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Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test methods to prove the design of cemented or wrapped joints

Tubes et raccords en plastiques thermodurcissables renforcés de verre (PRV) — Méthodes d'essai pour confirmer la conception des assemblages scellés ou enrobés

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Foreword

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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.

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ISO 8533 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 6, *Reinforced plastics pipes and fittings for all applications*.

Introduction

In a pipework system, pipes and fittings of different nominal pressures and stiffness may be used.

A joint may be made between pipes and/or fittings and should be designed such that its performance is equal to or better than the requirements of the pipeline, but not necessarily of the components being joined.

The requirements for the assembly of the joint are not included in this standard, but they should be in accordance with the manufacturer's recommendations.

Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test methods to prove the design of cemented or wrapped joints

1 Scope

This International Standard specifies methods of test for cemented or wrapped joints for plastics piping systems made of glass-reinforced thermosetting plastics (GRP) for buried and non-buried pipelines. This standard is only applicable to the joint and covers methods of test to prove its design. It assumes that the joint either is or is not intended to be subject to the effects of hydrostatic end thrust.

The tests detailed in 7.1 to 7.6 inclusive are applicable to cemented or wrapped joints intended to be used in either buried or non-buried applications. The bending tests detailed in 7.4 can be used to prove the design where joints are either intended to be used in buried applications or are intended to be used in particular above-ground situations where the tests may be considered appropriate.

With the exception of 7.4 these test procedures are applicable to joints between pipes and fittings of all nominal sizes. The tests detailed in 7.4 are applicable to joints between pipes and fittings up to and including DN 600. The tests are applicable to the evaluation of joints intended for the conveyance of liquids at temperatures specified in the referring standards (see Clause 2).

2 Principle

A joint is subjected to a specified internal pressure and, if applicable, longitudinal loading. The procedure includes prolonged static tests at elevated pressures and cyclic testing.

A joint is subjected to a specified internal negative pressure. This also simulates an external positive pressure.

NOTE 1 The only reason for testing the resistance to external pressure differential is to ensure adequate safety against infiltration of pollutants through the joint into the fluid carried in the piping system. Under these test conditions pipes with low stiffness may require support to prevent buckling.

A series of tests that are performed under bending is included.

At the end of each of the tests the joint is inspected for signs of leakage and damage and, unless otherwise specified, if either has occurred then the joint has failed.

If the joint is to be used in systems where the maximum operating temperature is higher than the value given in the referring standard the test conditions can be modified accordingly.

NOTE 2 It is assumed that the following test parameters are set by the standard making reference to this standard:

a) length, L, of the assembled test piece (see 4.1);

b) number of test pieces to be used (see 4.2);

c) if applicable, conditioning other than as given in Clause 5;

d) test temperature and its permissible deviations (see Clause 6);

e) nominal pressure relevant to the joint under test (see 4.1 and Clause 7, as well as the introduction to this standard);

f) if applicable, any criteria indicative of damage to the joint components [see Clause 7 and item j) of Clause 8];

g) whether the joint is or is not to be tested with end loads;

h) acceptable increase in pressure over 1 h for an external pressure differential test (see 7.2).

3 Apparatus

3.1 End-sealing devices

End-sealing devices shall be of a size and type appropriate to the joint system under test.

3.1.1 Capable of applying the end loads

If the joint is to be tested with the end load [see item g) of Note 2 of Clause 2] then the end-sealing devices shall be anchored to the pipes to transmit the end thrust loads.

3.1.2 Not capable of applying the end loads

If the joint is to be tested without the end load [see item g) of Note 2 of Clause 2 and 7.6] then the end-sealing devices shall not be anchored to the pipes.

3.2 Supports

3.2.1 End thrust supports

If required, the end thrust supports shall comprise part of the rig and shall be capable of supporting the end thrust induced by the internal pressure but shall not otherwise support the joint [see 7.6 and Figure 1b), item 3].

3.2.2 Straps and cradles

Straps or cradles for use as supports shall be of sufficient width for the pipe components of the test piece (see Figure 2) and shall not have a detrimental effect on the test piece, e.g. shall not apply point loads.

3.2.3 Special supports

Special supports may be used to prevent buckling of the pipe barrel during external pressure differential testing (see 7.2).

3.3 Source of hydrostatic pressure

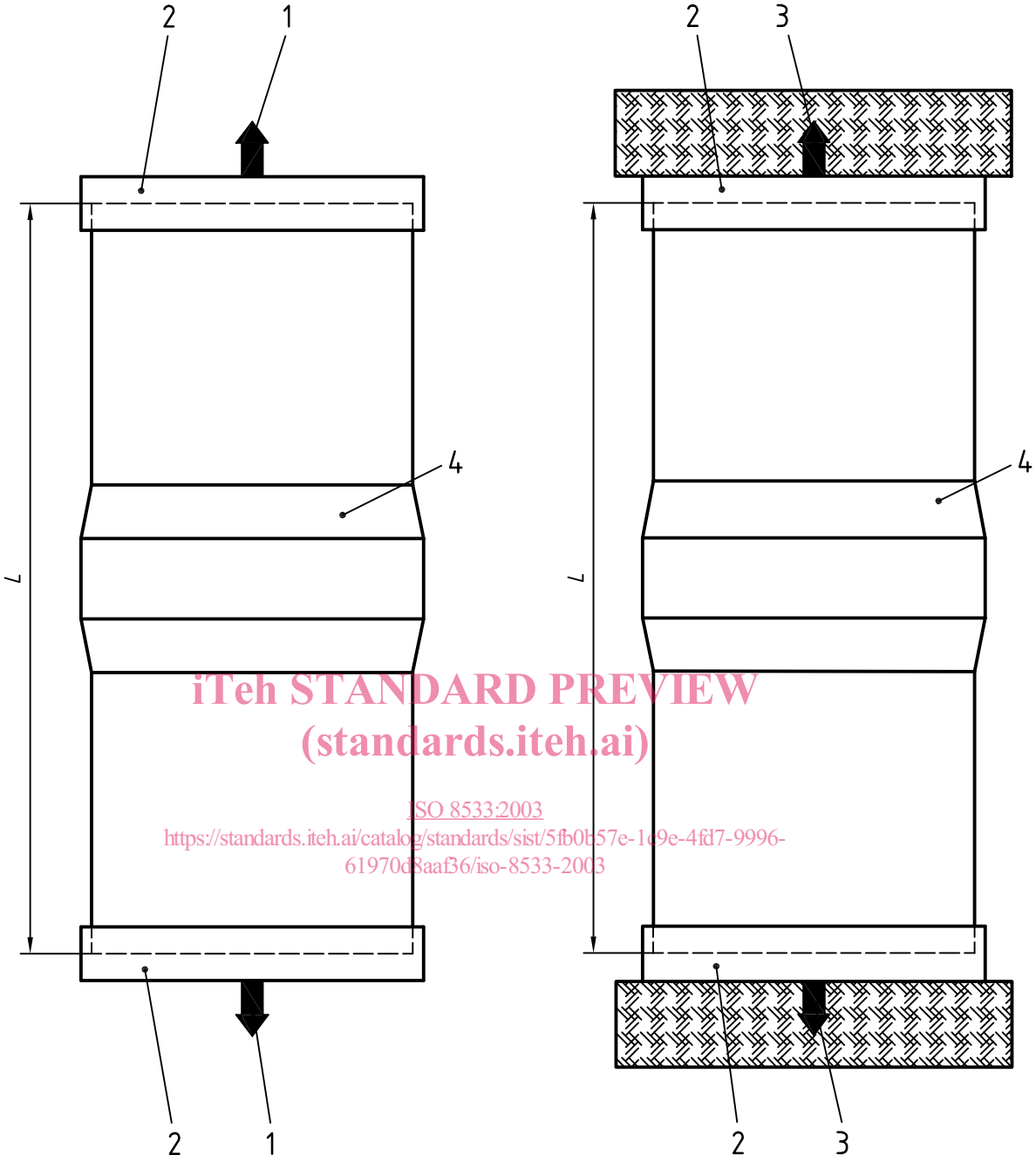
A source of hydrostatic pressure capable of meeting the needs of the test.

3.4 Means of measuring the gauge pressure

A means of measuring the gauge pressure at the top of the pipe to an accuracy within ± 1 % and checking conformity to the specified pressures (see 7.2, 7.3, 7.4 and 7.5).

3.5 Vacuum pump or equivalent

A vacuum pump or equivalent capable of applying the required negative gauge pressure (see 7.2).



a) Arrangement with end loads **b) Arrangement without end loads**

Key

1 thrust carried by test piece
2 end-sealing device
3 thrust carried by test rig
4 joint being tested
L length of the assembly

Figure 1 — Typical test arrangements for the tests detailed in 7.2, 7.3 and 7.5