

SLOVENSKI STANDARD

SIST EN 1151:2000

01-december-2000

Pumps - Rotodynamic pumps - Circulation pumps having an electrical effect not exceeding 200 W for heating installations and domestic hot water installations - Requirements, testing, marking

Pumps - Rotodynamic pumps - Circulation pumps having an electrical effect not exceeding 200 W for heating installations and domestic hot water installations - Requirements, testing, marking

Pumpen - Kreiselpumpen - Umwälzpumpen mit elektrischer Leistungsaufnahme bis 200 W für Heizungsanlagen und Brauchwassererwärmungsanlagen für den Hausgebrauch - Anforderungen, Prüfung, Kennzeichnung

[SIST EN 1151:2000](https://standards.itih.ai/catalog/standards/sist/3189ce56-bf7b-4086-bf4d-198198198198)

Pompes - Pompes rotodynamiques - Circulateurs de puissance absorbée n'excédant pas 200 W, destinés au chauffage central et à la distribution d'eau chaude sanitaire domestique - Exigences, Essais, Marquage

Ta slovenski standard je istoveten z: EN 1151:1999

ICS:

23.080 11.040.10 Pumps

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EUROPEAN STANDARD

EN 1151

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 1999

ICS 23.080

English version

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This European Standard was approved by CEN on 15 February 1997.

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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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This European Standard has been prepared by Technical Committee CEN/TC 197 "Pumps", the secretariat of which is held by AFNOR.

SIST EN 1151:2000

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 August 1999, and conflicting national standards shall be withdrawn at the latest by August 1999.

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



Introduction

The extent to which hazards are covered is indicated in the scope of this European Standard. In addition, machinery shall comply as appropriate with EN 292 for hazards for which are not covered by this European Standard.

For the purpose of this European Standard, circulation pumps having a rated power input ≤ 200 W are generally considered for domestic use and circulation pumps having a rated power input >200 W are considered for professional/commercial use.

1 Scope

This draft European Standard establishes general principles for the construction, use and testing of circulation pumps having a rated power input $P_1 \leq 200$ W, intended to be used in heating installations and domestic hot water service installations.

The requirements of this European Standard may apply to circulation pumps for domestic use having a rated power input above 200 W up to and including 300 W. However, this decision depends on agreement between the supplier and purchaser. Circulation pumps with a rated power input above 200 W for professional/commercial use are not covered by this European Standard.

Together with EN 809:1998 this European Standard covers the mechanical aspects of safety and performance for circulation pumps. As regards safety requirements for electrotechnical parts of circulation pumps EN 60 335-2-51:1991 applies.

All known hazards which are likely to occur at normal installation and operation are covered by this European Standard.

This European Standard does not contain any requirements and tests for airborne and structureborne noise emission. These items are going to be dealt with in an amendment.

This European Standard applies to:

- a) A.C. circulation pumps having a rated power input $P_1 \leq 200$ W intended to be used in ordinary heating water systems with a maximum permissible inlet temperature of $T_F \leq 110$ °C and a maximum outlet working pressure $p_{2\max o} \leq 6$ bar.
- b) A.C. circulation pumps having a rated power input $P_1 \leq 200$ W intended to be used in domestic hot water installations with a permissible inlet temperature of $T_F \leq 65$ °C and a maximum outlet working pressure $p_{2\max o} \leq 10$ bar.

The technical specifications given in this European Standard are limited to apply only to circulation pumps of the glandless type.

This European Standard applies to circulation pumps which are manufactured after the date of issue of this European Standard.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendments or revision. For undated references the latest edition of the publication referred to applies.

EN 292-1:1991, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology*

EN 292-2:1991, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications*

EN 809:1998, *Pumps and pump units for liquids — General safety requirements*

EN 60 335-2-51:1991, *Safety household and similar electrical appliances — Part 2: Particular requirements for stationary circulation pumps for heating and service water installations*

HD 472 S 1:1989, *Nominal voltages for low voltage public electricity supply systems*

HD 53.1 S 2:1987, *Rotating electrical machines. Part 1: Rating and performance.*

3 Definitions - Terminology - Symbols and units

For the purpose of this European Standard, the following definitions apply (see table 1 for symbols and units):

3.1 Circulation pump: A centrifugal pump which circulates heating water and/or domestic hot water, as determined by its type. It is a pumping device consisting of a hydraulic, a mechanical and an electric part including a motor.

3.2 Rated power input: The electrical power input at nominal voltage at normal operational condition and maximum load.

3.3 Glandless pump: A circulation pump, the rotor of the motor being in direct contact with the water being pumped.

3.4 Speed setting: With different settings the speed setting is the setting attained when the speed of the electric motor is changed.

3.5 Range of operation: The range of the $H(Q)$ characteristic specified by the manufacturer for normal operation of the pump.

3.6 Maximum inlet pressure (static pressure)¹⁾: The highest inlet pressure to which the pump is subjected during operation.

3.7 Differential pressure¹⁾: The gain in pressure between the pump inlet and pump outlet.

3.8 Maximum outlet working pressure¹⁾: The sum of maximum inlet pressure plus maximum differential pressure at rated conditions.

¹⁾All pressures in this European Standard are gauge pressures except for the differential pressure measured in 5.1.2.2.

Table 1 — Symbols and units

Symbol	Designation	Unit
g	Acceleration due to gravity	m/s ²
H	Head (water gauge)	m
P_1	Rated power input	W
p	Pressure	bar
p_{1max}	Maximum inlet pressure	bar
p_{1-2}	Differential pressure	Pa
p_{2max}	Maximum outlet working pressure	bar
Q	Flow rate	m ³ /h
T	Temperature	°C
T_F	Fluid temperature at inlet port	°C
v	Average velocity of water	m/s
ρ	Density	kg/m ³

4 Performance and safety requirements

4.1 Hydraulic characteristic

The hydraulic characteristic of the circulation pump shall be in accordance with the data published by the manufacturer. For circulation pumps with different speed settings, the performance curve of each setting shall be given (see 5.1 for test arrangement).

4.2 Rated power

For circulation pumps with different speed settings, the rated power input, P_1 , shall be given for at least the maximum and minimum settings (see 5.2 for test arrangement).

4.3 Starting characteristics

The circulation pump shall start satisfactorily (see 5.3 for test conditions).

4.4 Resistance to internal pressure

During the test in accordance with 5.4 the circulation pump shall be pressure tight.

4.5 Temperature resistance

During the test in accordance with 5.5 the circulation pump shall be resistant to temperatures there defined.

4.6 Resistance to thermal cycling

During the test under the conditions specified in 5.6 the circulation pump shall be resistant to thermal cycling.

4.7 Venting and deblocking

During the test in accordance with 5.7 the operation of venting and deblocking devices shall not cause a hazard.

4.8 Material- and design requirement

Circulation pumps for domestic hot water must not emit any toxic, biological or microbiological hazards, when tested in accordance with 5.8.

5 Test methods

The tests can be carried out using several samples of the same type of pump and are to be regarded as type tests. A running-in period of 1h shall be observed.

5.1 Testing of the hydraulic characteristic

The hydraulic characteristic of a circulation pump in accordance with this European Standard is described in the form of a $H(Q)$ performance curve for the permissible range of operation.

The hydraulic performance value assigned by the manufacturer refers to the point where the product of the flow rate Q and the head H reaches the maximum value (point I in figure 1a). A tolerance of $\pm 10\%$ of $H(Q = O)$ (point II in figure 1a) shall apply to the head specified for this point (point I in figure 1a).

In the case of circulation pumps with different speed settings, the above tolerance shall be found at the maximum setting and applies to the minimum settings at the point where the product of the flow rate Q and the head H reaches the maximum value (point III in figure 1b).

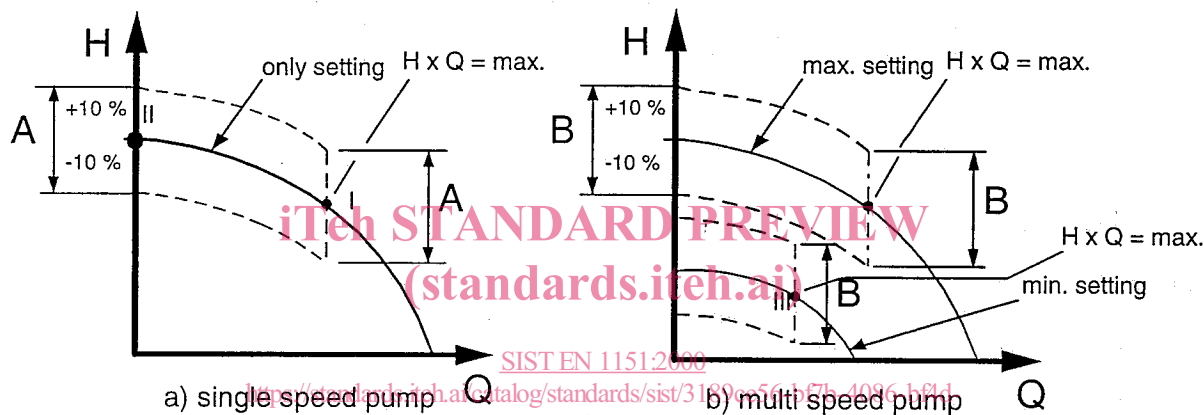


Figure 1 — Hydraulic performance values and tolerances

5.1.1 Test conditions

5.1.1.1 Water quality

The test system shall be supplied with clean water without solids having a temperature of $20\text{ °C} \pm 5\text{ °C}$. Care shall be taken that the water is free of bubbles.

5.1.1.2 Static pressure

A static pressure of 2 bar $\begin{pmatrix} +0,5 \\ 0 \end{pmatrix}$ bar shall be maintained in the test system.

5.1.1.3 Motor input voltage

The nominal voltage of the power supply shall be sinusoidal in accordance with HD 53.1 S 2 with a tolerance of $\pm 2\%$ including any inaccuracy of measuring instrument, the input being maintained at a constant level.

5.1.1.4 Test circuit

D_1 = Inside diameter of pipe and pump inlet
 D_2 = Inside diameter of pipe and pump outlet

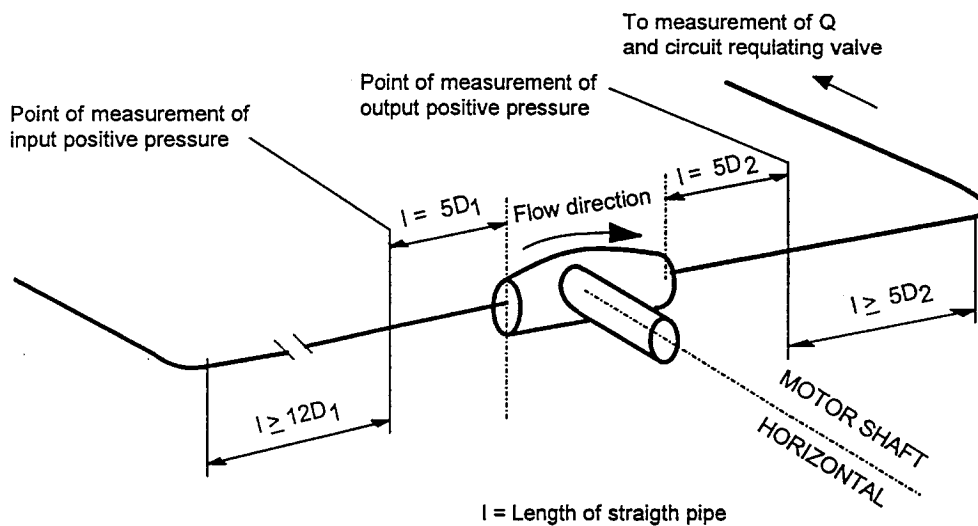


Figure 2 — Illustration of test circuit

The circulation pump is connected to an open or a closed test arrangement which conforms to the description of figure 2.

The arrangement shall be made so that it is possible to control the temperature of the water (adding new water or cooling).

5.1.1.4.1 Form and size of connectors for measurement of pressure

The pressure shall be measured at the point specified in figure 2. They allow determination of a static positive pressure at the level of the measurement point. They shall be provided in a plane perpendicular to the pipe axis. The axis of the measurement bore shall be perpendicular to the pipe axis. The diameter, d , of the measurement bore shall be 2mm.

The length, l , of the measurement bore shall not be greater than twice the bore diameter (see figure 3). The inside surface of the pipe shall be free from burrs and other irregularities.

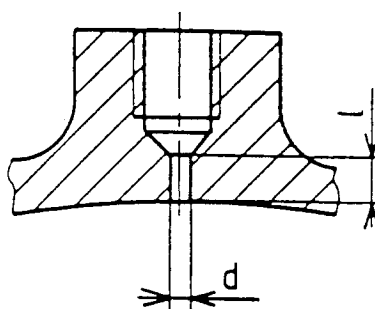


Figure 3 — Example of connector for pressure measurement

5.1.2 Testing of hydraulic performance

5.1.2.1 Flow rate

The flow rate is measured by means of an appropriate flow meter which is an integral part of the test arrangement. The inaccuracy of the measuring instrument used shall not exceed $\pm 2,5\%$ of the measured value.