SLOVENSKI STANDARD
SIST EN 15316-3:2018

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Nadomešča:
SIST EN 15316-2-3:2007
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Energijske lastnosti stavb - Metoda za izračun energijskih zahtev in učinkovitosti sistema - 3. del: Sistemi za distribucijo toplote (priprava tople sanitarne vode, ogrevanje in hlajenje prostora) - Moduli M3-6, M4-6 in M8-6

Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies - Part 3: Space distribution systems (DHW, heating and cooling), Module M3-6, M4-6, M8-6

Energetische Bewertung von Gebäuden - Verfahren zur Berechnung der Energieanforderungen und Nutzungsgrade der Anlagen - Teil 3: Wärmeverteilungssysteme (Trinkwassererwärmung, Heizung und Kühlung), Module M3-6, M4-6, M8-6

Performance énergétique des bâtiments - Méthode de calcul des besoins énergétiques et des rendements des systèmes - Partie 3 : Systèmes de distribution des locaux (eau chaude sanitaire, chauffage et refroidissement), Module M3-6, M4-6, M8-6

Ta slovenski standard je istoveten z: **EN 15316-3:2017**

ICS:

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

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English Version

Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies - Part 3: Space distribution systems (DHW, heating and cooling), Module M3-6, M4-6, M8-6

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

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

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Contents

European foreword

This document (EN 15316-3:2017) 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 document supersedes EN 15316-2-3:2007 and EN 15316-3-2:2007.

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of an identical text or by endorsement, at the latest by October 2017, and conflicting national standards shall be withdrawn at the latest by October 2017.

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

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Introduction

This standard is part of a package developed to support EPBD directive implementation, hereafter called “EPB set of 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.

CEN/TC 228 deals with heating systems in buildings. Subjects covered by TC 228 are:

— energy performance calculation for heating systems;

— inspection of heating systems;

— design of heating systems;

— installation and commissioning of heating systems

This standard specifies the heat flux from distribution systems in space heating systems, space cooling systems and domestic hot water systems. This standard also specifies the auxiliary energy for pumps in space heating systems, space cooling systems and domestic hot water systems.

This standard was developed during the first EPBD mandate and the first version was published in 2008 in two different parts – space heating systems and domestic hot water systems.

This standard is dealing with both earlier standards (EN 15316-2-3 and EN 15316-3-2) and added space cooling systems.

The revision concerned mainly unique calculation methods for the water-based distribution systems for the heat flux as well as for the auxiliary energy of pumps.

The standard was updated to cover hourly/monthly/yearly time-step.

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 parties wanting to motivate their assumptions by classifying the building energy performance for a dedicated building stock.

1 Scope

This European Standard covers energy performance calculation of water based distribution systems for space heating, space cooling and domestic hot water.

This European Standard deals with the heat flux from the distributed water to the space and the auxiliary energy of the related pumps.

The heat flux and the auxiliary energy for pumps can be calculated at any time-step (hour, month and year). The input and output data are mean values of the time step.

Instead of calculating the energy performance of water based distribution systems it is also possible to use measurements as long as they are following the timesteps of the whole performance calculation or can divided in those timesteps.

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 52000-1:2017.

NOTE 1 In CEN ISO/TR 52000-2:2017 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 the set of EPB standards

Overarching			Building (as such)		Technical Building Systems										
	Descriptions			Descriptions		Descriptions	Heating	Cooling	Ventilation	Humidification	Dehumidification	Domestic Hot water	Lighting	Building automation and control	Electricity production
sub1		M1	sub1	M2	sub1		M3	M4	M5	M6	M7	M8	M9	M10	M11
1	General		1	General	1	General	15316–1					15316–1			
2	Common terms and definitions; symbols, units and subscripts		2	Building Energy Needs	2	Needs						12831–3 ?			
3	Applications		3	(Free) Indoor Conditions without Systems	3	Maximum Load and Power	12831–1					12831–3			
4	Ways to Express Energy Performance		4	Ways to Express Energy Performance	4	Ways to Express Energy Performance	15316–1					15316–1			
5	Building Functions and Building Boundaries		5	Heat Transfer by Transmission	5	Emission and control	15316–2	15316–2							
6	Building Occupancy and Operating Conditions		6	Heat Transfer by Infiltration and Ventilation	6	Distribution and control	15316–3	15316–3				15316–3			
7	Aggregation of Energy Services and Energy Carriers		7	Internal Heat Gains	7	Storage and control	15316–5					15316–5 15316–4-3			
8	Building Partitioning		8	Solar Heat Gains	8	Generation									
					8–1	Combustion boilers	15316–4-1					15316–4-1			
					8–2	Heat pumps	15316–4-2	15316–4-2				15316–4-2			
					8–3	Thermal solar Photovoltaics	15316–4-3					15316–4-3			15316–4-3
					8–4	On-site cogeneration	15316–4-4					15316–4-4			15316–4-4
					8–5	District heating and cooling	15316–4-5	15316–4-5							15316–4-5
					8–6	Direct electrical heater	15316–4-6					15316–4-6			
					8–7	Wind turbines									15316–4-7
					8–8	Radiant heating, stoves	15316–4-8								
9	Calculated Energy Performance		9	Building Dynamics (thermal mass)	9	Load dispatching and operating conditions									
10	Measured Energy Performance		10	Measured Energy Performance	10	Measured Energy Performance	15378–3					15378–3			
11	Inspection		11	Inspection	11	Inspection	15378–1					15378–1			
12	Ways to Express Indoor Comfort		12	–	12	BMS									
13	External Environment Conditions														
14	Economic Calculation	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 15232-1, *Energy Performance of Buildings - Energy performance of buildings - Part 1: Impact of Building Automation, Controls and Building Management - Modules M10-4,5,6,7,8,9,10*

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 (ISO 52000-1:2017)*

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 specific definitions apply.

3.1
tapping profile
depending on the definition in M8-3

3.2
setback mode
operation Mode for pumps at the end of scheduled usage time

3.3
boost mode
operation Mode for pumps before the begin of scheduled usage time

4 Symbols and abbreviations

4.1 Symbols

For the purposes of this document, the symbols given in EN ISO 52000-1:2017 and the specific symbols listed in Table 2 apply

Table 2 — Symbols and units

Symbol	Name of quantity	Unit
n_{Tap}	Tapping profile	1/h
β	Mean part load in a time step	-
ε	Expenditure energy factor	-

4.2 Subscripts

For the purposes of this European Standard, the subscripts given in EN ISO 52000-1:2017, and the specific subscripts listed in Table 3 apply.

Table 3 — Subscripts

boost	Boost heating	dis	Distribution	$W_{X,dis}$	Operation mode
setb	Setback mode	dis	Distribution	$W_{X,dis}$	Operation mode

nom	nominal heat loss	dis	Distribution	$Q_{w,dis,nom}$	
stub	open circuited stubs	dis	Distribution	$Q_{W,dis,stub}$	

5 General description of the method - Output of the method

This method covers the calculation of

- thermal loss of the distribution system for space heating, space cooling and domestic hot water in the zone;
- recoverable thermal loss for space heating, space cooling and domestic hot water in the zone;
- auxiliary energy demand of distribution systems;
- recoverable auxiliary energy in the zone for space heating, space cooling and domestic hot water in the zone;
- recovered auxiliary energy in the fluid in the zone for space heating, space cooling and domestic hot water in the zone.

The time step of the output can be according to the time-step of the input values:

— hourly;

— monthly;

— yearly.

All input and output values are mean values in the corresponding time step. Because of summarized time steps with the same boundary conditions the bin-method is also valid.

6 Calculation of heat losses and auxiliary energy of distribution systems

6.1 Output data

The output data of this method are listed in Table 4:

Table 4 — Output data of this method:

Description	Symbol	Unit	Validity interval	Intended destination module	Varying
Temperature of DHW	ϑ_{Wend}	°C	30..70	M8–1	YES
Thermal loss of the distribution system for heating in the zone	$Q_{H,dis,ls}$	kWh	0…∞	M3–1	Yes
Thermal loss of the distribution system for cooling in the zone	$Q_{C,dis,ls}$	kWh	0…∞	M4–1	Yes
Thermal loss of the distribution system for DHW in the zone	$Q_{W,dis,ls}$	kWh	0…∞	M3–1	Yes
Recoverable thermal loss of the distribution system for heating in the zone	$Q_{H,dis,rbl}$	kWh	0…∞	M3–1	Yes
Recoverable thermal loss of the	$Q_{C,dis,rbl}$	kWh	0…∞	M4–1	Yes

distribution system for cooling in the zone					
Recoverable thermal loss of the distribution system for DHW in the zone	$Q_{W,dis,rbl}$	kWh	0…∞	M3–1	Yes
Auxiliary energy for distribution system heating in the zone	$W_{H,dis}$	kWh	0…∞	M3–1	Yes
Auxiliary energy for distribution system cooling in the zone	$W_{C,dis}$	kWh	0…∞	M4–1	Yes
Auxiliary energy for distribution system DHW in the zone	$W_{W,dis}$	kWh	0…∞	M3–1	Yes
Recoverable auxiliary energy for distribution system heating in the zone	$Q_{H,dis,rbl}$	kWh	0…∞	M3–1	Yes
Recoverable auxiliary energy for distribution system cooling in the zone	$Q_{C,dis,rbl}$	kWh	0…∞	M4–1	Yes
Recoverable auxiliary energy for distribution system DHW in the zone	$Q_{W,dis,rbl}$	kWh	0…∞	M3–1	Yes
Recovered auxiliary energy for distribution system heating in the zone	$Q_{H,dis,rvd}$	kWh	0…∞	M3–1	Yes
Recovered auxiliary energy for distribution system cooling in the zone	$Q_{C,dis,rvd}$	kWh	0…∞	M4–1	Yes
Recovered auxiliary energy for distribution system DHW in the zone	$Q_{W,dis,rvd}$	kWh	0…∞	M3–1	Yes

6.2 Calculation time steps

The methods described in paragraph 6 are suitable for the following calculation time steps:

— hourly

— monthly

— yearly

For this method, the output time step is the same as the input time-step. This method does not take into account any dynamic effect.

6.3 Input data

6.3.1 Product technical data (quantitative)

According to the EU-Regulations circulation pumps (wet running meter) are certified with an energy efficiency index EEI (see Table 5). The EEI-value is determined by a measurement procedure. If the EEI of a real pump is known it can be taken into account. Other circulation pumps are not included in this regulation.