
Elastomerna tesnila – Zahteve za materiale za tesnila za uporabo v napeljavah za vodo in kanalizacijo – 4. del: Poliuretanski tesnilni elementi

Elastomeric seals - Materials requirements for pipe joint seals used in water and drainage applications - Part 4: Cast polyurethane sealing elements

Elastomer-Dichtungen - Werkstoff-Anforderungen für Rohrleitungs-Dichtmittel für Anwendungen in der Entwässerung und Kanalisation - Teil 4: Dichtelemente aus gegossenem Polyurethan

Garnitures d'étanchéité en caoutchouc - Spécification des matériaux pour garnitures d'étanchéité pour joints de canalisation utilisés dans le domaine de l'eau et de l'évacuation - Partie 4: Éléments d'étanchéité en polyuréthane moulé

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23.040.80 Tesnila za cevne zveze Seals for pipe and hose assemblies

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English version

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This European Standard was approved by CEN on 3 June 2000.

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.

This European Standard exists 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 208 "Elastomeric seals for joints in pipework and pipelines", the secretariat of which is held by BSI.

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 January 2001, and conflicting national standards shall be withdrawn at the latest by January 2001.

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.

A European Standard is will be prepared for microbiological deterioration requirements and when published it is intended that materials comply with the requirements of that standard.

It is recommended that third party inspection be carried out at least twice a year without previous notice, the assessment body complying with the requirements of EN 45011 and EN 45012 or equivalent.

Part 1 of this Standard is based on ISO 4633 and ISO 9631, bringing these two sets of requirements (for cold and hot water respectively) under one specification. The major changes from ISO 4633 and ISO 9631 have been to incorporate requirements for effect on water quality and ozone resistance. The emphasis in respect of low temperature testing has moved away from hardness measurement to compression set, which is more discriminating.

Part 2 has been prepared by TC208 in response to requests from CEN/TC155 for a material specification for thermoplastic elastomer seals for use in conjunction with non-pressure thermoplastic pipe systems.

Part 3 has been prepared in response to those sections of the pipeline industry which employ cellular seals of vulcanized rubber.

This standard should be used where appropriate with product standards which specify performance standards which specify performance requirements for joints.

Seals and pipe joints using polyurethane elastomers should be designed and tested to take into account the different requirements compared with those specified in Part 1 of this Standard.

1 Scope

This Standard specifies requirements for materials used in factory cast polyurethane sealing elements used in joints for drainage, sewerage and rainwater systems and non potable water supply for continuous flow up to 45°C.

General requirements for finished joint seals are also given; any additional requirements called for by the particular application are specified in the relevant product standards taking into account that the performance of pipe joints is a function of the seal material properties, seal geometry and pipe joint design.

This Standard is applicable to joint seals for all pipeline materials, including iron, steel, clay, fibre cement, concrete, plastics and glass-reinforced plastics.

2 Normative references

This European 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 European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 37	Rubber, vulcanized or thermoplastic - Determination of tensile stress-strain properties
ISO 48	Rubber, vulcanized or thermoplastic - Determination of hardness (hardness between 10 and 100 IRHD)
ISO 188	Rubber, vulcanized - Accelerated ageing or heat-resistance tests
ISO 471	Rubber - Temperatures, humidities and times for conditioning and testing
ISO 815	Rubber, vulcanized or thermoplastic - Determination of compression set at ambient, elevated or low temperatures
ISO 2859-1	Sampling procedures for inspection by attributes - Part 1 : Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection https://standards.iteh.ai/catalog/standards/sist/1a3637d6-667d-419d-be1b-520b5e3c0c1c/iso-2859-1-1983
ISO 3302-1	Rubber - Tolerances for products - Part 1: Dimensional tolerances
ISO 3384:1999	Rubber, vulcanized or thermoplastic - Determination of stress relaxation in compression at ambient and at elevated temperatures
ISO 3951	Sampling procedures and charts for inspection by variables for percent nonconforming
ISO 4661-1	Rubber, vulcanized or thermoplastics - Preparation of samples and test pieces - Part 1: Physical tests

- ISO 9691:1992 Rubber - Recommendations for the workmanship of pipe joint rings - Description and classification of imperfections
- EN ISO 9002 Quality systems – Model for quality assurance in production, installation and servicing (ISO 9002:1994)
- EN ISO 9003 Quality systems – Model for quality assurance in final inspection and test (ISO 9003:1994)

3 Classification

Material requirements for pipe joint seals are specified in table 1. They correspond to a hardness range of (67 ± 5) IRHD.

4 Requirements

4.1 Materials

The materials shall be free of any substances which may have a deleterious effect on the fluid being conveyed or on the life of the sealing element, or on the pipe or fitting.

4.2 Finished seal requirements

4.2.1 Dimensional tolerances

Tolerances shall be specified from Class E2 of ISO 3302-1 or in relevant product standards.

4.2.2 Imperfections and defects

The seals shall be free of defects or irregularities which affect their function. Classification of imperfections shall be according to ISO 9691:1992 as follows:

- surface imperfections in zones involved in the sealing function as described in 4.1.1 of ISO 9691:1992 shall be considered as defects.

- surface imperfections in zones not involved in the sealing function as described in 4.1.2.1b) of ISO 9691:1992 shall not be considered as defects.

NOTE 1 Major surface imperfections in zones not involved in the sealing function as described in 4.1.2.1a) of ISO 9691:1992 could be considered as defects. This should be agreed between the interested parties; the acceptance criteria depend upon the seals' type or design respectively.

NOTE 2 Internal imperfections as described in 4.2 of ISO 9691:1992 could be considered as defects. The compressive force can be determined according to ISO 7743¹. The acceptable limiting values of the compressive force should be agreed between the interested parties; they depend upon the seals' type or design respectively.

¹ ISO 7743 *Rubber, vulcanized or thermoplastic - Determination of compression stress - strain properties*

4.2.3 Hardness

When determined by the micro-test method specified in ISO 48, the hardness shall comply with the requirement given in table 1.

NOTE If the dimensions of a seal are appropriate, the normal test method specified in ISO 48 can be used, provided that the micro-test method is used for reference purposes.

For the same seal, the difference between the minimum and maximum hardness shall not be more than 5 IRHD. Each value shall be within the specified tolerances.

4.2.4 Tensile strength and elongation at break

The tensile strength and elongation at break shall be determined by the method specified in ISO 37. Dumb-bell shaped test pieces of types 1, 2, 3 or 4 shall be used. Type 2 is the preferred size. The test report shall state the dumb-bell type whenever type 2 is not used.

The tensile strength and the elongation at break shall comply with the requirements given in table 1.

4.2.5 Compression set in air

4.2.5.1 General

If the test piece is taken from a seal, then the measurement shall be carried out as far as possible in the direction of compression of the seal in service.

4.2.5.2 Compression set at 23 ° C and 70 ° C

When determined by the method specified in ISO 815, at 23 °C and 70 °C, using the small Type B test piece, the compression set shall comply with the requirements given in table 1.

4.2.5.3 Low temperature compression set at - 10 ° C

When determined by the method specified in ISO 815 at - 10 °C using the small Type B test piece, and the (30 ± 3) min recovery measurement, the compression set shall comply with the requirements given in table 1.

Alternatively this requirement is satisfied if the maximum hardness at -10 °C ± 1 °C is not greater than 80 IRHD after storage at 10 °C ± 1 °C for 5 h.

4.2.6 Accelerated ageing in air

Test pieces prepared for the determination of hardness (see 4.2.3) shall be aged in air by the normal oven method specified in ISO 188 for 7 days at 70 °C.

The change in hardness shall comply with the requirement given in table 1.

4.2.7 Stress relaxation in compression

The stress relaxation shall be determined at 23°C by method A of ISO 3384:1999, except that the initial measurement shall be taken at 10 min, using the small cylindrical test piece after applying mechanical and thermal conditioning. Measurements shall then be taken after 3 h, 1, 3, 7 days for the 7 day test and after 3 h, 1, 3, 7, 30, 100 days for the 100 days test. The best fit straight line shall be determined by regression analysis using a logarithmic time scale and the correlation coefficients derived from these analyses shall not be lower than 0,93 for the 7 day test and 0,83 for the 100 day test. The 7 and 100 days requirements in table 1 are those derived from this straight line.

For continuous measurement using an apparatus described in the first paragraph of 5.2 of ISO 3384 the 7 days and 100 days requirements in table 1 are those derived from the measurements at 7 and 100 days.

The stress relaxation in compression shall comply with the requirements given in table 1.

The test temperature shall be maintained within the specified tolerance during the whole period of the test and verified by suitable recording equipment on a continuous basis.

The 100 days test shall be considered as a type approval test.

If the test piece is taken from a seal, then the measurement shall be carried out as far as possible in the direction of compression of the seal in service.

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