



**TECHNICAL PRESCRIPTIONS
FOR
CAST IRON COVERS:
ELASTOMERIC BEARINGS -
VULCANIZED RUBBER**

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FOREWORD

This document contains the technical prescriptions for elastomeric bearings made from vulcanized rubber for cast iron covers (further in this document called “elastomeric bearings”). The requirements included in these PTV respond to needs established by the various interested parties according to local customs.

The test methods and the requirements laid out in NBN EN 681-1 along with accompanying addenda were considered in establishing these requirements so that a uniform nomenclature is maintained for producers of elastomer - vulcanized rubber.

Bearings for cast-iron covers can also consist of other materials. These materials may possibly be described in other normative documents.

The PTV describing cast iron covers will refer to this PTV in the article concerning elastomeric bearings. This PTV only describes the elastomeric bearing requirements. The effectiveness of the cast iron cover and bearing combination is not included in this PTV. This is dealt with in the PTV relating to cast iron covers.

The conformity of the elastomeric bearings can be certified under the voluntary BENOR mark. With the BENOR mark, the supplier has to declare the performance of the elastomeric bearings for all the characteristics relevant to guaranteeing the application and limit values imposed by this PTV 832.

BENOR certification is based on full product certification in accordance with NBN EN ISO/IEC 17067.

1 INTRODUCTION

1.1 TERMINOLOGY

1.1.1 Definitions

Article	Set of units of a product with the same characteristics and performance that are produced in a specific manner and comply with the technical file.
Supplier	The party having to ensure that the elastomeric bearing complies with the technical prescriptions. This definition can apply to the producer, the dealer, the importer or the distributor.
Impartial body	Body that is independent of the supplier or user and is entrusted with conducting the acceptance test on delivery.
Producer	The party responsible for producing the elastomeric bearings.
Product	The result of an industrial activity or process. Meant by this in the context of these technical prescriptions is the elastomeric bearing. It is the collective term for all articles and product types to which these PTV apply.
Production unit	Technical facility/facilities tied to a geographical location used by a producer and in which one or more products are made.
Test	Technical action comprising the determination of one or more properties of a raw material or product according to a specified process.
Reference document	Document specifying the technical characteristics with which the materials, equipment, raw materials, production process and/or the product must comply (a standard, specification or any other technical specification).
Type testing	A series of checks for initially establishing (initial type testing) or, possibly, periodically confirming (repeat type testing) the characteristics of an article or product type and its conformity.

1.1.2 Abbreviations

CR	Chloroprene Rubber
EPDM	Ethylene Propylene Diene Monomer
NBR	Nitrile Butadiene Rubber
PTV	Technical Prescriptions
SBR	Styrene Butadiene Rubber

All symbols and abbreviations described in NBN EN 681-1 are also valid in this PTV.

1.1.3 References

ISO 34-2	Rubber, vulcanized or thermoplastic - Determination of tear strength - Part 2: Small (Delft) test pieces
ISO 37	Rubber, vulcanized or thermoplastic - Determination of tensile stress - strain properties
ISO 48	Rubber, vulcanized or thermoplastic - Determination of hardness (hardness between 10 IRHD and 100 IRHD)
ISO 188	Rubber, vulcanized or thermoplastic - Accelerated ageing and heat resistance tests
ISO 815-1	Rubber, vulcanized or thermoplastic - Determination of compression set - Part 1: At ambient or elevated temperatures
ISO 1431-1	Rubber, vulcanized or thermoplastic - Resistance to ozone cracking - Part 1: Static and dynamic strain testing
ISO 1817	Rubber, vulcanized or thermoplastic - Determination of the effect of liquids
ISO 3302-1	Rubber: Tolerances for products – Part 1: Dimensional tolerances
ISO 4649	Rubber, vulcanized or thermoplastic - Determination of abrasion resistance using a rotating cylindrical drum device
ISO 9691	Rubber - Recommendations for the workmanship of pipe joint rings - Description and classification of imperfections
NBN EN 681-1	Elastomeric seals - Materials requirements for pipe joint seals used in water and drainage applications – Part 1: Vulcanized rubber.

This PTV contains dated and undated references. Only the cited version applies to dated references. The latest version always applies to undated references, including any errata, addenda and amendments.

Of all the EN standards referred to in these prescriptions, the corresponding Belgian publication NBN EN applies in each case. COPRO can allow the use of a publication other than the Belgian one provided its content is identical to that of the Belgian publication.

1.2 AVAILABILITY OF THIS PTV

The current version of this PTV is available free of charge on the COPRO website.

A paper version of this PTV can be ordered from COPRO. COPRO has the right to charge for this.

No changes may be made to the original PTV approved by the sectoral commission and/or confirmed by the Board of Directors of COPRO.

1.3 STATUS OF THIS PTV

1.3.1 Version of this PTV

This PTV concerns version 2.0.

1.3.2 Approval of this PTV

This PTV was approved by the Sectoral Commission on 2018-03-30.

1.3.3 Confirmation of this PTV

This PTV was confirmed by the Board of Directors of COPRO on 2018-05-02.

1.3.4 Registration of this PTV

This PTV was submitted to BENOR non-profit organisation on 2018-05-02.

1.4 HIERARCHY OF RULES AND REFERENCE DOCUMENTS

1.4.1 Legislation

If certain rules contained in this PTV are inconsistent with applicable law, the rules arising from the legislation shall prevail. It is the responsibility of the supplier to monitor this and report any contradictions to COPRO in advance.

1.4.2 Directives concerning health and safety

If certain technical prescriptions are inconsistent with the directives concerning health and safety, such directives shall prevail. It is the responsibility of the supplier to monitor this and report any contradictions to COPRO in advance.

1.4.3 Special specification

If certain rules from the applicable special specification are inconsistent with these technical prescriptions, the supplier can report this to COPRO.

1.5 QUESTIONS AND COMMENTS

Questions or comments concerning these technical prescriptions are directed to COPRO.

2 POSITIONING OF TECHNICAL PRESCRIPTIONS

2.1 PTV FORMAT

2.1.1 Format of this PTV

These technical prescriptions for the elastomeric bearings are drawn up by the Sectoral Commissions of COPRO for elastomeric seals and cast iron.

2.2 OBJECTIVES

2.2.1 Purpose of this PTV

2.2.1.1 The aim of this PTV is to specify requirements for the elastomeric bearings made from vulcanized rubber used for cast iron covers.

2.3 SCOPE

2.3.1 Subject of these technical prescriptions

2.3.1.1 Elastomeric bearings made from vulcanized rubber (SBR, CR, EPDM or NBR) used for cast iron covers

2.3.2 Circulars

COPRO can supplement this PTV with one or more circulars forming an integral part of this PTV.

2.4 REFERENCE DOCUMENTS

2.4.1 Product standards

There are no applicable standards.

2.4.2 Tender documents

There are no applicable tenders.

2.4.3 Test methods

The applicable test methods are:

ISO 34-2	Rubber, vulcanized or thermoplastic - Determination of tear strength - Part 2: Small (Delft) test pieces
ISO 37	Rubber, vulcanized or thermoplastic - Determination of tensile stress - strain properties
ISO 48	Rubber, vulcanized or thermoplastic - Determination of hardness (hardness between 10 IRHD and 100 IRHD)
ISO 188	Rubber, vulcanized or thermoplastic - Accelerated ageing and heat resistance tests
ISO 815-1	Rubber, vulcanized or thermoplastic - Determination of compression set - Part 1: At ambient or elevated temperatures
ISO 1431-1	Rubber, vulcanized or thermoplastic - Resistance to ozone cracking - Part 1: Static and dynamic strain testing
ISO 1817	Rubber, vulcanized or thermoplastic - Determination of the effect of liquids
ISO 3302-1	Rubber: Tolerances for products – Part 1: Dimensional tolerances
ISO 4649	Rubber, vulcanized or thermoplastic - Determination of abrasion resistance using a rotating cylindrical drum device
ISO 9691	Rubber - Recommendations for the workmanship of pipe joint rings - Description and classification of imperfections

2.4.4 Other

There are no other applicable reference documents.

3 PRESCRIPTIONS

3.1 PRODUCTION UNIT AND EQUIPMENT

There are no requirements for the production unit and the equipment.

3.2 RAW MATERIALS

There are no requirements for the raw materials.

3.3 PRODUCTION PROCESS

There are no requirements for the production process.

3.4 Elastomeric bearings

3.4.1 General

- 3.4.1.1 The elastomeric bearing meets all the obligatory requirements set out in articles 3.4.2 to 3.4.14 and voluntary some of the additional requirements set out in articles 3.4.15 and 3.4.16. If the bearing meets any optional requirement as specified in articles 3.4.15 or 3.4.16, they shall be appropriately marked according clause 5.2.2.
- 3.4.1.2 The supplier shall in each case declare the performance for the characteristics set out in articles 3.4.2 to 3.4.14 for the elastomeric bearing for use in cast iron covers. Requirements for low temperature performance and volume change in oil are optional. If in the following clauses reference is made to a clause of NBN EN 681-1, then, in the corresponding clauses of NBN EN 681-1, the references to table 2 and 3 are replaced with a reference to table 1 of this PTV.
- 3.4.1.3 The requirements set out in table 1 are depending on the hardness category to which the bearing belongs (see 3.5 Classification and Table 2: Hardness categories).

3.4.2 Dimensional tolerances (obligatory)

The dimensions are declared by the manufacturer. For these dimensions, the tolerances are as specified in ISO 3302-1, class M2 for the dimensions of moulded profiles and class E2 for the dimensions of extruded profiles. For extruded profiles the tolerance for the length is 1 %.

The dimensions are determined according to ISO 3302-1.

3.4.3 Imperfections and defects (obligatory)

Clause 4.2.2 of NBN EN 681-1 applies.

3.4.4 Hardness (obligatory)

Clause 4.2.3 of NBN EN 681-1 applies.

3.4.5 Tensile strength and elongation at break (obligatory)

Clause 4.2.4 of NBN EN 681-1 applies.

3.4.6 Compression set in air (obligatory)

Clause 4.2.5 of NBN EN 681-1 applies, except that the compression set only has to be determined at 23 °C , at 70 °C and at - 10 °C.

3.4.7 Accelerated ageing in air (obligatory)

Clause 4.2.6 of NBN EN 681-1 applies, except that the ageing only has to be determined at 70 °C.

3.4.8 Volume change in water (obligatory)

Clause 4.2.8 of NBN EN 681-1 applies, except that the volume change only has to be determined at 70 °C.

3.4.9 Ozone resistance (obligatory)

Clause 4.2.9 of NBN EN 681-1 applies, taking into account an ozone concentration of 25 pphm.

3.4.10 Abrasion resistance (obligatory)

The requirements are laid down in table 1.

The abrasion resistance is determined according to ISO 4649.

3.4.11 Tear strength (obligatory)

The requirements are laid down in table 1.

The tear strength is determined according to ISO 34-2.

3.4.12 Chemical resistance (obligatory)

The requirements are laid down in table 1.

The chemical resistance is determined according to article 4.3 for the bearings without splices and according to 4.4 if the bearing contains splices.

3.4.13 Resistance to de-icing salts (obligatory)

The requirements are laid down in table 1.

The resistance to de-icing salts is determined according to ISO 1817 in a fluid for 7 days at $23\text{ °C} \pm 2\text{ °C}$. The fluid consist of 97 % in mass of drinking water and 3 % in mass of NaCl.

3.4.14 Splices of vulcanised profile ends (obligatory)

Clause 4.2.12 of NBN EN 681-1 applies. To be considered as an elastomeric bearing from vulcanized rubber (SBR, CR, EPDM or NBR) used for cast iron covers, maximum three splices per bearing are allowed.

3.4.15 Low temperature performance at -25 °C (Optional)

Clause 4.3.2 of NBN EN 681-1 applies, only for the compression set.

3.4.16 Volume change in oil (Optional)

Clause 4.3.3 of NBN EN 681-1 applies.

Table 1: Requirements for the bearings

				Requirements for hardness categories	
Property	Unit	Test Method	Clause	80	90
Permissible tolerance on nominal hardness	IRHD	ISO 48	3.4.4	± 5	± 5
Tensile strength, minimum	MPa	ISO 37	3.4.5	8	8
Elongation at break, minimum	%	ISO 37	3.4.5	125 %	100 %
Compression set, maximum 72 h at 23 °C 24 h at 70 °C 72 h at - 10 °C	%	ISO 815-1	3.4.6	30 30 60	30 30 60
Ageing, 7 days at 70 °C hardness change, maximum tensile strength change, maximum elongation at break change, maximum	IRHD % %	ISO 188 ISO 48 ISO 37 ISO 37	3.4.7	+ 8/- 5 - 20 + 10/- 40	+ 8/- 5 - 20 + 10/- 40
Volume change in water, maximum 7 days at 70 °C	%	ISO 1817	3.4.8	+ 8/- 1	+ 8/- 1
Ozon resistance	-	ISO 1431-1	3.4.9	NBN EN 681-1 table 2	
Abrasion resistance, maximum	mm ²	ISO 4649	3.4.10	300	300
Tear resistance, minimum	N	ISO 34-2	3.4.11	20	20
Chemical resistance 7 days at 45 °C Splice 28 days at 45 °C Volume change Tensile strength change, maximum Elongation at break change, maximum	% % %	ISO 1817 Art. 3.4.12 ISO 37 ISO 37	3.4.12 4.4 4.3	No visible imperfections ± 10 - 20 + 10/- 40	
Resistance to de-icing salts 7 days at 23 °C Volume change Tensile strength change, maximum Elongation at break change, maximum	% % %	ISO 1817 ISO 37 ISO 37	3.4.13	± 10 - 20 + 10/- 40	

Optional requirements

Compression set, maximum 72 h at - 25 °C	%	ISO 815-1	3.4.15	70	70
Volume change in oil, maximum 72 h at 70 °C Oil n° 1 Oil n° 3	%	ISO 1817	3.4.16	± 10 + 50/- 5	± 10 + 50/- 5

3.5 CLASSIFICATION

3.5.1 Classification

Two hardness grades for the material of bearings used for the cast iron covers are specified in Table 2. A nominal hardness shall be specified within the ranges in table 2. The requirements stated in Table 1 are depending on this classification.

Table 2: hardness categories

Hardness category	80	90
Range of hardness (IRHD)	76 tot 85	86 to 95

Note: By limiting the option of 76 being the minimum nominal hardness, then any bearing complying with this PTV achieves a minimum hardness of 71 IRHD.

Alternatively, a classification can be made based on the optional characteristics (regardless of hardness category):

Low temperature performance at -25 °C – clause 3.4.15: L

Volume change in oil – clause 3.4.16: O.

4 TEST METHODS

4.1 SAMPLING

4.1.1 Sampling

See NBN EN 681-1, Art. 7.1.

4.2 SAMPLE PREPARATION

4.2.1 Sample preparation

See NBN EN 681-1, Art. 5.1.

4.3 Chemical resistance of the seal

4.3.1 Aim and principle

This test is used to determine the resistance of the seal to pH2 and pH12 for a certain period. Therefore the samples are immersed in pH2 and pH12 and the test results for certain characteristics are compared with the results without immersion.

4.3.2 Instruments

See ISO 1817, Art. 3.1.

4.3.3 Sample preparation

The samples for the tests to be executed after immersion in the different liquids shall be prepared before immersing them in the liquid according the relevant test procedure.

4.3.4 Method

The chemical resistance is determined by testing the test pieces according the test method mentioned, after being immersed according ISO 1817 in a fluid with pH2 and pH12 at $45\text{ °C} \pm 2\text{ °C}$ for 28 days.

4.3.5 Result

The result is calculated as the difference in % with the result on test pieces that weren't submitted in the test liquid.

4.3.6 Test report

The test report sets out at least:

- the details of the laboratory,
- the details and identification of the sample,
- a description of the packaging in which the sample was delivered (possible damage, et cetera),
- the date of the test,
- the result of each characteristic,
- a reference to PTV 8681-1, clause 3.4.16.

Each test report is supplemented by an assessment of conformity to the requirements.

4.4 Chemical resistance of the splice

4.4.1 Aim and principle

This test is used to determine the resistance of the splice to pH2 and pH12 for a certain period. Therefore the splice is immersed into pH2 and pH12 and then elongated and examined.

4.4.2 Instruments

See ISO 1817, article 3.1.

4.4.3 Sample preparation

There isn't any specific sample preparation for this test.

4.4.4 Method

The test is executed according Annex C from NBN EN 681-1, taking into account the following prescriptions:

- the test pieces are, before the test, conditioned for 7 days at $45\text{ °C} \pm 2\text{ °C}$ in pH2 and pH12,
- the extension is executed at $50\text{ °C} \pm 2\text{ °C}$,
- the extension is maintained for 5 min instead of 1 minute.

4.4.5 Result

Examine the splice without magnification.

4.4.6 Test report

The test report sets out at least:

- the details of the laboratory,
- the details and identification of the sample,
- a description of the packaging in which the sample was delivered (possible damage, et cetera),
- the date of the test,
- the result of the examination,
- a reference to PTV 8681-1, clause 3.4.16.

Each test report is supplemented by an assessment of conformity to the requirements.

5 PRODUCT IDENTIFICATION

5.1 PRODUCT NAME

5.1.1 Official name

Elastomeric bearing for cast iron covers.

5.1.2 Commercial name

The commercial is freely chosen by the supplier insofar as it does not lead to confusion or clash with the official name.

5.2 IDENTIFICATION

5.2.1 Delivery modes

5.2.1.1 The product shall be delivered in a package.

5.2.1.2 Each packaging unit (e.g. per bucket or per bag) is identified.

5.2.2 Individual packages

The following information must be given on each bearing or packaging unit (if marking on the bearing is impossible):

- name and address of the supplier and/or producer,
- commercial name of the bearing,
- referral to this PTV 832,
- production date or production period or a clear reference to the production day,
- low temperature resistance (L) if appropriate (see 3.4.15),
- oil resistance (O) if appropriate (see 3.4.16),
- abbreviation of the rubber (SBR, EPDM, ...).