
Cevni sistemi iz polimernih materialov - Cevi iz duromernih materialov, okrepljenih s steklenimi vlakni (GRP) Metoda za preskus učinkov cikličnih sprememb notranjega tlaka

Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Test method for the effects of cyclic internal pressure

Kunststoff-Rohrleitungssysteme - Rohre aus glasfaserverstärkten duroplastischen Kunststoffen (GFK) - Prüfverfahren für die Auswirkungen von zyklischem Innendruck

Systemes de canalisations en plastiques - Tubes en plastiques thermodurcissables renforcés de verre (PRV) - Méthode d'essai relative aux effets de la pression cyclique interne

Ta slovenski standard je istoveten z: EN 1638:1997

ICS:

23.040.20	Cevi iz polimernih materialov	Plastics pipes
83.120	Ojačani polimeri	Reinforced plastics

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EUROPEAN STANDARD

EN 1638

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ICS 23.040.20

Descriptors: plastic tubes, reinforced plastics, glass reinforced plastics, thermosetting resins, pressure tests, pressure resistance, test specimen

English version

**Plastics piping systems - Glass-reinforced
thermosetting plastics (GRP) pipes - Test method
for the effects of cyclic internal pressure**

Systèmes de canalisations en plastiques - Tubes
en plastiques thermodurcissables renforcés de
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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems", the secretariat of which is held by NNI.

The material-dependent test parameters and/or performance requirements are incorporated in the referring standard.

This standard is one of a series of standards on test methods which support System Standards for plastics piping systems and ducting systems.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 1997, and conflicting national standards shall be withdrawn at the latest by October 1997.

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1 Scope

This standard specifies a method for the effects of cyclic internal pressure on of glass-reinforced thermosetting plastics (GRP) pipes. This standard is applicable to pipes of nominal size up to and including DN 600.

NOTE: Whilst this standard refers to pipes the procedures described can be applied to fittings.

2 Normative references

This standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter.

For dated references, subsequent amendments to, or revisions of, any of these publications apply to this standard only when incorporated in it by amendment or revision.

For undated references the latest edition of the publication referred to applies.

EN 1394

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Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of the apparent initial circumferential tensile strength

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 cyclic pressure: The pressure which fluctuates about a mean value at a given frequency and amplitude.

It is expressed in bars¹⁾ (or in megapascals).

3.2 mean pressure: The arithmetic average of the lower and upper limits of the pressure cycle.

It is expressed in bars (or in megapascals).

¹⁾ 1 bar = 10⁵ N/m² = 0,1 MPa

3.3 peak-to-peak pressure amplitude: The difference between the lower and upper pressure limits.

It is expressed in bars (or in megapascals).

3.4 cycle frequency: The number of cycles per unit time.

It is expressed in cycles per minute.

3.5 cycle: The change of pressure from the lower limit to the upper limit and then return to the lower limit.

3.6 leakage; weeping: Passage of liquid through the pipe wall.

3.7 bursting: Rupture of the pipe wall with immediate loss of test liquid.

4 Principle

A test piece is subjected to a specified cyclic pressure for a specified number of cycles. Following successful completion of the cyclic test the test piece is subjected to a circumferential tensile strength test.

NOTE: It is assumed that the following test parameters are set by the standard making reference to this standard: <https://standards.iteh.ai/catalog/standards/sist/c2aadc2-6324-4481-999-548ede75de2a/sist-en-1638-1999>

- a) type of end sealing device to be used (see 5.3)
- b) the number of test pieces (see 6.1);
- c) the length of the test piece (see 6.2);
- d) the test temperature and its tolerance (see clause 7);
- e) the mean pressure (see 8.2);
- f) the peak-to-peak pressure amplitude (see 8.2);
- g) the cycle frequency (see 8.5);
- h) the test liquid and external environment (see 8.3);
- i) the number of cycles (see 8.5).

5 Apparatus

5.1 Source of internal pressure, capable of both of the following:

- a) applying the required pressures gradually;
- b) maintaining the consistency of the cycle for the duration of the test.

6.3 Conditioning

Unless otherwise specified in the referring standard conditioning is not required.

7 Test temperature

The test temperature and tolerance shall be as specified in the referring standard.

8 Procedure

8.1 Determine the following dimensions of the test piece:

- a) external diameter;
- b) wall thickness;
- c) length.

8.2 Unless otherwise specified in the referring standard, determine the pressure settings as follows:

- a) the mean pressure shall be equal to [PN], when expressed in bar;
- b) the peak-to-peak pressure amplitude shall be 0,5 times [PN], when expressed in bar.

EXAMPLE: For a PN 10 pipe tested with a symmetrical peak-to-peak pressure amplitude of 5 bar, the lower test pressure limit is 7,5 bar and the upper limit 12,5 bar.

8.3 Fit the end sealing devices (see 5.3) and fill the test piece with the test liquid specified in the referring standard. Ensure that all air is expelled.

The external environment shall, unless otherwise specified by the referring standard, be air.

8.4 Connect the arrangement to the pressure generating system.

Prior to commencing the test ensure that both the external environment and the test liquid are at the test temperature (see clause 7).

8.5 Bring the internal pressure to the lower limit of the cycle.

Increase the internal pressure until the upper pressure limit is reached. Then reduce the pressure to the lower limit. Repeat this process using the applicable cycle frequency given in table 1 unless otherwise specified in the referring standard, until either the test piece fails (see clause 9) or the minimum required number of cycles specified in the referring standard is reached.

Table 1: Cycle frequency

Nominal size DN			Cycle frequency	
	DN	≤ 150	(16 ± 4)	cycles/min
150	< DN	≤ 350	(8 ± 2)	cycles/min
350	< DN	≤ 600	(4 ± 1)	cycles/min

In the event of an apparatus breakdown, the test may be continued following its repair.

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8.6 For test pieces that have undergone testing to the minimum required number of cycles, and for the test pieces that have not been subjected to pressure cycling, determine and record the circumferential tensile strength, using method A of EN 1394.

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8.7 Record the number of cycles to failure (see clause 9) for test pieces which fail before reaching the minimum required number of cycles.

In the event of an apparatus breakdown (see 8.5), the number of cycles of the different stages may be added together to give the total number of cycles achieved.

9 Failure

Failure shall comprise any type of leakage or weeping (see 3.6) or bursting (see 3.7) that occurs inside the valid failure zone (see figure 1).

If leakage occurs where an end sealing device is fitted, the device may be resealed and the test continued. The resulting interruption to the test shall be recorded.