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**Geotehnično preiskovanje in preskušanje – Preskušanje geotehničnih  
konstrukcij - 5. del: Preskušanje sider (ISO/DIS 22477-5:2005)**

Geotechnical investigation and testing - Testing of geotechnical structures - Part 5:  
Testing of anchorages (ISO/DIS 22477-5:2005)

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English version

**Geotechnical investigation and testing - Testing of geotechnical structures - Part 5: Testing of anchorages (ISO/DIS 22477-5:2005)**

Reconnaissance et essais géotechniques - Essais de structures géotechniques - Partie 5: Essais d'ancrages (ISO/DIS 22477-5:2005)

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## Foreword

This document (prEN ISO 22477-5:2005) has been prepared by Technical Committee CEN/TC 341 "Geotechnical Investigation and Testing", the secretariat of which is held by DIN, in collaboration with Technical Committee ISO/TC 182 "Geotechnics".

This document is currently submitted to the parallel Enquiry.

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## Geotechnical investigation and testing — Testing of geotechnical structures —

### Part 5: Testing of anchorages

*Reconnaissance et essais géotechniques — Essais de structures géotechniques —*

*Partie 5: Essais d'ancrages*

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## Foreword

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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 22477-5 was prepared by Technical Committee ISO/TC 182, *Geotechnics*, Subcommittee SC 1, *Geotechnical investigation and testing*.

ISO 22477 consists of the following parts, under the general title *Geotechnical investigation and testing — Testing of geotechnical structures*: **(standards.iteh.ai)**

- *Part 1: Pile load test by static axially loaded compression*
- *Part 2: Pile load test by static axially loaded tension*
- *Part 3: Pile load test by static transversally loaded tension*
- *Part 4: Pile load test by dynamic axially loaded compression test*
- *Part 5: Testing of anchorages*
- *Part 6: Testing of nailing*
- *Part 7: Testing of reinforced fill*

## Introduction

Various in-situ tests may be carried out on ground anchors (Investigation test, Suitability test, Acceptance test) and different stressing procedures may be followed (method 1 : cyclic tension test A, method 2 : cyclic tension test B; method 3 : maintained tension test) up to a proof tension or up to the ultimate soil-anchor resistance.

The present document concerns method 1, method 2 and method 3.

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# Geotechnical investigation and testing — Testing of geotechnical structures — Part 5: Testing of anchorages

## 1 Scope

(1) This Standard establishes specifications for the execution of tension load tests where a ground anchor, as defined in EN 1537, is loaded by step (method 3) or in incremental cycles (methods 1 and 2) from a datum load to a maximum test load. The displacement of the anchor head is measured over a period of time at each step (method 3) or at maximum load in each incremental cycle (method 1). The loss of load is measured over a period of time, at maximum load after lock off, in each incremental cycle (method 3)

(2) This standard is applicable to pre-stressed anchors consisting of an anchor head, a tendon free length and a fixed tendon length bonded to the ground by grout.

(3) This standard provides specifications for three types of tension tests : investigation tests, suitability tests and acceptance tests.

(4) The standard provides specifications for the experimental devices, the measurement apparatus, the test procedures, the definition and the presentation of the test results and the content of records.

NOTE The interpretation of the test results is not in the scope of this standard. Guidance is given however (in an informative annex) on the determination of the pull out resistance  $R_a$  of an anchor on the basis of Investigation tests and for checking of the displacement behaviour of an anchor on the basis of Suitability tests and Acceptance tests.

(5) This standard shall be used in conjunction with EN 1997-1 and EN 1537.

NOTE Section 8 of EN 1997-1:2004 provides specifications for the design of temporary and permanent anchors on the basis of Suitability tests and the checking of the design on the basis of Acceptance tests. EN 1537 provides specifications for the execution of anchors bounded to the ground.

## 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.

EN 1537, *Execution of special geotechnical works – Ground anchors*

EN 1997-1, *Eurocode 7 : Geotechnical design – Part 1 : General rules*

## 3 Terms, definitions and symbols

### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1997-1 and EN 1537 and the following apply.

3.1.1

**preliminary anchor**

an anchor which is installed before the commencement of the anchoring works for the purpose of establishing the suitability of the chosen type of anchors and for confirming its design, dimensions and tension resistance.

NOTE Preliminary anchors loaded to failure may not be included in the structure

3.1.2

**working anchor**

anchor that is part of a structure

3.1.3

**estimated anchor pull out resistance**

ultimate resistance of the ground-anchor interaction determined on the basis of comparable experience or numerical calculation before the test

3.1.4

**anchor pull-out resistance**

limit pull out force of an anchor deduced from an investigation test

3.1.5

**anchor critical resistance**

tension force of an anchor above which important displacement under constant load occurs.

3.1.6

**anchor tendon resistance**

ultimate structural resistance of an anchor tendon.

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3.2 Symbols

$A_t$	Cross sectional area of anchor tendon
$E_t$	Elastic modulus of anchor tendon
$f$	Friction loss as a percentage of $P_p$
$k_l$	Load loss
$L_{app}$	Apparent tendon free length
$L_e$	External length of tendon measured from the tendon anchorage in the anchor head to the anchorage point in the stressing jack
$L_{fixed}$	Fixed anchor length
$L_{free}$	Free anchor length
$L_t$	Tendon length
$L_{tb}$	Tendon bond length
$L_{tf}$	Tendon free length
$P$	Load on an anchor
$P_a$	Datum load
$P_c$	Critical creep load

$P_d$	Design value of P
$P_o$	Anchor lock-off load
$P_p$	Proof load
$P_u$	Anchor ultimate load determined in an Investigation test
$R_a$	Anchor pull-out resistance
$R_c$	Anchor critical resistance
$R_e$	Estimated anchor pull-out resistance
$R_{td}$	Design value of the structural tensile resistance of an anchor
$s$	Anchor head displacement
$s_o$	Anchor head displacement under datum load $P_a$
$t$	Time from application of load increment or load lock-off
$\alpha$	Slope of "creep displacement vs. lg time" plot
$\Delta P$	Difference between proof load and anchor datum load
$\Delta P_f$	Friction loss
$\Delta s$	Measured extension of anchor tendon under load increment $\Delta P$

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