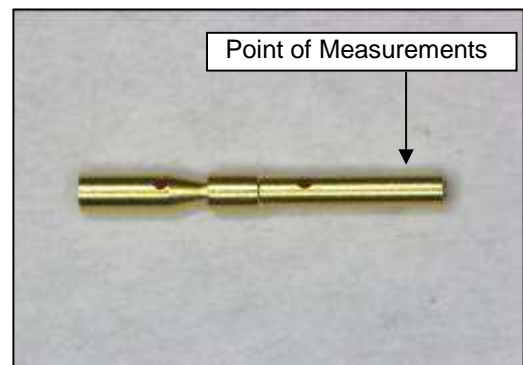
The thickness of the outer gold layer shall be measured using a X-ray equipment.

**TEST REQUIREMENTS :**

Gold plating thickness shall be 1.27  $\mu\text{m}$  minimum.

TEST SAMPLES : ref. 10 Cts SKT MDMA C252-8844-000

Ct N°	Gold plate thickness ( $\mu\text{m}$ )	Result	
		pass	fail
1	1,85	√	
2	1,81	√	
3	1,81	√	
4	1,59	√	
5	1,71	√	
6	1,88	√	
7	1,76	√	
8	1,69	√	
9	1,93	√	
10	1,91	√	





ESCC Detail Specification No. 3401/078

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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, for 3401/077 Microminiature Connectors based on type MDMA.

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:

- (a) ESCC Generic Specification No. 3401, Connectors, Electrical, Non-Filtered, Circular and Rectangular.
- (b) ESCC Detail Specification No. 3401/077, Connectors, Electrical, Rectangular, Microminiature, Removable Crimp Contacts, based on Type MDMA.

the requirements of which are supplemented herein.

1.2 TYPE VARIANTS

The contact type variants 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**

Characteristics	Variant				Unit
	01	02	03	04	
Type	Male	Female	Male	Female	-
Mating End Size	24	24	24	24	AWG
Crimp Barrel Size	26	26	24	24	AWG
Accept Wire	25, 26, 28	25, 26, 28	24, 2x28	24, 2x28	AWG
Rated Current for AWG 26, insulated and AWG 25 uninsulated solid wire	2.5	2.5	N.A	N.A	A
Rated Current for AWG 28 insulated wire	1.5	1.5	2x 1.5	2x 1.5	A
Rated Current for AWG 24 insulated wire	N.A	N.A	3.5	3.5	A
Maximum Weight	0.03	0.06	0.03	0.06	g



Characteristics			Variant		Unit
			01 / 03	02 / 04	
Engagement and Separation - Contact Engagement Force	Maximum Force		1.667	-	N
	Test Pin Diameter	Minimum	0.559	-	mm
		Maximum	0.564	-	mm
Engagement and Separation - Contact Separation Force	Maximum Force		0.137	-	N
	Test Pin Diameter	Minimum	0.582	-	mm
		Maximum	0.587	-	mm
Contact Capability - Pick-Up Weight	Weight		14	-	g
	Test Pin Diameter	Minimum	0.582	-	mm
		Maximum	0.587	-	mm
	Minimum Insertion Depth		1.5	-	mm
Contact Capability - Drop Weight	Weight		170	-	g
	Test Pin Diameter	Minimum	0.559	-	mm
		Maximum	0.564	-	mm
	Minimum Insertion Depth		1.5	-	mm
Contact Retention Force (in Insert)		Minimum	22.25	22.25	N
Contact Insertion and Withdrawal Forces		Maximum	10	10	N

TABLE 1(b) - MAXIMUM RATINGS

No.	Characteristics	Symbol	Maximum Ratings	Unit
1	Rated Current	$I_R$	See Table 1(a)	A
2	Operating Temperature Range	$T_{op}$	-55 to +125	°C
3	Storage Temperature Range	$T_{stg}$	-65 to +125	°C

FIGURE 1 - PARAMETER DERATING INFORMATION

Not applicable.



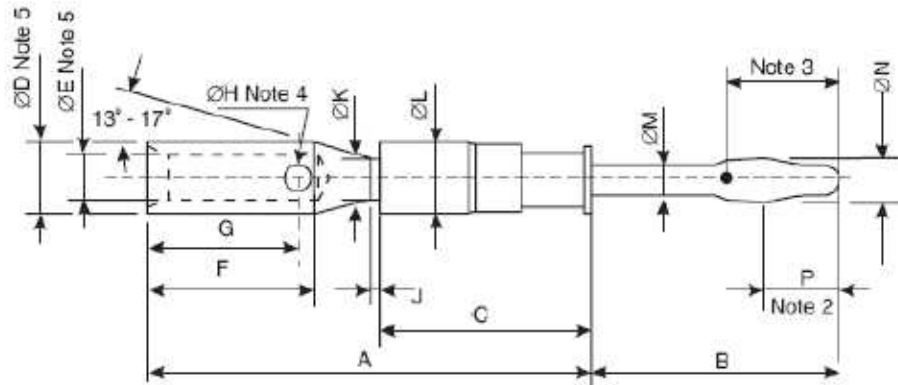
ESCC Detail Specification No. 3401/078

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**FIGURE 2 - PHYSICAL DIMENSIONS**

Figure 2.1 - Male Contact

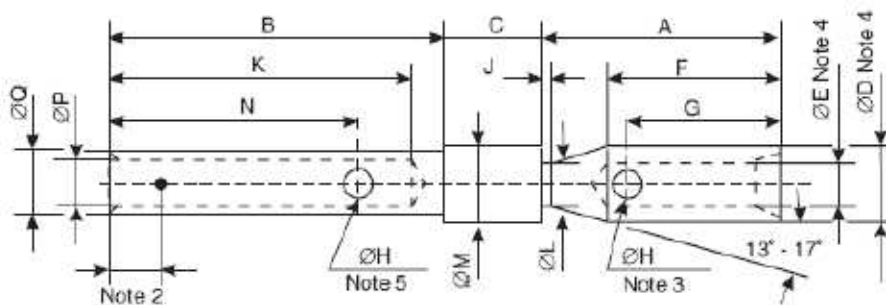


Variants		A	B	C	ØD	ØE	F	G	ØH	J	ØK	ØL	ØM	ØN	P
01	Min	5.7	3.17	2.7	0.92	0.56	2.1	1.8	-	0.05	0.52	0.92	0.42	0.65	0.9
	Max	5.9	3.4	2.8	0.96	0.6	2.4	2.1	0.45	0.15	0.58	0.96	0.45	0.8	1.4
03	Min	5.7	3.17	2.7	0.95	0.69	2.1	1.8	-	0.05	0.52	0.92	0.42	0.65	0.9
	Max	5.9	3.4	2.8	0.97	0.71	2.4	2.1	0.45	0.15	0.58	0.96	0.45	0.8	1.4

**NOTES:**

1. All dimensions are in millimetres.
2. Measurement point of ØN.
3. Measurement point for plating thickness: 1.5 ±0.5mm
4. Inspection hole may be H x H square and shall only penetrate one wall of the crimp barrel.
5. ØD and ØE to be concentric within 0.07mm

Figure 2.2 - Female Contact



Variants		A	B	C	ØD	ØE	F	G	ØH	J	K	ØL	ØM	N	ØP	ØQ
02	Min	2.9	4.17	1.1	0.92	0.56	2.1	1.8	-	0.05	3.5	0.52	0.92	3	0.56	0.81
	Max	3.1	4.29	1.3	0.96	0.6	2.4	2.1	0.45	0.15	-	0.58	0.98	3.3	0.6	0.85
04	Min	2.9	4.17	1.1	0.95	0.69	2.1	1.8	-	0.05	3.5	0.52	0.92	3	0.56	0.81
	Max	3.1	4.29	1.3	0.97	0.71	2.4	2.1	0.45	0.15	-	0.58	0.98	3.3	0.6	0.85





**APPENDIX 'A' - AGREED DEVIATIONS FOR C & K COMPONENTS (F)**

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS	
Deviations from Final Production Tests (Chart II)	Para. 9.4, Contact Capability: 100% Contact Capability Test may be omitted provided that a 100% visual inspection of the contacts is performed on each batch submitted to tests defined in the C&K PID requirements.	
Deviations from Qualification Tests (Chart IV) and Lot Acceptance Tests (Chart V)	Para. 9.15, Joint Strength: The contacts shall be crimped to insulated stranded wire AWG24, AWG26 and AWG28, and to uninsulated solid wire AWG25. Minimum tensile strengths are as follows:	
	Wire Sizes (Male and Female Contacts)	Minimum Tensile Strength (N)
	AWG 24	30
	AWG 26	22
	AWG 28	13
	2x AWG 28	20
	AWG 25 (Solid, Uninsulated)	22
	The value of failure shall be recorded together with the failure mode ("pull-out", "break in crimp" or "break in wire").	



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Table 5-3: Required ultimate axial strength for compactive and dispersive crimped joints

Wire barrel	Wire size (AWG)	Axial strength (Newton)		
		Silver- or tin-plated copper wire	Nickel-plated copper wire	Silver plated Copper-alloy wire
0	0	3 120	2 800	-
	2	2 450	2 200	-
2	2	2 450	2 200	-
	4	1 780	1 600	-
4	4	1 780	1 600	-
	6	1 330	1 200	-
6	6	1 330	1 200	-
	8	980	890	-
8	8	1 250	1 150	-
10	10	710	-	-
	12	500	-	-
12	12	500	-	-
	14	320	-	-
16	16	230	-	-
	18	155	-	-
	20	90	-	-
20	20	90	-	185
	22	60	-	115
	24	-	-	60
22	22	60	-	115
	24	-	-	60
	26	-	-	45
24	24	-	-	60
	26	-	-	45
	28	-	-	30
26	26	-	-	45
	28	-	-	30
28	28	-	-	30

NOTE 1 Wire barrel size < 6 AWG tools are without adjustable setting.  
NOTE 2 Wire barrel sizes ≥ 8 AWG tools are generally with adjustable settings which permit optimized crimped joints having higher axial strengths.

**5.2.5 Connector barrel and multiple wire crimping**

- a. Requirements of this clause shall be applied when single wire crimping cannot be used.
- b. The maximum number of wires in one crimp barrel shall be two.
- c. The sum of the two nominal conductor sections shall be compatible with the crimp barrel used

NOTE 2 × 24 AWG is approximately equal to 1 × 20 AWG.

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- d. Both conductors shall be of the same material and support the same plating finish.

NOTE 1 For example: Both are silver and not a combination of silver and nickel

NOTE 2 Before introduction into the barrel wires or conductors can be twisted to obtain a "single" conductor.

- e. Axial strength measurements shall be performed on the two associated wires and the axial strength shall be 75 % of the sum of the two wires axial strength requirements.