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Ships and marine technology — Fire resistance of non-metallic hose assemblies and non-metallic compensators — Requirements for the test bench

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15541 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 3, *Piping and machinery*.

Introduction

The main objective of the test using the test bench described in this International Standard is to determine whether and for a safety period a non-metallic hose assembly or non-metallic compensator can be exposed to fire, without becoming inoperable, when subjected to the envisaged working pressure. Despite the fact that the attacking fire is simulated so as to correspond to a fire occurring in practice, it cannot be assumed that the duration of resistance to fire as recorded during that test will also occur in the event of an actual fire, as the conditions of installation, which essentially affect to the duration of resistance to fire, may vary from case to case.

Test carried out using the test bench specified in this International Standard are intended to lead to results capable of being reproduced.

Ships and marine technology — Fire resistance of non-metallic hose assemblies and non-metallic compensators — Requirements for the test bench

1 Scope

This International Standard specifies requirements for a test bench to determine the fire resistance of non-metallic hose assemblies and non-metallic compensators with nominal diameter up to 150 mm. It may be used for bigger sizes provided proper test bench conditions are obtained. During the exposure to flames, there are possible working pressures of up to 16 bar.

The flame spread ability of non-metallic hose assemblies or non-metallic compensators cannot be tested with the test bench specified in this International Standard.

Only water is permitted as a test medium. With a view to ensuring maximum safety for both the operating personnel and the test bench in the event of damage of the non-metallic hose assembly or non-metallic compensator during the test, the use of combustible test media is excluded.

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.

ISO 15540:2015, *Ships and marine technology — Fire resistance of non-metallic hose assemblies and non-metallic compensators — Test methods*

IEC 60051-1:1997, *Direct acting indicating analogue electrical measuring instruments and their accessories — Part 1: Definitions and general requirements common to all parts*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
fire resistance
ability of an element of building construction, component or structure, to fulfill for a stated period of time the required stability, integrity, thermal insulation and/or other expected duty specified, in a standard fire resistance test

4 Requirements

4.1 Components of test bench

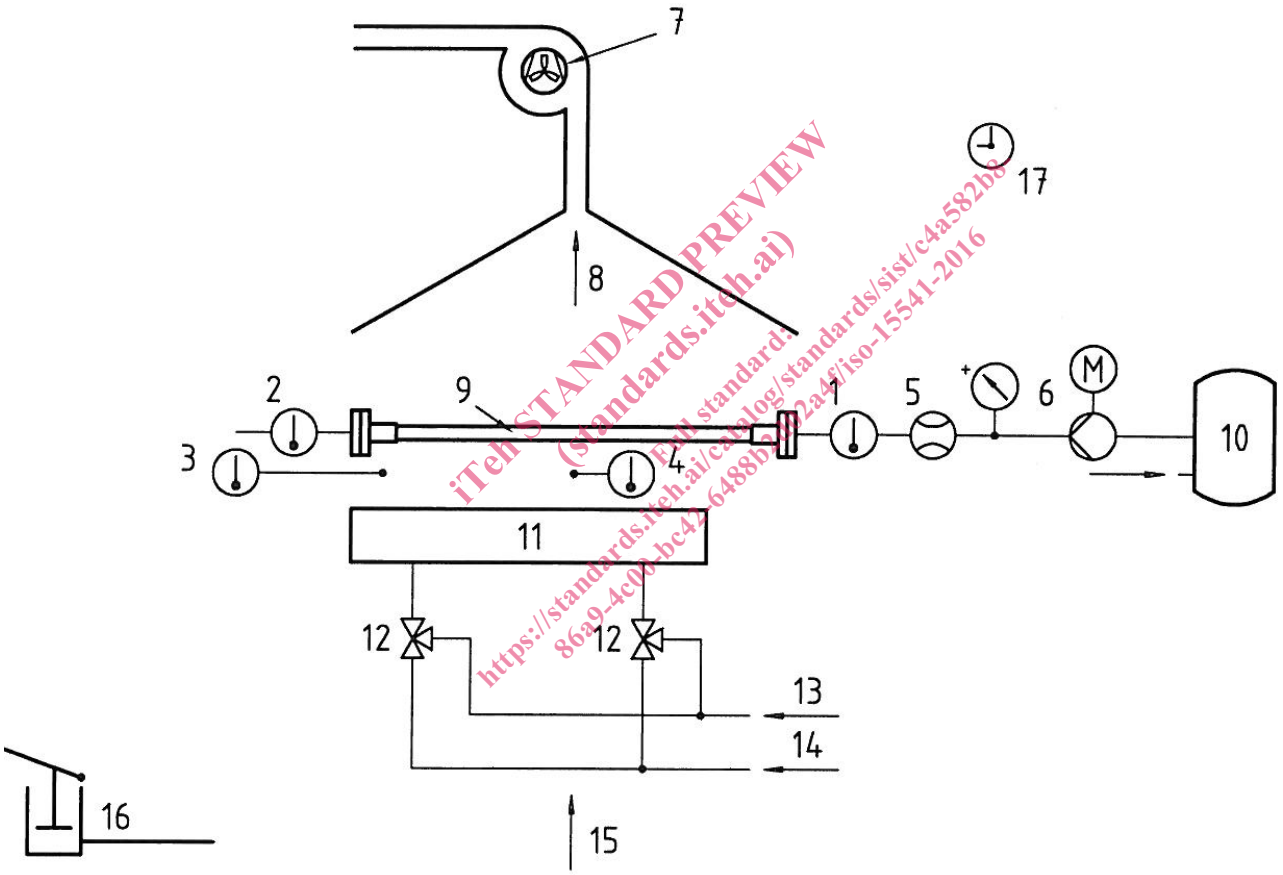
The test bench shall consist of the following parts (see Figure 1):

— burner chamber with connecting device for the test specimens, burner and exhaust gas trunk (refer to parameters 4.2);

— aggregate box with equipment for conditioning and controlling the test medium (see 4.3);

— equipment for monitoring and recording the test procedure (see 4.4);

— pressure-producing equipment which can load the test specimen at the end of flame application with the test pressure as specified in the technical specification (see 4.5).



Key

Indication, measurement, recording, control and adjustments

1 measuring point water temperature of test medium, inlet
2 measuring point water temperature of test medium, outlet
3 measuring point flame temperature below test specimen outlet
4 measuring point flame temperature below centre of test specimen
5 flow rate of water
6 working pressure during test
7 fan
8 exhaust gas
9 test specimen
10 water tank with heating/cooling
11 sectional area burner
12 mixing valve
13 gas
14 combustion air
15 air supply
16 pump for pressure test
17 test duration

Figure 1 — Diagram of test bench

4.2 Burner chamber

4.2.1 General

The connections of the test specimen shall be arranged to an operating height (e.g. 1 000 mm). They shall enable testing of hose assemblies with a free length of hose of 500 mm minimum and non-metallic compensators of varying length and shapes. A steady air flow upwards shall be provided. The base area of the air supply shall be approximately 0,6 m^2.

An example of an arrangement of a burner chamber is shown in Annex A, Figure A.1 and Figure A.2.

4.2.2 Burner

The total sectional area of the burner shall be 150 mm × 500 mm minimum. The sectional area can consist of several single-area burner units. The burner shall be sized to cover both end fittings of non-metallic compensators as required by ISO 15540, clause 7.1.

Burners with a minimum of 20 nozzles per square decimetre shall be used.

Burners shall be of the fan type or atmospheric type.

Each single area burner unit shall be provided with a mixing valve for mixing the gas and the combustion air, creating a flame of (800 ± 50) °C, at measuring points 3 and 4 of Figure 1. Flame appearance shall be according to Annex A, Figure A.1 and Figure A.2.

The burner should be movable to avoid exposing the test specimen to the flames during adjustment of the flame.

The burner shall be variable in height in order that the flame can envelop test specimens of all possible nominal diameters. Temperatures measured, (15^{+5}_{0}) mm directly under the test specimen shall be (800 ± 50) °C.

4.2.3 Exhaust trunk

The exhaust gas shall be drawn off upwards by means of an exhaust fan. The fan shall be infinitely variable. The upward air flow shall produce a directed flame.

Environmental restrictions according to local law shall be taken into consideration.

4.2.4 Coolant circuit

For controlling the coolant circuit, shut-off valves and measuring instruments shall be provided in the coolant supply and drain line.

4.3 Aggregate box

Heating and cooling arrangements shall be provided for supplying the test specimen with water of (80 ± 2) °C at the test specimen inlet.

The installation shall provide an adjustable water velocity of at least 0,1 m/s in the test specimen and constant pressure of at least (5 ± 0,2) bars up to the maximum allowable working pressure (M.A.W.P.) of the test specimen.