



SLOVENSKI STANDARD
SIST EN 14343:2006
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Rotary positive displacement pumps - Performance tests for acceptance

Rotierende Verdrängerpumpen - Leistungsprüfung zur Abnahme

Pompes volumétriques rotatives - Essais de performances pour la réception

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English Version

Rotary positive displacement pumps - Performance tests for acceptance

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Rotierende Verdrängerpumpen - Leistungsprüfung zur Abnahme

This European Standard was approved by CEN on 26 October 2005.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Foreword

This European Standard (EN 14343:2005) has been prepared by Technical Committee CEN/TC 197 “Pumps”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by June 2006, and conflicting national standards shall be withdrawn at the latest by June 2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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1 Scope

This European Standard describes specified types of acceptance tests for rotary positive displacement pumps for applications other than fluid power, excluding progressing cavity and peristaltic type pumps.

This European Standard applies to the testing of pumps with and without drivers.

This European Standard covers a selection of tests to establish a uniform demonstration of the pump's ability to perform satisfactorily. It does not, however, cover all tests that may be needed for particular pump types or applications, e.g. tests for hazardous liquids or single shaft multiple pump units. Furthermore, it does not cover any noise and vibration tests, priming tests nor any hydrostatic pressure tests. Some pump types with integral relief valves may require more extensive relief valve tests than described in this European Standard. For dosing and metering applications, further tests to demonstrate the dosing and metering abilities of the pumps may be necessary.

NOTE Extrapolation of test results to non-tested pumps is not described in this European Standard. Such extrapolation could be made for mass-produced pumps with reference to pertinent quality assurance methods and standards.

2 Normative references

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

EN 10204, *Metallic products — Types of inspection documents*

EN 12723:2000, *Liquid pumps — General terms for pumps and installations — Definitions, quantities, letter symbols and units*

<https://standards.iteh.ai/catalog/standards/sist/32b9a3b6-1030-4bb6-9a01-4c3609e00000/EN-12723-2000>

EN ISO 10012, *Measurement management systems — Requirements for measurement processes and measuring equipment (ISO 10012:2003)*

3 Terms and definitions

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

3.1 General

For the purposes of this European Standard, the terminology, symbols and abbreviations as given in EN 12723:2000 apply.

3.2 Types of test

3.2.1 T1 flow test

test to verify that the pump flow is within a specified tolerance

3.2.2 T2 power test

test to verify that the input power is within specified tolerances

3.2.3 T3 inlet pressure test

test to verify that the pump operates satisfactorily without cavitation at specified inlet pressure conditions

NOTE The inlet pressure test T3 is not designed to establish the limit for cavitation, nor is it intended to establish the priming characteristics of the pump. Some guidance for priming tests is given in Annex B. Such a test, when required, may be made part of the test programme, but will require separate description of the test procedure and acceptance criteria, adapted to the subject type of pump.

3.2.4 T4 relief valve test

test to verify the pressure accumulation of a relief valve and its ability to reseal/close when the pressure is returned to normal

3.3 Test levels**3.3.1 L1 works test**

manufacturers' internal quality assurance test. This test level is a pass/fail test without any formal recording requirements

3.3.2 L2 standard test

manufacturers' internal quality assurance test, with traceable records of pertinent test data

3.3.3 L3 order specified test

test to verify the performance of a pump or pump unit at specified conditions. Test data are recorded

3.3.4 L4 observed test

test to verify the pump or pump unit performance at specified conditions. The purchaser is given an opportunity to have a representative present at test. Test data are recorded.

3.3.5 L5 witness test

test to verify the pump or pump unit performance at specified conditions. The purchaser needs a representative present at test (shall be a hold point). Test data are recorded

3.4 Other terms**3.4.1 test condition variables (TCV)**

those variables, such as pressure, speed and viscosity, that are directly controlled by the test arrangement and its operation

3.4.2 test result variables (TRV)

those variables, such as flow and power consumption, that are obtained as a result of TCV and reflect the performance of the object under test

3.4.3 accuracy grade

set of instrumentation and test equipment accuracy requirements

3.4.4 tolerance class

set of tolerance requirements for TRV

3.4.5 pressure accumulation

for the purpose of this European Standard, pressure accumulation is considered as the difference between the maximum pressure observed during relief valve opening and the specified operating pressure. This value includes the margin between operating pressure and valve setting and the pressure increase by relief valve characteristic

4 Performance requirements

The supplier shall identify and specify in writing, prior to the test, the TCV values (test conditions) together with the corresponding requirement values of TRV (performance results) for each set. He shall also specify test level, accuracy grade and tolerance class relevant to the purpose of the test.

NOTE For test levels L3, L4 and L5 the TCV (test condition variables) values should be selected to conform as far as practical to the conditions of the order and agreed upon by manufacturer and purchaser.

Unless otherwise specified and agreed between purchaser and supplier, the following default values shall apply:

- test type: T1 Flow test
and, for pumps with integral valve or a valve directly attached to the pump body,
T4 Relief valve test
- test level: L2 Standard test
- accuracy: Grade 2
- tolerance: Class 2

5 Organisation

5.1 Responsibility for test

The supplier shall be responsible for the appointment of a competent and experienced person to be in charge of the tests. The supplier shall also be responsible for ensuring compliance with all relevant safety regulations and standards, unless testing is performed at an independent laboratory or at site, when conformity to safety regulations shall be ensured by the party responsible for the test location.

5.2 Test location

Unless otherwise specified, testing shall be carried out at the supplier's works. If so agreed between purchaser and supplier, the testing may be carried out either at an independent test facility or at site.

5.3 Test date

The supplier shall determine the date of test. For observed or witness test (level L4 and L5), a minimum of 10 calendar days notice shall be provided to the purchaser unless otherwise agreed in advance.

5.4 Test programme

The test procedure shall be described in a test programme prior to test. For observed test L4 or witness test L5, the test programme shall be made available to the purchaser prior to test.

The test programme shall include details on scheduling and responsibility for test, test methods and arrangements, performance requirements as per Clause 4 above, verification levels for inlet pressure tests T3, when applicable (see 9.4.2), sequence and timing of actions and observations, recording of test data, methods for data corrections (see 7.1), presentation of results etc.

6 Equipment

6.1 Test equipment

6.1.1 General

The pump under test shall be connected to a suitably dimensioned and rated test loop. Example of a test loop is given in Annex A. The test loop shall conform to the installation instruction given for the test pump. Special attention should be given to the alignment between pump and driver, possibilities to fill and drain the pump and to access for observation of leakage, vibration or other indications of malfunction.

When necessary, an auxiliary loop for conditioning of the liquid, i.e. heating, cooling and/or filtering, shall be provided, see 6.1.3 and 6.1.4.

6.1.2 Test liquid

The test liquid shall be a Newtonian liquid of known characteristics selected by the manufacturer. Necessary liquid data, such as viscosity-temperature relationship, shall be available at the test stand, either in tabulated or graphical form, indicating the liquid designation and the date of issue and latest revision.

The amount of test liquid shall be sufficient to allow it to settle in the tank and for this purpose the ratio of liquid volume to pump flow shall exceed 150 s, unless the purpose can be ascertained by other means, like highly efficient filtration and cooling.

6.1.3 Liquid temperature

Means shall be provided to maintain an inlet temperature to the pump during test, constant within $\pm 1,5$ °C.

6.1.4 Liquid cleanliness

If necessary, adequate filtration in order to maintain the cleanliness of the liquid within the limits specified for the pump under test shall be provided.

6.1.5 Entrained air

For viscous test liquids and when otherwise so required, means shall be provided for separating un-dissolved air and gas from the test liquid in order to minimise the risk of air and other gases entering the pump. Such means may include for instance a sloping mesh in the tank or suitably arranged bleeder valves.

6.1.6 Driver

For tests on bare-shaft pumps, a suitable driver shall be selected, capable of maintaining constant speed at any given test point within ± 5 rpm.

6.1.7 Inlet pressure control device

When so required, a suitably dimensioned valve to control the inlet pressure shall be fitted in the inlet line. In fully open position it shall not cause any significant pressure drop. The type of such a valve and its position in the test loop shall be selected in such a way that cavitation in the valve is minimised and possible cavitation or release of dissolved gases in the valve does not influence the test. It shall generally be fitted as far from the pump as possible and as far below the pump inlet level as possible.

Any other relevant means to decrease inlet pressure, such as a pressure-controlled tank or changing the geodetic suction height, is acceptable.