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Pregled avtomatizacije stavb in izvršnih elementov ter tehničnega upravljanja stavb - Modul M10-11

Inspection of Building Automation, Controls and Technical Building Management - Module M10-11

Inspektion der Gebäudeautomation, Regelungstechnik und des Technischen Gebäudemanagements

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Inspection of Building Automation, Controls and Technical Building Management - Module M10-11

Inspektion der Gebäudeautomation, Regelungstechnik
und des Technischen Gebäudemanagements

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 247.

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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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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prEN 16946-1:2015 (E)

European foreword

This document (prEN 16946-1:2015) has been prepared by Technical Committee CEN/TC 247 “Building Automation, Controls and Building Management”, the secretariat of which is held by SNV.

This document is currently submitted to the CEN Enquiry.

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 series of standards aiming at international harmonization of the methodology for the assessment of the energy performance of buildings, called “EPB set of standards”.

As part of the “EPB set of standards” it complies with the requirements for the set of basic EPB documents prEN ISO 52000-1:2015 (see Normative references), CEN/TS 16628 and CEN/TS 16629 (see bibliography [2] and [3]) developed under a mandate given to CEN by the European Commission and the European Free Trade Association (Mandate M/480), and supports essential requirements of EU Directive 2010/31/EC on the energy performance of buildings (EPBD).

The standards issued by TC 247 for M/480 belong to the EPB set of standards and are in line with the over-arching standard (prEN ISO 52000-1:2015) and drafted in accordance with the basic principles and detailed technical rules developed in the Phase I of the mandate.

Also these standards are clearly identified in the modular structure developed to ensure a transparent and coherent EPB standard set. BAC (Building Automation and Control) is identified in the modular structure as Technical Building System M10. However, the standards of TC 247 deal with control accuracy, control functions and control strategies using standards communications protocol (these last standards don't belong to the EPB standards set).

To avoid a duplication of calculation due to the BAC (avoid double impact), no calculation are done in BAC EPB standard set, but in each underlying standard of EPB set of standards (from M1 to M9 in the Modular Structure), an IDENTIFIER developed and present in the M10 covered by EN 15232 is used where appropriate. These way of interaction is described in detailed in the Technical Report (prCEN ISO/TR 52000-2) accompanying the over-arching standard. As consequence, the Annex A and Annex B concept as EXCEL sheet with the calculation formulas used in the EPB standards are not applicable for the standards issued by TC 247 for M/480.

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

<https://cdm.constructiondocuments.com/standards/16946-1-2015>
Table 1 — Position of this standard within the EPB set of standards

| Submodule | Over-arching | Building (as such) | Technical Building System | | | | | | | | | |
|-----------|---|--|---------------------------|---------|---------|-------------|----------------|------------------|---------------------|----------|---------------------------------|--------------|
| | | | 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 | | | | | | | | | |

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| Submodule | Over-arching | Building (as such) | Technical Building System | | | | | | | | | |
|-----------|--|---|---|---------|---------|-------------|----------------|------------------|---------------------|----------|---------------------------------|--------------|
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| sub1 | M1 | M2 | | M3 | M4 | M5 | M6 | M7 | M8 | M9 | M10 | M11 |
| 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 Conditions | Heat Transfer by Infiltration and Ventilation | Distribution and control | | | | | | | | | |
| 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 European Standard defines guidelines for the inspection of installed an operational functions of Building Automation, Controls and Technical Building Management System including its configuration.

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 ISO 52000-1:2015, *Energy performance of buildings – Overarching EPB assessment - Part 1: General framework and procedures*

EN ISO 16484-1, *Building automation and control systems (BACS) - Part 1: Project specification and implementation (ISO 16484-1)*

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*

prCEN/TR 15232-2:2015, *Accompanying TR EN 15232-1*

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 and prEN ISO 52000-1:2015 apply.

4 Introduction

Building Automation and Controls including Technical Building Management (BAC) contribute to the energy 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;
- plant performance issues;
- control issues and control equipment issues;
- misplaced sensors and mounting issues;
- etc.

The requirements in this standard describe a method and its steps and its 2 pillow approach to maintain the desired performance over time.

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The inspection method basically delivers a tool variant (e.g. EXCEL) that allows keeping track of the inspected BAC portions.

This standard and its accompanying Technical Recommendations is defining an inspection method based on prEN 15232-1:2015 that shall evaluate the actual working functionality as well as giving a ranked list of improvement measures. In the accompanying TR an ongoing supervision method is described that allows constant monitoring of a BAC installation and its controlled equipment (if instrumented with BAC – equipment).

5 Inspection method**5.1 General**

BAC (Building Automation and Controls) is the description of products, software, and engineering services for automatic controls, monitoring and optimization, human intervention, and management to achieve energy efficient, economical and safe operation of building services equipment.

This inspection method of Building Automation and Controls builds on the prEN 15232-1:2015 and its accompanying prCEN/TR 15232-2:2015.

The method inspects all existing BAC functions in a building according to Table 4 of prEN 15232-1:2015 assesses its influencing building area (e.g. rooms, space, zones) and its schedule of operation (all as is).

5.2 Inspection procedure

The recommended procedure is to follow the energy flow from “production” (e.g. boilers, chillers, air handles) to “distribution” (e.g. water networks, air distribution, electrical energy distribution) to “emission” (e.g. floor heating, radiators, fan coils, VAV boxes, light controls and blinds). A systematic procedure helps to easily assess all the installed systems and building services. Since the (functional-) inspection is more or less independent of the characteristics of specific technical building systems and its controls the inspection shall be assessed with the skills of a controls engineer without exactly analysing the programming of specific control equipment. This abstraction allows given with Table 4 of the prEN 15232-1:2015 to inspect buildings equipped with any system or products. The recommended skill mix of an inspector shall be a trained and experienced controls engineer with experience in building operations.

An inspection includes technical building systems for lighting and blinds as well since the energy performance can be influenced significantly by integration the controls of those systems.

5.3 Major steps in the inspection

- a) Building type that is being inspected (building type that drives the most energy consumption is deciding its type).
- b) Ventilation system controls and scheduling.
- c) Heating system(s) controls and sequencing information of generators.
- d) Cooling systems controls and cold distribution.
- e) Zoning and grouping of building space usage including scheduling.
- f) Inclusion of controls integration of lighting and blinds.