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**Test methods for repair materials for water-leakage cracks in underground concrete structures
— Part 2: Test method for chemical resistance**

~~Part 2:~~

~~Test method for chemical resistance~~

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 71, Concrete, reinforced concrete and pre-stressed concrete, Subcommittee SC 7, Maintenance and repair of concrete structures.

This second edition cancels and replaces the first edition (ISO/TS 16774-2:2016) which has been technically revised.

The main changes are as follows:

- ambient conditions in 6.3 and A.3.3 have been modified;
- some clarifications have been made in Clause 7 and 9.2;
- some editorial corrections have been made.

A list of the following all parts, under in the general title *Test methods for repair materials for water leakage cracks in underground concrete structures*: ISO 16774 series can be found on the ISO website.

- Part 1: Test method for thermal stability
- Part 2: Test method for chemical resistance
- Part 3: Test method for water (wash out) resistance
- Part 4: Test method for adhesion on wet concrete surface
- Part 5: Test method for watertightness

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Introduction

This ~~Technical Specification document~~ is linked to ISO/TR 16475. ISO/TR 16475 outlines ~~six~~ basic properties and the required performance levels of water leakage repair materials, and ~~the~~ ISO/TS 16774 ~~series~~ proposes sample testing methods that are capable of evaluating the respective properties of the repair materials.

The test methods in this ~~Technical Specification document~~ are intended to serve as a reference for nations that have not yet developed a test method on the ~~six~~ required performance properties of water leakage repair materials. If other forms of test methods that are simpler, more accurate or more organized are available, such methods are recommended for use instead. Many of the dependent variables outlined in the reference test methods of this ~~Technical Specification document~~ are subject to change in accordance with the environmental conditions (temperature and humidity, chemical solution and concentration, width of movement activity, water pressure or water flow velocity, etc.) outlined in the standards used in respective countries.

For ISO/TS 16774-1, ISO/TS 16774-5 and ISO/TS 16774-6, for the purpose of objectively comparing the performance of injected repair materials, artificial cracks of same width, height, and volume were used to control the usage of repair materials for each testing cycle and enable repetition of the same test methods under the same conditions.

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Test methods for repair materials for water-leakage cracks in underground concrete structures — Part 2: Test method for chemical resistance

1 Scope

This ~~part of ISO/TS 16774~~document specifies a laboratory test method for the qualitative determination of the retention level of chemical resistance of repair materials in repaired cracks of concrete structures in conditions where the material is either underwater or in contact with water that ~~may~~can have various chemical components present.

2 Normative references

The following documents, ~~are referred to in whole the text in such a way that some or in part, are normatively referenced in all of their content constitutes requirements of this document and are indispensable for its application.~~ For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TR 16475, *Guidelines General practices for the repair of water-leakage cracks in concrete structures*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 16475 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

<https://standards.iteh.ai/catalog/standards/sist/780f2c26-35f8-4eb2-9a52-6f9830085043/iso->

— IEC Electropedia: available at <https://www.electropedia.org/>

3.1

water leakage repair material for water-leakage cracks

grouting materials used to prevent water-leakages in concrete cracks

Note 1 to entry: In this ~~Technical Specification~~document, target ingredients are limited to injection materials outlined in ISO/TR 16475.

4 Principle

A repair material's resistance to chemical attacks is one of the fundamental properties that water-leakage repair materials should possess.— Repair materials can undergo chemical property changes due to chemical attack. Harmful chemical substances can also corrode the repair material and reduce their ability to prevent water leakage. This test method evaluates a water-leakage repair material's chemical resistance performance by determining if the tested material can maintain as closely as possible its original mass after being exposed to various types of chemical substances as a means to evaluate the material's resistance against chemical corrosion. In this method, comparing the mass difference of water leakage repair materials before and after chemical exposure can be used to determine the repair material's chemical resistance level. An example test method is provided in Annex A.

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The tested repair material sample prepared in a Petri dish is placed in a container and completely immersed in chemical solutions for predetermined number of hours or days (values subject to change in accordance ~~to~~^{with} different national standards). The concentration of the tested chemical solution follows the condition of the applied environment belonging to different national standards, meaning test chemical substances that represent common chemical substances that are exposed to concrete material and repair materials, as well as exposure time and chemical concentration range values should reflect the applicable environmental conditions.

Test specimens are treated so that they remain in a stable state prior to immersion in chemical substance so that physical factors such as swelling, pore-filling, or bubbling do not affect the principles of this test method. The mass of the test specimen after immersion in chemical substance is measured using an electronic scale and the mass difference is recorded. Tested types of repair materials in this ~~part of ISO/TS 16774~~ document are limited to injection type water-leakage repair materials.

5 Apparatus

5.1 ~~5.1~~ Container.

Any size of plastic or glass type of container used to contain the chemical solution and immerse the test specimens (quality of the material of container, bowl, or dish being used should be made with materials that are non-reactive to chemical substance).

5.2 ~~5.2~~ Others.

5.2.1 **Glass testing dishes (Petri dish) and plate** (~~used to elevate the specimen above the floor of the container~~).

5.2.2 **Electronic scale** (~~measurable, capable of measuring up to two decimal places in unit-grams~~).

5.2.3 **Stirring rod and trowel** used for specimen placement into Petri dish.

5.2.4 **Other types of injecting apparatus** (optional).

6 Preparation

6.1 Test specimens

a) Completely fill the glass Petri dish with repair material.

Repair material surface should be treated with a trowel or other surface treating tools to make ~~certain~~^{sure} the surface of the material is flat (tolerance for uneven surface allowed). Should there be a specific instruction provided by the manufacturer on how to prepare ~~on~~/inject material, such method should be used instead.

b) Cure the test specimens in the test room for predetermined number of hours or days until it dries to constant mass with +/- tolerance.

c) Prepare a set number of specimens for test repetition.