BS ISO
6805:1994

Implementation of
ISO 6805:1994

Rubber hoses and hose assemblies for underground mining — Wire-reinforced hydraulic types for coal mining — Specification

ICS 73.100.30; 83.140.00

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PRI/66, Hoses, 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 Extinguising Trades Association
Home Office
LP Gas Association
London Fire and Civil Defence Authority
Ministry of Defence
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 May 1995

The following BSI references relate to the work on this standard:
Committee reference PRI/66
Draft for comment 88/42256 DC

ISBN 0 580 24150 5

Amendments issued since publication

Amd. No.	Date	Comments

Contents

National foreword

This British Standard reproduces verbatim ISO 6805:1994 and implements it as the UK national standard.

This British Standard is published under the direction of the Sector Board for Materials and Chemicals whose Technical Committee PRI/66 has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international committee any enquiries on interpretation, or proposals for change, and keep UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

NOTE International and European Standards, as well as overseas standards, are available from Customer Services, BSI, 389 Chiswick High Road, London W4 4AL.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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 ISO title page, pages ii to iv, pages 1 to 6 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

INTERNATIONAL STANDARD

ISO 6805

Second edition
1994-10-01

Rubber hoses and hose assemblies for underground mining — Wire-reinforced hydraulic types for coal mining — Specification

Tuyaux et flexibles en caoutchouc pour les mines souterraines — Types hydrauliques avec armure de fils métalliques pour mines de charbon — Spécifications

Reference number
ISO 6805:1994(E)

Contents

Descriptors: Coal mines, mining equipment, hydraulic equipment, rubber products, hoses, rubber hoses, classification, specifications, dimensions, tests, marking.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 6805 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products,* Subcommittee SC 1, *Hoses (rubber and plastics).*

This second edition cancels and replaces the first edition (ISO 6805:1984), which has been technically revised.

blank

1 Scope

This International Standard specifies requirements for six types of embedded-wire hose and hose assembly of bore diameter from 5 mm to 51 mm for use with common hydraulic fluids such as mineral oils, soluble oils, oil and water emulsions, aqueous glycol solution and water at temperatures ranging from – 40 °C to + 100 °C for types 1 to 5 and from – 40 °C to + 121 °C for type 6. Operation at the extremes of or outside this temperature range may materially reduce the life of the hose. The hose is not suitable for use with fluids having a castor oil or ester base.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1402:—, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing*[1)].

ISO 1436:1991, *Rubber hoses and hose assemblies — Wire-reinforced hydraulic type — Specification.*

ISO 1817:1985, *Rubber, vulcanized — Determination of the effect of liquids.*

ISO 3862:1991, *Rubber hoses and hose assemblies — Rubber-covered, spiral wire reinforced, hydraulic type — Specification.*

ISO 4671:1984, *Rubber and plastics hose and hose assemblies — Methods of measurement of dimensions.*

ISO 4672:1988, *Rubber and plastics hoses — Sub-ambient temperature flexibility tests.*

ISO 6803:1994, *Rubber or plastics hoses and hose assemblies — Hydraulic-pressure impulse test without flexing.*

ISO 6945:1991, *Rubber hoses — Determination of abrasion resistance of the outer cover.*

ISO 7326:1991, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions.*

ISO 8030:1987, *Rubber and plastics hoses for underground mining — Method of test for flammability.*

ISO 8031:1993, *Rubber and plastics hoses and hose assemblies — Determination of electrical resistance.*

ISO 8033:1991, *Rubber and plastics hose — Determination of adhesion between components.*

3 Types of hose

Six types of hose are specified:

Type 1: a hose with two steel-wire braids, dimensionally and constructionally in line with ISO 1436:1991, type 2A.

Type 2: a hose with two steel-wire braids, which is typical of that at present in use in many deep coal-mining installations. The dimensional parameters have been selected to provide increased reliability.

Type 3: a hose with four steel-wire spiral plies, dimensionally and constructionally in line with ISO 3862:1991, type 2.

Type 4: a hose with two steel-wire braids, dimensionally in line with type 2 but constructed to give higher maximum working pressure ratings.

Type 5: a hose with four steel-wire spiral plies, dimensionally and constructionally in line with ISO 3862:1991, type 5.

Type 6: a hose with four or six steel-wire spiral plies, designed for higher working pressures and temperatures than type 5.

4 Materials and construction

NOTE 1 This International Standard does not include requirements for end fittings. It is limited to the performance of hoses and hose assemblies.

4.1 The hose shall be anti-static and fire-resistant. The hose shall consist of an oil- and water-resistant synthetic-rubber lining, a steel-wire reinforcement and an oil-, water-, weather- and abrasion-resistant synthetic-rubber cover. A ply or braid of suitable textile material may be used over the lining and/or the wire reinforcement to anchor the synthetic rubber to the wire. Each braid or spiral wire layer shall be separated by an insulating layer of rubber.

4.2 The hose shall be concentric in accordance with the requirements of Table 1, when measured in accordance with ISO 4671.

5 Dimensions

The bore diameter, diameter over reinforcement and outside diameter of finished hose shall meet the requirements of Table 2 to Table 7 when measured in accordance with ISO 4671.

[1)] To be published. (Revision of ISO 1402:1984)

Table 1 — Hose concentricity

Values in millimetres

Nominal bore	Maximum variation from concentricity	
	Bore diameter to overall diameter	Bore diameter to reinforcement diameter
Up to and including 6,3	0,5	0,5
Over 6,3 and up to and including 25	0,7	0,7
Over 25	1,0	1,0

Table 2 — Hose dimensions: type 1

Dimensions in millimetres

Nominal bore	Bore diameter		Diameter over outer wire braid		Outside diameter of finished hose	
	min.	max.	min.	max.	min.	max.
5	4,5	5,4	10,6	11,7	15,1	16,7
6,3	6,1	7,0	12,1	13,3	16,7	18,3
10	9,3	10,1	16,1	17,3	20,6	22,2
12,5	12,3	13,5	19,0	20,6	23,8	25,4
16	15,4	16,7	22,2	23,8	27,0	28,6
19	18,6	19,8	26,2	27,8	31,0	32,6
25	25,0	26,4	34,1	35,7	38,5	40,9
31,5	31,3	33,0	43,3	45,7	49,2	52,4
38	37,7	39,3	49,6	52,0	55,6	58,8
51	50,4	52,0	62,3	64,7	68,2	71,4

Table 3 — Hose dimensions: type 2

Dimensions in millimetres

Nominal bore	Bore diameter		Diameter over outer wire braid		Outside diameter of finished hose	
	min.	max.	min.	max.	min.	max.
6,3	6,1	6,6	12,3	13,1	16,4	17,7
10	9,3	9,8	16,2	17,2	20,8	22,1
12,5	12,4	13,0	20,6	21,6	25,8	27,1
16	15,6	16,1	24,0	25,0	29,2	30,5
19	18,8	19,3	27,8	28,8	33,0	34,3
25	25,0	25,8	34,7	36,0	39,9	41,4
31,5	31,4	32,1	40,8	42,0	46,7	48,3

Table 4 — Hose dimensions: type 3

Dimensions in millimetres

Nominal bore	Bore diameter		Diameter over outer wire ply		Outside diameter of finished hose	
	min.	max.	min.	max.	min.	max.
6,3	6,2	7,0	14,1	15,3	17,1	18,7
10	9,3	10,1	16,9	18,1	20,6	22,2
12,5	12,3	13,5	19,4	21,0	23,8	25,4
16	15,5	16,7	23,0	24,6	27,4	29,0
19	18,6	19,8	27,4	29,0	33,0	33,4
25	25,0	26,4	34,5	36,1	38,5	40,9
31,5	31,4	33,0	45,0	47,0	49,2	52,4
38	37,7	39,3	51,4	53,4	55,6	58,8
51	50,4	52,0	64,3	67,3	68,2	71,4

Table 5 — Hose dimensions: type 4

Dimensions in millimetres

Nominal bore	Bore diameter		Diameter over outer wire braid		Outside diameter of finished hose	
	min.	max.	min.	max.	min.	max.
12,5	12,4	13,0	20,6	21,6	25,8	27,1
19	18,8	19,3	27,8	28,8	33,0	34,3
25	25,0	25,8	34,7	36,0	39,9	41,4
31,5	31,4	32,1	40,8	42,0	46,7	48,3
38	37,8	39,0	47,4	48,7	53,3	54,9
51	50,5	51,7	60,1	61,3	66,0	67,6

Table 6 — Hose dimensions: type 5

Dimensions in millimetres

Nominal bore	Bore diameter		Diameter over outer wire ply		Outside diameter of finished hose	
	min.	max.	min.	max.	min.	max.
12,5	12,3	13,5	21,8	23,4	24,6	26,2
19	18,6	19,8	27,6	29,2	31,4	33,0
25	25,0	26,4	34,4	36,0	37,5	39,9
31,5	31,4	33,0	40,9	42,9	43,9	47,1
38	37,7	39,3	47,8	49,8	51,9	55,1
51	50,4	52,0	62,2	64,2	66,5	69,7

Table 7 — Hose dimensions: type 6

Dimensions in millimetres

Nominal bore	Bore diameter		Diameter over outer wire ply		Outside diameter of finished hose	
	min.	max.	min.	max.	min.	max.
19	18,6	19,8	28,2	29,8	31,0	33,2
25	25,0	26,4	34,9	36,4	37,6	39,8
31,5	31,4	33,0	45,6	48,0	48,3	51,3
38	37,7	39,3	53,1	55,5	55,8	58,8
51	50,4	52,0	66,9	69,3	69,5	72,7

6 Pressure requirements

6.1 The maximum working pressure of the hose shall comply with the requirements of Table 8.

6.2 The hoses shall withstand without damage or failure a proof test pressure of twice the maximum working pressure given in Table 8 and maintained by the method described in ISO 1402.

6.3 The hoses shall be capable of achieving a minimum burst pressure of four times the maximum working pressure given in Table 8, when tested in accordance with the burst pressure test described in ISO 1402.

7 Minimum bend radius and change in length at maximum working pressure

7.1 The hose shall be capable of performing at maximum working pressure when curved to a radius not smaller than that given in Table 9.

NOTE 2 Should any portion of the hose be curved to a radius smaller than the specified bend radius, the performance capability of the hose is reduced.

7.2 The change in length at the maximum working pressure shall not be greater than $\binom{+2}{-4}$ % for all types, when measured in accordance with the change-in-length test described in ISO 1402.

Table 8 — Maximum working pressure

Nominal bore	Maximum working pressure											
	Type 1		Type 2		Type 3		Type 4		Type 5		Type 6	
mm	MPa	bar	MPa	bar	MPa	bar	MPa	bar	MPa	bar	MPa	bar
5	41,5	415	—	—	—	—	—	—	—	—	—	—
6,3	40,5	405	38,0	380	45,0	450	—	—	—	—	—	—
10	33,0	330	32,7	327	44,5	445	—	—	—	—	—	—
12,5	27,5	275	27,5	275	41,5	415	36,2	362	55,0	550	—	—
16	25,0	250	21,5	215	35,0	350	—	—	—	—	—	—
19	21,5	215	18,7	187	35,0	350	27,6	276	42,0	420	34,5	345
25	16,5	165	16,7	167	28,0	280	21,5	215	38,0	380	34,5	345
31,5	12,5	125	13,2	132	21,0	210	17,2	172	32,5	325	34,5	345
38	9,0	90	—	—	18,5	185	14,6	146	29,0	290	34,5	345
51	8,0	80	—	—	16,5	165	11,2	112	25,0	250	34,5	345

Table 9 — Minimum bend radius

Dimensions in millimetres

Nominal bore	Minimum bend radius				
	Type 1	Types 2 and 4	Type 3	Type 5	Type 6
5	90	—	—	—	—
6,3	100	100	150	—	—
10	130	130	180	—	—
12,5	180	150	230	200	—
16	200	190	250	—	—
19	240	230	300	280	240
25	300	300	340	350	305
31,5	420	380	460	455	420
38	500	450	560	560	510
51	630	600	660	710	635

8 Length of hose

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

8.2 When no specific lengths are ordered, the percentages of different lengths in any given bulk delivery shall be:

a) over 13 m: not less than 65 %

b) 7,5 m to 13 m: not more than 35 %

c) 1 m to 7,5 m: not more than 10 %

No length shall be less than 1 m.

9 Impulse test requirements

9.1 When tested in accordance with the requirements of ISO 6803 with the following parameters for test pressure:

types 1 to 5: 133 % of the maximum working pressure given in Table 8,

type 6: 120 % of the maximum working pressure given in Table 8,

hose assemblies shall withstand a minimum number of impulse cycles as follows:

type 1: 200 000 cycles,

types 2 and 4: 100 000 cycles,

types 3 and 5: 400 000 cycles,

type 6: 500 000 cycles.

9.2 The oil circulating in the hose assemblies under test shall be maintained at a temperature of

100 °C ± 5 °C for types 1, 3 and 5;

55 °C ± 5 °C for types 2 and 4;

121 °C ± 5 °C for type 6.

9.3 There shall be no leakage or other malfunction after the specified number of cycles.

Leakage at the end fitting, fitting blow-off or rupture of the hose adjacent to the fitting shall be considered as a failure of the assembly. Such failures do not necessarily demonstrate an inability of the hose to meet the specified requirements with an alternative fitting.

The mode and position of any failures shall be recorded.

In addition to being capable of meeting the impulse test described in **9.1**, 6,3 mm and 10 mm hose of type 2 shall also be capable of meeting the following impulse test:

When tested to an impulse pressure of 76,0 MPa (760 bar) (for 6,3 mm hose) or 65,5 MPa (655 bar) (for 10 mm hose) in accordance with ISO 6803, the hose shall be required to achieve 5 000 impulse cycles without failure.

Three additional test pieces shall be used for this test.

10 Cold-flexibility requirements

When tested in accordance with method B of ISO 4672:1988, 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 test after regaining ambient temperature.

11 Ozone resistance

When tested in accordance with ISO 7326, no cracking or deterioration of the cover shall be visible.

12 Oil resistance

The lining and the cover, when tested by the method described in ISO 1817, immersed in oil No. 3 for 72 h at a temperature of 100 °C, shall show no shrinkage and shall not show volume swelling greater than 100 % for the cover and 60 % for the lining.

13 Abrasion resistance

The cover of the hose, when tested by the method described in ISO 6945 using a vertical force of 50 N, shall have a maximum loss in mass of 1,0 g after 2 000 test cycles.

14 Electrical resistance

When tested in accordance with ISO 8031, the electrical resistance, as measured between the electrodes in the manner described, shall not exceed 2 MΩ/m.

Tests shall be made on five lengths of hose and all the test results shall be within the specified limit.

The statutory requirement of the national authority of a particular country for electrical resistance may be different from that quoted. In such cases, the requirement of the national authority shall apply.

15 Flame resistance

When tested in accordance with ISO 8030, the average time of persistence of flame or glow, after withdrawal of the flame, shall not exceed 30 s. Six test pieces of hose shall be tested and the average value calculated from the individual results.

The statutory requirement of the national authority of a particular country for flame resistance may be different from that quoted. In such cases, the requirement of the national authority shall apply.

16 Adhesion between components

When tested in accordance with ISO 8033, adhesion between lining and reinforcement and between reinforcement layers shall not be less than 2,5 kN/m.

Adhesion between cover and reinforcement shall not be less than 4,0 kN/m.

17 Marking

Hoses complying with this International Standard shall be marked with at least the following:

a) the number of this International Standard, i.e. ISO 6805;

b) the hose type;

c) the nominal bore size;

d) the manufacturer's name or trade-mark;

e) the date of manufacture, i.e. the month and last two digits of the year of manufacture, e.g. 10/94 (= October 1994);

f) the maximum working pressure.

Other information as agreed between the purchaser and the manufacturer may be included, if required.

blank

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

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

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL