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Gumeni cevni priključki za dotok in odtok nafte in naftnih derivatov - Specifikacija za priključke

Rubber hose assemblies for oil suction and discharge services - Specification for the assemblies

Gummischlauchleitungen für das Ansaugen und Fördern von Öl - Anforderungen an die Schlauchleitungen

Flexibles en caoutchouc pour chargement et déchargement des produits pétroliers - Spécifications pour les flexibles

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Contents

Foreword

This document (EN 1765:2004) 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of an identical text or by endorsement, at the latest by May 2005, and conflicting national standards shall be withdrawn at the latest by May 2005.

This document supersedes EN 1765:1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This document specifies minimum requirements for the satisfactory performance of wire or textile reinforced rubber hose assemblies of both smooth and rough bore types for oil suction and discharge services. The hoses are commonly used for transferring crude oil and liquid petroleum products, other than liquefied petroleum gas and natural gas, to and from tanker and bunkering vessels or for similar duties ashore.

Specific details of the construction of hoses are not rigidly defined in this document since it is felt that this could restrict the introduction of improved methods of construction. The hose assemblies have been classified and designated in terms of service pressure, which includes an allowance for surge pressure and which equates to the factory test pressure. To keep this specification in line with other documents this factory test pressure is also defined as the maximum working pressure (see Table 1). It is the responsibility of the user to determine the appropriate working pressure, which will depend on the severity of the user's operating conditions and on the service life that is expected of the hose assembly.

It is necessary for the purchaser to provide certain information about the hose assembly and its intended use at the time of enquiry and/or order; this information is listed in Annex A (informative). Recommendations concerning packaging and transportation are given in Annex B (informative) and expected masses of hoses, in kilograms per metre of free length, are given in Annex C (informative).

1 Scope

This document specifies the characteristics of four types of oil suction and discharge hose assemblies used for the conveyance of petroleum, including crude oils and other liquid petroleum products containing a maximum aromatics content of 50 % (*v/v*). It is not suitable for liquefied petroleum gas and natural gas.

Hose assemblies to this document can be used in the temperature range -20 °C to 82 °C.

The hoses specified are in the size range of nominal bore 50 to 500 and may be smooth bore, rough bore or armoured rough bore.

NOTE Hoses for use with petroleum products having an aromatic content greater than 50 % (*v/v*) are outside the scope of this document but the requirements may be used as a basis for such hoses on request to the manufacturer.

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 288-3:1992, *Specification and approval of welding procedures for metallic materials – Part 3: Welding procedure tests for arc welding of steels*

EN 22063, *Metallic and other inorganic coatings – Thermal spraying – Zinc, aluminium and their alloys (ISO 2063:1991, modified)*

EN 28033, *Rubber and plastics hose - Determination of adhesion between components (ISO 8033:1991)*

EN ISO 1402, *Rubber and plastics hoses and hose assemblies – Hydrostatic testing (ISO 1402:1994)*

EN ISO 1460, *Metallic coatings – Hot dip galvanized coatings on ferrous materials – Gravimetric determination of the mass per unit area (ISO 1460:1992).*

EN ISO 7233, *Rubber and plastics hoses and hose assemblies – Determination of suction resistance (ISO 7233:1991).*

EN ISO 8330:2000, *Rubber and plastics hoses and hose assemblies – Vocabulary (ISO 8330:1998).*

EN ISO 8031, *Rubber and plastic hoses and hose assemblies – Determination of electrical resistance (ISO 8031:1993).*

ISO 1431-1, *Rubber, vulcanized or thermoplastic – Resistance to ozone cracking – Part 1: Static strain test.*

ISO 1461, *Metallic coatings – Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods (ISO 1461:1999).*

ISO 1817, *Rubber, vulcanized – Determination of the effect of liquids.*

ISO 4649, *Rubber, vulcanized or thermoplastic – Determination of abrasion resistance using a rotating cylindrical drum device.*

ISO 7005-1, *Metallic flanges – Part 1: Steel flanges.*

ASME B.1.20.1, *Pipe threads, general purposes (inch).*

BS 3592-1, *Steel wire for hose reinforcement – Part 1: Specification for coated round and flat steel wire for rubber hose reinforcement.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 8330:2000 and the following apply.

3.1 Electrically bonded hose assembly

hose assembly that uses a metallic wire connection to create a low-resistance electrical connection between the end connections

3.2 Electrically discontinuous hose assembly

hose assembly that incorporates an electrical insulation between the end of the helical wire or/and wire cord reinforcement and on or both couplings

4 Classification

4.1 General

WARNING — Careful consideration needs to be given before the use of electrically discontinuous hoses for transferring liquids known to generate static charges. In no circumstances should more than one length of electrically discontinuous hose be used in an individual transfer pipeline and effective electrical continuity to earth from both ends of the electrically discontinuous hose should be maintained.

4.2 End – use

Hose assemblies for this application are classified according to end-use as follows:

- **Type R**, rough bore hose assemblies for dock operation and intended for situations where a relatively stiff, heavy and robust assembly can be used. The lining of the rubberized fabric is supported and reinforced by an internal (hot-dipped) zinc coated steel wire helix. Type R assemblies are electrically continuous;

- **Type A**, armoured rough bore hose assemblies for dock operation. In addition to an internal zinc coated steel wire helix there shall be external helical armour of a similar material. Type A hoses are electrically continuous and may be lighter and more flexible than type R;

- **Type S**, smooth bore hose assemblies for dock operation where flexibility and lightness are important. Type S hose assemblies may be electrically continuous or electrically discontinuous (see Warning);

- **Type L**, hose assemblies for dock service where greater flexibility, lower weight and ease of handling are of primary consideration. Type L hose assemblies may be electrically continuous or electrically discontinuous. They are only suitable for discharge applications (see Warning).

4.3 Pressure ratings and designations

Each type of hose assembly shall be designated according to the type letters R, A, S, or L followed by the maximum working pressure given in Table 1.

For the purposes of this document the maximum working pressure includes an allowance for surge pressures above the normal operating pressure.

Table 1 — Pressure ratings and designation

Maximum working pressure and test pressure bar[a]	Proof pressure (maximum 5 min.) bar	Type and designation	Description
7	10,5	R7	Rough bore
7	10,5	A7	Armoured rough bore
7	10,5	S7	Smooth bore
7	10,5	L7	Light weight
10	15	R10	Rough bore
10	15	A10	Armoured bore
10	15	S10	Smooth bore
10	15	L10	Lightweight
15	22,5	R15	Rough bore
15	22,5	A15	Armoured bore
15	22,5	S15	Smooth bore
15	22,5	L15	Lightweight
[a] 1 bar = 0,1 MPa			

5 Materials and construction

5.1 Materials

5.1.1 Lining

The rubber lining shall be resistant to the materials the assembly is to convey.

The hose lining shall be suitable for continuous operation with the liquids to be conveyed.

NOTE The purchaser should state the products that the assembly is to carry (see Annex A).

5.1.2 Reinforcing plies

The reinforcing plies shall consist of textile or wire cord impregnated with rubber.

Reinforcing wire cord shall be brass, copper or zinc coated carbon steel wire.

5.1.3 Wire helices

Wire helices shall be cold drawn carbon steel having sulphur and phosphorus contents each not greater than 0,040%, and coated with copper or phosphate and comply with the requirements given in BS 3592-1.

If joined, helical reinforcement wire shall be welded and shall conform to the following requirements:

a) welding shall be carried out using electric butt welding;

b) no weld shall be within 1,5 m of a nipple end or of another weld in the same wire neither along the hose length nor, in the case of two or more wire plies, nearer than 600 mm in adjacent wires.

5.1.4 Internal and armouring wire helices

Internal and armouring, round and flat steel wire shall be cold drawn coated steel having sulphur and phosphorus contents each not greater than 0,040 % and comply with the requirements given in BS 3592-Part 1.

5.1.5 Cover

The cover of synthetic rubber shall be resistant to abrasion, outdoor exposure and petroleum products, including fuel.

5.2 Construction

5.2.1 Type R: Electrically continuous

5.2.1.1 Hoses

Hoses shall comprise of:

a) an internal wire helix sunk into the inner wall of the hose;

NOTE An additional wire helix can be embedded into other layers.

b) at least one oil resistant rubber impregnated textile ply between the internal wire helix and the lining;

c) a lining of oil resistant rubber, conforming to the requirements given in 5.1.1;

d) plies of woven textile reinforcement or textile or wire cord;

e) an open weave breaker fabric;

f) an outer rubber cover conforming to the requirements given in 5.1.5.

5.2.1.2 Hose assemblies

The internal wire helix shall be connected to the nipple of the end connections by welding or brazing.

If an embedded wire helix is incorporated it shall be spiralled over the nipples to a point at least between the first and second bands and shall be finished off with at least two closed turns anchored together by welding or by clipping and soldering.

5.2.2 Type A: Electrically continuous

5.2.2.1 Hoses

Hoses shall comprise of:

a) an internal round wire helix;

b) a textile ply impregnated with rubber conforming to the requirements given in 5.1.2;

c) a rubber lining filler resistant to the product to be carried by the hose, (see Annex A) and conforming to the requirements given in 5.1.1;

d) plies of textile reinforcement thoroughly impregnated with rubber;

e) an outer rubber cover conforming to the requirements given in 5.1.5;

f) an external round wire armouring helix lying in the corrugations of the outer cover with no free movement in any direction when the hose is laid out straight and under no pressure. When pressed against the cover, the wires shall stand proud of the cover by a minimum of one-third of the diameter of the wire.

5.2.2.2 Hose assemblies

Where built-in nipples are used, the internal wire helix shall be spiralled over the nipples for at least 30 mm and shall be finished off with at least two close turns anchored together and attached to the nipple by welding or brazing.

The external wire helix shall be close pitched when wiring on top of the nipple except on the top of the nipple bands, where the wire may cross at open pitch and return to close pitch between bands.

Both ends of the wire helix shall be secured around the carcass of the hose by a number of close turns having a minimum axial length equal to three-quarters of the nominal size of the hose. These turns shall be fixed together by soldering, clipping, welding or a combination of these. The ends of the wire helix shall be bonded electrically to the nipple.

There shall be stepped stiffening layers of rubber-impregnated fabric overlapping the nipples.

5.2.3 Type S: Electrically continuous or electrically discontinuous

5.2.3.1 Hoses

Hoses shall comprise of:

a) a lining of rubber conforming to the requirements given in 5.1.1, which shall be smooth and reasonably free from scores or indentations and shall be flush with the nipples when built-in nipples are used;

b) an open weave textile breaker fabric thoroughly impregnated with rubber laid between the hose lining and the reinforcing plies and between the plies and the cover;

c) reinforcing plies of either woven textile or textile or wire cord thoroughly impregnated with rubber;

d) at least one helical wire embedded in a layer of rubber;

e) a smooth outer rubber cover conforming to the requirements given in 5.1.5.

5.2.3.2 Hose assemblies

The embedded wire helix (helices) shall be spiralled over the nipples to a point at least between the first and second bands and shall be finished off with at least two turns anchored together by soldering, clipping, welding or a combination of these.

Where built-in nipples are used for electrically continuous hose assemblies, the end of the wire helix shall be electrically bonded to the nipples by brazing, welding or by soldering a short of flexible bonding wire to the end of the helical wire and the nipple. For discontinuous hose assemblies see Clause 6.3.

5.2.4 Type L: Electrically continuous or electrically discontinuous

5.2.4.1 Hoses

Hoses shall comprise of:

a) a lining conforming to the requirements given in 5.1.1, which shall be smooth and reasonably free from scores or indentations and shall be substantially flush with the nipples when built-in nipples are used for assemblies;

b) a breaker fabric incorporated between the lining and reinforcement when fine wire reinforcement is used;

c) reinforcing plies of either textile or fine wire thoroughly impregnated with rubber; the ends of the hose adjacent to the nipples shall have extra reinforcement to reduce the flexibility of the hose/nipple junction; textile reinforcing plies shall incorporate at least two electrical bonding wires consisting of at least nine strands of wire having a high resistance to fatigue and continuous throughout the reinforcement;

d) a smooth outer rubber cover conforming to the requirements given in 5.1.5.

5.2.4.2 Hose assemblies

As this hose type is for discharge application only, the construction does not incorporate a wire helix and therefore requires no special instructions for attachment of the hose to the nipple of the fitting.

For electrically continuous assemblies the ends of the electrical bonding wire shall be in contact with the fitting nipples by means of a low resistance, corrosion protected connection. For discontinuous hose assemblies see Clause 6.3.

6 End connections

6.1 Nipples and flanges

Nipples and flanges shall be of steel or aluminium alloy (see Annex A).

Nipple tube, bands and other welded-on components shall conform to the requirements of EN 288- 3:1992, Table 3, Group 1 with a minimum yield stress of 205 N/mm^2, a minimum tensile strength of 331 N/mm^2 and a maximum carbon content of 0,23 %.

Nipples shall be screwed, with a thread conforming to ASME B.1.20.1, or flanged.

Flanges shall be normalized carbon steel forgings with a maximum carbon content of 0,25 % and, where fitted, shall be drilled in accordance with a standard drilling table relating to the purchaser's requirements and the pressure designation of the hose.

Flanges shall be attached to the nipple by screwing or welding or formed integral with the nipple. They shall be aligned with the nipple so that the deviation in any direction shall not exceed 1°.

The flange gasket contact surface shall be machine finished and conform to the requirements given in ISO 7005-1. They shall have a continuous spiral grove generated by a 1,6 mm radius round nose tool at a feed rate of 0,8 mm ± 0,01 mm per revolution.

The use of built-in swivel flanges is permitted when high flexibility and easy handling has been specified (see Annex A).

Flange protection coatings may be specified by the purchaser (see Annex A) but shall not be applied to the flange sealing surface nor the internal surfaces of the flange or nipple. Coatings may be applied either by galvanizing or aluminium or zinc spraying in accordance with the requirements given in EN 22063 to a nominal thickness of 100 μm, with no localized area being less than 75 μm.

Hot-dip coatings when applied shall conform to the requirements given in EN ISO 1460 and EN ISO 1461.

6.2 Method of attachment of end connections to the hose

For Types R, S and L, end fittings shall be either built-in during manufacture of the hose or shall be swaged.

For Type A, end fittings shall be built-in during manufacture, or swaged, or wired in, or strapped.

The exterior of the hose over built-in nipples shall taper smoothly into the body of the hose and no outside bands or clips shall be fitted. The design of the hose body shall be such that threaded bolts appropriate to the flange can be inserted into the flange.

NOTE For types S and L see clauses 6.3 and 6.4.