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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**

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