BS EN 4652-210:2015

BSI Standards Publication

Aerospace series — Connectors, coaxial, radio frequency

Part 210: Type 2, TNC interface — Clamp nut assembly version — Straight plug — Product standard

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Aerospace series - Connectors, coaxial, radio frequency - Part 210: Type 2, TNC interface - Clamp nut assembly version - Straight plug - Product standard

Série aérospatiale - Connecteurs coaxiaux pour radio fréquences - Partie 210 : Type 2, interface TNC - Version à presse étoupe - Fiche droite - Norme de produit

Luft- und Raumfahrt - Koaxiale Hochfrequenz-Steckverbinder - Teil 210: Typ 2, TNC-Anschluss - Klemmverbindung - freier Steckverbinder, gerade - Produktnorm

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European foreword

This document (EN 4652-210:2015) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this European Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

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1 Scope

This European Standard specifies the characteristics of screwed on coupling (TNC interface) coaxial straight plugs – 50 ohms. The cable to connector assembly is a clamp technology.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 2591 [1)], *Aerospace series — Elements of electrical and optical connection — Test methods*

EN 2812, *Aerospace series — Stripping of electric cables*

EN 4652-001, *Aerospace series — Connectors, coaxial, radio frequency — Part 001: Technical specification*

EN 4652-212, *Aerospace series — Connectors, coaxial, radio frequency — Part 212: Type 2, TNC interface — Clamp nut assembly version — Square flange receptacle — Product standard*

EN 4652-213, *Aerospace series — Connectors, coaxial, radio frequency — Part 213: Type 2, TNC interface — Clamp nut assembly version — Bulkhead receptacle — Product standard*

EN 9133, *Aerospace series — Quality management systems — Qualification procedure for aerospace standard parts*

TR 6058, *Aerospace series — Cable code identification list* [2)]

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 4652-001 apply.

4 Required characteristics

— The connection technology shall comply to required tests described in Clause 5.

— Interface shall comply to EN 4652-001.

— A self-locking device on plugs shall be proposed if hole for lockwire do not exist.

— Water ingress resistance is required in mated conditions for all cable groups.

— Water ingress resistance is required in unmated condition for cable group A.

1) All parts quoted in this standard.

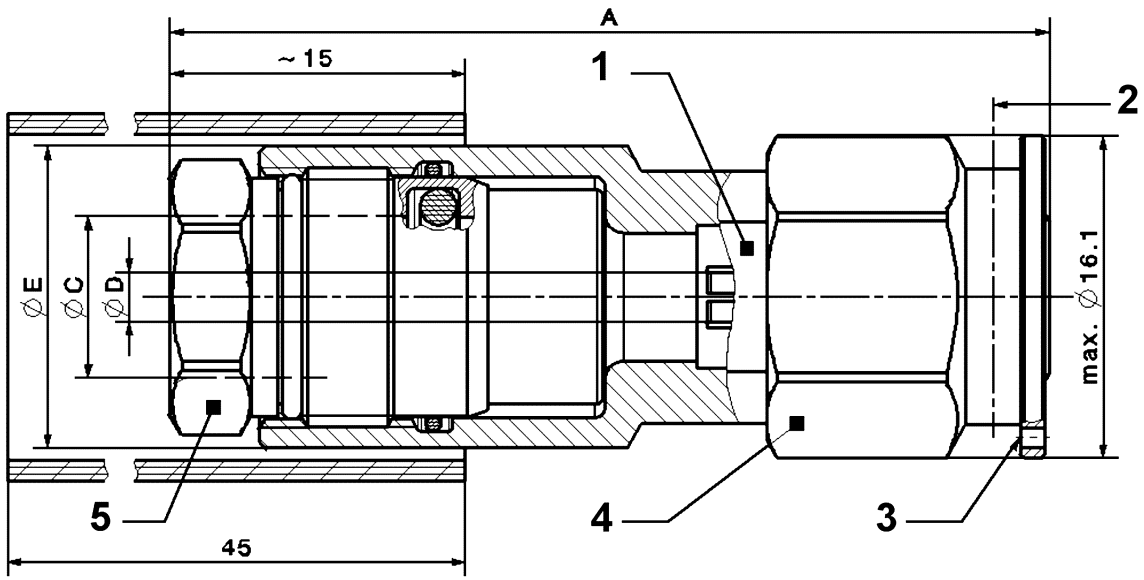
2) Published as ASD-STAN Technical Report at the date of publication of this standard. http://www.asd-stan.org/

4.1 Configuration, dimension and mass

Mass without heat shrink tubing.

See Figure 1 and Table 1.

Dimensions in millimetres



Key

1 Flat 10
2 Marking
3 3 holes for lockwire Ø 1
4 HEX. 14
5 HEX. *F*

Figure 1 — TNC straight plug

Marking: see Clause 9.

Table 1 — TNC straight plug dimensions and mass

Cable group	*A* max.	*ØC* (cable jacket) max.	*ØD* (cable conductor)	*ØE* max.	HEX. *F*	**Interface style** (according to EN 4652-001)	**Mass** g max.
A	43,6	7,8	2,3	15	12	Style C	35,7
B	35,9	5,55	1,4	13	8	Style C	25,2

4.2 Materials and finish

Centre contact ..... : Copper alloy gold plated over nickel undercoat

Insulators ..... : PTFE

Seals ..... : Silicone rubber or silicone fluoride

Body ..... : Copper alloy, nickel plated

Heat shrink tube ..... : Polyolefin

Coupling nut, rear screw and other parts' materials shall have mechanical and electrical characteristics consistent with the requirements of this product standard.

4.3 Temperature

Operating temperature shall be between – 65 °C and 165 °C.

4.4 Electrical characteristics

Impedance ..... : 50 Ω

Maximum operating frequency ..... : 6 GHz

VSWR ..... : 1,15 up to 6 GHz

Insertion loss ..... : $0{,}04\sqrt{f}$ dB max., f in GHz

Contact resistance (initial centre contact) ..... : 1,5 mΩ max.

Insulation resistance ..... : 5 000 MΩ min.

Withstand voltage ..... : 1 500 Veff (at sea level)

4.5 General characteristics

Tightening torque of coupling nut ..... : 2,6 Nm ± 0,3 Nm

Force to engage or disengage ..... : 0,23 Nm max.

Service life ..... : 500 cycles

Retention of centre contact ..... : 27 N min.

Retention of cable ..... : see Table 2.

Table 2 — Retention of cable

Cable group	**Retention of cable** N min.
A	180
B	180

4.6 Admissible cables, tools and stripping lengths

See Table 3 to Table 5.

Table 3 — Stripping lengths

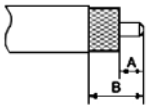
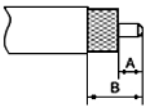
Cable group	**Cable code** (see TR 6058)	**Stripping lengths** mm
A	KW	
B	KX	

Table 4 — Stripping lengths cable group A

A		*B*	
min. mm	max. mm	min. mm	max. mm
4,6	5,4	8,6	9,4

Table 5 — Stripping lengths cable group B

A		*B*	
min. mm	max. mm	min. mm	max. mm
3,6	4,4	7,6	8,4

For stripping, see EN 2812.

5 Test methods

See Table 6.

Table 6 — Test methods

<table>
<tr><th>EN 2591-</th><th>Designation of the test</th><th>Details</th></tr>
<tr><td>101</td><td>Visual examination</td><td>Applicable</td></tr>
<tr><td>102</td><td>Examination of dimensions and mass</td><td>TNC interface style A: see subclause 4.1 and EN 4652-001.
TNC interface style B: see subclause 4.1 and EN 4652-001.
TNC interface style C: see subclause 4.1 and EN 4652-001.
The manufacturer shall precise which style of interface is used.</td></tr>
<tr><td>201</td><td>Contact resistance - low level</td><td>Applicable on centre contact</td></tr>
<tr><td>202</td><td>Contact resistance at rated current</td><td>1,5 mΩ max. = initial centre contact, and
2,0 mΩ max. after test
For nickel plated connectors:
0,4 mΩ max. = initial external contact, and
1,2 mΩ max. after test</td></tr>
<tr><td>204</td><td>Discontinuity of contacts in the microsecond range</td><td>Duration of micro discontinuity: ≤ 1 µs
Method B
Test time: throughout duration of tests EN 2591-402 and EN 2591-403</td></tr>
<tr><td>206</td><td>Measurement of insulation resistance</td><td>5 000 MΩ min.</td></tr>
<tr><td>207</td><td>Voltage proof test</td><td>Method A
<table>
<tr><th>Pressure</th><th>Mated [a]</th><th>Unmated [a]</th></tr>
<tr><td>Sea level</td><td>1 500</td><td>1 500</td></tr>
<tr><td>12,1 kPa</td><td>800</td><td>550</td></tr>
<tr><td>4,7 kPa</td><td>375</td><td>350</td></tr>
<tr><td>2,7 kPa</td><td>250</td><td>200</td></tr>
<tr><td colspan="3">[a] Values in Volts RMS.</td></tr>
</table></td></tr>
<tr><td>212</td><td>Surface transfer impedance</td><td>Applicable (up to 100 MHz)
3 mΩ 1 MHz
1 mΩ 10 MHz
3 mΩ 30 MHz
5 mΩ 100 MHz</td></tr>
</table>

EN 2591-	Designation of the test	Details
214	Lightning strike, current and voltage pulse	10 kA wave form 5 A, 10 A RMS
221	Voltage Standing Wave Ratio (VSWR)	Method B VSWR ≤ 1,15 up to 6 GHz
222	Insertion Loss (I.L.)	$0{,}04\sqrt{f}$ dB max., f in GHz Measurement shall be performed with connector mated with EN 4652-212 or EN 4652-213 receptacle from same technology and cable group.
223	Measurement of characteristic impedance of a coaxial connector or contact	50 Ω ± 5 Ω at 200 MHz – Input impedance
224	RF leakage	Measured from 2 GHz to 3 GHz – 50 dB for connectors on cable group A – 60 dB for connectors on cable group B
225	RF high potential withstanding voltage	1 000 V at 5 MHz
226	Corona level	Corona extinction voltage > 315 V rms at 4,4 kPa (70'000 feet altitude)
303	Cold/low pressure and damp heat	Five (5) cycles Minimum temperature – 60 °C
305	Rapid change of temperature	Mated connectors $T_A = \left(165 \begin{smallmatrix}+5\\0\end{smallmatrix}\right)$ °C; $T_B = \left(-65 \begin{smallmatrix}0\\-5\end{smallmatrix}\right)$ °C.
307	Salt mist	The connectors shall be suspended in the test chamber with non-metallic cords, so that no accumulation of condensed saline solution can occur. The connectors shall be: — subjected to 50 cycles of mating and unmating at a rate ≤ 5 cycles/min.; — exposed to the salt mist: — mated for 240 h. — Not exposed to the salt mist: — unmated for 48 h.

EN 2591-	Designation of the test	Details
308	Sand and dust	The mated connectors shall be arranged so that their longitudinal axis is parallel to the wind direction, with the rear of the plug facing the wind. Wind velocity in the duct: (3,5 ± 0,5) m/s Number of cycles: one (1)
311	Low air pressure	Refer to test EN 2591-207.
314	Immersion at low air pressure	Specimen without heat shrinkable tube. In unmated condition (applicable only for connectors on cable group A). After the three (3) cycles, remove the specimen from salt water, clean the interface with soft paper. In mated condition (applicable for all connectors): standard procedure.
315	Fluid resistance	See EN 4652-001.
317	Flammability	Method A
402	Shock	Method A, half sine Severity 30 g, duration 11 ms Number of shocks: one (1) in each way for each of the three (3) axis (six (6) shocks in all)
403	Sinusoidal and random vibration	Method A: sinusoidal vibration with the following individual modalities: Level 2 50 Hz to 70 Hz 1,5 mm double amplitude 70 Hz to 2 000 Hz 20 g Three (3) axis or two (2) axis (straight connectors) Duration 4 h per axis at ambient temperature
404	Transverse load	Applicable on rear of plug; torque moment = 15 Nm
406	Mechanical endurance	500 cycles
408	Mating and unmating forces	0,23 Nm max.
409	Contact retention in insert	27 N min., applicable on cabled specimen
417	Tensile strength (crimped connection)	See Table 2.
418	Gauge insertion/extraction forces (female contacts)	Not applicable
422	Locking wire hole strength	Applicable
507	Plating porosity	Applicable

EN 2591-	Designation of the test	Details
508	Measurement of thickness of coating on contacts	Applicable
509	Adhesion of coating on contacts	Applicable
513	Magnetic permeability	≤ 2

6 Qualification

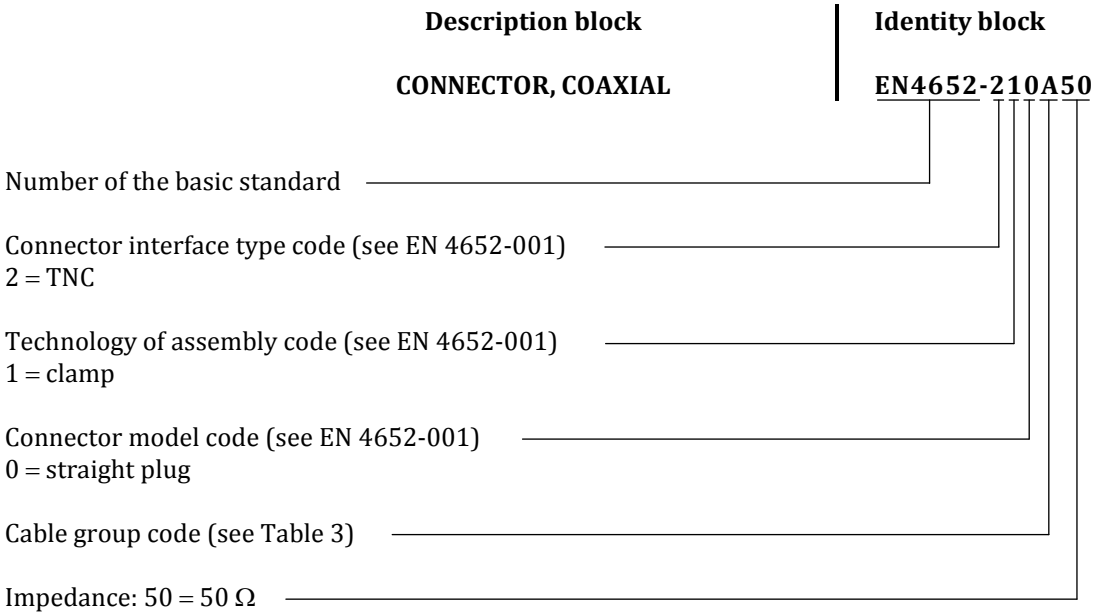
Qualification test programme: see EN 4652-001.

7 Quality assurance

See EN 9133.

8 Designation

EXAMPLE



NOTE If necessary, the code I9005 shall be placed between the description block and the identity block.

9 Marking

See EN 4652-001.

10 Packaging

See EN 4652-001.

11 Storage

See EN 4652-001.

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