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EXTERNAL VISUAL INSPECTION OF

ELECTRICAL CONNECTORS

ESA/SCC Basic Specification No. 2053400

space components
coordination group

Issue/Rev.	Date	Approved by	
		SCCG Chairman	ESA Director General or his Deputy
Issue 2	September 1997		

DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
'A'	Sept. '97	This Issue supersedes Issue 1 and incorporates all changes agreed in the following DCRs:-		
		Cover Page		None
		DCN		None
		Para. 2	: Title and text amended and Table added	221391
		Para. 3	: In the second sentence, text deleted and new text added	221391
			: First alinea deleted	221391
			: Second alinea amended	221391
			: Third alinea made generally applicable	221391
			: New last sentence added	221391
		Para. 4.1	: Inspection criteria added and text modified	221391
			: "Detachable burrs" added	221391
		Para. 4.2	: Inspection criteria added and text modified	221391
		Para. 4.3	: Inspection criteria added and text modified	221391
			: Note added	221391
		Para. 5.	: Inspection criteria added and text modified	221391
		Para. 6.1	: Inspection criteria added and text modified	221391
			: "Detachable burrs" added	221391
		Para. 6.2	: Inspection criteria added and text modified	221391
		Para. 6.3	: Third and fourth sentences deleted	221391
			: Inspection criteria added	221391
		Para. 6.4	: Inspection criteria added and text modified	221391
			: Note added	221391
		Para. 6.5	: Inspection criteria added and text modified	221391
		Para. 7	: First sentence amended	221391
			: Inspection criteria added and text modified	221391
			: Note deleted	221391

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1. SCOPE

This specification, to be read in conjunction with ESA/SCC Basic Specification No. 20500, 'External Visual Inspection', specifies additional external visual inspection requirements that are applicable to - and shall be imposed on - electrical connectors, rectangular, circular, PCB and coaxial, R.F. attenuators, loads and couplers.

N.B.
The term "coaxial connectors" shall be understood to include: coaxial connectors, R.F. attenuators, loads and couplers.

2. TEST CONDITIONS

The inspection of a connector or contact lot shall be performed as follows:

- Naked eye: 100% for general examination.
- Binocular or stereoscopic microscope with a X6 to X10 magnification, sample size in accordance with the Table below.

Lot Size	Sampling
2 to 15	2
16 to 25	3
26 to 90	5
91 to 150	8
151 to 280	13
281 to 500	20
501 to 1 200	32
1 201 to 3 200	50
3 201 to 10 000	80

In case of doubt in the interpretation of a defect, a magnification of maximum X20 is allowed.

Illumination

Components being inspected using optical equipment shall be illuminated such that a particle or blemish measuring 0.0125mm in the major dimension can be detected at magnification X20.

3. GENERAL

A component shall be rejected if it exhibits one or more of the defects listed in the following paragraphs.

Accept or reject criteria are established in relation to functional and/or non-functional areas as applicable (N/A indicates that the criteria is not applicable):

- A functional area is one which contributes to the electrical and/or mechanical function.

The letters "P.I.D." in the text mean "Process Identification Document".

Cleaning of the component is only allowed as follows:

- Nominal gas blow (dry nitrogen or dry filtered air, 14N/cm^2), or
- According to the process specified in the P.I.D.

Foreign matter shall be considered as attached if it cannot be removed by either of the above mentioned processes.

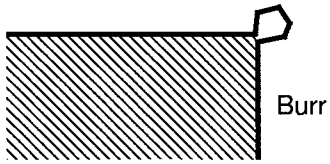
A detachable burr is any burr that can be detached when connectors are mated or installed.

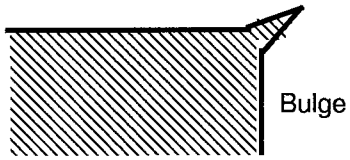
4. CONTACTS

4.1 BURRS AND BULGES

A burr is any rough or ragged protrusion such as is caused by a cutting tool.

A bulge is any raised material which distorts the design profile.





Functional		Non-Functional	
Accepted	Rejected	Accepted	Rejected

Either shall be considered as a defect when it:

- Is greater than 0.1mm in any dimension.	-	X	N/A	N/A
- Is greater than 0.05mm on the female contact entry or on the functional area of the male contact.	-	X	N/A	N/A
- Prevents the introduction of prescribed wires.	-	X	N/A	N/A
- Causes any dimension to exceed its limits.	-	X	-	X
- Is likely to damage an element of the component (gasket).	-	X	N/A	N/A
- Is likely to be a hazard to personnel.	-	X	-	X

The following shall be looked for in particular:

- Burr on contact retention shoulder.	-	X	X	-
- Burr on solder pot.	N/A	N/A	X	-
- Burr obscurring more than 30% of crimp inspection hole.	N/A	N/A	-	X
- Detachable burrs.	-	X	-	X

4.2 GOLD-PLATING

All surfaces shall be free from foreign particles and contamination. There shall be no evidence of corrosion, holes, cracks and peeling. Surfaces achieved by one process or the same sequence of operations shall be of uniform appearance and colour. In addition, gold-plating is not supposed to present an appreciable change in colour according to the data of the parts defined in the P.I.D. (reference parts).

The following shall be looked for in particular and shall be deemed cause for rejection:

- Any scratch on plating, showing base metal or underplate.	-	X	-	X
- Stained plating.	-	X	X	-
- Any blister on plating.	-	X	-	X
- Any extraneous plating residue.	-	X	-	X

Functional		Non-Functional	
Accepted	Rejected	Accepted	Rejected
-	X	-	X
-	X	X	-
-	X	-	X

- Dull and dark aspect at bottom of female contact or solder bucket or crimp bucket (a dull and light aspect is permitted).
- Nodular aspect.
- Flakes and whiskers.

4.3 SOLDER-PLATING

The following shall be looked for in particular:

-	X	N/A	N/A
-	X	N/A	N/A
X(1)	-	N/A	N/A
X(1)	-	N/A	N/A
X(1)	-	N/A	N/A

- Incorrect distribution of solder alloy.
- Incomplete covering or dewetting.
- Oxidation of plating.
- Solder alloy with granular aspect.
- Porosity of solder alloy.

NOTES

1. If solderability test as per applicable Generic Specification, is acceptable.

4.4 OTHER DEFECTS

The following shall be looked for in particular and shall be deemed cause for rejection:

-	X	N/A	N/A
-	X	X	-
-	X	-	X
-	X	-	X
N/A	N/A	-	X
-	X	N/A	N/A
-	X	N/A	N/A
N/A	N/A	-	X
-	X	N/A	N/A

- Bent contact. (Contacts shall be aligned on a flat area. A contact will be considered as bent if its end deviates by more than half the diameter).
- Deformation or dents.
- Trace of shock, showing base metal.
- Any crack on socket sleeve.
- No inspection hole in crimp bucket.
- No lead-in chamfer on female contact.
- No radius or cone on male contact.
- No lead-in chamfer on crimp bucket.
- Machining marks on male contact, giving a degree of rugosity greater than the value specified in the P.I.D.

Functional		Non-Functional	
Accepted	Rejected	Accepted	Rejected

5. INSERTS

The following shall be looked for in particular.

Hard Inserts

- Any break whose length exceeds 0.8mm or 50% of the distance between two adjacent holes, or hole and periphery of insert.	-	X	N/A	N/A
- Any crack.	-	X	-	X
- Moulding flash >0.25mm.	-	X	X	-
- Moulding flash preventing contact insertion.	-	X	N/A	N/A

Soft Inserts

- Any cut or tear.	-	X	X	-

PFTE Inserts

- Any tear area in interfacial zone >0.5mm^2.	-	X	N/A	N/A
- Any scratch >0.2mm (depth).	-	X	X	-
- Any crack.	-	X	-	X

All Inserts

- Non-homogeneous colour of one insert block (assembled elements may show different shades of colour due to different moulding lots).	X	-	X	-
- Any inclusion (hermetic connectors only).	-	X	X	-
- Foreign particles. (Accept if removed after cleaning as per Para. 3. Otherwise, not admissible for re-submission at any time).	-	X	X	-
- Any contact cavity identification letter or symbol missing or illegible that could produce a possible error in contact location.	N/A	N/A	-	X

6. HOUSING AND ACCESSORIES

6.1 BURRS AND BULGES

A burr is any rough or ragged protrusion such as is caused by a cutting tool.

A bulge is any raised material which distorts the design profile.

Either shall be considered as a defect when it:

- Is greater than 0.2mm (0.1mm for coaxial connectors only).	-	X	N/A	N/A
- Causes any dimension to exceed its limits.	-	X	-	X
- Is likely to damage an element of the component (gasket) or the fixture onto which the component is mounted.	-	X	-	X
- Is likely to be a hazard to personnel.	-	X	-	X

Functional		Non-Functional	
Accepted	Rejected	Accepted	Rejected

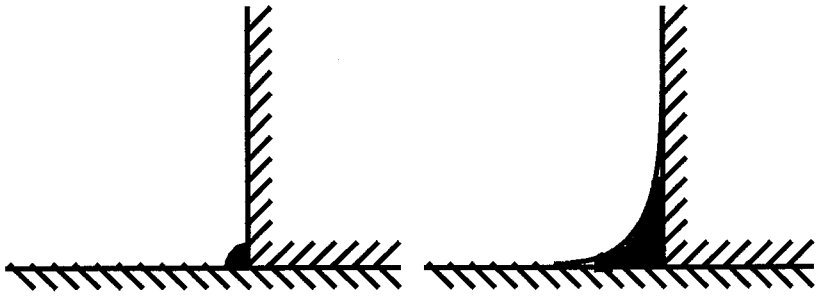
The following shall be looked for in particular:

- Burr on thread edges.	-	X	X	-
- Burr or bulge >0.1mm in engagement area (0.05mm on functional area of coaxial connector only.	-	X	N/A	N/A
- Machinining marks outside engagement area.	N/A	N/A	X	-
- Machining marks, having a degree of rugosity greater than the value specified in the P.I.D., in engagement area or on functional areas.	-	X	N/A	N/A
- Detachable burr	-	X	-	X

6.2 BRAZED PARTS (WHEN APPLICABLE)

The following shall be looked for in particular and shall be deemed cause for rejection:

- Incorrect distribution of brazing alloy.	-	X	X	-



Incorrect Correct

- Incomplete covering or dewetting.	-	X	-	X
- Oxidation of plating.	-	X	X	-
- Brazing alloy with granular aspect.	-	X	X	-
- Porosity of brazing alloy.	-	X	X	-
- Hole in brazing alloy if the bottom is not visible.	-	X	-	X

6.3 PLATING

All surfaces shall be free from foreign particles and contamination. There shall be no evidence of corrosion, holes, cracks and peeling.

- Any scratch on plating, showing base metal or underplate.	-	X	X	-
- Stained plating.	-	X	X	-
- Any blister on plating.	-	X	-	X

Functional		Non-Functional	
Accepted	Rejected	Accepted	Rejected

6.4 SOLDER-PLATING

The following shall be looked for in particular and shall be deemed cause for rejection:

- Incorrect distribution of solder alloy.	-	X	N/A	N/A
- Incomplete covering or dewetting.	-	X	N/A	N/A
- Oxidation of plating.	X(1)	-	N/A	N/A
- Solder alloy with granular aspect.	X(1)	-	N/A	N/A
- Porosity of solder alloy.	X(1)	-	N/A	N/A

NOTES

1. If solderability test, as per applicable Generic Specification, is acceptable.

6.5 OTHER DEFECTS

The following shall be looked for in particular:

- Crack on crimp eyelets showing the edge of the back shell hole.	-	X	N/A	N/A
- More than three cracks on crimp eyelets of shells.	-	X	N/A	N/A
- Asymmetry of shell eyelet crimp.	X	-	N/A	N/A
- Any burr in a groove containing a sealing gasket.	-	X	X	-
- Dirty threads. (Accept if dirt removed after cleaning as per Para. 3. Otherwise not admissible for re-submission at any time).	-	X	-	X
- Deformation or dents on threads.	-	X	N/A	N/A

7. COMPLETE ASSEMBLIES

All defects described in the preceding paragraphs of this specification are also applicable to complete assemblies.

The following shall be looked for in particular and shall be deemed cause for rejection:

- Illegible or incomplete marking.	N/A	N/A	-	X
- Incorrect positioning of marking.	N/A	N/A	X	-
- Faulty marking.	N/A	N/A	-	X
- Missing positioning or indicator mark.	N/A	N/A	-	X
- Wrong polarisation of insert into housing (circular connectors).	N/A	N/A	-	X
- Polarisation out of P.I.D. tolerances.	N/A	N/A	-	X
- Potting not adhering to insert or shell.	-	X	X	-
- Contact solder pots not facing the same direction (within 15°).	N/A	N/A	-	X
- Insert play within shell >0.25mm (for D*M/D*MA types only).	-	X	N/A	N/A