



SLOVENSKI STANDARD
SIST EN 1361:2000
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Gumene cevi in cevni priključki za pretakanje letalskih goriv - Specifikacija

Rubber hoses and hose assemblies for aviation fuel handling - Specification

Gummischläuche und -schlauchleitungen für die Flugzeugbetankung - Anforderungen

Tuyaux et flexibles en caoutchouc pour transfert de carburant aviation - Spécification

Ta slovenski standard je istoveten z: EN 1361:1997

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EUROPEAN STANDARD

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English version

Rubber hoses and hose assemblies for aviation fuel handling - Specification

Tuyaux et flexibles en caoutchouc pour
transfert de carburant aviation - Spécification

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 218 'Rubber and plastics hoses and hose assemblies', the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by October 1997, and conflicting national standards shall be withdrawn at the latest by October 1997.

This standard is based on BS 3158 but the following major changes have been incorporated:

- six hose types reduced to four, omitting type A (non electrically bonded) and type D (non electrically bonded but incorporating an antistatic cover compound), which are no longer in regular use and are considered to be obsolete ;
- maximum allowable fuel soluble matter has been increased;
- minimum levels for adhesion between components have been increased;
- pressure ratings for all types have been standardized to the same requirements.

A flammability test proposed by Germany has been included as an informative annex (annex A) so that experience in use and values may be obtained prior to consideration for inclusion as a requirement.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the dimensions, construction and requirements for four types of hoses and hose assemblies for use in all operations associated with the ground fuelling and defuelling of aircraft.

All four types of hose are designed for:

- a) use with petroleum fuels, having an aromatic hydrocarbon content not exceeding 30 % by volume;
- b) operation within the temperature range of -30 °C to +65 °C and are to be undamaged by climatic conditions of -40 °C to +70 °C when stored in static conditions.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

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- EN 24671 Rubber and plastics hose and hose assemblies - Methods of measurement of dimensions (ISO 4671 : 1984)
- EN 24672 Rubber and plastics hoses - Sub-ambient temperature flexibility tests (ISO 4672 : 1988)
- EN 26246 Determination of existent gum in fuels by jet evaporation (ISO 6246 : 1995)
- EN 27326 Rubber and plastics hoses - Assessment of ozone resistance under static conditions (ISO 7326 : 1991)
- EN 28031 Rubber and plastics hoses and hose assemblies - Determination of electrical resistance (ISO 8031 : 1993)
- EN 28033 Rubber and plastics hose - Determination of adhesion between components (ISO 8033 : 1991)
- ISO 37 Rubber, vulcanized or thermoplastic - Determination of tensile stress-strain properties
- ISO 188 Rubber, vulcanized - Accelerated ageing or heat-resistance tests
- ISO 1402 Rubber and plastics hoses and hose assemblies - Hydrostatic testing
- ISO 1817:1985 Rubber, vulcanized - Determination of the effect of liquids
- ISO 4649 Rubber - Determination of abrasion resistance using a rotating cylindrical drum device

3 Definitions

For the purposes of this standard, the definitions given in ISO/TR 8330 apply.

4 Types and service reeling diameters

4.1 Types

Hoses shall be one of the following four types, each incorporating an antistatic cover compound:

- a) type B, electrically conductive;
- b) type C, non-electrically conductive but incorporating an antistatic cover compound;
- c) type E, with enhanced defuelling capability (electrically conducting and incorporating a metallic wire helix reinforcement);
- d) type F, with enhanced defuelling capability (non-electrically conducting and incorporating a non-metallic helix reinforcement with an antistatic cover).

NOTE 1: Type C hoses are intended for general pressure application on all vehicles used for into-plane fuelling. It may also be used for vehicle/rail car loading and discharge where excessive vacuum does not occur.

NOTE 2: Type F hoses may be used for into-plane delivery applications on vehicles that are also used for defuelling at high flow rates, and where type C hoses are not suitable.

NOTE 3: Type E and type F hoses may also be used for vehicle/rail car loading and discharge, for trailer to fueller transfer, and for elevating platform supply (riser) to provide greater kink resistance. However, for 'riser' application, a 'heavy duty' type C hose or standard type C hose with an external wire spiral should be used when possible. This spiral should not be in electrical contact with the end couplings.

4.2 Service reeling diameter

Hoses shall be designed for operation on equipment fitted with hose reels of the diameters given in table 1.

NOTE: These hoses remain substantially circular in cross section when reeled on drums (see table 1) and should not be confused with hoses of the collapsible type that are intended to be reeled flat.

Table 1: Service reeling diameters

Nominal bore	Minimum external diameter of reeling drum used in service in mm
19	225
25	300
32	375
38	450
50	550
63	600
75	600
76	600
100	900
101	900

5 Construction

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The hose shall be mandrel built and vulcanized on the mandrel. Particulate type release agents shall not be used. The hose shall be uniform in quality and free from porosity, air holes, foreign inclusions and other defects.

The hose shall comprise:

- a lining of synthetic rubber resistant to petroleum fuel;
- a reinforcement of layers of woven, braided or spirally wound textile material;
- an outer cover of synthetic rubber, resistant to abrasion, outdoor exposure and petroleum fuel. The outer surface shall be uncorrugated and free from abrasive particles or ingredients which could scratch or mark aircraft surfaces.

NOTE : The cover may have a shallow cloth marked finish.

For type E and type F hoses only, an embedded helix reinforcement shall be included in the construction.

For type E hoses the wire reinforcement used shall be a hard steel and shall have a galvanized finish.

Construction relating to electrical properties are specified in clause 11.

6 Physical properties

6.1 Rubber compounds

The physical properties of the rubber compounds used for the lining and cover shall comply with the values given in table 2, when tested by the methods listed in table 2.

Tests shall be carried out either on samples taken from the hose or from separately vulcanized sheets, except for cold embrittlement and abrasion resistance tests which shall be carried out on moulded test pieces.

Table 2: Physical properties of rubber compounds

Property	Unit	Requirement		Method of test	
		Lining	Cover		
Tensile strength,	min.	MPa	7,0	7,0	ISO 37 (dumb-bell test pieces)
Elongation at break,	min.	%	250	300	ISO 37 (dumb-bell test pieces)
Swelling in fuel,	max.	%	50	75	8.2 of ISO 1817 : 1985 (48 h at 40 °C in liquid B)
Fuel-soluble matter,	max.	%	4,0	Not applicable	Annex B
Cold embrittlement	-		No cracking	No cracking	Annex C
Abrasion resistance		mm ³	Not applicable	140	Method A of ISO 4649
Ageing Tensile strength change,	max.	%	± 30	± 30	ISO 188 (7 days at 70 °C) (air-oven method)
Elongation at break change,	max.	%	± 30	± 30	

6.2 Finished hose

The physical properties of the finished hose shall comply with the values given in table 3, when tested by the methods listed in table 3.

Table 3: Physical properties of finished hoses

Property	Unit	Requirement	Method of test
Adhesion between components dry, after contact with fuel,	min. N/mm min. N/mm	3,0 2,0	Annex D
Fuel contamination, R_e	max. mg/ 100ml	10	Annex E
Ozone resistance	-	No cracking observed under X2 magnification	EN 27326 (40 °C)
Flexibility	-	No permanent deformation or visible structural damage, no increase in electrical resistance, no impairment of electrical continuity and shall comply with the proof pressure requirement in 7.3 when measured at (20 ± 5) °C	Annex F (20 °C) Annex G (-30 °C)
Crush recovery (type F only) after 1 min after 10 min	 -	 Regain 90 % of original diameter Regain 95 % of original diameter Shall comply with the proof pressure requirement in 7.3 at (20 ± 5) °C	Annex H
Cyclic kinking (type B and type C only)	-	No leakage at proof pressure; electrical resistance not increased; adhesion between lining and reinforcement not less than 2,0 N/mm	Annex J

7 Pressure ratings

7.1 General

For all types of hoses the following shall apply:

- . maximum working pressure 20 bar ¹⁾
- . proof pressure 40 bar
- . minimum bursting pressure 80 bar

NOTE : It is essential that the maximum pressure, including surge pressure to which the hose is subjected in service, does not exceed the permissible maximum working pressure specified.

7.2 Variation in length at maximum working pressure

When tested in accordance with K.1.1, (see annex K), the maximum variation in length at maximum working pressure shall be 7 % of the original length for type B and type C hoses and 12 % of the original length for type E and type F hoses.

7.3 Proof pressure

When tested in accordance with K.1.2, (see annex K), the electrical continuity of type B and type E hoses shall comply with 11.1 and the electrical resistance of type C and type F hoses shall comply with 11.3. The hose shall show no signs of leakage or other damage.

7.4 Minimum bursting pressure

When tested in accordance with K.2, (see annex K), the minimum bursting pressure shall not be less than 80 bar.

8 Dimensions

8.1 Internal diameters

When measured in accordance with EN 24671 the internal diameters and tolerances shall comply with the values given in table 4.

¹⁾ 1 bar = 10⁵ N/m² = 10⁵ Pa