BRITISH STANDARD

BS EN
855 : 1997

Plastics hoses and hose assemblies —

Thermoplastics textile reinforced hydraulic type —

Specification

The European Standard EN 855 : 1996 has the status of a British Standard

ICS 23.040.70

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PRI/66, Rubber and plastics tubing, hoses and hose assemblies, upon which the following bodies were represented:

Association of Metropolitan Authorities
British Coal Corporation
British Compressed Gases Association
British Rubber Manufacturers' Association Ltd.
Chief and Assistant Chief Fire Officers' Association
Energy Industries Council
Fire Extinguishing Trades Association
Home Office
London Fire and Civil Defence Authority
Ministry of Defence
RAPRA Technology Ltd.
Society of Motor Manufacturers and Traders Limited

The following body was also represented in the drafting of the standard, through subcommittees and panels:

British Fluid Power Association

This British Standard, having been prepared under the direction of the Sector Board for Materials and Chemicals, was published under the authority of the Standards Board and comes into effect on
15 April 1997

Amendments issued since publication

Amd. No.	Date	Text affected

The following BSI references relate to the work on this standard:
Committee reference PRI/66
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Contents

National foreword

This British Standard has been prepared by Technical Committee PRI/66 and is the English language version of EN 855 : 1996 *Plastics hoses and hose assemblies — Thermoplastics textile reinforced hydraulic type — Specification*, published by the European Committee for Standardization (CEN).

The text used for this implementation is the corrected text authorized by CEN/CS.

This British Standard is a revision of BS 4983 : 1992 which is withdrawn.

EN 855 : 1996 has been approved by CEN member bodies under the weighted voting procedures introduced in 1988 to coincide with the introduction of the 'New Approach' Directives from the Commission of the European Community.

Cross-references

Publication referred to	Corresponding British Standard
EN 24671 : 1993	BS EN 24671 : 1993 *Rubber and plastics hose and hose assemblies. Methods of measurement of dimensions*
EN 24672 : 1993	BS EN 24672 : 1993 *Rubber and plastics hoses. Sub-ambient temperature flexibility tests*
EN 27326 : 1993	BS EN 27326 : 1993 *Rubber and plastics hoses. Assessment of ozone resistance under static conditions*
EN ISO 1402 : 1996	BS EN ISO 1402 : 1997 *Rubber and plastics hoses and hose assemblies — Hydrostatic testing*
ISO 1817 : 1985	BS 903 *Physical testing of rubber* Part A16 : 1987 *Determination of the effect of liquids*
ISO 6803 : 1994	BS ISO 6803 : 1996 *Rubber and plastics hoses and hose assemblies — Hydraulic-pressure impulse test without flexing*

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 6, an inside back cover and a back cover.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 855

March 1996

ICS 23.040.70

Descriptors: Plastic tubes, hoses, thermoplastic resins, weaves, hydraulic systems, hydraulic fluids, specifications, dimensions, dimensional tolerances, tests, service pressure, marking

English version

Plastics hoses and hose assemblies — Thermoplastics textile reinforced hydraulic type — Specification

Tuyaux et flexibles en plastique — Type hydraulique en thermoplastiques à armature de textile — Spécification

Kunststoffschläuche und -schlauchleitungen — Kunststoff-Hydraulikschläuche mit Textileinlage — Spezifikation

This European Standard was approved by CEN on 1995-12-09. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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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

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 standard is based on ISO 3949.

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 September 1996, and conflicting standards shall be withdrawn at the latest by September 1996.

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.

Contents

1 Scope

This European Standard specifies requirements for two types of textile reinforced thermoplastics hoses and hose assemblies with maximum working pressures in the range of 69 bar to 345 bar. The hoses are suitable for use with:

– petroleum and synthetic based hydraulic fluids at temperatures ranging from −40 °C to +100 °C;

– water based hydraulic fluids at temperatures ranging from 0 °C to +70 °C.

The standard does not include requirements for end fittings. It is limited to the performance of hoses and hose assemblies.

NOTE 1. Operating temperatures in excess of 100 °C may materially reduce the life of the hose.

NOTE 2. Requirements for hydraulic hoses for underground mining are standardized in separate standards.

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 revision 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.

EN 24671	*Rubber and plastics hoses 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 27326	*Rubber and plastics hoses — Assessment of ozone resistance under static conditions* (ISO 7326 : 1991)
EN ISO 1402	*Rubber and plastics hoses and hose assemblies — Hydrostatic testing* (ISO 1402 : 1994)
ISO 1817	*Rubber, vulcanized — Determination of the effect of liquids*
ISO 6803	*Rubber or plastics hoses and hose assemblies — Hydraulic pressure impulse test without flexing*

3 Types of hoses

Two types of hoses, types R7 and R8, are specified distinguished by their maximum working pressure (see table 4).

4 Materials and construction

4.1 Hose

The hose shall consist of a seamless thermoplastics lining resistant to hydraulic fluids, with a suitable synthetic fibre reinforcement and a thermoplastics cover resistant to hydraulic fluids and the weather.

4.2 Hose assemblies

Hose assemblies shall only be manufactured with those hose fittings whose functionality has been verified in all tests according to this standard.

5 Dimensions

5.1 Diameters and concentricity

When measured in accordance with EN 24671, the diameters of the hose shall comply with the values given in table 1.

Table 1. Diameters of hoses
Dimensions in millimetres

Nominal bore	Internal diameter				Maximum outside diameter	
	Type R7		Type R8		Type R7	Type R8
	min.	max.	min.	max.		
5	4,6	5,4	4,6	5,4	11,4	14,6
6	6,2	7,0	6,2	7,0	13,7	16,8
8	7,7	8,5	—	—	15,6	—
10	9,3	10,3	9,3	10,3	18,4	20,3
12	12,3	13,5	12,3	13,5	22,5	24,6
16	15,6	16,7	15,6	16,7	25,8	29,8
19	18,6	19,8	18,6	19,8	28,6	33,0
25	25,0	26,4	25,0	26,4	34,7	38,6

When measured in accordance with EN 24671, the concentricity of hoses shall comply with the values given in table 2.

Table 2. Concentricity of hoses
Dimensions in millimetres

Nominal bore	Maximum variation in wall thickness
	Between internal diameter and outside diameter
Up to and including 6	0,8
Over 6 and including 19	1,0
Over 19	1,3

5.2 Length

5.2.1 *Hoses*

The hoses shall be supplied in lengths as specified by the purchaser, subject to a tolerance on the specified lengths of ± 2 %.

When no specific hoses lengths have been ordered, the percentages of different lengths in any given delivery shall be as follows:

– over 20 m: not less than 80 % of total length;

– over 10 m to 20 m: not more than 20 % of total length;

– 1 m to 10 m: not more than 3 % of total length.

No hose length shall be less than 1 m.

5.2.2 *Hose assemblies*

The tolerances on the length of hose assemblies shall comply with the values given in table 3.

Table 3. Tolerances of length of hose assemblies
Dimensions in millimetres

Hose assembly length	Tolerances
Up to and including 630	+ 7 −3
Over 630 and including 1250	+ 12 −4
Over 1250 and including 2500	+ 20 −6

6 Requirements

6.1 Hydrostatic requirements

6.1.1 When tested in accordance with EN ISO 1402, the maximum working pressure, the proof pressure and burst pressure of the hose and hose assemblies shall comply with the values given in table 4.

Table 4. Maximum working pressure, proof pressure and burst pressure

Nominal bore	Maximum working pressure bar[1)]		Proof pressure bar		Burst pressure bar	
	Type		Type		Type	
	R7	R8	R7	R8	R7	R8
5	205	345	410	690	820	1380
6	190	345	380	690	760	1380
8	170	—	340	—	680	—
10	155	275	310	550	620	1100
12	135	240	270	480	540	960
16	100	190	200	380	400	760
19	86	155	172	310	344	620
25	69	138	138	275	276	550

[1)] 1 bar = 0,1 MPa

6.1.2 When tested in accordance with EN ISO 1402, the change in length of hose at the maximum working pressure shall not exceed ±3 %.

6.2 Minimum bend radius

When bent to the minimum bend radius in table 5 measured on the inside of the bend, the flatness shall not exceed 10 % of the original outside diameter.

Measure the hose outside diameter with a calliper before bending the hose. Bend the hose to the minimum bend radius and measure the flatness with the calliper.

Table 5. Minimum bend radius
Dimensions in millimetres

Nominal bore	Minimum bend radius
5	90
6	100
8	115
10	125
12	180
16	205
19	240
25	300

6.3 Impulse test requirements

6.3.1 The impulse test shall be in accordance with ISO 6803. The test temperature shall be 100 °C.

6.3.2 For type R7 hose, when tested at impulse pressure equal to 125 % of the maximum working pressure, the hose shall withstand a minimum of 150 000 impulse cycles.

For type R8 hose, when tested at impulse pressure equal to 133 % of the maximum working pressure, the hose shall withstand a minimum of 200 000 impulse cycles.

6.3.3 There shall be no leakage or other malfunction before reaching the specified number of cycles.

6.3.4 This test shall be considered a destructive test and the test piece shall be thrown away.

6.4 Leakage of hose assemblies

When tested in accordance with EN ISO 1402 there shall be no leakage or evidence of failure. This test shall be considered a destructive test and the test piece shall be thrown away.

6.5 Cold flexibility

When tested in accordance with method B of EN 24672 at a temperature of −40 °C there shall be no cracking of the lining or cover. The test piece shall not leak or crack when subjected to a proof pressure test after regaining ambient temperature.

6.6 Fluid resistance

When tested in accordance with ISO 1817, the lining and cover, immersed in Oil No. 3 for 72 h at a temperature of 100 °C, shall show shrinkage not greater than 15 % nor volume swelling greater than 35 %.

NOTE. If the resistance against synthetic or water based hydraulic fluids is to be tested, the test fluid and the test procedure can be specified as agreed between manufacturer and user.

6.7 Ozone resistance

When tested in accordance with method 1 or 2 of EN 27326, depending on the nominal bore of the hose, no cracking or deterioration of the cover shall be visible under ×2 magnification.

6.8 Electrical conductivity

When tested in accordance with annex A, hoses shall not show a leakage greater than 50 μA.

7 Designation

Hoses shall be designated as the following example.

Designation of a type R7 thermoplastics textile reinforced hydraulic hose and a nominal bore of 10:

Hose EN 855 - R7 10

8 Marking

8.1 Hoses

Hoses shall be marked at a maximum spacing of 500 mm with at least the following information:

a) the manufacturer's name or identification, e.g. XXX;

b) the number of this European Standard 'EN 855';

c) type, e.g. R7;

d) nominal bore, e.g. 16;

e) quarter and last two digits of year of manufacture, e.g. 4Q96.

EXAMPLE: XXX/EN 855/R7/16/4Q96

NOTE. Other information, as agreed between the purchaser and the manufacturer, can be included, if requested.

8.2 Hose assemblies

Hose assemblies shall be marked with at least the following information:

a) the manufacturer's name or identification, e.g. XXX;

b) maximum working pressure of the assemblies, in bar, e.g. 100

c) last two digits of year and month of assembly, e.g. 9610

EXAMPLE: XXX/100/9610

NOTE. Other information, as agreed between purchaser and the manufacturer, can be included, if requested.

Annex A (normative)

Method of test for electrical conductivity

WARNING NOTE. Care should be taken whilst carrying out this test in view of the high electrical voltage applied to the test assembly.

Expose the hose assembly, having a free length of 150 mm $\pm$ 10 mm without fluid, and capped to prevent entry of moisture, to a minimum of 85 % relative humidity at 23 °C $\pm$ 3 °C for a period of 168 h. Remove surface moisture prior to testing.

Attach one end fitting of conditioned assembly to the lead from a source of 50 Hz to 60 Hz sinusoidal, 37.5 kV (rms) electricity. Suspend this lead by dry fabric strings so that the hose hangs free at least 600 mm from any extraneous objects. Connect the lower end of the hose to earth through a known resistance between 1×10^3 Ω and 1×10^6 Ω, keeping the resistor near the end of the hose.

Connect a suitable a.c. voltmeter across the resistor, using a fully shielded cable with the shielding well earthed. Apply 37.5 kV (equivalent to 250 kV/m) to the test piece for 5 min and take a current reading.

List of references

See national foreword.

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British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

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