INTERNATIONAL STANDARD

ISO 15540

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Ships and marine technology — Fire resistance of hose assemblies — Test methods

Navires et technologie marine — Résistance au feu des tuyauteries — Méthodes d'essais

Reference number
ISO 15540:1999(E)

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 3.

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 15540 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 3, *Piping and machinery*.

Annex A forms a normative part of this International Standard.

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Introduction

The main objective of the test described in this International Standard is to determine whether and for how long a hose assembly can be exposed to fire, without becoming inoperable, e.g. without becoming untight 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 the test will also occur in the event of an actual fire, as the conditions of installation, which essentially affect the duration of resistance to fire, may vary from case to case.

When carried out using the test bench specified in ISO 15541, the test procedure according to this International Standard is intended to lead to results capable of being reproduced.

A specimen test certificate is specified in normative annex A.

Ships and marine technology — Fire resistance of hose assemblies — Test methods

1 Scope

This International Standard specifies a test procedure for determining the fire resistance of hose assemblies with nominal diameters of at least 100 mm.

It serves for proving whether, after the period of fire effect on the test bench specified in ISO 15541, hose assemblies continue to be tight, even when subjected to proof pressure.

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

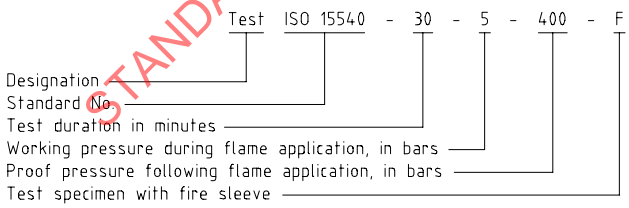
2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 15541:1999, *Ships and marine technology — Fire resistance of hose assemblies — Requirements for the test bench*.

3 Designation

The designation of the test for determining the fire resistance is composed of the elements quoted in the example below:



4 Test specimen and specimen preparation

Hose assemblies with a hose length of at least 500 mm shall be used as test specimens.

The orderer and operator of the test bench shall agree which fitting types shall be used for the test.

The test specimens may be tested either with or without fire sleeves subject to agreement; identification letter B for tests without fire sleeves, identification letter F for tests with fire sleeves.

Prior to the test, the test specimens shall be stored at ambient temperature for 24 h.

5 Number of test specimens

The tests shall be carried out on a minimum of three hose assemblies of different nominal diameters, but of identical hose construction. The smallest, the middle and the largest nominal diameter of each series shall be tested.

6 Test bench

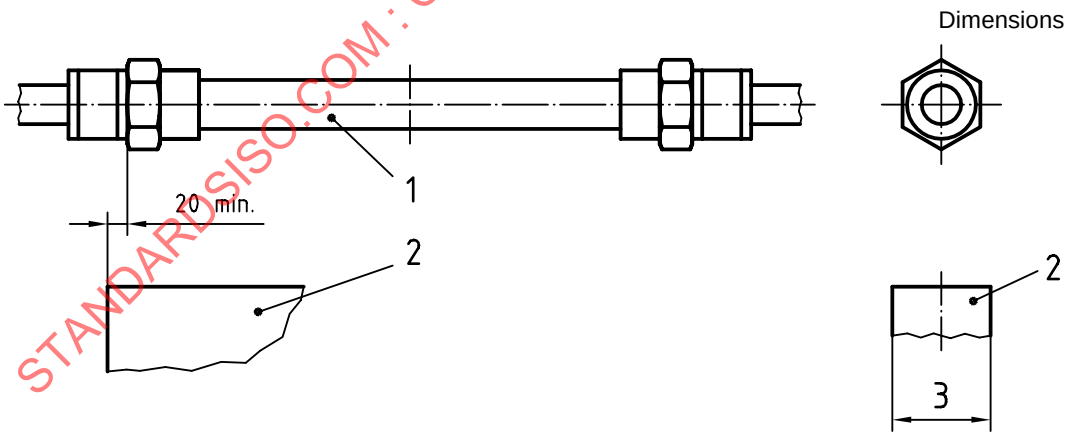
The tests shall be carried out on a test bench according to ISO 15541.

7 Test performance

7.1 Installation of test specimen

The test specimens shall be installed on the test bench such that the burner end extends beyond a hose fitting by at least 20 mm such that the fitting is completely enclosed by the flames (see Figure 1).

The test specimens shall be centred above the burner surface (see Figure 1).



Key

1 Test specimen
2 Burner
3 Burner width

Figure 1 — Test specimen arrangement

7.2 Burner width

In order to ensure that the flames reliably enclose the test specimen, the minimum burner widths shown in Table 1 shall be observed.

Table 1 — Burner width

Minimum width of burner mm	Outside diameter of hose mm
50	up to 25
100	over 25 up to 75
150	over 75 up to 125
200	over 125 up to 150
250	over 150 up to 200

7.3 Preparation

Following installation, the test specimens shall be rinsed with the test medium water for at least 1 min, in order to evacuate as far as possible the air contained in the test specimen.

7.4 Measured values and measuring points

The following measured values shall be determined at the measuring points indicated in Figure 2:

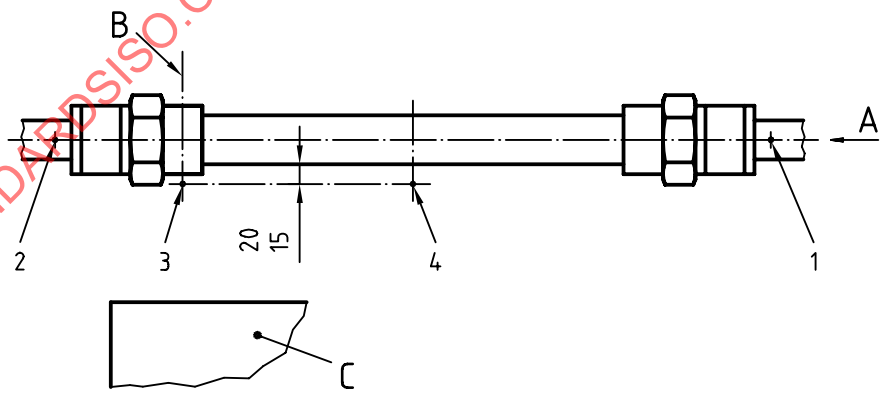
— water temperature at measuring points 1 and 2;

— flame temperature at measuring points 3 and 4;

— flow rate of water;

— pressure inside test specimen during the flame application.

Dimensions in millimetres



Key

A Flow direction
B Centre of socket
C Burner

Figure 2 — Temperature measuring points

7.5 Temperature during flame application

The test duration starts at the moment the test specimen is exposed to the test temperature (flame temperature), which shall have been reached at both measuring points.

The temperatures according to Table 2 shall be observed. In order to ensure the water temperatures indicated, the velocity of flow shall be controlled accordingly.

Table 2 — Temperatures

Temperature of flowing water at	temperature measuring point 1	(80 ± 2) °C
	temperature measuring point 2	max. 85 °C
Temperature of flame at temperature measuring points 3 and 4 during test		(800 ± 50) °C
NOTE For temperature measuring points, see Figure 3.		

7.6 Pressure during flame application

The test specimen shall be subjected to a working pressure of (5 ± 0,2) bar as provided for the test.

NOTE Any deviating working pressures shall be agreed on.

7.7 Duration of test

The duration of the test is 30 min. The duration starts at the moment the test specimen is exposed to the test temperature (flame temperature), which shall have been reached at both measuring points.

NOTE Any deviating durations of test shall be agreed on.

7.8 Proof pressure application

Following flame application, the test specimen shall be subjected at ambient temperature to proof pressure stipulated by the applicable hose/hose assembly standard or other technical specifications for 2 min.

8 Assessment

The test is considered as passed when the test specimen remains tight when subjected to proof pressure after flame application.

In the event of a test specimen failing, the test shall be repeated on two specimens of the nominal diameter having failed. If one specimen fails during the repeat test, the hose assembly of the design presented for testing will be regarded as having failed.

If the test specimens pass the test successfully, the hose assembly of the design presented for testing will be approved, i.e. from the smallest up to the largest nominal diameter of the series.

9 Test certificate

The test results shall be certified in a test certificate as shown in the specimen in normative annex A.