

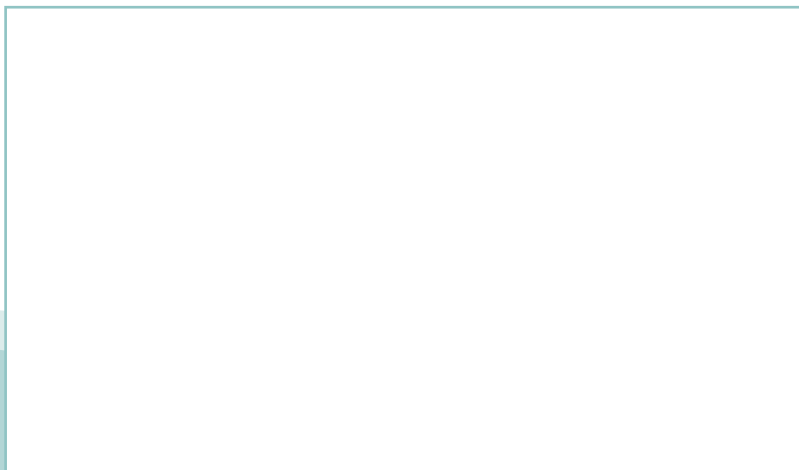
Teknisk rapport

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Byggnaders energiprestanda – Metod för beräkning av energibehov och systemeffektivitet – Del 6-8: Förklaring och motivering av EN 15316-4-5 (Fjärrvärme och fjärrkyla), Modul M3-8-5, M4-8-5, M8-8-5, M11-8-5

**Energy performance of buildings – Method for calculation of system energy requirements and system efficiencies –
Part 6-8: Explanation and justification of EN 15316-4-5 (District heating and cooling), Module M3-8-5, M4-8-5, M8-8-5, M11-8-5**



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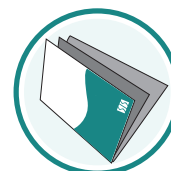
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TECHNICAL REPORT

CEN/TR 15316-6-8

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

April 2017

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English Version

Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies - Part 6-8: Explanation and justification of EN 15316-4-5 (District heating and cooling), Module M3-8-5, M4-8-5, M8-8-5, M11-8-5

Performance énergétique des bâtiments - Méthode de calcul des besoins énergétiques et des rendements des systèmes - Partie 6-8 : Explication et justification de l'EN 15316-4-5 (Chauffage et refroidissement urbains), Module M3-8-5, M4-8-5, M8-8-5, M11-8-5

Heizungsanlagen und Wasserbasierte Kühlanlagen in Gebäuden - Verfahren zur Berechnung der Energieanforderungen und Nutzungsgrade der Anlagen - Teil 6-8: Begleitende TR zur EN 15316-4-5 (Fernwärme und Fernkälte)

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European foreword

This document (CEN/TR 15316-6-8:2017) 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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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SIS-CEN/TR 15316-6-8:2017 (E)**Introduction****The set of EPB standards, technical reports and supporting tools**

In order to facilitate the necessary overall consistency and coherence, in terminology, approach, input/output relations and formats, for the whole set of EPB-standards, the following documents and tools are available:

- a) a document with basic principles to be followed in drafting EPB-standards: CEN/TS 16628:2014, Energy Performance of Buildings - Basic Principles for the set of EPB standards [1];
- b) a document with detailed technical rules to be followed in drafting EPB-standards; CEN/TS 16629:2014, Energy Performance of Buildings - Detailed Technical Rules for the set of EPB-standards [2];
- c) the detailed technical rules are the basis for the following tools:
 - 1) a common template for each EPB-standard, including specific drafting instructions for the relevant clauses;
 - 2) a common template for each technical report that accompanies an EPB standard or a cluster of EPB standards, including specific drafting instructions for the relevant clauses;
 - 3) a common template for the spreadsheet that accompanies each EPB standard, to demonstrate the correctness of the EPB calculation procedures.

Each EPB-standards follows the basic principles and the detailed technical rules and relates to the overarching EPB-standard, EN ISO 52000-1:2017 [3].

One of the main purposes of the revision of the EPB-standards is to enable that laws and regulations directly refer to the EPB-standards and make compliance with them compulsory. This requires that the set of EPB-standards consists of a systematic, clear, comprehensive and unambiguous set of energy performance procedures. The number of options provided is kept as low as possible, taking into account national and regional differences in climate, culture and building tradition, policy and legal frameworks (subsidiarity principle). For each option, an informative default option is provided (Annex B).

Rationale behind the EPB technical reports

There is a risk that the purpose and limitations of the EPB standards will be misunderstood, unless the background and context to their contents – and the thinking behind them – is explained in some detail to readers of the standards. Consequently, various types of informative contents are recorded and made available for users to properly understand, apply and nationally or regionally implement the EPB standards.

If this explanation would have been attempted in the standards themselves, the result is likely to be confusing and cumbersome, especially if the standards are implemented or referenced in national or regional building codes.

Therefore, each EPB standard is accompanied by an informative technical report, like this one, where all informative content is collected, to ensure a clear separation between normative and informative contents (see CEN/TS 16629 [2]):

- to avoid flooding and confusing the actual normative part with informative content;
- to reduce the page count of the actual standard; and

— to facilitate understanding of the set of EPB standards.

This was also one of the main recommendations from the European CENSE project [5] that laid the foundation for the preparation of the set of EPB standards.

SIS-CEN/TR 15316-6-8:2017 (E)

1 Scope

This Technical Report refers to standard EN 15316-4-5:2017.

It contains information to support the correct understanding, use and national adaptation of EN 15316-4-5:2017

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 15316-4-5:2017, *Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-5: District heating and cooling, Module M3-8-5, M4-8-5, M8-8-5, M11-8-5*

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 52000-1:2017 and EN 15316-4-5:2017 apply.

4 Symbols, subscripts and abbreviations

For the purposes of this document, the symbols, subscripts and abbreviations given in EN ISO 52000-1:2017 and EN 15316-4-5:2017 and the specific subscripts and abbreviations listed in Table 1 and Table 2 apply.

Table 1 — Specific Subscripts

Subscript	Term	Subscript	Term
abs	absorption chiller	ac	ambient cooling
carnot	carnot	cch	compression chiller
coal	coal	gf	gaseous fuel
hn	heating network	infra	infrastructure embedded
lf	liquid fuel	ncv	net calorific value
return	return	sewage	sewage sludge
supply	supply	upstr	upstream chain
wte	waste-to-energy		

Table 2 — Abbreviations

Abbreviation	Term
GCV	gross calorific value
MIG	multi-input generation unit
NCV	net calorific value
WTE	waste to energy

5 Indicators

5.1 Output data

The outcome of the calculation procedure is indicators that characterize a district energy system. The indicators are subdivided into two groups. Energy performance indicators reflect efficiency aspects as well as the source of the energy carrier. Energy source indicators don't reflect the efficiency aspects of the system but characterize the origin of the energy carrier.

In 2012/27/EU Article 2 No. (41) efficiency and energy source are defined differently: *"Efficient district heating and cooling' means a district heating or cooling system using at least 50 % renewable energy, 50 % waste heat, 75 % cogenerated heat or 50 % of a combination of such energy and heat"*.

However EN 15316-4-5 does not set any efficiency requirements but provides the calculation procedures that facilitate compliance with requirements set by regulations like 2012/27/EU. *RER*, *WHR* and *CHR* can directly be used for this purpose.

5.2 Input data and calculation time step

The vast majority of systems already exist so they should be assessed on the basis of measured energy data. Due to the many factors that can affect district energy systems, the indicators can fluctuate over time. For the purpose of building regulation a fluctuating energy indicator causes unwanted effects like unequal treatment of customers connected to the same system. This can be limited by basing the calculation on a broad range of data. Thus existing schemes shall be calculated using the energy data from the last three years. If the system set-up or the fuel input mix has been changed within the last three years the calculation may be based on the energy data from a single year.

Large systems supplying hundreds or even thousands of customers usually don't have the possibility to determine all input data on a monthly basis. Most energy indicators will therefore be valid for the whole year.

In some special cases seasonal or monthly input data are required and available, e.g. in a trigeneration system where cooling is supplied by an absorption chiller that is supplied by a cogeneration unit. On an annual data basis it would not be possible to divide the power bonus into a heating-related part and a cooling related part. Seasonal or monthly input data facilitate the determination of an accurate cooling performance indicator and a heating performance indicator. Another example is a small new system where even the delivered energy is calculated on a monthly basis.

In the determination of the final operating condition, the design conditions and manufacturing data the following developments may be taken into account: heat demand changes, changes in numbers of consumers, adaptations in generators and/or energy carriers.