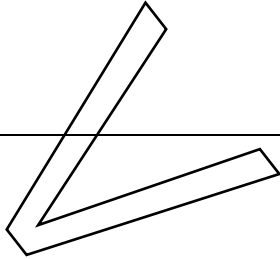


norm

NEN-ISO 15840 (en)

Ships and marine technology - Standard specification for thermosetting resin fibreglass pipe and fittings to be used for marine applications
(ISO 15840:2004, IDT)

april 2004
ICS 47.020.30; 83.140.30



Als Nederlandse norm is aanvaard:

- ISO 15840:2004, IDT

Normcommissie 345 040 "Schepen en maritieme techniek"

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Preview

ISO 15840

**Ships and marine technology — Standard
specification for thermosetting resin
fibreglass pipe and fittings to be used for
marine applications**

*Navires et technologie maritime — Spécification normalisée pour les
tuyaux et raccords en résine thermodurcissable avec renforcement en
fibre de verre pour des applications maritimes*



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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.

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ISO 15840 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 3, *Piping and machinery*.

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Preview

Ships and marine technology — Standard specification for thermosetting resin fibreglass pipe and fittings to be used for marine applications

1 Scope

This International Standard applies to reinforced thermosetting resin pipe systems with nominal diameter (DN) 0 through 1 200 mm and nominal pipe sizes (NPS) 0 through 48, which are to be used in marine piping systems.

Values stated in SI units are to be regarded as the standard. Values given in English units are for information only.

The dimensionless designators DN and NPS have been substituted for traditional terms such as “nominal diameter”, “size”, and “nominal size”.

The following safety hazard caveat pertains to the test methods that are included in this International Standard. This standard does not purport to address all of the safety concerns associated with its use.

SAFETY PRECAUTIONS — It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

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.

American Society of Mechanical Engineers (ASME) B16.1:1998, *Cast Iron Pipe Flanges and Flanged Fittings*

American Society of Mechanical Engineers (ASME) B16.5:1996, *Pipe Flanges and Flanged Fittings*

American Society for Testing and Materials (ASTM) D883, *Standard Terminology Relating to Plastics*

ASTM D1598, *Standard Test Method for Time-To-Failure of Plastic Pipe Under Constant Internal Pressure*

ASTM D1599, *Standard Test Method for Resistance to Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings*

ASTM D2310, *Standard Classification for Machine-Made Fibreglass (Glass-Fibre-Reinforced Thermosetting-Resin) Pipe*

ASTM D2583, *Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor*

ASTM D2584, *Standard Test Method for Ignition Loss of Cured Reinforced Resins*

ASTM D2924, *Standard Test Method for External Pressure Resistance of Fibreglass (Glass-Fibre-Reinforced Thermosetting-Resin) Pipe*

ASTM D2992: 2001, *Standard Practice for Obtaining Hydrostatic or Pressure Design Basis for Fibreglass (Glass-Fibre-Reinforced Thermosetting-Resin) Pipe and Fittings*

ASTM D3567, *Standard Practice for Determining Dimensions of Fibreglass (Glass-Fibre-Reinforced Thermosetting Resin) Pipe and Fittings*

ASTM E1529: 2000, *Standard Test Methods for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies*

ASTM F412, *Standard Terminology Relating to Plastic Piping Systems*

International Maritime Organisation (IMO), *International Convention for the Safety of Life at Sea (SOLAS)*

International Maritime Organisation (IMO) Resolution A.753 (18), *Guidelines for the Application of Plastic Pipes on Ships*

IMO Resolution MSC.61 (67), *International Code for Application of Fire Test Procedures*

ISO 75-1:—¹⁾, *Plastics — Determination of temperature of deflection under load — Part 1: General test method*

ISO 75-2:—²⁾, *Plastics — Determination of temperature of deflection under load — Part 2: Plastics and ebonite*

ISO 4901, *Reinforced plastics based on unsaturated polyester resins — Determination of residual styrene monomer content*

ISO 9001:2000, *Quality management systems — Requirements*

ISO 11357-2 *Plastics — Differential scanning calorimetry (DSC) — Part 2: Determination of glass transition temperature*

National Sanitation Foundation (NSF) International, *Standard 61 Drinking Water System Components — Health Effects*

United Kingdom Health and Safety Executive (HSE) Offshore Technology Report (OTI) 95 634, *Jet-Fire Resistance Test of Passive Fire Protection Materials*

United States Code of Federal Regulations (CFR), Title 21 — Food and Drugs, Sections 175.105, 177.2280, 177.2410 and 177.2420.

United States CFR, Title 46 — Shipping

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ASTM D383 and ASTM F412 and the following apply.

3.1

continuously conductive

pipe and fittings made conductive using continuous conductive filaments, liners or layers

1) To be published. Revision of ISO 75-1:1993.

2) To be published. Revision of ISO 75-2:1992.

3.2**homogeneously conductive**

pipe and fittings made conductive using a resin additive so that conductivity is maintained between any two points on the pipe or fitting

NOTE For conveying non-conducting fluids (those having conductance less than 1 000 picosiemens per metre), pipe systems which are homogeneously conductive or have conductivity from the inside surface to the outside surface are recommended.

3.3**maximum operating pressure**

highest pressure that can exist in a system or subsystem under normal operating conditions

3.4**non-conducting fluid**

fluid having conductance less than 1 000 picosiemens per metre

3.5**representative piping system**

system composed of a single manufacturer's pipes, fittings, joints and adhesives that would normally be used by a customer or installer

4 Classification**4.1 General**

Pipe and fittings are to be classified using the system described in 4.2 through 4.6, which are similar to the requirements of ASTM D2810 for pipe.

4.2 Types

The following are pipe and fitting types:

- a) Type I — Filament wound
- b) Type II — Centrifugally cast
- c) Type III — Moulded (fittings only)

4.3 Resin

The following are examples of resin classifications:

- a) Resin 1 — Epoxy resin
- b) Resin 2 — Vinylester resin
- c) Resin 3 — Polyester resin
- d) Resin 4 — Phenolic resin
- e) Resin 5 — Customer-specified resin

4.4 Class

The following represent class types:

- a) Class A — No liner
- b) Class B — Reinforced liner
- c) Class C — Non-reinforced liner

4.5 Pressure rating (see Annex A)

The following are examples of pressure test classifications:

- a) Rating Method 1 — Short-term test
- b) Rating Method 2 — Medium-term (1 000 h) test
- c) Rating Method 3 — Long-term (10 000 h) test
- d) Rating Method 4 — Long-term (10 000 h) regression test

4.6 Fire endurance (see Annex B)

4.6.1 Fluid

The following fluid types are specified for fire endurance testing:

- a) Fluid E — Empty
- b) Fluid EF — Initially empty for 5 min, followed by flowing water. [Fluid velocity of 1 m/s (3 ft/s) maximum during qualification test.]
- c) Fluid S — Stagnant water

4.6.2 Fire type

The following represent types of fire test:

- a) Fire Type JF — Jet fire with heat flux between 300 kW/m² and 400 kW/m² (95 100 Btu/h/ft² and 126 800 Btu/h/ft²)
- b) Fire Type IF — Impinging flame with heat flux of 113,5 kW/m² (36 011 Btu/hr/ft²)
- c) Fire Type HF — Hydrocarbon furnace test at 1 100 °C (2 012 °F).

4.6.3 Integrity

The following represent various classifications of piping integrity:

- a) Integrity A — No leakage during or after test
- b) Integrity B — No leakage during fire test except a slight weeping may be accepted. Capable of maintaining rated pressure for a minimum of 15 min with a leakage rate of 0,2 l/min (0,05 gal/min) after cooling.
- c) Integrity C — Minimal or no leakage [less than or equal to 0,5 l/min (0,13 gal/min)] during fire test. Capable of maintaining rated pressure with a customer-specified leakage rate after cooling.

4.6.4 Duration

The duration of the test shall be expressed in minutes and shall be specified or approved by the authority having jurisdiction.

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