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TECHNICAL PRESCRIPTIONS

PTV 8450-2

TECHNICAL PRESCRIPTIONS

FOR

PREFABRICATED SYNTHETIC LINERS FOR MANHOLES AND INSPECTION CHAMBERS

System requirements

Version 2.0 dated 2017-09-13

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FOREWORD

This document contains the functional requirements and the test methods for prefabricated synthetic liners for manholes and inspection chambers in combination with the manhole or inspection chamber. The prefabricated liners can be used on all parts of the manhole or inspection chamber (base unit, chamber unit, shaft unit, cover slab, reducing slab, adjusting unit, taper). The prefabricated liners can be used to improve some properties of the manholes or inspection chambers. The requirements included in these PTV respond to needs established by the various interested parties according to local customs.

This PTV only describes the system requirements for a combination of a prefabricated synthetic liner and a new manhole or inspection chamber. The requirements for the prefabricated synthetic liner itself are described in PTV 8450-1.

This PTV doesn't describe the requirements for the base material of the manhole or inspection chamber itself. These materials are described in other normative documents.

1. INTRODUCTION

1.1 TERMINOLOGY

1.1.1 Definitions

Delivery age	For some base materials for the manholes or inspection chambers, their certification has foreseen a minimum delivery age. (f.e. for concrete this minimum delivery age can be 7 or 14 days). The delivery age for the combination of the prefabricated synthetic liners and sockets with those base materials is the same as stipulated for the base material.
Producer	The party responsible for producing the system.
Production unit	Technical facility/facilities tied to a geographical location used by a producer and in which one or more systems are made.
Supplier	The party having to ensure that the system complies with the technical prescriptions. This definition can apply to the producer, the dealer, the importer or the distributor.
Test	Technical action comprising the determination of one or more properties of a system according to a specified process.
Reference document	Document specifying the technical characteristics with which the materials, equipment, raw materials, production process and/or the system must comply (a standard, specification or any other technical specification).

1.1.2 Abbreviations

PTV	Technical Prescriptions

1.1.3 References

ISO 7500-1	Metallic materials - Calibration and verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Calibration and verification of the force-measuring system
PTV 8450-1	Technical prescription for prefabricated synthetic liners for manholes and inspection chambers: product requirements

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.

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 advisory board 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 and replace version 1.0 and circular 45/2017/01 (8th of June 2017) from COPRO.

1.3.2 Approval of this PTV

This PTV was approved by the Advisory Board on the 31th of August 2017.

1.3.3 Confirmation of this PTV

This PTV was confirmed by the Board of Directors of COPRO on the 13th December 2017.

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 system of prefabricated synthetic liners and the manholes or inspection chambers are drawn up by the advisory board for synthetic liners for sewer elements of COPRO.

2.2 OBJECTIVES

2.2.1 Purpose of this PTV

The aim of this PTV is to specify requirements for the system of prefabricated synthetic liners in combination with new manholes or inspection chambers.

2.3 SCOPE

2.3.1 Subject of these technical prescriptions

This PTV contains the functional requirements to which a prefabricated synthetic liner and socket (if applicable) for manholes and inspection chamber must comply in combination with the manhole or inspection chamber. The prefabricated synthetic liner and socket (if applicable) can only be used in combination with new manholes or inspection chambers and not for renovation of existing manholes or inspection chambers. They can be used on all parts of the manhole or inspection chamber (base unit, chamber unit, shaft unit, cover slab, reducing slab, adjusting unit, taper).

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 aren't any applicable standards.

2.4.2 Tender documents

There aren't any applicable tender documents.

2.4.3 Other

There aren't any other applicable reference documents.

3 PRESCRIPTIONS

3.1 PRODUCTION UNIT AND EQUIPMENT

There aren't any requirements for the production unit and the production equipment.

3.2 RAW MATERIALS

For this PTV, the prefabricated synthetic liners and the sockets are considered as the raw materials. The prescriptions for the prefabricated synthetic liners and the sockets are written down in PTV 8450-1. Each raw material is presumed to comply with the applicable legislation. Raw materials harmful to the environment and health are excluded.

3.3 PRODUCTION PROCESS

3.3.1 Production process and production parameters

The production of a manhole or inspection chamber including prefabricated synthetic liners and sockets according PTV 8450-1 shall be in accordance with the prescriptions of the manufacturer of the prefabricated synthetic liners and socket, if those prescriptions exists.

3.4 FUNCTIONAL REQUIREMENTS

3.4.1 General

3.4.1.1 The functional requirements are set out in articles 3.4.2 to 3.4.4. Articles 3.4.2 and 3.4.3 are the obligatory requirements. Article 3.4.4 is a voluntary requirement.

3.4.1.2 The supplier shall in each case declare the performance for the characteristics set out in articles 3.4.2 and 3.4.3 for the prefabricated synthetic liners and the sockets in combination with manholes or inspection chambers. The supplier shall also declare the performance for the characteristic set out in article 3.4.4, if applicable.

3.4.2 Water tightness

The requirements for the water tightness of the prefabricated synthetic liners and sockets in combination with the manhole or inspection chamber are the same as the requirements for the manhole or inspection chamber alone and shall be tested following the instructions for the manhole or inspection chamber.

3.4.3 Pull-off resistance of the liner

The pull-off resistance of the prefabricated synthetic liner shall be reached on the minimum delivery age of the manhole or inspection chamber and one year after the prefabricated liner is built into the manhole or inspection chamber.

Determination of the pull-off resistance is done according article 4.3 of this PTV on 3 different places, judiciously distributes over the whole liner, according article 4.3 of this PTV. Each individual result shall be ≥ 0.4 MPa. The determination of the pull-off resistance after one year shall be executed on the same element that was used to determine the pull-off resistance on the minimum delivery age.

3.4.4 Maximum height of the chemical resistance

If the synthetic liner is used to protect the base material of the manhole or inspection chamber against aggressive substances then the manufacturer has to declare the maximum height upon which the manhole or inspection chamber is protected. In this case, all possible exposed parts of the manhole or inspection chamber beneath this height, including the parts assuring the connection between two parts of the manhole or inspection chamber (sleeve / spigot) shall be covered by the liner or the seal.

4 TEST METHODS

4.1 SAMPLING

4.1.1 Sampling

Sampling is according the prescriptions for sampling of the manhole or inspection chamber.

4.2 SAMPLE PREPARATION

4.2.1 Sample preparation

The manhole or inspection chamber with the prefabricated synthetic liner shall be conditioned in the same conditions as the manhole or inspection chamber would be stored if it was produced without the liner.

4.3 PULL-OFF RESISTANCE

4.3.1 Aim and principle

This test is used to determine the strength of the connection between the prefabricated liner and the manhole or inspection chamber.

4.3.2 Instruments

- A metal piece (preferable a square 5 * 5 cm).
- Glue (or another method) to fix the metal piece to the liner. This glue shouldn't affect the properties of the liner material.
- Testing machine (possibility to increase the force with a constant rate) complying with ISO 7500-1, class 2 or better. The testing machine shall be equipped with the necessary tools so that it can apply the force on the metal piece.

4.3.3 Sample preparation

- The surface of the liner will be cleaned so that it is free of dust, grease, ….
- If necessary, the surface will be dried.
- The metal piece will be connected to the liner with the glue (or another method). When the liner has provisions to ensure a solid connection to the base material, then the metal piece shall be connected above this provisions.

- The test piece shall be isolated from the rest of the liner: therefore, on each side of the metal piece and as close as possible to this piece, cuts will be made through the liner. These cuts shall be at least 5 mm deep in the material of the manhole or inspection chamber.

4.3.4 Method

- The force shall be applied perpendicular to the surface of the liner.
- The force will be increased linear by 100 N/s for a square of 5 * 5 cm. For other dimensions, the increase is calculated proportional.
- The maximum force shall be registered.
- The place of the fracture shall be registered (between the metal piece and the glue, in the glue, between the glue and the liner, in the liner, between the liner and the base material of the manhole or inspection chamber, in the base material of the manhole or inspection chamber).

4.3.5 Result

- Calculate the pull-off force as the quotient of the maximum force and the area of the contact surface between the liner and the metal piece. The result is expressed in MPa with 1 significant number after the comma.
- If the pull-off force is more than the required minimum, then the test result is considered conform. It doesn't matter where the fracture surface is situated (glue, liner, …).
- If the pull-off force is less than the required minimum, then there are 2 possibilities. Depending on where the fracture is situated, the test is considered as valid or invalid:
    - The test is considered valid (so the test result isn't conform) if one of the following is true :
        - ° the fracture is situated in the liner,
        - ° the fracture surface is situated partly in the base material of the manhole or inspection chamber and partly between the liner and the base material and the surface contains less than 25 % of base material.
    - In all other cases, the test is considered as invalid and should be repeated.

4.3.6 Test report

The test report sets out at least:

- the details of the laboratory,
- the details and identification of the sample (manhole or inspection chamber and liner),
- the pull-off force as calculated in article 4.3.5,
- the place of the fracture,
- references to this PTV.