

COAXIAL CONNECTOR CARE

FML-CD-001 Iss 01

1.0 Purpose & Scope

The purpose of this document is to communicate the importance of, and the methods required, to care for high performance coaxial connectors.

Foreign object debris (FOD) has the potential to harm the near perfect performance of high precision coaxial connectors. FOD also has the potential to cause foreign object damage; surface imperfections such as scratches and nicks can permanently damage a high precision connector.

Coupling of connectors must also be done correctly and with mechanical sympathy. Using the correct techniques, tools, and coupling torques is important in preserving the condition and ongoing performance of the connectors.

2.0 References

IEEE Std 287.1-2021: Precision Coaxial Connectors at RF, Microwave, and Millimetre-Wave Frequencies – Part 1 General Requirements, Definitions, and Detailed Specifications

3.0 Responsibilities

It shall be the responsibility of all persons making coaxial connections to:

- Be aware of the requirements of this document,
- Understand the requirements of this document and why they are important,
- Apply the requirements of this document entirely,
- Stop and seek support if requirements cannot be met or doubt exists,

4.0 Connector List

Connector Type	Outer conductor size (mm)	Recommended Frequency (Maximum)GHz	Waveguide Size (WG)	Coupling wrench, A/F size (mm)	Coupling Torque (Nm)	Max Safety Torque (Nm)
7 - 16 (D)	16.05	8	up to 13	32	2.5	30
N Type	7.0	12	up to 18	19	1.3-1.7	5.4
N Type extended	7.0	18	up to 18			
APC (APC7)	7.0	18	up to 18	19	1.3-1.7	5.4
TNC (X)	7.0	11	up to 15	N/A	N/A	N/A
TNCA (X)	7.0	19	up to 18	N/A	N/A	N/A
SMA	N/A	18	up to 18	N/A	N/A	N/A
SMA extended	N/A	26.5	up to 20	N/A	N/A	N/A
3.5mm (J)	3.5	33	up to 21	8	0.9±0.1	1.7
K Type	2.92	40	up to 22	8	0.8±0.2	1.8
2.4mm (T)	2.4	50	up to 23	8	0.9±0.1	1.6
V Type	1.85	67	up to 24 (part of 25)	8	0.9±0.1	1.6
1.0mm Type	1.0	110	up to 27 (part of 29)	6	0.45±0.05	0.7
0.8mm Type	0.8	145	up to 28 (part of 29)	6	0.45±0.05	0.7

Table 1 – compiled from IEEE Std 287.1-2021

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4.1 Compatibility

J and K Type connectors (3.5mm and 2.92mm) and V and T Type connectors (1.85mm and 2.4mm) are compatible with each other

Note: J and K Type connectors are also compatible with SMA connectors, although this is not recommended as the SMA connector is a cheaper style of connector.

5.0 Connector care

5.1 Visual Inspection

Prior to making a connection, the following visual checks shall be completed using a microscope with x10 magnification:

- Inspect the Male and Female parts for FOD - metal particles, contaminants, fibres etc.,
- Inspect the reference planes (mating faces) for damage to the surface finish. Damage caused by excessive machining marks or misalignment damage are to be rejected,
- Inspect the parts for surface defects – damage, burrs, dents etc.,
- Inspect the Male connectors ensuring the pin is present, secure, and centred,
- Inspect the Female connectors ensuring that the contact (fingers) integrity and concentricity has not been compromised – see image 2,

CARE POINT:

Under no circumstance are damaged connectors to be used.

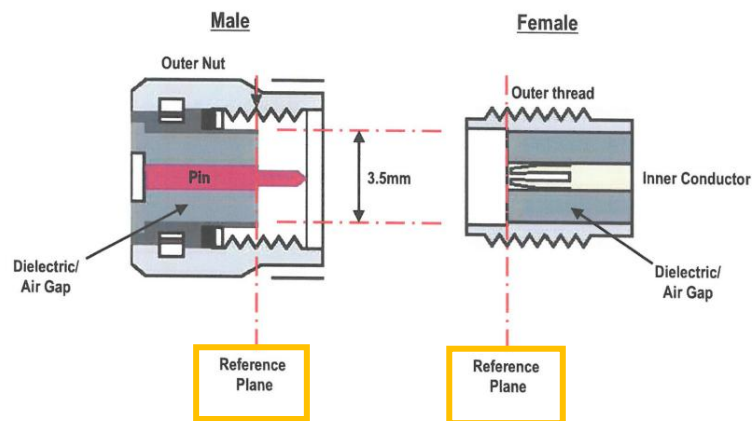


Image 1

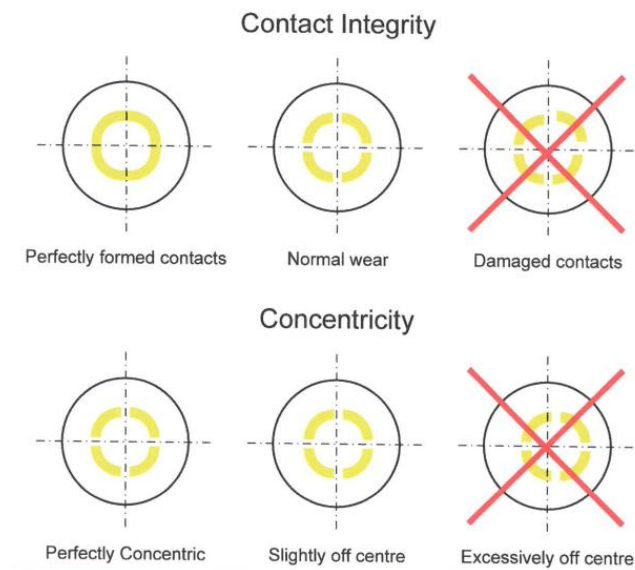


Image 2

5.2 Cleaning

Cleaning Connector Threads:

Use a clean, soft, lint-free swab, such as a cotton swab, lightly moistened with isopropyl alcohol to remove dirt, dust, and other debris (see image 3).

- Apply a small amount of isopropyl alcohol to the lint free swab. Press excess alcohol out of swab on a clean lint free cloth,
- Clean the connector threads. Do not allow alcohol to come into contact with dielectrics or gaskets. Do not allow alcohol to migrate into the connector. Migration can cause VSWR, phase, and insertion loss problems. If migration occurs, the cable assembly should be thermal cycled at +70 C for one hour,
- Allow the isopropyl alcohol to evaporate, then dry the threads using containerized compressed air. Make sure the connectors are completely dry before use,
- Re-inspect connector to be sure there is no visible debris,



Image 3

5.3 Connector Coupling

- a) Carefully align the Male and Female connectors - see image 1,
- b) Make preliminary connection by pushing the connectors straight together,

CARE POINT:

Do not twist the connectors together as this may cause damage to the contact fingers of the Female connector.



- c) Using just finger and thumb, apply the lightest pressure to screw the **outer nut** onto the Female body until minimal resistance is met – see image 4.

CARE POINT:

Do not fully tighten the outer nut.

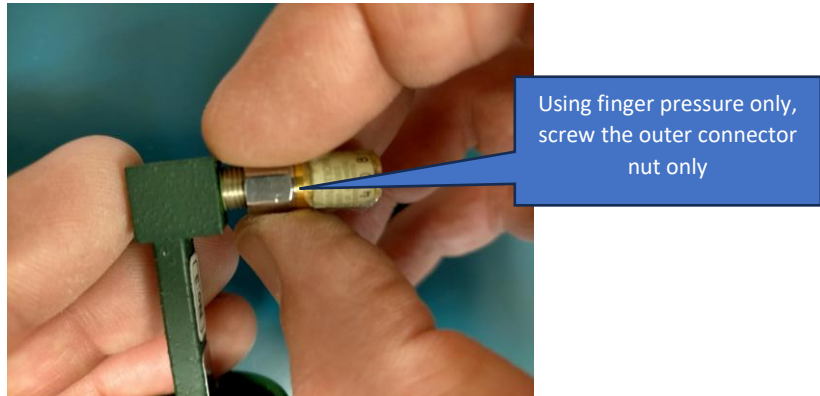


Image 4

- d) Final tightening is done using an appropriate calibrated torque wrench – see image 5 & Table 1.
It is essential, to prevent damage to the connectors, that the specified torque is applied in accordance with IEE 287.1 - see Table 1.

CARE POINT:

Do not tighten past torque wrench 'break point'.

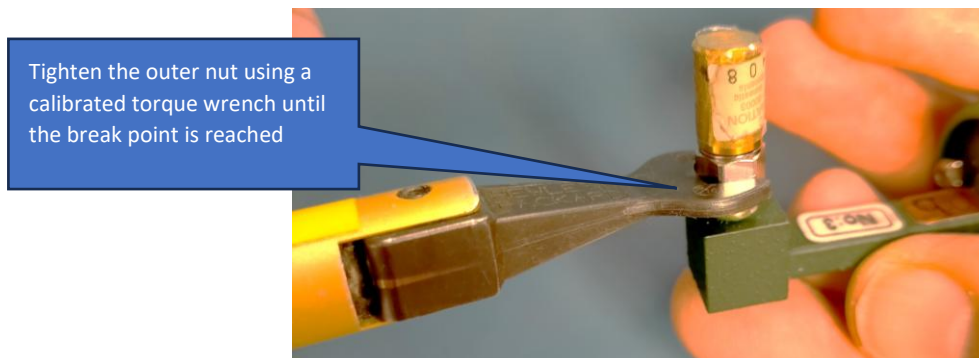


Image 5

6.0 Connector Storing

Once the connectors have been finished with

- Fit dust caps to all open connections,
- Place back into correct storage container,

END