



**SLOVENSKI STANDARD**  
**oSIST prEN 12831-3:2015**  
**01-januar-2015**

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**Ogrevalni sistemi in sistemi za hlajenje z vodo v stavbah - Metoda izračuna projektnih toplotnih obremenitev - 3. del: Toplotne obremenitve hišnih toplovodnih sistemov in značilnosti potreb**

Heating systems and water based cooling systems in buildings - Method for calculation of the design heat load - Part 3: Domestic hot water systems heat load and characterisation of needs

Heizungsanlagen und wassergeführte Kühlanlagen in Gebäuden - Verfahren zur Berechnung der Energieanforderungen und Nutzungsgrade der Anlagen - Teil 3: Trinkwassererwärmung, Heizlast und Bedarfsbestimmung

Systèmes de chauffage et systèmes de refroidissement à eau dans les bâtiments - Méthode de calcul des déperditions calorifiques de base - Partie 3 : Charge thermique des systèmes de production d'eau chaude sanitaire, caractérisation des besoins

**Ta slovenski standard je istoveten z: prEN 12831-3**

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**ICS:**

91.140.65 Oprema za ogrevanje vode Water heating equipment

**oSIST prEN 12831-3:2015**

**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 12831-3**

October 2014

ICS 91.140.65

Will supersede EN 15316-3-1:2007

English Version

## Heating systems and water based cooling systems in buildings - Method for calculation of the design heat load - Part 3: Domestic hot water systems heat load and characterisation of needs

Systèmes de chauffage et systèmes de refroidissement à eau dans les bâtiments - Méthode de calcul des déperditions calorifiques de base - Partie 3 : Charge thermique des systèmes de production d'eau chaude sanitaire, caractérisation des besoins

Heizungsanlagen und wassergeführte Kühlanlagen in Gebäuden - Verfahren zur Berechnung der Energieanforderungen und Nutzungsgrade der Anlagen - Teil 3: Trinkwassererwärmung, Heizlast und Bedarfsbestimmung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 228.

If this draft becomes a European Standard, 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.

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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## Foreword

This document (prEN 12831-3:2014) 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 is currently submitted to the CEN Enquiry.

This document will supersede EN 15316-3-1:2007.

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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**prEN 12831-3:2014 (E)****Introduction**

This standard is part of a package developed to support EPBD<sup>1)</sup> implementation, hereafter called "EPB standards".

CEN/TC 228 deals with heating systems in buildings. Subjects covered by CEN/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 was developed to cover hourly/monthly/seasonal time-steps.

This standard includes and replaces the EN 15316-3-1:2007.

Figure 1 shows the relative position of this standard within the EPB package of standards.

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1) Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast)

Overarching		Building (as such)		Technical Building Systems										
	Descriptions		Descriptions		Descriptions	Heating	Cooling	Ventilation	Humidification	Dehumidification	Domestic Hot water	Lighting	Building automation & control	Electricity production
sub 1		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 & control	15316-2	15316-2						
6	Building Occupancy and Operating Conditions		6	Heat Transfer by Infiltration and Ventilation	6	Distribution & control	15316-3	15316-3			15316-3			
7	Aggregation of Energy Services and Energy Carriers		7	Internal Heat Gains	7	Storage & 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												

Figure 1 — Position of EN 12831-3 within the modular structure

**prEN 12831-3:2014 (E)****1 Scope**

This standard describes a method to calculate the power and the storage volume required for the dimensioning of domestic hot water systems (DHW). The applicability ranges from direct water heaters (no storage volume and a comparatively large effective heating power) to long term storage systems (e.g. seasonal storage with a comparatively small heating power and large storage volume).

This standard is applicable to the following water storage systems

- storage charging systems characterized by a minimised mixing zone, e.g. layer-charging storage tanks or storage tanks with external heat exchangers, and
- hot water tanks and storage systems characterized by a distinct mixing zone, e.g. storage systems with internal heat exchangers,

and for different uses.

The scope of the second part is to standardise the methods for determining the energy need for domestic hot water. This standard covers the domestic hot water needs in buildings.

The calculation of the energy needs for domestic hot water applies to a dwelling, a building or a zone of a building.

This standard also provides energy needs for different application cases of DHW-systems in hourly, monthly, and seasonal time steps, based on national default values.

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## 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 15316-1, *Heating and DHW systems in buildings — Part 1: General and Energy performance expression*

prEN 15603, *Energy performance of buildings — Overarching standard EPB*

EN 12897, *Water supply — Specification for indirectly heated unvented (closed) storage water heaters*

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### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7345:1995, prEN 15603:2013 and the following specific definitions apply.

- 3.1 buffer storage/tank**  
tank for heat storage/buffering (DHW).
- 3.2 centralised DHW system**  
DHW system where water for several building entities is heated centrally and then distributed to each building entity.
- 3.3 cold water**  
water that has not been heated by the DHW system.
- 3.4 decentralised, individual DHW system**  
DHW system where water is distributed as cold water to each building entity and then individually heated (e. g. separate DHW module in each apartment); here, usually, hot water is only distributed within each building entity
- 3.5 energy need for domestic hot water**  
heat to be delivered to the needed amount of domestic hot water to raise its temperature from the cold network temperature to the prefixed delivery temperature at the delivery point
- 3.6 DHW energy supply**  
amount of energy that the DHW system is able to deliver over the considered period of time (usually a day).
- 3.7 hot water**  
water heated by the DHW system to a specified temperature.
- 3.8 hot water tank**  
tank for heating and storage of domestic hot water (DHW).
- 3.9 hot water tank with distinct mixing zones**  
in hot water tank with distinct mixing zones, mixing of hot and cold water is not minimised by design; e. g. tanks with internal heat exchanger.
- 3.10 needs curve**  
cumulated course of energy needs.
- 3.11 storage charging system**  
hot water or buffer tank characterised by a minimised mixing zone during the charging process (no mixing between hot and cold water in the tank intended); e. g.  
— Layer-charging tanks

— Tanks with external heat exchanger

Within this standard, *storage charging* always refers to hot water tanks (DHW).

### 3.12

#### **summation curve**

cumulated course of a time-dependent item over time; the *needs curve* and the *supply curve* are *summation curves*.

### 3.13

#### **supply curve**

cumulated course of the energy supply that the DHW system can deliver.

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## 4 Symbols and abbreviations

### 4.1 Symbols

For the purposes of this European Standard, the symbols given in prEN15603:2013 and the specific symbols listed in Table 1 apply.

**Table 1 — Symbols and units**

Symbol	Name	Unit
$\Phi$	Power/Wattage (Heat power)	W
$\vartheta$	Temperature on the Celsius scale	°C
$Q$	Energy depending on context, absolute or time-specific	kWh or kWh/[unit of time]
$U$	(Linear) Thermal transmittance of the piping	W/mK
$l$	Length of the piping	m
$q$	Specific energy, relating to a certain period of time	kWh/d
$f$	Adjustment/correction factor or term	-
$\rho_w$	Density of water	kg/l
$c_w$	Specific thermal capacity of (liquid) water	kJ/kgK
$V$	Volume	m <sup>3</sup>
$h$	Height	
$x$	Relative amount of water drawn within a certain period of time	-
$t$	Depending on context, a period of time or a time step (1 minute)	min

### 4.2 Subscripts

For the purposes of this European Standard, the subscripts given in prEN 15603:2013, and the specific subscripts listed in Table 2 apply.

**Table 2 — Subscripts**

Index	Meaning/Use
$w$	Water
$W$	Domestic hot water
$c$	Cold; referring to cold water
$sto$	Storage
$sb$	Standby
$dis$	Distribution
$d, day$	Per day, daily
$t$	Time; referring to a period of time or one time step within the calculation
$draw$	Drawn; referring to properties of the water drawn at the tap
$heat-up$	Heating up; referring to the period of time that is required before the full power of the heat

	generator is available for the heating of (drinking-)water
<i>i</i>	General numbering index
<i>i</i>	Loop cycle / calculation step (one cycle per each minute of the period under consideration); referring to cumulated items
<i>t</i>	Time step, one minute; referring to non-cumulated items
<i>ch</i>	Charging
<i>h</i>	Hourly, per hour, over the time of an hour
<i>sup</i>	Supply
<i>start</i>	Start; referring to (estimated) start values for iterative calculation approaches
<i>r</i>	Rated, obtained from manufacturer data
<i>pon</i>	Power on; referring to times the heat generator is on/heating
<i>eff</i>	Effective
<i>HG</i>	Heat generator
<i>min</i>	Minimum
<i>max</i>	Maximum
<i>m</i>	Mean
<i>l</i>	(Time) Lag

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