Titre / Title

HIGH RELIABILITY

RF COAXIAL CONNECTORS

SMP TYPE, 50 OHMS

Rédigé par / Written by	Responsabilité / Responsibility	Date	Signature
S. POIZAT	Space Project Manager	17/05/2016	
Vérifié par / Verified by			
V EUDELINE	Space B. U. Manager	17/05/2016	
Approuvée par / Approved by			
C. DAVENEL	Space Quality Manager	17/05/2016	

DOCUMENTATION CHANGE NOTICE

REVISION OR ISSUE	DATE	CHANGE
1 -	19/01/2005	Initial issue – Specification ESCC 3402/0XX Draft D
1 A	17/02/2006	Updated with specification ESCC 3402/0XX Draft H
1 B	14/09/2006	Correction of the title for variant 6: Full Detent instead of Limited Detent
2 -	02/05/2011	-Updated with new logo of Radiall - Cancelled Table 1(a), replaced by the detail specification RAD-LIS-CONN-001 - Table 1(b) renamed by Table 1(a) - Cancelled the figure 2(b) replaced by the detail specification RAD-LIS-CONN-001
2/A	28/11/2013	-Updated with new logo of Radiall - Updated table 1: See TDS instead of See RAD-LIS-CONN-001 , - Updated Figure 1: correction of scale of temperature - Updated Figure 2 to change inch by mm, add Smooth bore and Catcher's Mit - Clarification of §4.3.5.1 - Updated §4.3.6 Endurance
2/B	04/12/2013	- Updated §1.2: replace "Table 1(a)" by "RAD-LIS-CONN-001".
2/C	18/07/2014	Updated the scope paragraph (§1.1): to replace ESCC3402 by RAD-GEN-CONN-001.
3 -	17/05/2016	Add Materials and Finishes

TABLE OF CONTENTS

LIST OF TABLES, ILLUSTRATIONS AND FIGURES

1 GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, tests and inspection data for RF Coaxial connectors, based on type SMP, 50 Ohms. It shall be read in conjunction with RADIALL Generic Specification RAD-GEN-CONN-001, the requirements of which are supplemented herein.

1.2 TYPE VARIANTS

A list of the type variants of the connectors specified herein, which are also covered by this specification, is given in the RAD-LIS-CONN-001 specification.

1.3 MAXIMUM RATINGS

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

1.4 PARAMETER DERATING INFORMATION

The parameter derating information of the connectors specified herein, are shown in Figure 1.

1.5 PHYSICAL DIMENSIONS

The physical dimensions of the connectors specified herein, are shown in Technical Data Sheet

1.6 FUNCTIONAL DIAGRAM

Not Applicable

TABLE 1(a) : MAXIMUM RATINGS

N°	CHARACTERISTICS	SYMBOL	MAXIMUM RATING	UNIT	REMARKS
1	Peak Power at 25°C	Pmax	0,5	kW	1 us Max
2	Power	P	See Figure 1(a) and 1(b)	-	
3	Nominal lmpedance	Z	50	Ohms	
4	Frequency Range	f	See Technical Data Sheet	GHz	
5	Operating Voltage	Vop	335	Vrms	
6	Operating Temperature Range	Top	-65 / +165°C	°C	Excepted if in TDS, the temperature range is lower
7	Storage Temperature Range	Tstg	-65 / +165°C	°C	Excepted if in TDS, the temperature range is lower

FIGURE 1 : PARAMETER DERATING INFORMATION

FIGURE 1(a) : POWER VERSUS TEMPERATURE

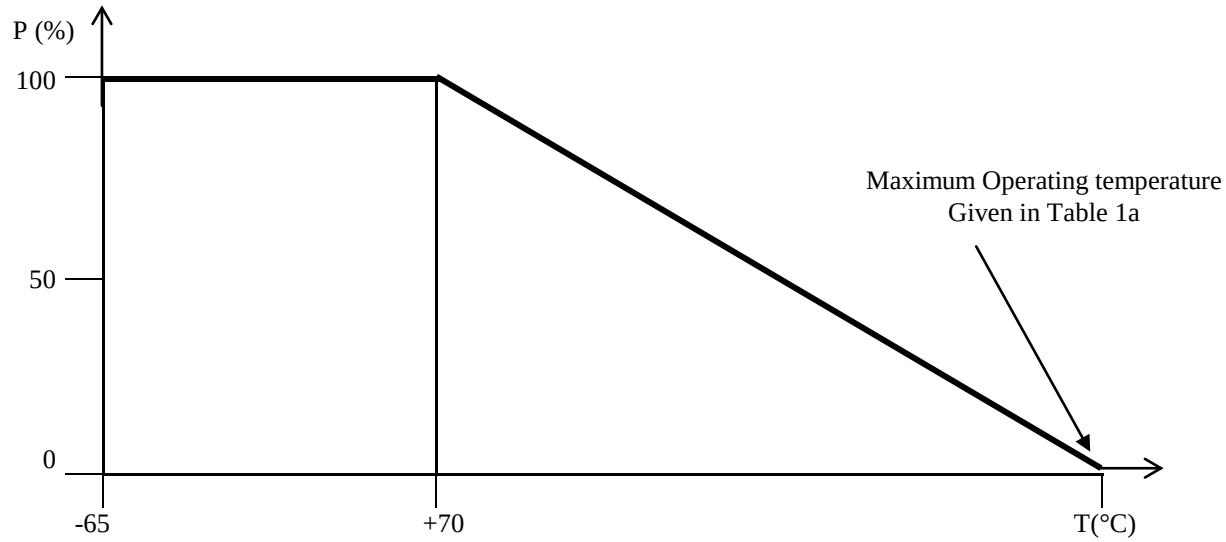
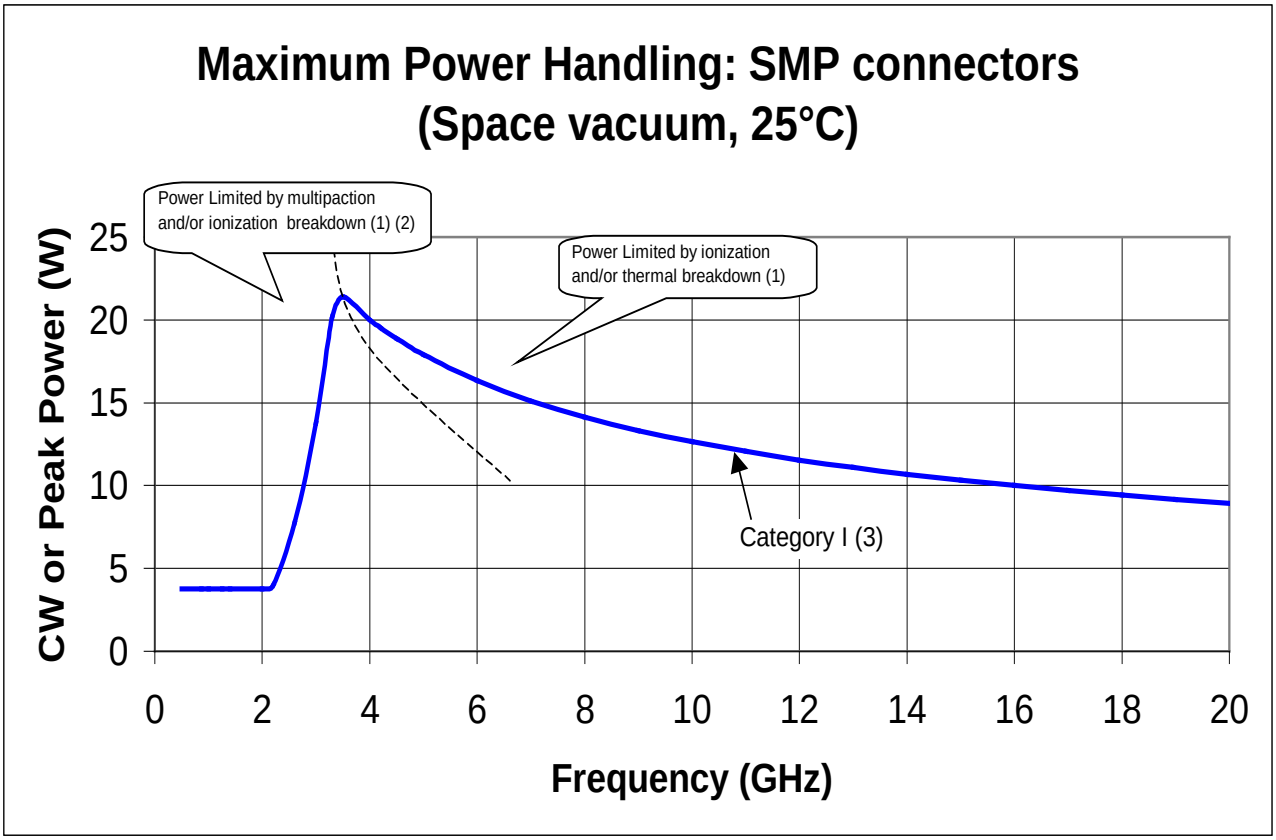


FIGURE 1(b) : POWER VERSUS FREQUENCY

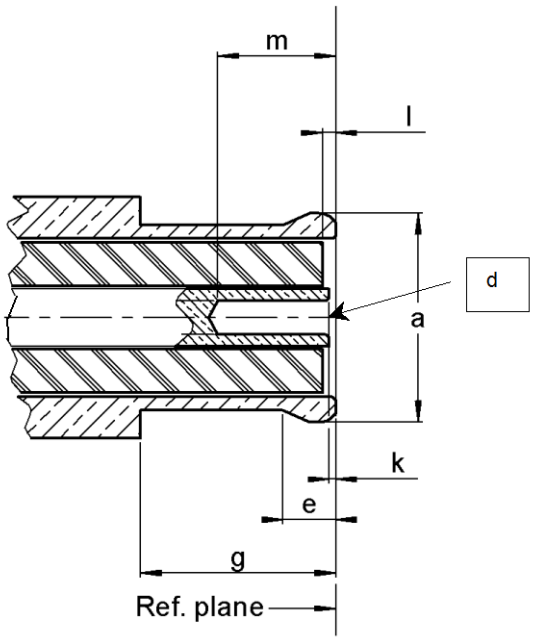


Notes:
1: Load VSWR is better than 1,30:1
2: The part of the curve limited by multipaction takes into account a 6 dB margin as recommended by ESA
3: See TDS to know applicability of power handling categories to the different part numbers

FIGURE 2 : PHYSICAL DIMENSIONS

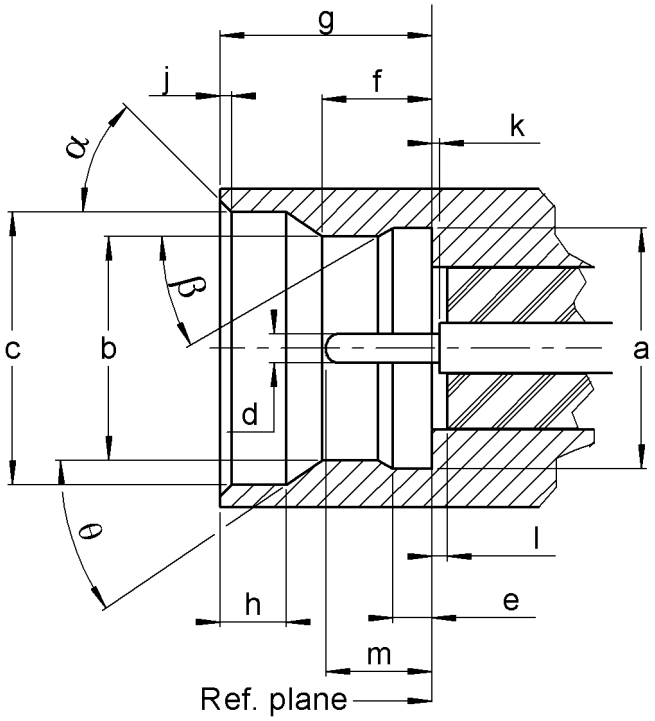
FIGURE 2(a) CONNECTOR INTERFACE

FEMALE INTERFACE : MIL-STD 348a, NOTICE 6, FIGURE 326-1



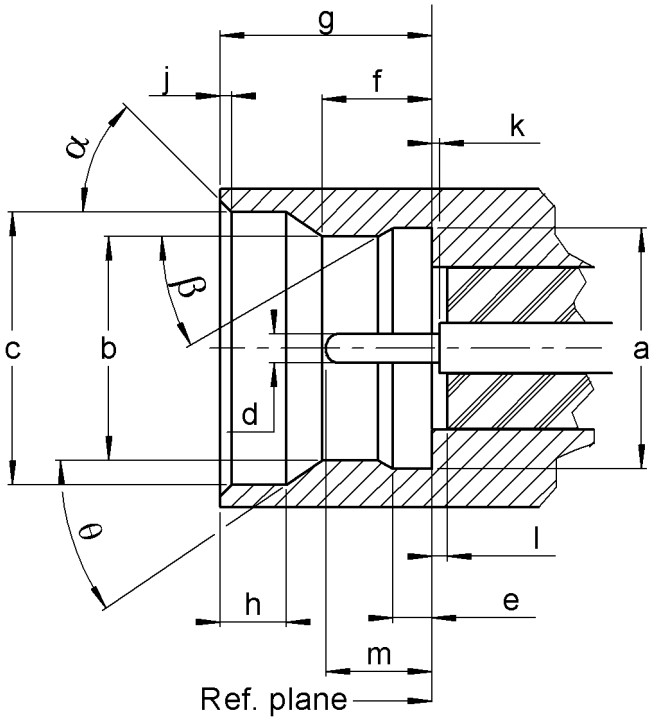
	MIL-STD-348A				Comments
	Inch (original)		mm		
	mini.	maxi.	mini.	maxi.	
a	-	0.135	-	3.43	Dia, opened slots
d	-	-	-	-	Dia, Accept 0,38mm +/-0,03 dia pin
e	0.018	0.025	0.46	0.64	Uncabled connector
g	0.112	-	2.84	-	
k	0.000	0.008	0.00	0.20	Contact recession
l	0.000	-	0.00	-	Dielectric recession
m	0.070	-	1.78	-	

MALE INTERFACE, FULL DETENT : MIL-STD 348a, NOTICE 6, FIGURE 326-2



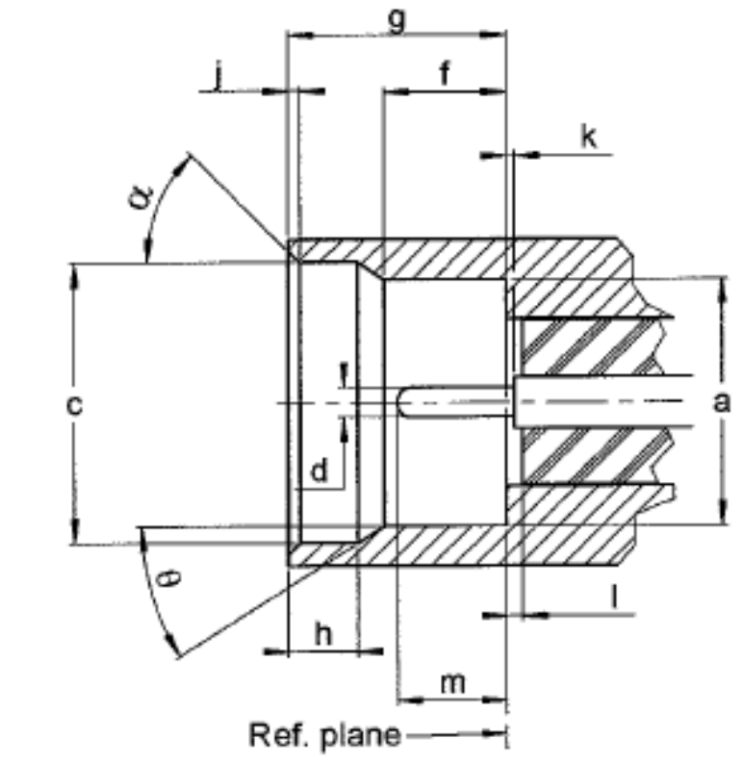
	MIL-STD-348A				Comments
	Inch (original)		mm		
	mini.	maxi.	mini.	maxi.	
a	0,124	0,126	3,15	3,20	dia
b	0,114	0,118	2,90	3,00	dia, Full Detent
c	0,139	0,145	3,53	3,68	dia
d	0,014	0,016	0,36	0,41	dia
e	0,0205	0,0235	0,52	0,60	
f	0,051	0,057	1,30	1,45	Full Detent
g	0,108	0,112	2,74	2,84	Full Detent
h	0,033	0,037	0,84	0,94	
j	0,003	0,008	0,08	0,20	
k	-	-	0,00	0,01	Contact recession
l	-	-	0,00	-	Dielectric recession
m	0,045	0,055	1,14	1,40	
α	40	50	-	-	Degree (REF)
β	30 REF.		-	-	Degree
θ	35 REF.		-	-	Degree (REF)

MALE INTERFACE, LIMITED DETENT : MIL-STD 348a, NOTICE 5, FIGURE 326-3



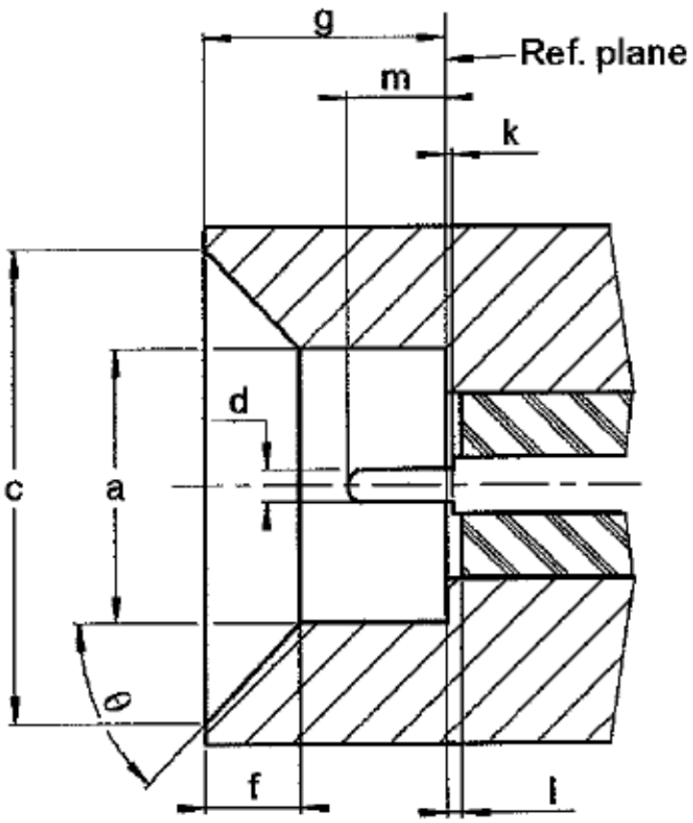
	MIL-STD-348A				Comments
	Inch (original)		mm		
	mini.	maxi.	mini.	maxi.	
a	0,124	0,126	3,15	3,20	dia
b	0,118	0,122	3,00	3,10	dia, Limited Detent
c	0,139	0,145	3,53	3,68	dia
d	0,014	0,016	0,36	0,41	dia
e	0,0205	0,0235	0,52	0,60	
f	0,054	0,060	1,37	1,52	Limited Detent
g	0,108	0,112	2,74	2,84	Limited Detent
h	0,033	0,037	0,84	0,94	
j	0,003	0,008	0,08	0,20	
k	-	-	0,00	0,14	Contact recession
l	-	-	0,00	-	Dielectric recession
m	0,045	0,055	1,14	1,40	
α	40	50	-	-	Degree (REF)
β	30 REF.		-	-	Degree
θ	35 REF.		-	-	Degree (REF)

MALE INTERFACE, SMOOTH BORE : MIL-STD 348a, NOTICE 5, FIGURE 326-4



	MIL-STD-348A				Comments
	Inch (original)		mm		
	mini.	maxi.	mini.	maxi.	
a	0.123	0.127	3.13	3.23	dia
c	0.139	0.145	3.53	3.68	dia
d	0.014	0.016	0.36	0.41	dia
f	0.059	0.065	1.50	1.65	
g	0.108	0.112	2.74	2.84	
h	0.033	0.037	0.84	0.94	
j	0.003	0.008	0.08	0.20	
k	-	-	0.00	0.14	Contact recession
l	-	-	0.00	-	Dielectric recession
m	0.045	0.055	1.14	1.40	
α	40	50	-	-	Degree (REF)
θ	35 REF.		-	-	Degree (REF)

MALE INTERFACE, CATCHER'S MIT : MIL-STD 348a, NOTICE 5, FIGURE 326-5



	mm		Comments
	mini.	maxi.	
a	3.13	3.23	dia
c	5.40	5.50	dia
d	0.36	0.41	dia
f	1.10	1.18	
g	2.74	2.84	
k	0.00	0.14	Contact recession
l	0.00	-	Dielectric recession
m	1.14	1.40	
θ	-	-	Degree (REF)

2 APPLICABLE DOCUMENTS

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

ESCC No. 3402	ESCC Generic Specification No 3402 for RF Coaxial Connectors
MIL-STD 348	Interface Standard
MIL-STD 348, Notice 5	Notice 5 to Interface Standard
MIL-STD 348 , Notice 6	Notice 6 to Interface Standard
MIL-G 45204C	Gold plating Electrodeposited

3 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

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

4 REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the connectors specified herein are stated in this specification and ESCC Generic specification No 3402. Deviations from the Generic Specification applicable to this specification only, are listed in Para. 4.2.

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)
(a) Coupling Proof Torque: Not Applicable
(b) Centre Contact Retention : To be tested to special inspection level S-4, AQL 1.0 of IEC publication N°410.
(c) Seal Test: Not Applicable

4.2.3 Deviations from Qualification Tests (Chart IV)
(a) Coupling Proof Torque : Not Applicable
(b) Seal Test : Not Applicable
(c) Plating thickness : Not Applicable
(d) Residual magnetism : Not Applicable

4.2.4 Deviations from Lot Acceptance Tests (Chart V)

(a) Coupling Proof Torque : Not Applicable
(b) Seal Test : Not Applicable
(c) Plating thickness : Not Applicable

4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the connectors specified herein shall be checked in accordance with the requirements of ESCC No 3402, Para. 9.25 and be shall conform to those shown in Figures 2(a) and 2(b) of this specification.

4.3.2 Weight

The maximum weight of the connectors specified herein shall be provided in Technical Data Sheet

4.3.3 Coupling Proof Torque

Not Applicable

4.3.4 Cable Retention Force

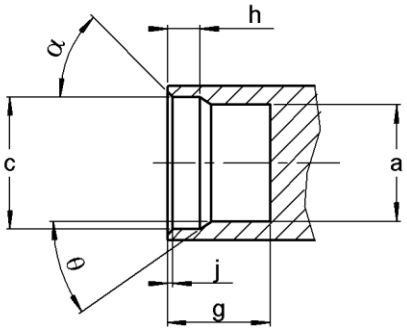
See in Technical Data Sheet if applicable.

4.3.5 Mating and Unmating Forces

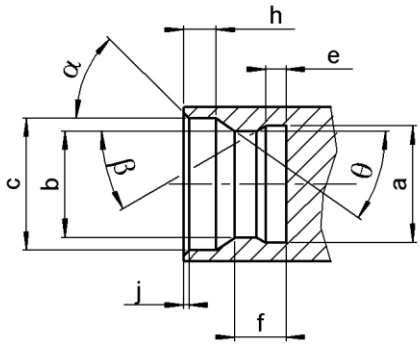
The applicable measurement requirements are specified in Section 9 of ESA/SCC Generic Specification No.3402. The maximum/minimum forces during mating and unmating are given in paragraph 4.3.5.3.

4.3.5.1 Outer Contact gauges (Full and Limited Detent)

Insertion Gauge

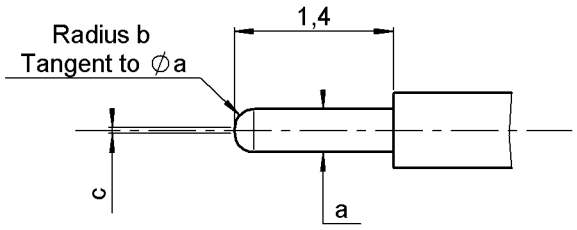


Separation Gauge



	Insertion		Separation		Comments
	mini.	maxi.	mini.	maxi.	
a	3,11	3,12	3,14	3,15	dia
b	2,885	2,90	3,00	3,015	dia, Full Detent
	2,985	3,00	3,10	3,115	dia, Limited Detent
c	3,55	3,65	3,55	3,65	dia
e	NA	NA	0,51	0,52	
f	NA	NA	1,32	1,42	Full Detent
	NA	NA	1,45	1,55	Limited Detent
g	2,75	2,83	2,75	2,83	
h	0,85	0,93	0,85	0,93	
j	0,10	0,20	0,10	0,20	
α	43,0	47	43,0	47,0	Degree (REF)
β	NA	NA	29,5	30,5	Degree
θ	29,5	30,5	29,5	30,5	Degree

4.3.5.2 Inner Contact gauges



	Insertion		Separation		Comments
	mini.	maxi.	mini.	maxi.	
a	0,41	0,425	0,35	0,365	dia
b	0,16	0,17	0,17	0,20	Radius
c	-	0,05	-	0,05	

4.3.5.3 Measuring method :

Step 1 : Insertion one time (probe operation)
Step 2 : Insertion one time and measurement

	Insertion force	Separation force	Unit	Comments
	maxi.	mini.		
Outer Contact	63,0	22,0	N	Full Detent
	40,0	9,0		Limited Detent
Inner Contact	7,0	5,0	N	
Female Connector	68	22	N	Full Detent
	45,4	9		Limited Detent

4.3.6 Endurance

The applicable test requirements are specified in section 9 of ESCC Generic Specification No. 3402. The test conditions shall be as follows:

Paired with	Nb of cycle for Qualification (Rate: ≤12 cycles/minutes)	Nb of cycle for LAT (Rate: ≤12 cycles/minutes)
Smooth Bore/ Catcher's Mit	>1000	>200
Limited Detent	>500	>100
Full Detent	>100	>20

4.3.7 Residual Magnetism

The applicable measurement requirements are specified in Section 9 of ESCC Generic Specification No 3402. There are no requirements in respect of residual magnetism. This version is made such that the residual magnetism does not exceed 2000 gammas

4.3.8 Centre Contact Retention

The requirements for this test are specified in section 9 of ESCC Generic specification 3402.
The axial and rotation forces as specified in Technical Data Sheet.

4.4 MATERIALS AND FINISHES

4.4.1 Shells

Shells shall be made of:

- Beryllium copper, with underplate Nickel 1.3µm or 2µm min, Gold plated 1.3µm min type II of MIL G 45204
  or
- Brass, with underplate Nickel 1.3µm or 2µm min, Gold plated 0.5µm min type II of MIL G 45204
  or
- Brass, with NPGR plated (NPGR : Radiall Gold over Nickel Phosphorus with 0.2µm of gold)
  or
- Stainless steel passivated

4.4.2 Centre contact

Centre contact shall be made of:

- Beryllium copper, with underplate Nickel 1.3µm or 2µm min, Gold plated 1.3µm min type II of MIL G 45204

4.4.3 Inserts

Insert shall be made of:

- PTFE
  or
- Peek

4.4.4 Accessoriess

Accessories (ferrule, crimping or solder sleeves) shall be made of:

- Brass, with underplate Nickel 2µm min, Gold plated 0.5µm min type II of MIL G 45204
  or
- Brass, with NPGR plated (NPGR : Radiall Gold over Nickel Phosphorus with 0.2µm of gold)

4.5 MARKING

4.5.1 General

The marking of all components delivered to this specification shall be in accordance with the following paragraphs.Each component shall be marked with respect of:

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

4.5.2 The RADIALL Component Number

The Radiall Component Number shall be constituted and marked as follows
R232705000 (Example of Radiall reference number

4.5.3 Traceability Information

Each comportent shall be marked in respect of traceability information in accordance with the requirements of ESCC Basic Specification No. 21700.

4.5.4 Marking of small components

When it is considered that the component is too small to accommodate the marking as specified above, as much as space permits shall be marked. The order of precedence shall be as specified in Para. 4.5.1. The marking information in full shall accompany each component in its primary package.

4.6 ELECTRICAL MEASUREMENTS

4.6.1 Electrical Measurements at Room Temperature

The parameters to be measured at room temperature are scheduled in Table 2. The measurements shall be performed at T_{amb} = +22 ± 2 °C.

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

Not Applicable

4.6.3 Circuits for Electrical Measurements

Not Applicable

4.7 BURN-IN TESTS (Table 4 and 5)

Not Applicable

TABLE 2 : ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

N°	Characteristics	Symbol	Spec. and/or Test Method	Test Conditions	Limits		Unit
					Min	Max	
1	Insulation resistance	Ri	ESCC 3402, Para 9.1	500 Vdc	5000		MΩ
2	Voltage Proof Leakage Current	I_L	ESCC 3402, Para 9.2	See figure 2 (b)		2.0	mA

TABLES 3,4 AND 5 : NOT APPLICABLE

TABLE 4 : Parameter Drift Values During LAT :Not Applicable

4.8 ENVIRONMENTAL AND ENDURANCE TESTS

See Charts IV and V of ESCC Generic Specification No. 3402

4.8.1 Measurements and Inspections on Completion of Environmental Tests

The parameters to be measured on completion of environmental tests are scheduled in Table 6 of this specification. Unless otherwise stated, the measurements shall be performed at T_{amb} = +22 ± 2 °C

4.8.2 Measurements and Inspection at Intermediate Points during Measurements and Inspection

Not Applicable

4.8.3 Measurements and Inspection on Completion of Endurance Test

The parameters to be measured on completion of endurance tests are scheduled in Table 6 of this specification. Unless otherwise stated, the measurements shall be performed at T_{amb} = +22 ± 2 °C

4.8.4 Condition for Operating Life Tests (Part of Endurance Test)

Not Applicable

4.8.5 Electrical Circuits for Operating Life Tests

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. 3402. The conditions for high temperature storage shall be the maximum operating temperature as specified in Table 1.

TABLE 6 : measurements and inspections on completion of environment and endurance tests

N°	ESCC Generic Spec. No.3402		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Test (1)	Test Method and Conditions	Identification	Conditions		Min	Max	
01	Mating and Unmating Forces	Para. 9.5	During Test Force	-	-	See TDS)		N
02	External Visual Inspection	Para. 9.8	External Visual Inspection	Para.9.8 of ESCC 3402	-	-	-	-
03	Contact Resistance	Para. 9.9 6V; 10mA	During Test Contact Resistance	Centre Contact Shell			11 7	mΩ mΩ
04	Vibration	Para. 9.10 Full Engagement	During Test Electrical Measurements Final Measurements Visual Inspection Contact Resistance	Last cycle in each direction: No open or short circuits No evidence of Damage Centre Contact (6V, l0mA)			 11	 mΩ
05	Shock or Bump	Para 9.11 Full Engagement	Final Measurements Visual Inspection Contact Resistance	No evidence of Damage Centre Contact (6V, l0mA)			 11	 mΩ
06	Rapid Change of Temperature	Para. 9.12	Final Measurements Contact Resistance Voltage Proof Leakage Current Visual Inspection	After a recovery period of 24±2hrs Centre Contact (6V, l0mA) Table 2, Item 2	 I_L		 11 2	 mΩ mA
07	Climatic Sequence	Para. 9.13	During Test Voltage Proof Final Measurements External Visual Inspection Insulation Resistance Voltage Proof Leakage Current	At Low Air Pressure 0.1x value of See TDS After final Damp Heat cycle (within 1 to 24 hrs recovery) Para. 9.8 of ESCC 3402 Table 2, Item 1 Table 2, Item 2	 VP Ri I_L	 No flash break 200	 Over or down 2	 MΩ mA
08	Cable Retention Force	Para 9.14 and Para. 4.3.4 of this spec	During Test Continuity					

Table 6 :MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENT AND ENDURANCE TESTS

N°	ESCC Generic Spec. No.3402		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Test (1)	Test Method and Conditions	Identification	Conditions		Min	Max	
09	Cabling and Crimping Capability	Para 9.15	Visual Examination Dimensions Insulation Resistance Voltage Proof Leakage Current	Para. 9.15 of ESCC 3402 Para. 9.15 of ESCC 3402 Table 2, Item 1 Table 2, Item 2	Ri	Figure 5000	2a and 2b	MΩ
10	VSWR	Para 9.16	VSWR	Para. 9.16 of ESCC 3402		See TDS		
11	Corona Level	Para 9.17		Para. 9.16 of ESCC 3402		See TDS		
12	Endurance	Para 9.18 and Para 4.3.6 of this spec	Mating /unmating Forces Contact Resistance Visual Inspection	Para 4.3.5 of this spec Centre Contact Shell Contact Para 9.18 of ESCC 3402			11 7	mΩ mΩ
15	RF Insertion Loss	Para. 9.19	Insertion Loss	Para 9.19 of ESCC 3402		See TDS		
16	Corrosion	Para. 9.20	Visual Inspection	Para. 9.20 of ESCC 3402 No expose of base metal				
17	Residual Magnetism	Para 9.21	Magnetism		Para. 4.3.7			
18	Soldering Proof	Para 9.22	Final Measurements Interface Dimensions Mating/Unmating forces Insulation Resistance Voltage Proof Leakage Current Contact Resistance External Visual Inspection	Par 4.3.5 of this spec. Table 2 item 1 Table 2 Item 2 Centre Contact (6V / 10 mA) Shell (6V/10mA) Hermetic Centre Contact Par 9.8 of ESCC 3402			11 7 40	mΩ mΩ mΩ
19	RF Leakage	Para 9.23	Leakage			See See TDS		
20	High temperature Storage	Para 9.24 and Para 4.8.6 of this spec	Final Measurements Interface Dimensions Mating/Unmating forces Insulation Resistance Voltage Proof Leakage Current Contact Resistance External Visual Inspection	Par 4.3.5 of this spec. Table 2 item 1 Table 2 Item 2 Centre Contact (6V / 10 mA) Shell (6V/10mA) Hermetic Centre Contact Par 9.8 of ESCC 3402			11 7 40	mΩ mΩ mΩ

TABLE 7 - LIST OF PART NUMBERS WITH APPLICABLE POWER HANDLING CATEGORY

See the detail specification RAD-LIS-CONN-001 paragraph 18