INTERNATIONAL STANDARD

**ISO 14824-3**

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# Grout for prestressing tendons —

# Part 3: Test methods

*Coulis pour câbles de précontrainte —*

*Partie 3: Méthodes d'essai*



Reference number
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 14824-3 was prepared by Technical Committee ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, Subcommittee SC 3, *Concrete production and execution of concrete structures*.

ISO 14824 consists of the following parts, under the general title *Grout for prestressing tendons:*

— *Part 1: Basic requirements*

— *Part 2: Grouting procedures*

— *Part 3: Test methods*



 

# Introduction

In post-tensioned prestressed concrete construction, the grouting of tendons is an important operation. The intention of this part of ISO 14824 is to provide a specification for grouting, compliance with which will satisfy the requirements in ISO 22966.

The testing regimes anticipated by this part of ISO 14824 include three levels:

(1) initial type and audit testing in accordance with ISO 14824-1;

(2) suitability testing for confirmation of the selected grout for a specific project in accordance with ISO 14824-2;

(3) inspection during the production of grout on a specific project in accordance with ISO 14824-2.

The test methods for each of the regimes are given in this part of ISO 14824. Some tests given herein are alternatives and it will be necessary to relate the chosen test method to the specified requirements. The tests are reference tests for checking suitability of grout for use with any type of tensile steel element.

Where the suitability of high viscosity grouts has been proven by full scale trials, alternative appropriate test methods can be adopted provided a correlation or safe relationship with these test methods has been established.

# Grout for prestressing tendons —

# Part 3: Test methods

## 1 Scope

This part of ISO 14824 describes the test methods for grout specified in ISO 14824-1. The test methods are applicable to grout for all types of structures, including bridges and buildings.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 679, *Cement — Test methods — Determination of strength*

ISO 14824-1, *Grout for prestressing tendons — Part 1: Basic requirements*



## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.



**3.1**
**grout**
homogeneous mixture of cement and water, which may contain admixtures and additions

## 4 Testing of grout

### 4.1 General

#### 4.1.1 Personnel

The grouts shall be tested by competent personnel experienced in the subject.

#### 4.1.2 Test conditions

Testing shall be carried out at temperatures specified in accordance with ISO 14824-1. The temperature of constituent materials should be as recommended by the manufacturer in order to attain grout of the required temperature.

The grout for the tests shall be made from materials specified in ISO 14824-1 and mixed in accordance with ISO 14824-1.

NOTE ISO14824-2 requires suitability testing to be carried out using the same type of mixing equipment as is used for the actual site operations, hence it is preferable to also use the same type of equipment for all testing.

#### 4.1.3 Test reports

All test reports shall include the following information as a minimum:

a) reference to this part of ISO 14824;

b) name and address of the testing laboratory;

c) identification number of the test report;

d) name and address of the organization or person who ordered the test;

e) name and address of the manufacturer or supplier of the product(s);

f) name or other identification mark of the product;

g) date of fabrication, and if relevant, supply of the product;

h) date of manufacture of test specimens;

i) date of test;

j) temperature of the fresh grout and ambient temperature;

k) batching and mixing procedures used;

l) specification of the grout mixer used;

m) identification of test equipment used, including, where appropriate, calibration details;

n) individual results for the required test;

o) any inaccuracies or uncertainty of test results;

p) date and signature of the person responsible for the tests.



### 4.2 Sieve test

#### 4.2.1 Principle of test



The test consists of pouring a quantity of grout through a sieve to check for the absence of lumps on the sieve.

The test may be omitted where all grout used in the project automatically passes through a sieve with an aperture ≤ 2 mm within the supply equipment.

#### 4.2.2 Apparatus

A 150 mm diameter sieve with an aperture ≤ 2 mm.

#### 4.2.3 Procedure

Pour a minimum of 1 l of freshly mixed grout through the sieve.

NOTE This can be carried out while filling the fluidity test cone.

#### 4.2.4 Reporting

Report the absence of lumps on the sieve.

### 4.3 Fluidity test

Two test methods are described. Only one is to be performed as appropriate for the type or characteristics of the grout.

#### 4.3.1 Cone method

##### 4.3.1.1 Principle of test

The fluidity of grout, expressed in seconds, is measured by the time necessary for a stated quantity of grout (1 l) to pass through the orifice of the cone, under stated conditions.

#### 4.3.1.2 Apparatus

The following apparatus is required for the test:

a) Cone of the dimensions given in Figure 1. The cone shall be of smooth non-absorbent material. The volume of the cone (excluding the cylindrical portions at top and bottom) shall be (1,7 ± 0,17) l.

b) Stopwatch showing time to 0,1 s.

c) Graduated cylinder of minimum 1 l capacity and with a diameter of approximately 60 mm.

d) Thermometer.

NOTE The cone in Figure 1 is available in plastic.

#### 4.3.1.3 Test procedure

##### 4.3.1.3.1 Preparation

Mount the cone with its axis vertical and its largest diameter uppermost and support firmly in position. During the test prevent the cone from vibrating. Place the cylinder under the cone outlet. All surfaces of the cone shall be clean and shall be dampened so that the surfaces are moist but without free water. Close the lower cone orifice.

##### 4.3.1.3.2 Procedure



Pour the grout to fill the conical section of the cone. The grout shall be poured sufficiently slowly to prevent a build-up of air. Open the lower cone orifice and at the same time start the stopwatch. Measure the time taken to the nearest 0,5 s, for 1 l of grout to run into the cylinder. The grout shall be kept agitated while waiting further testing if required.



#### 4.3.1.4 Reporting of results

Report the time measured.