SLOVENSKI STANDARD

SIST EN 1151-2:2007

01-januar-2007

Nadomeģļ a:

SIST EN 1151:2000

Ļ rpalke - Centrifugalne ļ rpalke - Obtoļ ne ļ rpalke z naznaļ eno vhodno moļ jo do najveļ 200 W za grelne inģtalacije in gospodinjske toplovodne inģtalacije - 2. del: Oznaka preskusa hrupa (vibro-akustiļ nega) pri merjenju hrupa konstrukcije in hrupa tekoļ ine

Pumps - Rotodynamic pumps - Circulation pumps having a rated power input not exceeding 200 W for heating installations and domestic hot water installations - Part 2: Noise test code (vibro-acoustics) for measuring structure- and fluid-borne noise

Pumpen - Kreiselpumpen - Umwälzpumpen mit elektrischer Leistungsaufnahme bis 200 W für Heizungsanlagen und Brauchwassererwärmungsanlagen für den Hausgebrauch - Teil 2: Geräuschprüfvorschrift (vibro-akustisch) zur Messung von Körperschall und Flüssigkeitsschall

Pompes - Pompes rotodynamiques - Circulateurs de puissance absorbée n'excédant pas 200 W, destinés aux installations de chauffage central et d'eau chaude sanitaire domestique - Partie 2 : Code d'essai acoustique (vibro-acoustique) pour le mesurage des bruits solidiens et de liquide

Ta slovenski standard je istoveten z: **EN 1151-2:2006**

ICS:

23.080	Ļ rpalke	Pumps

SIST EN 1151-2:2007 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1151-2

April 2006

ICS 23.080

Supersedes EN 1151:1999

English Version

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This European Standard was approved by CEN on 27 February 2006.

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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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Foreword

This document (EN 1151-2:2006) 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of an identical text or by endorsement, at the latest by October 2006, and conflicting national standards shall be withdrawn at the latest by October 2006.

This document, together with EN 1151-1:2006, supersedes EN 1151:1999.

EN 1151 consists of the following parts under the general title *Pumps — Rotodynamic pumps — Circulation pumps having a rated power input not exceeding 200 W for heating installations and domestic hot water installations*:

-*Part 1: Non-automatic circulation pumps, requirements, testing, marking.*

-*Part 2: Noise test code (vibro-acoustics) for measuring structure and fluid-borne noise*.

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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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This part of EN 1151 covers the measurement of fluid and structure-borne noise as induced by small circulation pumps. It has been prepared in response to the need of having uniform procedures as requirements for noise levels especially in residential housing, tightened by national and European regulations. The issue of airborne noise is covered by other standards.

1 Scope

This part of EN 1151 specifies a test code for the vibro-acoustic characterisation of circulation pumps as defined in EN 1151-1, and is limited to circulation pumps with threaded connections of 1½ inch. The test code comprises the test rig, the measurement method and the test conditions.

The characterisation principle is based on measuring the structure-borne and the fluid-borne power transmitted respectively by vibration and pressure fluctuations in the pipe connected to a circulation pump.

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 1151-1:2006, *Pumps — Rotodynamic pumps — Circulation pumps having a ratecd power input not exceeding 200 W for heating installations and domestic hot water installations — Part 1: Non-automatic circulation pumps, requirements, testing, marking.*

ISO 2016, *Capillary solder fittings for copper tubes — Assembly dimensions and tests*.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1151-1:2006 and the following apply.

3.1
fluid-borne intensity
I_{fb}
time averaged rate of flow of the acoustic energy per cross section of fluid transmitted lengthways the straight pipe by internal pressure fluctuations

NOTE 1 Its sign can be positive or negative indicating the sense of energy propagation.

NOTE 2 Fluid-borne intensity is expressed in W/m^2.

3.2
fluid-borne power
P_{fb}
net acoustic power emitted by a source of pressure fluctuations in the connected straight pipe 〈circulation pumps〉

NOTE 1 Fluid-borne power is always positive.

NOTE 2 Fluid-borne power is expressed in W.

3.3
structure-borne intensity
I_{sb}
time averaged rate of flow of the vibrational energy per unit of length transmitted lengthways the straight pipe by vibration

NOTE 1 Its sign can be positive or negative indicating the sense of energy propagation.

NOTE 2 I_{sb} is an average of the structure borne intensity over the pipe wall thickness and is therefore expressed in W/m.

3.4
structure-borne power
P_{sb}
net vibration power emitted by a source of vibration in the connected straight pipe ⟨circulation pumps⟩

NOTE 1 Structure-borne power is always positive.

NOTE 2 Structure-borne power is expressed in W.

3.5
coefficient of fluid-borne energy reflection
R_{fb}
ratio between the net fluid-borne power reflected by pipework discontinuities and the net fluid borne power emitted in a straight pipe by a pump ⟨circulation pumps⟩

NOTE 1 Pipework discontinuities covers bends, obstructions, section changes, pipe fixations etc.

NOTE 2 This coefficient is always positive and is non-dimensional.

3.6
coefficient of structure-borne energy reflection
R_{sb}
ratio between the net structure-borne power reflected by pipework discontinuities and the net structure borne power emitted in a straight pipe by a pump ⟨circulation pumps⟩

NOTE 1 Pipework discontinuities covers bends, obstructions, section changes, pipe fixations etc.

NOTE 2 This coefficient is always positive and is non-dimensional.

3.7
fluid-borne power level
L_{Wfb}
logarithmic measure of the fluid-borne power emitted in the straight pipe by a source ⟨circulation pumps⟩

3.8
structure-borne power level
L_{Wsb}
logarithmic measure of the structure-borne power emitted in the straight pipe by a source ⟨circulation pumps⟩

3.9
steady state temperature
period of time during which the variation of temperature on the motor and on the body of the circulation pump is contained between limits specified by the manufacturer

4 Test rig

4.1 General

The fluid- and structure-borne powers are determined from measurement data acquired from the test rig.

Components and assembly of the test-rig are described below. To get repeatable and reproducible results of the measurements, it is essential to use a rig, which is in accordance with or corresponds to all specifications and assembly advice given here.

4.2 Main components of test rig

The test rig is illustrated in Figure 1 and its main components are given in Table 1.

Table 1 — Main components of test rig

No.	Component	Purpose
1	Circulation pump	Test object: source of pressure pulsation and vibration.
2	Vibration measurement pipe	Acquisition of vibration data allowing the determination of the structure-borne power.
3	Solid anechoic termination	Device absorbing structure-borne power.
4	Pressure pulsation measurement pipe	Acquisition of pressure fluctuation data allowing the determination of the fluid-borne power.
5	Liquid anechoic termination	Device absorbing fluid-borne power.
6	Water tank	Acoustical isolation of the regulation valve.
7	Pressure vessel	Device equalizing the system pressure.
8	Flow meter	Measurement of flow rate
9	Regulation valve	Flow rate regulation
10	Pipe supports	Connecting devices of pipework with frame.
11	Frame	Metal structure.

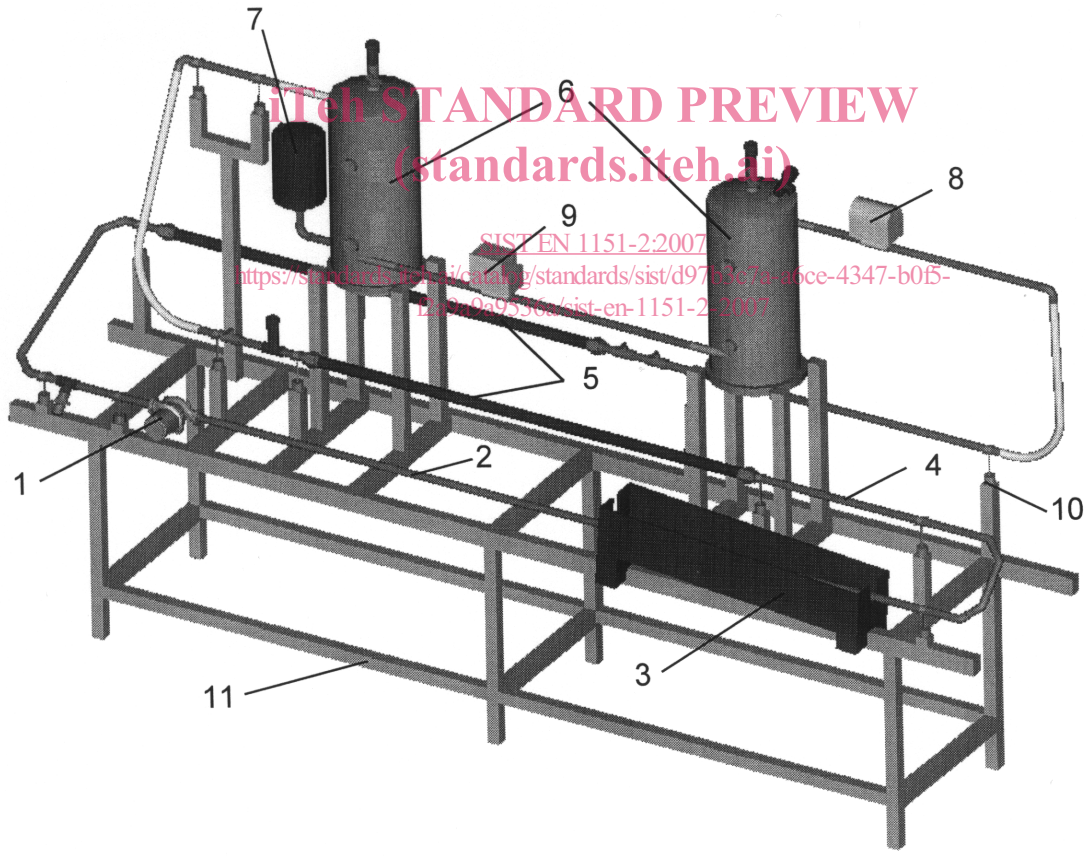

Figure 1 — Test rig

4.3 Specification of test rig components

Table 2 provides the necessary overview of the specified components of the test rig.

Table 2 — Specification of components

Ref.	Component/Part	Qty.	Specification/Remark
1	**Circulation pump**		
1	Pump housing	1	According to EN 1151-1
2	Washer	2	Non absorbing fibre type
2	**Vibration measurement pipe**		
1	Pipe		Usual commercial, Copper, ext. diam. approx. 28 mm, wall thickness 0,9 mm – 1 mm
2	Union nut	2	Usual commercial
3	Insert	2	Usual commercial, soldered conn. diam. approx 28 mm
4	Accelerometer	4	Calibration according to 4.8
3	**Solid anechoic termination**		Propagation index curve according to 4.9
1	Sand box	1	Wood or plastic, wall thickness approx. 10 mm
2	Pipe cover	1	Usual commercial, plastic foam, wall thickness 10 mm
3	Sand	10kg	Fine grain 30 µm – 300 µm, medium grain size 130 µm
4	**Pressure pulsation measurement pipe**		
1	Bend	4	Copper, diam. approx. 28 mm, Form A according to ISO 2016
2	Pipe		Copper, ext. diam. approx. 28 mm, wall thickness 0,9 mm – 1 mm usual commercial
3	Sensor adapter	2	Welding socket piece for flush mounted sensor
4	Pressure transducer	2	Calibration according to 4.8
5	**Liquid anechoic termination**		Propagation index curve acc. To 4.9
1	Terminator	2	Length 1580 mm, diam. approx. 30 mm
2	Pipe connection	4	Union, usual commercial, inox steel
6	**Water tank**		
1	Tank	2	Non-corrosive, volume approx. 50 l
2	Support	8	Connection to frame, screw fixed
3	Intermediate connection	1	Usual commercial stainless steel or copper, ext. diam. approx. 28 mm
4	Pipe connection	2	Flexible tube
7	**Pressure vessel**		
1	Membrane or pressure tank	1	Usual commercial
8	**Flow meter**		
1	Flow meter	1	According to 5.1.2.1 of EN 1151-1:2006
9	**Regulation valve**		
1	Valve	1	Usual commercial
10	**Pipe support**		
1	Support bar		
2	Clip		
3	Rubber insert		
11	**Frame**		
1	Profile		Massive or hollow, iron or aluminium
12	**Miscellaneous**		
	Inlet/outlet valve		
	Manometer		
	Air separator		
	Shut-off valve		

NOTE The test rig may be equipped with additional elements, which are necessary for the trouble-free operation of the water circuit. Such parts shall be installed (in flow direction) behind the 1st and in front of the 2nd liquid anechoic terminator. No additional element exceeding the specified parts is allowed in the remaining test loop area where the measurements take place between and including the fluid anechoic terminations.