FINAL
DRAFT

INTERNATIONAL
STANDARD

**ISO/FDIS
8639**

ISO/TC **138**/SC **6**

Secretariat: ASI

Voting begins on:
2015-10-27

Voting terminates on:
2015-12-27

Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test methods for leaktightness and proof of structural design of flexible joints

Tubes et raccords en plastiques thermodurcissables renforcés de verre (PRV) — Méthodes d'essai pour l'étanchéité et preuve de conception structurelle de joint flexible

Reference number
ISO/FDIS 8639:2015(E)

COPYRIGHT PROTECTED DOCUMENT

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

Contents

Page

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. www.iso.org/patents

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 6, *Reinforced plastics pipes and fittings for all applications*.

This second edition cancels and replaces the first edition (ISO 8639:2000), which has been technically revised. The modifications are:

— changed title and scope to cover the proof of structural design of flexible joints;

— changed scope to mention that the test procedure is a destructive test;

— changed testing sequences from mandatory to suggested;

— changed wording from misalignment to deformation;

— clarified support conditions;

— additional test sequence for the proof of the structural design (Clause 8);

— changes in Table 1 with additional testing sequences for the proof of the structural design of flexible joints;

Introduction

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

Any joint made between pipes and/or fittings 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 assembly of the joint are not included in this International Standard, but they should be in accordance with the manufacturer's recommendations.

The material-dependent parameters and/or performance requirements are stated in the referring specification.

Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test methods for leaktightness and proof of structural design of flexible joints

1 Scope

This International Standard specifies test methods for flexible non-thrust resistant socket-and-spigot joints with elastomeric sealing elements for buried and above ground glass-reinforced thermosetting plastics (GRP) pipeline applications. It covers methods of test for the leaktightness and resistance to damage of the joint only, when subject to specified combinations of longitudinal extension (draw), angular movement (angular deflection), compression (deformation) perpendicular to the pipe axis and internal pressure. This International Standard is applicable to joints for either pressure or non-pressure applications.

NOTE The joints tested in accordance with this International Standard are subjected to conditions which measure their ability to function and thereby prove the design of the joint, especially for type test purposes.

These test procedures are applicable to joints for pipes and fittings of all nominal sizes. The tests are suitable for the evaluation of joints intended for applications in which the liquids are conveyed at temperatures specified in the referring standards.

The test procedures in this International Standard are damaging to the test piece which will not be suitable for reuse after these tests. The test procedure shall be applied for type testing purposes.

2 Terms and definitions

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

2.1
pressure
hydrostatic gage pressure

2.2
angular deflection
angle between the axes of the joint and the consecutive pipe(s), expressed in degrees (°)

2.3
draw
longitudinal movement of the pipe relative to the socket (joint), expressed in millimetres (mm)

2.4
total draw
sum of the draw, and the additional longitudinal movement, of joint components due to the presence of angular deflection, expressed in millimetres (mm)

2.5
deformation
pipe deformation in the coupling as a result of a vertical force on the pipe and a supported coupling causing a step between the two pipe spigots at the loading position in millimeters (mm)

3 Principle

A test piece comprising two pieces of pipe jointed together, by incorporation of a socket or inclusion of a double-socket coupler, is subjected to specified combinations of draw, angular deflection and

deformation. In each specified combination the test piece is subjected to a series of test pressures for specified periods of time, including an internal sub-atmospheric test pressure.

In addition, a test at elevated positive static pressure is conducted to prove the structural design of the coupling.

When under pressure, the joint is monitored for leakage.

Between each test condition (see Table 1) the joint is inspected for signs of damage.

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

— the nominal size of the components to be connected by the joint (see 5.1);

— the pressure class of the components (see 5.1);

— the total effective length, *L*, of the test piece (see 5.1);

— the number of test pieces (see 5.2);

— if applicable, the conditioning to be applied (see Clause 6);

— the test temperature (see Clause 7);

— sequence of testing, if appropriate (see 8.1);

— the joint positions (see Table 1);

— the draw, angular deflection (see 8.3) and the force, *F* (see 8.4);

— the permissible change in negative pressure (see 8.2.3).

4 Apparatus

4.1 End-sealing devices

End sealing devices, of sizes and type appropriate to the components under test, anchored to take the axial end thrust and permit free longitudinal movement.

4.2 Supports and restraints

4.2.1 Longitudinal supports, capable of supporting the end thrust induced by the internal pressure but which shall not otherwise support the joint (see Figure 1, Figure 2 and Figure 3).

4.2.2 Straps or cradles, (100 ± 5) mm wide supporting an 180° arc of the pipe barrel or of the socket (see Figure 3).

The use is as follows:

a) a strap, cradle or support, to support the socket on a fixed base, as required for deformation testing (see 8.4);

b) a strap or cradle, positioned adjacent to the end of the joint being tested (see Figure 3), through which the force *F* necessary for deformation testing (see 8.4) can be applied;

The straps or cradles shall not have a detrimental effect on the test piece, e.g. point loads.

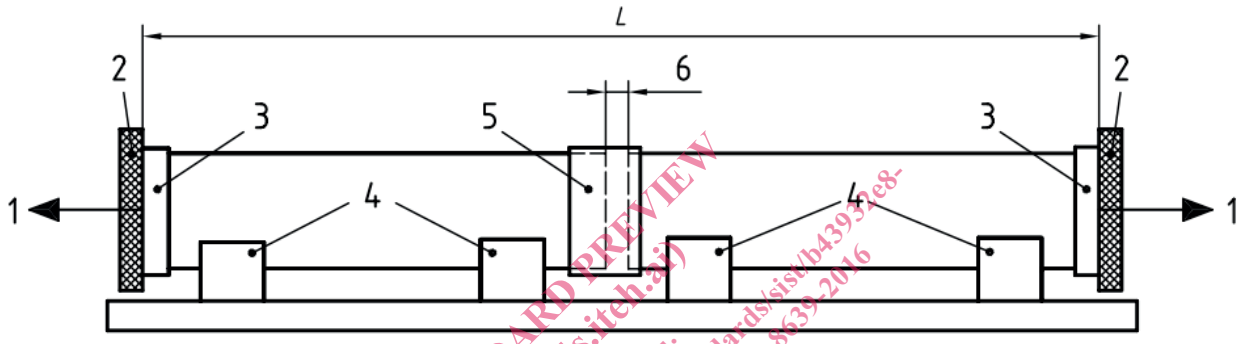
4.2.3 Pipe supports, capable of supporting an arc of approximately 120° of the pipe barrel (see Figure 1, 2 and 3) for use as follows:

a) support *R*, positioned at least 500 mm from the spigot end of the pipe at the point of balance (see Figure 3) to provide support during testing with deformation;

b) supports, for the pipe components of the test piece (see 5.1 and Figure 1, Figure 2 and Figure 3). These can be used to apply angular deflection (see 8.3 and Figure 2). They shall allow deformation to occur (see 8.4, 8.5, 8.6 and Figure 3).

4.2.4 Special supports, if necessary to prevent buckling of the pipe barrel of low stiffness pipe during negative pressure testing.

4.2.5 Special restraints, to provide support for the test assembly to prevent uncontrolled movements, particularly when testing at high pressures. Such supports shall be positioned in a manner so as to not influence the test being conducted and shall not induce point loads.



Key

1 thrust resisted by test rig
2 test rig
3 end cap or sealing device (e.g. joint)
4 supports
5 test joint
6 draw
L total effective length

Figure 1 — Test arrangement for total draw