SLOVENSKI STANDARD
SIST EN 15378-1:2018

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Nadomešča:
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Energijske lastnosti stavb - Sistemi za ogrevanje stavb in pripravo tople sanitarne vode - 1. del: Pregled kotlov, sistemov za ogrevanje in pripravo tople sanitarne vode - Modula M3-11, M8-11

Energy performance of buildings - Heating systems and DHW in buildings - Part 1: Inspection of boilers, heating systems and DHW, Module M3-11, M8-11

Energetische Bewertung von Gebäuden - Heizungsanlagen und Trinkwassererwärmung in Gebäuden - Teil 1: Inspektion von Kesseln, Heizungsanlagen und Trinkwassererwärmung, Module M3-11, M8-11

Performance énergétique des bâtiments - Systèmes de chauffage et production d'eau chaude sanitaire dans les bâtiments - Partie 1 : Inspection des chaudières, des systèmes de chauffage, et production d'eau chaude sanitaire, Module M3-11, M8-11

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ICS:

91.140.10	Sistemi centralnega ogrevanja	Central heating systems
91.140.65	Oprema za ogrevanje vode	Water heating equipment

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EUROPEAN STANDARD

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English Version

Energy performance of buildings - Heating systems and DHW in buildings - Part 1: Inspection of boilers, heating systems and DHW, Module M3-11, M8-11

Performance énergétique des bâtiments - Systèmes de chauffage et production d'eau chaude sanitaire dans les bâtiments - Partie 1 : Inspection des chaudières et des systèmes de chauffage, Module M3-11, M8-11

Energetische Bewertung von Gebäuden - Heizungsanlagen und Trinkwassererwärmung in Gebäuden - Teil 1: Inspektion von Kesseln und Heizungssystemen, Modul M3-1, M8-11

This European Standard was approved by CEN on 27 February 2017.

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European foreword

This document (EN 15378-1:2017) has been prepared by Technical Committee CEN/TC 228 “Heating systems and water based cooling systems in buildings”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.

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

This document supersedes EN 15378:2007.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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

Introduction

This European Standard is part of a series of standards aiming at international harmonization of the methodology for the assessment of the energy performance of buildings, called ” set of EPB standards “.

All EPB standards follow specific rules to ensure overall consistency, unambiguity and transparency.

All EPB standards provide a certain flexibility with regard to the methods, the required input data and references to other EPB standards, by the introduction of a normative template in Annex A and Annex B with informative default choices.

For the correct use of this standard, a normative template is given in Annex A to specify these choices. Informative default choices are provided in Annex B.

The main target group of this standard are all the users of the set of EPB standards (e.g. architects, engineers, regulators).

Use by or for regulators: In case the standard is used in the context of national or regional legal requirements, mandatory choices may be given at national or regional level for such specific applications. These choices (either the informative default choices from Annex B or choices adapted to national / regional needs, but in any case following the template of this Annex A) can be made available as national annex or as separate (e.g. legal) document (national data sheet).

NOTE So in this case:

— the regulators will specify the choices;

— the individual user will apply the standard to assess the energy performance of a building, and thereby use the choices made by the regulators.

Topics addressed in this standard can be subject to public regulation. Public regulation on the same topics can override the default values in Annex B of this standard. Public regulation on the same topics can even, for certain applications, override the use of this standard. Legal requirements and choices are in general not published in standards but in legal documents. In order to avoid double publications and difficult updating of double documents, a national annex may refer to the legal texts where national choices have been made by public authorities. Different national annexes or national data sheets are possible, for different applications.

It is expected, if the default values, choices and references to other EPB standards in Annex B are not followed due to national regulations, policy or traditions, that:

— national or regional authorities prepare data sheets containing the choices and national or regional values, according to the model in Annex A. In this case the national annex (e.g. NA) refers to this text;

— or, by default, the national standards body will consider the possibility to add or include a national annex in agreement with the template of Annex A, in accordance to the legal documents that give national or regional values and choices.

Further target groups are users of the voluntary common European Union certification scheme for the energy performance of non-residential buildings (EPBD art.11.9) and any other Pan EU parties wanting to motivate their assumptions by classifying the building energy performance for a dedicated building stock

More information is provided in the Technical Report accompanying this standard (CEN/TR 15378-2).

This document specifies procedures to be used for the inspection and assessment of energy performance and sizing of heat generators and accessible parts of heating systems to provide advice to

users on the replacement of heat generators, other modifications to the heating system and on alternative solutions as required by article 14 of Directive 2010/31/EU of the European Parliament and of the Council of 19 may 2010 on the energy performance of buildings (recast).

This standard includes, either in the normative text or in the informative annexes:

— inspection procedures;

— calculation procedures;

— sample reports;

— advice criteria.

Procedures and methodologies defined in this standard are not intended to provide a full energy audit of the heating system. They are intended to:

— support identification of areas of possible improvements;

— define criteria to produce reliable advice on possible improvements of the energy performance of heat generators and heating systems through replacement of components or other measures;

— support advice on the sizing of the boiler and heating system.

Any replacement of appliances or modification of the heating system following advice should be designed according to appropriate methodologies. This may require additional input and investigation for detailed design and final check of economical effectiveness.

Clauses 6 and 7 describe separately the inspection procedures related to:

— inspection of the heat generators;

— inspection of the entire heating systems

Clause 7 should be applied to comply with requirements of article 14 of Directive 2010/31/EU of the European Parliament.

This standard introduces inspection levels by which different levels of inspection accuracy and detailed inspection requirements can be determined, because:

— the same inspection procedure and level of details cannot reasonably be required for any kind and/or any size of heat generators and heating systems;

— there are currently significant differences among EU Member States with respect to:

  — heating systems typologies;

  — legal and/or standard requirements;

  — maintenance and inspection practices.

Alternative and/or optional partial inspection procedures and measurement methods for heat generators and heating system parts are described in the accompanying Technical Report.

Inclusion/omission/alternatives of individual inspection items as well as border lines between levels are specified through tables compiled according to the template given in normative Annex A. If no specific national specification is available, a default specification of inspection levels is given in informative Annex B. Specifications given nationally may refer either to methodologies given in the

accompanying technical report to this standard or to suitable existing national standards and procedures.

This standard has been drafted to support inspection required by Directive 2010/31/EU of the European Parliament and of the council of 19 May 2010 on the energy performance of buildings (recast) that is "*a regular inspection of the accessible parts of systems used for heating buildings, such as the heat generator, control system and circulation pump(s), with boilers of an effective rated output for space heating purposes of more than 20 kW*".

This does not exclude the possibility to use this standard for other types of generation devices (e.g. warm air heaters, heat pumps, thermal solar, CHP, etc.) and to domestic hot water systems if appropriate additional levels are defined.

Detailed information on each clause of this standard, the rationale of the default and suggested choices and all other supporting information (such as examples) are included in CEN/TR 15378-2.

Default references to EPB standards other than EN ISO 52000-1 are identified by the EPB module code number and given in Annex A (normative template) and Annex B (informative default choice).

NOTE Example of EPB module code number: M5–5, or M5–5.1 (if module M5–5 is subdivided), or M5–5/1 (if reference to a specific clause of the standard covering M5–5.

1 Scope

This document specifies inspection procedures for the assessment of energy performance of existing boilers and heating systems.

Heat generators types covered by this standard are:

— boilers for heating, domestic hot water or both;

— gas, liquid, solid fuel fired combustion boilers;

— electrically driven and gas driven heat pumps;

— thermal solar systems for domestic hot water, heating or both;

— other heat generators types, such as cogeneration units.

Parts of heating systems covered by this standard are:

— heat generators, including generation control;

— heating distribution network, including associated components and controls;

— heating emitters, including components and controls;

— space heating control system;

— heat storage and associated components;

— domestic hot water production system.

This standard covers issues related to energy conservation and environmental performance.

Table 1 shows the relative position of this standard within the set of EPB standards in the context of the modular structure as set out in EN ISO 52000-1.

NOTE 1 In prCEN ISO/TR 52000-2 the same table can be found, with, for each module, the numbers of the relevant EPB standards and accompanying technical reports that are published or in preparation.

NOTE 2 The modules represent EPB standards, although one EPB standard may cover more than one module and one module may be covered by more than one EPB standard, for instance a simplified and a detailed method respectively. See also Clause 2 and Tables A.1 and B.1.

Table 1 — Position of this standard within the modular structure of EPB standards

	Overarching		Building (as such)		Technical Building Systems									
Submodule	Descriptions		Descriptions		Descriptions	Heating	Cooling	Ventilation	Humidification	Dehumidification	Domestic Hot water	Lighting	Building automation and control	Electricity production
sub1		M1		M2		M3	M4	M5	M6	M7	M8	M9	M10	M11
1	General		General		General	EN 15316–1					EN 15316–1			
2	Common terms and definitions; symbols, units and subscripts		Building Energy Needs		Needs						EN 12831–3			
3	Applications		(Free) Indoor Conditions without Systems		Maximum Load and Power	EN 12831–1					EN 12831–3			
4	Ways to Express Energy Performance		Ways to Express Energy Performance		Ways to Express Energy Performance	EN 15316–1					15316–1			
5	Building categories and Building Boundaries		Heat Transfer by Transmission		Emission and control	EN 15316–2	EN 15316–2							
6	Building Occupancy and Operating Conditions		Heat Transfer by Infiltration and Ventilation		Distribution and control	EN 15316–3	EN 15316–3				EN 15316–3			
7	Aggregation of Energy Services and Energy Carriers		Internal Heat Gains		Storage and control	EN 15316–5					EN 15316–5 EN 15316–4-3			
8	Building zoning		Solar Heat Gains		Generation									
8–1					Combustion boilers	EN 15316–4-1					EN 15316–4-1			
8–2					Heat pumps	EN 15316–4-2	EN 15316–4-2				EN 15316–4-2			
8–3					Thermal solar Photovoltaics	EN 15316–4-3					EN 15316–4-3			EN 15316–4-3
8–4					On-site cogeneration	EN 15316–4-4					EN 15316–4-4			EN 15316–4-4

8–5					District heating and cooling	EN 15316–4-5	EN 15316–4-5							EN 15316–4-5
8–6					Direct electrical heater	EN 15316–4-8					EN 15316–4-8			
8–7					Wind turbines									EN 15316–4-10
8–8					Radiant heating, stoves	EN 15316–4-8								
9	Calculated Energy Performance		Building Dynamics (thermal mass)		Load dispatching and operating conditions									
10	Measured Energy Performance		Measured Energy Performance		Measured Energy Performance	EN 15378–3					EN 15378–3			
11	Inspection		Inspection		Inspection	**EN 15378–1**					**EN 15378–1**			
12	Ways to Express Indoor Comfort			–	BMS									
13	External Environment Conditions													
14	Economic Calculation	EN 15459–1												
NOTE The shaded modules are not applicable														

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 7345:1995, *Thermal insulation - Physical quantities and definitions (ISO 7345:1987)*

EN ISO 52000-1:2017, *Energy performance of buildings — Overarching EPB assessment – Part 1: General framework and procedures*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7345:1995, EN ISO 52000-1:2017 and the following definitions apply.

NOTE The terms of EN ISO 52000-1 that are indispensable for the understanding of the underlying standard are repeated here.

3.1
boiler
gas, liquid or solid fuelled appliance designed to provide hot water for space heating

Note 1 to entry: A boiler may (but need not) be used to provide heat for domestic hot water heating as well.

3.2
thermal input
product of the fuel flow rate and the net calorific value of the fuel

3.3
condensing boiler
boiler that, under normal operating conditions and at certain operating water temperatures, partially condenses the water vapour in the combustion products in order to make use of the latent heat of water vapour for heating purposes

Note 1 to entry: Boilers not so designed, or without the means to remove the condensate in liquid form are called 'non-condensing'.

[SOURCE: EN 15502-1 and EN 15034, modified]

3.4
multistage boiler
boiler with the capability to vary the fuel burning rate stepwise whilst maintaining continuous burner firing

3.5
modulating boiler
boiler with the capability to vary continuously (from a set minimum to a set maximum) the fuel burning rate whilst maintaining continuous burner firing

3.6
energyware
tradable commodity used mainly to produce mechanical work or heat, or to operate chemical or physical processes

Note 1 to entry: Energywares form a proper subset of energy carriers. The set of energy carriers is open.

3.7
heat pump
appliance which takes up heat at a certain temperature and releases heat at a higher temperature

Note 1 to entry: When operated to provide heat (e.g. for space heating or water heating), the appliance is said to operate in the heating mode; when operated to remove heat (for example, for space cooling), it is said to operate in the cooling mode.

3.8
electrically-driven heat pump
vapour compression cycle heat pumps, which incorporates a compressor that is driven by an electric motor

Note 1 to entry: This definition refers to the frame of this standard only.

3.1.9
EPB standard
standard that complies with the requirements given in EN ISO 52000-1, CEN/TS 16628 and CEN/TS 16629

Note 1 to entry: CEN/TS 16628 and CEN/TS 16629 contain specific rules to ensure overall consistency, unambiguity, transparency and flexibility, supported by common templates. EN ISO 52000-1, the overarching EPB standard, is indispensable for each EPB standard, because of the modular structure, common terms and definitions, symbols and subscripts and because it provides the general framework for the EPB assessment.

[SOURCE: EN ISO 52000-1:2017]

3.10
gas-driven heat pump
vapour compression cycle heat pumps, which incorporate a compressor that is driven by an gas motor

3.11
gas absorption heat pump
heat pump working with a thermodynamic cycle that uses ammonia as a refrigerant and water as absorber, powered through a combustion direct flame

4 Symbols and subscripts

4.1 Symbols

For the purposes of this document, the symbols given in Clause 4 and EN ISO 52000-1, Annex C and the specific symbols listed in Table 2 apply.

Table 2 — Symbols and units

Symbol	Name of quantity	Unit
α	loss factor	%
β	load factor	-

4.2 Subscripts

For the purposes of this document, the subscripts given in Clause 4 and EN ISO 52000-1, Annex C and the specific subscripts listed in Table 3 apply.

Table 3 — Subscripts

A	area (referred to)	mod	modulating	req	required
ch	chimney	ovsz	oversizing	Φ	power (heat load)
cmb	combustion	fuel	fuel	ge	generator envelope

5 Description of the method

5.1 Heat generator inspection

Regular heat generator inspection procedures and methods are intended to:

a) verify if the heat generator is set, operated and maintained correctly with regard to energy efficiency;

b) estimate actual heat generator energy performance;

c) when required, support advice on possible heat generator energy performance improvements.

5.2 Heating system inspection

Heating system inspection procedures and methods are intended to:

a) verify if the heating systems is set, equipped, operated and maintained correctly with regard to energy efficiency;

b) estimate actual heat generator energy performance;

c) estimate the sizing of the heat generator compared to building needs;

d) provide advice on possible heating system energy performance improvements.

Inspection procedures and optional measurement methods (if any) are specified separately for each subsystem of the heating system.