SLOVENSKI STANDARD
SIST-TP CEN/TR 16946-2:2018

01-maj-2018

Energijske lastnosti stavb - Pregled avtomatike, regulacije in tehničnega upravljanja stavb - 2. del: Razlaga in utemeljitev prEN 16946-1:2015 - Moduli M10-11

Energy Performance of Buildings - Inspection of Building Automation, Controls and Technical Building Management - Part 2: Accompanying TR prEN 16946-1:2015 - Modules M10-11

Ta slovenski standard je istoveten z: **CEN/TR 16946-2:2016**

ICS:

35.240.67	Uporabniške rešitve IT v gradbeništvu	IT applications in building and construction industry
97.120	Avtomatske krmilne naprave za dom	Automatic controls for household use

SIST-TP CEN/TR 16946-2:2018 **en**

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CEN/TR 16946-2

September 2016

ICS 97.120

English Version

Energy Performance of Buildings - Inspection of Building Automation, Controls and Technical Building Management - Part 2: Accompanying TR prEN 16946-1:2015 - Modules M10-11

This Technical Report was approved by CEN on 11 April 2016. It has been drawn up by the Technical Committee CEN/TC 247.

CEN members are the national standards bodies of 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

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

Ref. No. CEN/TR 16946-2:2016 E

Contents

Page

European foreword

This document (CEN/TR 16946-2:2016) has been prepared by Technical Committee CEN/TC 247 "Building Automation, Controls and Building Management", the secretariat of which is held by SNV.

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

This document is currently divided into the following parts:

— *Inspection of Building Automation, Controls and Technical Building Management — Module M10-11* [currently at Enquiry stage];

— *Inspection of Building Automation, Controls and Technical Building Management — Part 2: Accompanying* prEN 16946-1:2015 *Modules M10-11* [the present Technical Report; currently at Voting stage].

Introduction

The CENSE project, the discussion between CEN and the Concerted action highlighted the high page count of the entire package due to a lot of “textbook” information. This resulted in flooding and confusing the normative text.

A huge amount of informative contents shall indeed be recorded and available for users to properly understand, apply and nationally adapt the EPB standards.

The detailed technical rules CEN/TS 16629 ask for a clear separation between normative and informative contents:

— to avoid flooding and confusing the actual normative part with informative content;

— to reduce the page count of the actual standard;

— to facilitate understanding of the package.

Therefore each EPB standard shall be accompanied by an informative technical report, like this one, where all informative content is collected.

Table 1 shows the relative position of this standard within the EN EPB set of standards.

Table 1 — Position of this TR within the EPB set of standards

	Over-arching	**Building (as such)**	**Technical Building System**									
Submodule	**Descriptions**	**Descriptions**	**Descriptions**	**Heating**	**Cooling**	**Ventilation**	**Humidification**	**Dehumidification**	**Domestic Hot waters**	**Lighting**	**Building automation and control**	**PV, wind, ..**
sub1	**M1**	**M2**		**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**
1	General	General	General									
2	Common terms and definitions; symbols, units and subscripts	Building Energy Needs	Needs									
3	Application	(Free) Indoor Conditions without Systems	Maximum Load and Power									
4	Ways to Express Energy Performance	Ways to Express Energy Performance	Ways to Express Energy Performance									
5	Building Functions and Building Boundaries	Heat Transfer by Transmission	Emission and control									
6	Building Occupancy and Operating	Heat Transfer by Infiltration and Ventilation	Distribution and control									

	Over-arching	Building (as such)	Technical Building System									
Submodule	Descriptions	Descriptions	Descriptions	Heating	Cooling	Ventilation	Humidification	Dehumidification	Domestic Hot waters	Lighting	Building automation and control	PV, wind, ..
sub1	M1	M2		M3	M4	M5	M6	M7	M8	M9	M10	M11
	Conditions											
7	Aggregation of Energy Services and Energy Carriers	Internal Heat Gains	Storage and control									
8	Building Partitioning	Solar Heat Gains	Generation and control									
9	Calculated Energy Performance	Building Dynamics (thermal mass)	Load dispatching and operating conditions									
10	Measured Energy Performance	Measured Energy Performance	Measured Energy Performance									
11	Inspection	Inspection	Inspection								x	
12	Ways to Express Indoor Comfort		BMS									
13	External Environment Conditions											
14	Economic Calculation											

1 Scope

This Technical Report refers to prEN 16946-1, *Inspection of Building Automation, Controls and Technical Building Management — Module M10-11*.

It contains information to support the correct understanding, use and national adaption of standard prEN 16946-1:2015.

This Technical Report does not contain any normative provision.

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.

prEN 16946-1:2015, *Inspection of Building Automation, Controls and Technical Building Management — Module M10-11*

prEN 15232-1:2015, *Energy performance of buildings — Part 1: Impact of Building Automation, Controls and Building Management — Modules M10-4,5,6,7,8,9,10*

prEN ISO 52000-1:2015, *Energy performance of buildings — Overarching EPB assessment — Part 1: General framework and procedures (ISO/DIS 52000-1:2015)*

prCEN ISO/TR 52000-2:2014, *Energy Performance of buildings — Module M1-x — Accompanying Technical Report on draft Overarching standard EPB*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7345:1995, prEN ISO 52000-1:2015 and prEN 16946-1:2015 (the accompanied EPB standard) apply.

4 BAC audit methodology

4.1 Introduction

Building Automation and Controls including Technical Building Management (BAC) contribute to the performance of buildings. BAC performance has a tendency to decline over time if not actively checked, maintained and adapted to the actual use of the building (independent of the building type). This performance depends on a number of factors. Some of the factors are:

— building / space usage changes

— equipment maintenance and re-commissioning

— manual interventions and missing “back to “normal” change

— manual set point adjustments and back to “normal” procedure

This technical recommendation describes a methodology to audit “BAC” in any state of its implementation in a building.

An inspection shall:

— hold all important data for a specific BAC

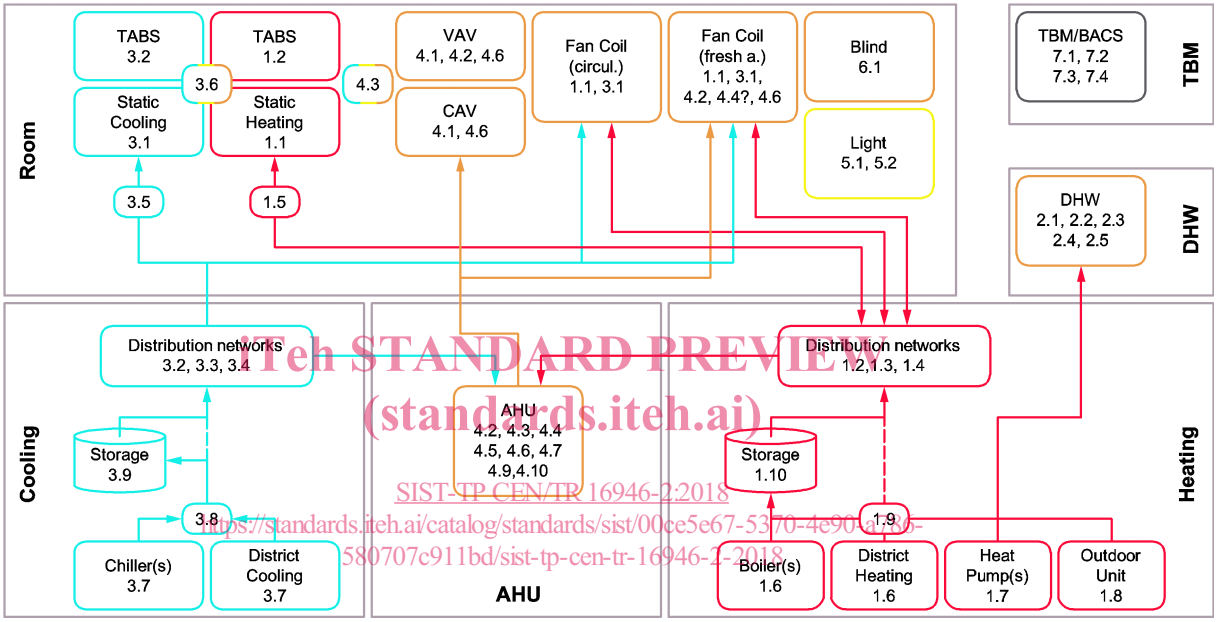
— keep track of the inspected BAC portion and its model data

— produces a report (e.g. on paper and/or electronically)

— acts as base for improvement measures determination

4.2 Energy flow and mapping of functionality groups of EN 15232

4.2.1 General



Key

The numbers in the boxes are referring the numbers in the functions in prEN 15232-1:2015, Table 4

The different colours are to separate the various flows. Heating: red; cooling: blue; air flow: yellow

Figure 1 — Principle functions being addressed in prEN 15232-1:2015

4.2.2 Explanation of graphic

Energy flow is indicated by lines whereas equipment and its control logic is represented by boxes. The numbers are referring to the (controls) functional groups in prEN 16946-1:2015, Table 1. Identifying the energy flows in the technical systems is important because efficient functions deliver audit result contributions among the entire energy flow – of that particular instance. The colours indicate the various energy carrier types (e.g. warm water, cold water, air).

The graphic might imply that all systems shall be present to perform an audit. This is not the case, Systems are audited according to their existence and functions implemented whereas non existing equipment does not need to be mentioned. Logic shall identify non-existing equipment and exclude it from the evaluation while applying a correct weighting.

4.3 Functionality Description

The functionality of BAC is described in prCEN ISO/TR 52000-2:2014. The generic terms shall be applied as most appropriate since the description is kept at high level to be technology independent.

4.4 Implementation of Inspection Procedures

4.5 Scope

The scope of the audit includes controls functions for:

— Generation of heating and cooling

— Ventilation

— Lighting

— Blinds (Sunlight protection)

— Domestic Hot Water

— Technical Building Management

— Other systems as defined in the implementation guidelines

5 Classification Method

5.1 Purpose of Classification

The main purpose of the classification is to establish a relationship between a set of functions and the capability of energy efficiency for the installed and working BAC functions with its weighted influence.

5.2 Classification using Points

A classification that applies the efficiency classes according to the EN Standard would not necessarily allow differentiating the result in a way to use it for e.g. improvement recommendations. A simple method to stretch the result among e.g. a normalized scale from 0 to 100 shall serve the purpose. Other scales might apply accordingly. In this document the scale of 0 to 100 shall be used as example.

Interpreting an audit result using the scale would give a simple analysis method: More points lead to a better efficiency of the BAC analysed.

5.3 Classification influence factors

The document prEN 16946-1:2015 implies a number of influence factors that need to take into account while assessing a BAC. The factors are:

— Building type (e.g. office building)

— Weighting factors of the services among the building services

— Applicable space regarding e.g. emission functions

— Energy generation and supply functions supplying above space

— Desired usage time of above space

— Schedules of equipment

5.4 EN 15232 Classes

The standard assigns efficiency classes per functional group in its associated TR. It might be useful – depending on the implementation of a specific classification system – to determine the EN 15232 classes as well however this can only be done on a per functional group basis.

With a complex mix of functionality within the same application a weighted point's value is calculated. The points relate back to EN 15232 functions and are converted to A/B/C/D. This is calculated in such a way that to reach an A, the point score shall be larger than the average of points for A and B, i.e. higher than 2,5, to reach a B it shall be higher than 1,5, etc.

According to the rules of EN 15232 to achieve an A, all applications (groups of functions), e.g. 1.1, 1.2, 1.3 etc., shall be A. So the worst scoring group of functions decides the final classification according to A/B/C/D.

However there are some rules included in EN 15232:2012 that allow for missing functionality and functionality that has no substantial impact (<5 %) within the kind of energy used for Heating, Cooling, Ventilation, DHW, Lighting or Blinds. These rules are taken into consideration when calculating the final assessment results.