SLOVENSKI STANDARD
SIST EN ISO 22282-4:2012

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Geotehnično preiskovanje in preskušanje - Hidrogeološke preiskave - 4. del: Črpalni preskus (ISO 22282-4:2012)

Geotechnical investigation and testing - Geohydraulic testing - Part 4: Pumping tests (ISO 22282-4:2012)

Geotechnische Erkundung und Untersuchung - Geohydraulische Versuche - Teil 4: Pumpversuche (ISO 22282-4:2012)

Reconnaissance et essais géotechniques - Essais géohydrauliques - Partie 4: Essais de pompage (ISO 22282-4:2012)

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ICS:

93.020	Zemeljska dela. Izkopavanja. Gradnja temeljev. Dela pod zemljo	Earthworks. Excavations. Foundation construction. Underground works

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EUROPEAN STANDARD

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English Version

Geotechnical investigation and testing - Geohydraulic testing - Part 4: Pumping tests (ISO 22282-4:2012)

Reconnaissance et essais géotechniques - Essais géohydrauliques - Partie 4: Essais de pompage (ISO 22282-4:2012)

Geotechnische Erkundung und Untersuchung - Geohydraulische Versuche - Teil 4: Pumpversuche (ISO 22282-4:2012)

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Foreword

This document (EN ISO 22282-4:2012) has been prepared by Technical Committee CEN/TC 341 “Geotechnical Investigation and Testing", the secretariat of which is held by ELOT, in collaboration with Technical Committee ISO/TC 182 "Geotechnics".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2012, and conflicting national standards shall be withdrawn at the latest by December 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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INTERNATIONAL STANDARD

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Geotechnical investigation and testing — Geohydraulic testing —

Part 4: Pumping tests

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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.

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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.

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ISO 22282-4 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 341, *Geotechnical investigation and testing*, in collaboration with Technical Committee ISO/TC 182, *Geotechnics*, Subcommittee SC 1, *Geotechnical investigation and testing*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 22282 consists of the following parts, under the general title *Geotechnical investigation and testing — Geohydraulic testing*:

— *Part 1: General rules*

— *Part 2: Water permeability tests in a borehole using open systems*

— *Part 3: Water pressure tests in rock*

— *Part 4: Pumping tests*

— *Part 5: Infiltrometer tests*

— *Part 6: Water permeability tests in a borehole using closed systems*

Geotechnical investigation and testing — Geohydraulic testing —

Part 4: Pumping tests

1 Scope

This part of ISO 22282 establishes requirements for pumping tests as part of geotechnical investigation service in accordance with EN 1997-1 and EN 1997-2.

A pumping test consists in principle of:

— drawing down the piezometric surface of the groundwater by pumping from a well (the test well);

— measuring the pumped discharge and the water level in the test well and piezometers, before, during and after pumping, as a function of time.

This part of ISO 22282 applies to pumping tests performed on aquifers whose permeability is such that pumping from a well can create a lowering of the piezometric head within hours or days depending on the ground conditions and the purpose. It covers pumping tests carried out in soils and rock.

The tests concerned by this part of ISO 22282 are those intended for evaluating the hydrodynamic parameters of an aquifer and well parameters, such as:

— permeability of the aquifer,

— radius of influence of pumping,

— pumping rate of a well,

— response of drawdown in an aquifer during pumping,

— skin effect,

— well storage,

— response of recovery in an aquifer after pumping.

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 14688-1, *Geotechnical investigation and testing — Identification and classification of soil — Part 1: Identification and description*

ISO 14689-1, *Geotechnical investigation and testing — Identification and classification of rock — Part 1: Identification and description*

ISO 22282-1, *Geotechnical investigation and testing — Geohydraulic testing — General rules*

ISO 22475-1, *Geotechnical investigation and testing — Sampling methods and groundwater measurements — Part 1: Technical principles for execution*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 22282-1 and the following apply.

3.1.1
radius of influence of pumping
$R(t)$
distance, measured from the axis of the well, beyond which the lowering of the piezometric surface of the groundwater is nil

NOTE In a steady-state condition, $R(t)$ is constant, and is thus designated by R_a.

3.2 Symbols

Symbol	Designation	Unit
D	drilled diameter of the well	m
d	thickness of the aquifer	m
L	wetted length of screen of the perforated pipe placed in the well	m
Q	flow rate	m^3/s
Q_d	discharge rate, assessed pumping discharge at the end of the well preparation	m^3/s
Q_e	discharge of the pumping test	m^3/s
R_a	radius of influence under steady-state conditions	m
$R(t)$	radius of influence at time (t)	m
S	storage factor	—
T	transmissivity	m^2/s
t	time	s
v	velocity	—
a	slope of the line that characterizes the drawdown in the well	—
b	ordinate at the origin of the line that characterizes the drawdown in the well	—
c	conventional drawdown unit of the preliminary pump discharge	—
d_N	size which may be interpolated from the grading curve, of the square sieve mesh of side d for which the weight percent of undersize is equal to N percent	—
e	distance between the bottom of the well and the surface of the unconfined groundwater at rest in an aquifer	m
k_h	horizontal permeability coefficient	m/s
Δh	drawdown of the water level in the well	m
$\Delta h'$	drawdown of the water level in the well after 2 h	m
Δh_f	drawdown of the water level in the well, set during the preliminary test and not to be exceeded	m
Δh_{max}	maximum drawdown of the water level in the well during the pumping test	m

4 Equipment

Conducting a pumping test requires the following equipment and instruments:

a) a test well and piezometers (see ISO 22475-1);