



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS K 7042 : 1998

(ISO/FDIS 8533 : 1997)

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

ICS 23.040.20; 23.040.45

Descriptors : thermosetting polymers, plastics, reinforcing materials, glass, pipework systems, pipes, pipe connections, bonding, adhesion tests, testing

Reference number : JIS K 7042 : 1998 (E)

K 7042 : 1998 (ISO/FDIS 8533 : 1997)

Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of International Trade and Industry through deliberations at Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law:

Date of Establishment: 1998-10-20

Date of Public Notice in Official Gazette: 1998-10-20

Investigated by: Japanese Industrial Standards Committee

Divisional Council on Chemical

JIS K 7042:1998, First English edition published in 2000-06

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

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Printed in Japan

Plastics piping systems — Glass – reinforced thermosetting plastics (GRP) pipes and fittings — Test methods to prove the design of cemented or wrapped rigid joints

Introduction This Japanese Industrial Standard has been prepared based on "ISO/FDIS 8533, Glass-reinforced thermosetting plastics (GRP) pipes and fittings—Test methods to prove the design of cemented or wrapped rigid joints" issued in 1997 without changing the technical contents.

1 Scope

This standard specifies methods of test for cemented or wrapped rigid joints for plastics piping systems of glass-reinforced thermosetting plastics (GRP) intended to be used for buried and above ground 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 7.7 inclusive are applicable to rigid cemented or wrapped joints intended to be used in buried or above ground applications. The bending tests detailed in 7.6 can be used to prove the design where joints are either intended to be used in buried applications where the soils are known to have very poor properties or are intended to be used in particular above ground situations where the tests may be considered appropriate. The tests detailed in 7.6 are applicable to joints for pipes and fittings up to and including DN 600.

With the exception of clause 7.6 these test procedures are applicable to joints for pipes and fittings of all nominal sizes. The tests are applicable for evaluating joints intended for applications conveying liquids at temperatures specified in the referring specifications (see clause 3).

2 Principle

A joint is subjected to a specified internal pressure and, if appropriate for the joint design, the consequent hydrostatic end thrust. The procedure includes prolonged static tests at elevated pressures and cyclic testing.

A method is also included to test the resistance of the joint to an internal negative pressure. This also simulates an external positive pressure.

NOTE:

The only intention of testing the resistance to negative pressure is to give 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.

An additional series of tests under bending conditions is included for special applications.

At the end of the tests the joint is inspected for signs of leakage and damage.

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

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

- a) the total effective length, L , of the assembled test piece (see clause 4.1).
- b) the number of test pieces to be used (see clause 4.2);
- c) if applicable, conditioning other than as given in clause 5;
- d) the test temperature and its permissible deviations (see clause 6);
- e) the nominal pressure relevant to the joint under test (see clauses 4.1 and 7);
- f) if applicable, any criteria indicative of damage to the joint components [see clause 7 and item i) of clause 8];
- g) whether the joint is or is not to be tested with end loads.
- h) if applicable the load F_1 to be applied in the bending tests (see 7.6).
- i) acceptable increase in pressure over one h for negative pressure test (see 7.3).

3 Apparatus

3.1 End sealing devices of 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 2g) 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 2g) then the end-sealing devices shall not be anchored to the pipes. (see 7.7).

3.2 Supports

3.2.1 Longitudinal supports, if required, comprising part of the rig which shall be capable of supporting the end thrust induced by the internal pressure but which shall not otherwise support the joint.

3.2.2 Straps or cradles, for use as follows:

a) a strap or cradle (100 ± 5) mm wide supporting an 180° arc of the pipe barrel positioned the appropriate position to apply the force F_1 , (see figure 2) necessary for the bending test (see 7.6);

b) supports of sufficient width for the pipe components of the test piece (see figure 2).

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

3.2.3 Special supports, if necessary to prevent buckling of the pipe barrel during negative pressure (7.3) testing. Such supports shall be positioned so that they do not affect the force, F_1 , applied to the joint or the joint's response to such a load.

3.3 A source of hydrostatic pressure to meet the needs of the test.

3.4 A means to measure the gauge pressure at the top of the pipe to an accuracy within $\pm 1\%$ and check conformance with the specified pressures (see 7.2.3, 7.3.2, 7.3.4, 7.4.3, 7.4.6, 7.4.9, 7.5.2, 7.5.3, 7.6.4, 7.6.6, and 7.6.7).

3.5 Vacuum pump or equivalent, capable of applying the required negative gauge pressure (see 7.3).

3.6 Means of applying and measuring the required force F_1 if applicable (see 7.4 and 7.6) to an accuracy within $\pm 5\%$.