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**Cevni sistemi iz polimernih materialov - Cevi iz polietilena (PE) - Metoda za preskus odpornosti proti notranjemu tlaku po izvedenem stiskanju cevi (squeeze-off)**

Plastics piping systems - Polyethylene (PE) pipes - Test method for the resistance to internal pressure after application of squeeze-off

Kunststoff-Rohrleitungssysteme - Rohre aus Polyethylen (PE) - Bestimmung der Widerstandsfähigkeit gegen Innendruck nach Abquetschen

Systemes de canalisations en plastique - Tubes en polyéthylène (PE) - Méthode d'essai de résistance a la pression interne apres application de l'écrasement

**Ta slovenski standard je istoveten z: EN 12106:1997**

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**ICS:**

23.040.20 Cevi iz polimernih materialov Plastics pipes

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EUROPEAN STANDARD

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English version

**Plastics piping systems - Polyethylene (PE) pipes -  
Test method for the resistance to internal pressure  
after application of squeeze-off**

Systèmes de canalisations en plastique - Tubes  
en polyéthylène (PE) - Méthode d'essai de  
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Comité Européen de Normalisation  
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## 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.

This standard is based on annex B (informative) of the International Standards ISO 4437:1988 "Buried polyethylene (PE) pipes for the supply of gaseous fuels - Metric series - Specification", published by the International Organization for Standardization (ISO).

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.

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of an identical text or by endorsement, at the latest by February 1998, and conflicting national standards shall be withdrawn at the latest by February 1998.

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

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BUTTING END OF PIPE



## 1 Scope

This standard specifies a method for determining the resistance to internal pressure of polyethylene (PE) pipes after being subjected to a squeeze-off procedure.

## 2 Normative reference

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 921:1994                      *Plastics piping systems - Thermoplastics pipes - Determination of resistance to internal pressure at constant temperature*

## 3 Principle

A polyethylene (PE) pipe, conditioned to 0 °C, is squeezed between two parallel circular-section bars located at right angles to the pipe centreline, at a position midway between the pipe ends. The squeeze is subsequently released after an appropriate time period. The pipe is then subjected to a hydrostatic strength test at 80 °C.

NOTE 1: In certain countries the technique of squeeze-off is used to restrict the flow of fluid in PE piping systems whilst effecting maintenance and repair operations. The test described herein may be used to assess the effect of squeeze-off on the strength of pipes.

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

- a) the diameter and series of the pipe to be tested (see 5.1);
- b) the number of test pieces (see 5.2);
- c) the parameters for the hydrostatic strength test at 80 °C (see 6.5).

## 4 Apparatus

**4.1 Squeeze-off equipment**, comprising a compressive loading device with a combination of a fixed bar and a moveable bar contained within a framework designed to withstand the forces generated by the squeeze-off action.

Each bar shall have a circular cross section having sufficient rigidity to ensure a uniform separation between and along the bars in the course of squeeze-off. Each bar shall have the same diameter which shall be not less than the applicable minimum value given in table 1.

The moveable bar may be hydraulically or mechanically operated to achieve the applicable level of squeeze-off given in table 1.

Means shall be provided for the measurement and maintenance of the bar displacement to within  $\pm 0,2$  mm of the required squeeze-off level  $L$  during the squeeze-off phase.

**4.2 Temperature conditioning apparatus**, capable of establishing and maintaining the test piece temperature (before squeeze-off) at  $(0 \pm 1,5)$  °C.

**4.3 Pipe test equipment**, conforming to EN 921:1994 for the following items:

- a) **pressurizing equipment**;
- b) **timer**;
- c) **tank** filled with water or other liquid for immersion of test pieces, maintained at  $(80 \pm 1)$  °C;
- d) **end caps** of type a).

**Table 1: Squeeze-off levels**

Nominal outside diameter $d_n$	Minimum bar diameter mm	Squeeze-off level $L$ % 1)
$d_n \leq 63$	25,0	80
$63 < d_n \leq 250$	38,0	80
$250 < d_n \leq 630$	50,0	90
1) The squeeze-off level, $L$ , is the percentage ratio of the distance between the squeeze-off bars, in millimetres, and twice the specified minimum wall thickness of the pipe, $e_{min}$ , in millimetres.		

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## 5 Test pieces

### 5.1 Preparation

The test piece shall be a pipe of which the minimum free length, between end caps of any type, shall be 250 mm or six times the nominal outside diameter,  $d_n$ , of the pipe, whichever is the greater.

The diameter and series of the pipe shall be as specified in the referring standard.

For pressure testing (see 6.5) the test piece shall be closed with end caps of type a) (4.3).

### 5.2 Number

The number of test pieces shall be as specified in the referring standard.

## 6 Procedure

6.1 Calculate the final distance,  $e_q$ , to be applied between the squeeze-off bars, in millimetres, using the following equation:

$$e_q = 0,02L \times e_{\min}$$

where:

- $e_{\min}$  is the minimum wall thickness specified for the pipe;  
 $L$  is the squeeze-off level conforming to table 1.

6.2 Condition the pipe at 0 °C for a time at least as long as that required in EN 921:1994 for the appropriate pipe wall thickness. Any conditioning fluids used shall not affect the properties of the test piece.

6.3 Position the test piece between squeeze bars set at right angles to the pipe centreline and midway between the pipe ends. Using a squeeze bar closure rate between 25 mm/min and 50 mm/min, squeeze-off at ambient temperature of not more than 25 °C to the distance,  $e_q$ , calculated in accordance with 6.1, within the following time interval after its removal from the conditioning environment:

- a) 90 s for  $d_n \leq 110$ ;  
 b) 180 s for  $110 < d_n \leq 250$ ;  
 c) 300 s for  $d_n > 250$ .

6.4 Maintain the squeeze-off level for a hold time period of  $(60 \pm 5)$  min. Immediately after that hold time has elapsed, release the squeeze progressively so that the squeeze applied by the bars is fully released within 1 min.

6.5 Prepare the test piece for determination of hydrostatic strength at 80 °C in accordance with EN 921:1994 and conduct that test using the pressure, testing time and failure criteria as specified in the referring standard [see c) of note 2 to clause 3].

6.6 After testing, inspect the test piece and record the position and mode of any failure, as applicable (see 6.5).

## 7 Test report

The test report shall include the following information:

- a) the reference to this standard and to the referring standard;
- b) a complete identification of the pipe, including manufacturer, type of material (e.g. PE 80) and production date;
- c) the nominal diameter,  $d_n$ , of the pipe;
- d) the minimum wall thickness,  $e_{min}$ , of the pipe;
- e) the squeeze-off bar diameter;
- f) the final distance,  $e_q$ , between squeeze-off bars;
- g) the test pressure;
- h) the duration of testing at 80 °C;
- i) details of the position and mode of any failure;
- j) any factors which may have affected the results, such as any incidents or any operating details not specified in this standard;
- k) the date of test.

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