



SLOVENSKI STANDARD

SIST EN 921:1997

01-februar-1997

Cevni sistemi iz polimernih materialov - Plastomerne cevi - Določanje odpornosti na notranji tlak pri konstantni temperaturi

Plastics piping systems - Thermoplastics pipes - Determination of resistance to internal pressure at constant temperature

Kunststoff-Rohrleitungssysteme - Rohre aus Thermoplasten - Bestimmung der Widerstandsfähigkeit gegen Innendruck bei konstanter Temperatur

Systemes de canalisations plastiques - Tubes thermoplastiques - Détermination de la résistance a la pression interne a température constante

<https://standards.iteh.ai/catalog/standards/sist/32641a7e-aad6-49d1-b49d-47f1ea6e7ec/sist-en-921-1997>

Ta slovenski standard je istoveten z: EN 921:1994/AC:1995

ICS:

23.040.20 Cevi iz polimernih materialov Plastics pipes

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en

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EUROPEAN STANDARD

EN 921

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 1994

ICS 23.040.20

Descriptors: Fluid pipelines, plastic tubes, thermoplastic resins, pressure resistance

English version

**Plastics piping systems - Thermoplastics pipes -
Determination of resistance to internal pressure at
constant temperature**

Systèmes de canalisations plastiques - Tubes
thermoplastiques - Détermination de la
résistance à la pression interne à température
constante

Kunststoff-Rohrleitungssysteme - Rohre aus
Thermoplasten - Bestimmung der
Widerstandsfähigkeit gegen Innendruck bei
konstanter Temperatur

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This European Standard was approved by CEN on 1994-11-08. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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

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

Foreword

This standard was prepared by CEN/TC 155 "Plastics piping systems and ducting systems" the secretariat of which is held by NNI.

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 May 1995, and conflicting national standards shall be withdrawn at the latest by May 1995.

This standard is based on the final text for the second edition of International Standard ISO 1167 "Thermoplastics pipes for the transport of fluids - Resistance to internal pressure - Test method", prepared by the International Organization for Standardization (ISO). It is a modification of that text for reasons of alignment with texts for other standards on test methods.

The modifications are:

- the variety of end caps described under type a) has been extended and the use of type c) end caps has been omitted;
- the time for pressurization has been changed from 60 s to the shortest time practicable between 30 s and 1 h. This is to enable testing of pipes with larger diameters for which pressurization was not possible within 60 s;
- the minimum free lengths of test pieces have been extended;
- editorial changes have been introduced.

The material-dependent parameters and/or performance requirements are incorporated in the System Standard(s) concerned.

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

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.



Introduction

This standard describes a method for determining the resistance of thermoplastics pipes to constant internal pressure at constant temperature.

It is a method which uses the following conditions:

- water as the reference liquid inside the pipes;
- water, air or a specified liquid as the environment outside the pipes.

The method can be used for short or long-term tests, at different temperatures.

Through interaction with the referring standard, it may be used to determine the time-to-failure at a specified pressure or to test for resistance to internal pressure using a specified pressure/temperature/time combination.

The results obtained can differ depending on whether the environment is air, water or another liquid.

For specific tests, particularly where other liquids such as corrosive liquids are used, other test methods may be used.

This method may be used to obtain data to establish stress/time-to-failure graphs at different temperatures. The rules for drawing these graphs are not within the scope of this document. For such purposes attention is drawn to "Plastics piping and ducting systems - Thermoplastics pipes - Determination of long-term hydrostatic strength of thermoplastics pipe materials by extrapolation" (under preparation at the time of publication of this standard).

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1 Scope

This standard specifies a method for determining the resistance of thermoplastics pipes to constant internal water pressure at constant temperature.

This standard is applicable to thermoplastics pipes intended for the transport of fluids.

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.

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EN 496 *Plastics piping systems - Plastics pipes and fittings -
Measurements of dimensions and visual inspection of surfaces.*

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3 Principle

After conditioning, test pieces are subjected to a specified constant internal hydrostatic pressure for a specified period of time or until the test piece(s) fail(s).

Throughout the test, the test pieces are kept in an environment at a specified constant temperature: this is water ("water-in-water" test), another liquid ("water-in-liquid" test) or air ("water-in-air" test).

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

- a) the type of end cap to be used (see 4.1);
- b) the test temperature (see 4.2, clause 8 and 9.1);
- c) the orientation of test pieces (e.g. horizontal or vertical) while under pressure (see 4.3 and 9.1);
- d) for evaluation purposes, the size and S-series of pipe to be used (see 5.1);
- e) the sampling procedure (see 6.1);
- f) for pipes of nominal outside diameter, d_n , greater than 315 mm, the free length of the test piece, if other than 1000 mm (see 6.3.1);
- g) the number of test pieces (see 6.4);
- h) the test pressure, p , or the circumferential (hoop) stress, σ , to be induced by the test pressure (see 7.2.2);
- i) the conditioning period (see clause 8);
- j) the type of test, i.e. water-in-water/air/liquid (see this clause and 9.1); (standards.iteh.ai)
- k) the duration of the test under pressure and the criteria for a failure (see 9.3); (standards.iteh.ai/catalog/standards/sist/32641a7e-aad6-49d1-b49d-47f1ea6e7ec/sist-en-921-1997)
- l) the requirements, or patterns of requirements, if any, which determine the initiation of additional testing.

4 Apparatus

4.1 End caps, fixed to the ends of the pipe.

By means of an appropriate system, they shall allow sealing, venting of air and connection to the pressurizing equipment.

The constituent material of the end cap shall not have any adverse effect on the pipe under test; e.g. end caps of copper-based alloys shall not be used for testing polypropylene (PP) pipes at temperatures above 100 °C.

The end cap shall be one of the following types:

type a). Fittings rigidly connected to the test piece but not to each other, and hence transmitting the hydrostatic end thrust to the test piece e.g. as shown in figure 1 or equivalent. They may comprise flanged plates on the ends of a large diameter pipe, optionally fused when flanges, caps, plugs or plates are of the same material as the test pieces;

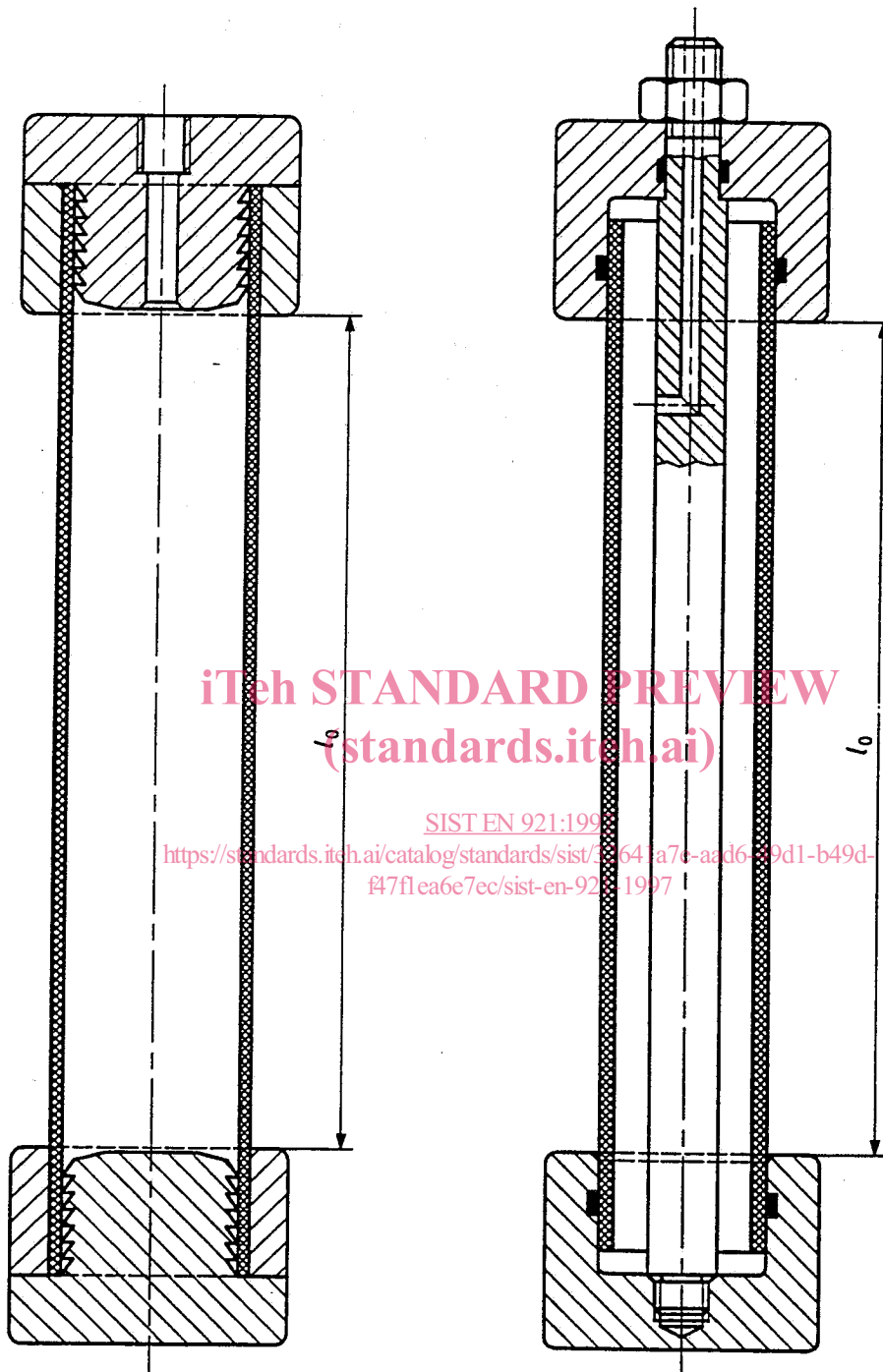
type b). Female parts, made of metal, fitted with joints ensuring sealing onto the external surface of the test piece and connected to one another and hence not transmitting the hydrostatic end thrust to the test piece. They may comprise one or more metal rods, see figure 1, allowing sufficient longitudinal movement at the ends of the test piece, to avoid buckling due to thermal expansion when the caps are mounted at a lower temperature than the test temperature.

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Other than toothed grips, any sharp edges which would come into contact with the outside surface of the pipe shall be rounded off.



Type a)
 without metal rod
 [Hydrostatic end thrust
 transmitted to the test piece]

Type b)
 with metal rod
 [Hydrostatic end thrust not
 transmitted to the test piece]

Figure 1: Illustrated principles for the two types of end devices for the internal pressure testing of pipes

NOTE: In general, times to failure with end caps type b) are shorter than those obtained with end caps of type a).

4.2 **Tank**, filled with water or other liquid, kept at a temperature as specified in the referring standard to within ± 1 °C or \pm_1^3 °C, as applicable, (see 9.1), or **oven**, the temperature of which shall be kept at the specified value to within \pm_1^3 °C.

NOTE: As the results are strongly influenced by temperature, the tolerance on temperature should be kept as small as possible within the specified limits, e.g. by using forced circulation of the fluid.

The water shall not contain impurities which could affect the results.

When an environment other than water is used, necessary precautions shall be taken, in particular those concerning safety and any interaction between liquids and the material(s) of the test piece.

For obtaining comparable results, tests shall be carried out in the same environment.

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4.3 **Supports or hangers**, enabling test pieces to be placed in the tank or oven (see 4.2) in such a way that there is no contact between them or with the sidewalls of the tank or oven.

4.4 **Pressurizing equipment**, capable of applying the required pressure gradually and evenly in accordance with 9.1 and then of keeping it constant to within \pm_1^2 % for the duration of the test.

NOTE 1: As the results are strongly influenced by pressure, the deviation of pressure should be kept as small as possible within the specified limits.

NOTE 2: The pressure should, preferably, be applied individually to each test piece. However, the use of equipment enabling the pressure to be applied simultaneously to several test pieces is also permitted if there is no danger of interference when failure occurs (e.g. by the use of an isolation valve or a test based on the first failure in a batch). If the tests are carried out at a specified stress, the dimensions of the test pieces should be comparable.

NOTE 3: To maintain the pressure within the specified tolerance, it is recommended that a system be introduced which automatically resets the pressure, when it drops slightly (e.g. because of swelling of the test piece), to the specified value.