BRITISH STANDARD

BS EN
4604-008:2009

Aerospace series — Cable, electrical, for signal transmission

Part 008: Cable, coaxial, 50 ohms, 200°C., Type WD — Product standard

ICS 49.060

BSI
British Standards

National foreword

This British Standard is the UK implementation of EN 4604-008:2009.

The UK participation in its preparation was entrusted to Technical Committee ACE/6, Aerospace avionic electrical and fibre optic technology.

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

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Série aérospatiale - Câbles électriques pour transmission de signaux - Partie 008: Câble, coaxial, 50 ohms, 200 °C, type WD - Norme de produit

Luft- und Raumfahrt - Elektrische Leitungen fur Signalubertragungen - Teil 008: Koaxialkabel, 50 Ohm, 200 °C, Typ WD - Produktnorm

This European Standard was approved by CEN on 20 June 2009.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 4604-008:2009) 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 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.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2010, and conflicting national standards shall be withdrawn at the latest by February 2010.

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1 Scope

This standard specifies the required characteristics of a coaxial cable, 50 Ω, type WD, for use in aircraft electrical systems at operating temperature between – 55 °C and 200 °C and specially for high frequency up to 8 GHz. Nevertheless, if needed, – 65 °C is also acceptable as shown by thermal stability test.

2 Normative references

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

EN 3475-100*, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 100: General.*

EN 4604-001, *Aerospace series — Cable, electrical, for signal transmission — Part 001: Technical specification.*

EN 4604-002, *Aerospace series — Cable, electrical, for signal transmission — Part 002: General.*

TR 6058, *Aerospace series — Cable code and identification list.* 1)

ASTM-B298-99, *Standard specification for silver-coated soft or annealed copper wire.* 2)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 3475-100 apply.

4 Required characteristics

4.1 Material, constructions, dimension and mass

4.1.1 Material

See Table 1.

Table 1 — Material

	Material	Finish	Colour
Conductor	Multi-strands copper per ASTM-B298-99	Class A silver plated	—
Dielectric	Fluorocarbon	—	—
Shield	2 braids, copper per ASTM-B298-99.	Class A silver plated	—
Jacket	Fluorocarbon	—	white

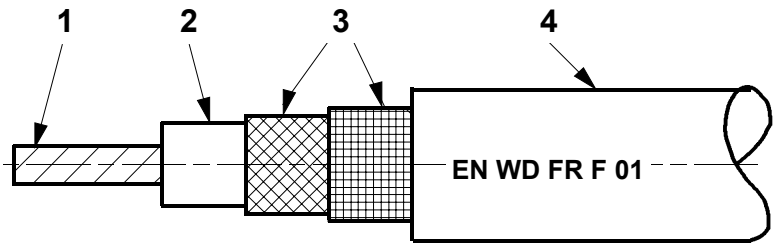
* And all parts quoted in this standard.

1) Published as ASD Technical Report at the date of publication of this standard.

2) Published by: American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive,. PO Box C700, West Conshohocken, PA 19428-2959 USA.

4.1.2 Construction, dimensions and mass

See Figure 1 and Table 2.



Key

1 Conductor
2 Dielectric
3 Shield
4 Jacket

Figure 1 — Construction

Table 2 — Dimensions and mass

Diameter (mm)					**Mass**	
Conductor	Dielectric		Shield	Cable	g/m	
	min.	max.			nom.	max.
2,33 ± 0,05 (37 × 0,34) mm	5,9	6,1	7,1 ± 0,1	7,70 ± 0,20	130	137

Shield strand diameter shall be 0,13 mm.

4.2 General characteristics

a) Operating temperature: – 55 °C to 200 °C

b) Minimum bend radius:
   1) in static use: 40 mm
   2) in dynamic use: 80 mm

c) Performances are guaranteed up to 8 GHz.

4.3 Electrical characteristics

a) Characteristic impedance: Zc = (50 ± 2) Ω at 200 MHz

b) Capacitance per unit length: Cp = 85 pF/m

c) Transfer impedance: see Table 4.

d) Operating voltage: 1 000 V RMS max.

e) Maximum power handling (at sea level): See Table 3.

f) Attenuation versus frequency: See Table 3.

g) Velocity of propagation: 240 000 km/s (Vr = 80 %) min.

Table 3 — Frequency, attenuation, power handling and VSWR

Frequency MHz	50	100	150	200	400	1 000	1 600	2 500	3 000	8 000
Attenuation max. dB/100 m	5,0	7,2	9,1	10,7	16,1	28,6	39,6	55,0	61,0	110,0
Attenuation nom. dB/100 m	4,6	6,5	8,3	9,7	14,6	26,0	36,0	50,0	55,0	105,0
Power cw nom. W	5 700	4 000	3 100	2 700	1 800	1 000	730	530	480	250
Max. return loss VSWR	1,10			1,15			1,20			1,35

Table 4 — Frequency, transfer impedance

Frequency MHz	0 to 0,01	0,1	1	5	10	30	100
Transfer impedance Zt max. mΩ/m	4,2	4	1,3	0,6	1,0	2,3	5,5

4.4 Tests

See Table 5.

Table 5

EN 3475-	Designation of the test	Remarks
201	Visual examination	—
202	Mass	Applicable 137 g/m max.
203	Dimensions	Applicable See 4.1 and Table 2.
301	Ohmic resistance per unit length	Applicable 5,5 Ω/km
302	Voltage proof test	Applicable Dielectric Dry test: 2 500 V AC Jacket Dry impulse: 5 000 V Dry test: 1 750 V AC
303	Insulation resistance	Applicable > 5 000 MΩ.km between shield and conductor
304	Surface resistance	Not applicable
305	Overload resistance	Not applicable
306	Continuity of conductors	Applicable
307	Corona extinction voltage	Applicable Extinction voltage 1 500 V
401	Accelerated ageing	Not applicable
402	Shrinkage and delamination	Not applicable
403	Delamination and blocking	Not applicable
404	Thermal shock	Not applicable
405	Bending at ambient temperature	Not applicable
406	Cold bend test	Not applicable
407	Flammability	Applicable. Method 1. Load = 20 N Extinction time < 3 s
408	Fire resistance	Not applicable
409	Air-excluded ageing	Not applicable
410	Thermal endurance	Not applicable

continued

Table 5 *(continued)*

EN 3475-	Designation of the test	Remarks
411	Resistance to fluids	Applicable
412	Humidity resistance	Not applicable
413	Wrap back test	Not applicable
414	Differential scanning calorimeter (DSC Test)	Not applicable
415	Rapid change of temperature	Applicable Variation of capacitance: 5 % max. Increase of attenuation: 5 % max. Shrinkage: 1,5 mm max. 1st specimen length (C,α): 30 m
416	Thermal stability	Applicable Heat exposure temperature: 200 °C. Variation of capacitance: 5 % max. Increase of attenuation: 5 % max. Variation of impedance: 3 % max. Shrinkage: 1,5 mm max. 3rd specimen length (C,α): 30 m Mandrel diameter: 120 mm
417	Fire resistance of cables confined inside a harness	Not applicable
418	Thermal endurance for conductors	Not applicable
501	Dynamic cut-through	Not applicable
502	Notch propagation	Applicable Cut depth: 0,05 mm Immersion test = 1 750 VAC
503	Scrape abrasion	Applicable Number of cycles : 10 000 Load: 9 N
504	Torsion	Not applicable
505	Tensile test on conductors and strands	Applicable Elongation ≥ 10 % Tensile strength: ≥ 75 daN. for whole conductor. Tensile strength: ≥ 80 daN. for the braid
506	Plating continuity	Applicable

continued

Table 5 *(continued)*

EN 3475-	Designation of the test	Remarks
507	Adherence of plating	Applicable
508	Plating thickness	Applicable See 4.1.1.
509	Solderability	Not applicable
510	Tensile strength and elongation of extruded insulation, sheath and jacket material	Not applicable
511	Cable-to-cable abrasion	Not applicable
512	Flexure endurance	Applicable Load: 1,5 daN Mandrel diameter: 100 mm 500 cycles
513	Deformation resistance (Installation with plastic cable ties)	Applicable
514	Porosity of copper cladding on aluminium strands	Not applicable
515	Crush resistance	Applicable. Load: 100 daN Sample length: > 10 m Load application time = 2 minutes Attenuation: See Table 3. Impedance: See 4.3. VSWR: See Table 3.
601	Smoke density	Applicable
602	Toxicity	Applicable
603	Resistance to wet arc tracking	Not applicable
604	Resistance to dry arc propagation	Not applicable
605	Wet short circuit test	Not applicable
701	Strippability and adherence of insulation to conductor	Applicable 15 N to 75 N
702	Screen pushback capability	Applicable
703	Permanence of manufacturer's marking	Applicable Except when marking on tape between shield and jacket
704	Flexibility	The force to crush the loop by 25 % shall be 10 N maximum.

continued

Table 5 *(concluded)*

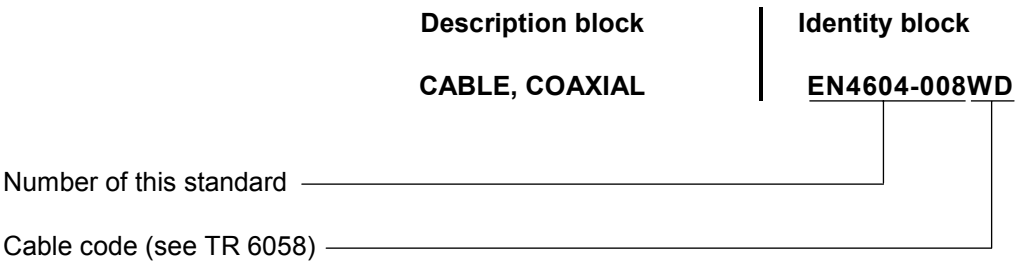
EN 3475-	Designation of the test	Remarks
705	Contrast measurement	Not applicable
706	Laser markability	Not applicable
801	Capacitance per unit length	Applicable See 4.3.
802	Capacitance unbalance	Not applicable
803	Capacitance variation	Not applicable
804	Velocity of propagation	Applicable See 4.3.
805	Characteristics impedance	Applicable See 4.3.
806	Attenuation	Applicable See 4.3, Table 3.
807	Transfer impedance	Applicable See Table 4.
808	Cross-talk	Not applicable
809	Resistance unbalance	Not applicable
810	Structural return loss	Not applicable
811	Unbalance attenuation	Not applicable
812	Return loss (VSWR)	Applicable See 4.3 and Table 3.

5 Quality assurance

See EN 4604-001.

6 Designation

EXAMPLE



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

7 Identification and marking

Colour of the marking shall be black or green.

See EN4604-002

8 Packaging, labelling and delivery lengths

8.1 Packaging and labelling

See EN 4604-001.

8.2 Delivery lengths

Delivery on cable drums (about 100 metres).

Minimum length of each piece: 30 metres. / 2 pieces per drum.

9 Technical specification

See EN 4604-001.

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