Contribution of CEN/TC247 Building Automation and Control (BAC) for EPB standards

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This article describes the contribution of CEN/TC247 Building Automation and Control to the EPB standards set. The intentions of EU for this M/480, in accordance with the statement from the mandate are: "make the CEN standards more usable as direct reference in national legislation and give a high transparency of national choices". A second intention is to close the gaps between REGULATIONS (National) who could use the standards when implementing the Directive EPBD recast, for: a better transparency (what are the national choices for EPB?), to support a Voluntary Certification Scheme through EU, go to NZEB and last but not list to try to converge the Primary Energy Factors. In this context, CEN/TC247 has done his work for more visibility of BAC within the EPB standards Set, and for the usability of BAC technique as Technical Building System.

Keywords: Building Automation and Control (BAC), energy performance of buildings, EPB, EPB regulations, Control Accuracy, Control Functions, Control Strategies.

Introduction

On bases of M/480, CEN/TC247 has three work areas:

1) Revision of the existing BAC standards, related to the EPBD recast.

2) Developing two new standards:
   - Inspection for BAC (with link with eu.bac system): EN 16946-1
   - Contribution of TBM (Technical Building Management) for Energy Efficiency: N 16947-1

3) Work to be performed to support the relevant CEN/TC's (TC 89, TC 228, TC 156, TC 169) to contribute with the BAC topics in the deliverables of these TC's!

Insight the CEN/TC247/WG6 deliverables

Also, as a result of the EPBD recast, about 52 EN and EN/ISO standards were updated, merged or developed to harmonize the energy calculation methods concerning buildings. To increase the transparency and coherence of the calculation methodology used

today and tomorrow within the European countries and where possible globally. BAC (via CEN/TC247) contributes with 7 standards and 7 Technical reports. The main standard is EN 15232. This standard which contains a comprehensive and structured (for calculation methodology) list of BAC functions that are intended to be used in the whole EPB standards set as contribution of BAC in all modules of the new MODULAR STRUCTURE of EPB standards, where applicable. BAC is identified as Module M10 and covers the modules M10-1, M10-5, M10-6, M10-7, M10-8, M10-9 and M10-10 vertically, but consistently will be present in ALL Modules Mx-5, Mx-6, Mx-7 and Mx-8.

Improved energy efficiency in buildings is a high priority among European decision makers, as well as building owners. Presently there is one CEN standard assisting building owners to ensure that a newly constructed building or an existing building being refurbished, will have the best available BACS technology to save energy – i.e. the EN 15232 "Energy performance of buildings – Impact of Building Automation, Controls and Building Management standard". Two standards (EN 15500 and EN 12098-x) complete the set of functions of EN 15232 and give the CONTROL INPUT DATA for other modules. For BAC standards, the set is completed by new subjects: Contribution of Building Management System (or Technical Building Management TBM) to optimize the energy use of technical building systems and the Inspection for Building Automation and Control. 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). These subjects will be in another article of BAC Consortia Team in charge for M/480.

> However, there are no standards available that address the difficult challenge of building owners to ensure that their buildings keep good performing over time, or better, than when they were first commissioned.

The scope of BAC and TBM covers in accordance with their role from one side all installed and involved Technical Building Systems (where the effect of the BAC is used in the calculation procedures) and from another side the global overall optimization energy performance of a building.

There are two ways of calculation of the contribution of BAC for energy performance of buildings:

- One is using the factor methodology described in the EN 15232-1; this methodology is used for Inspection of Building Automation, Controls and Technical Building Management EN 16946-1 (Module M10-11 in the Modular Structure of EPB Standards set).
- Second is in the underling standards of the other Technical Building Systems (M3, 4, 5, 6, 7, 9) as DATA INPUT where the CONTROL IDENTIFIERS are used in the calculation methodology of the entire EPB standards set.

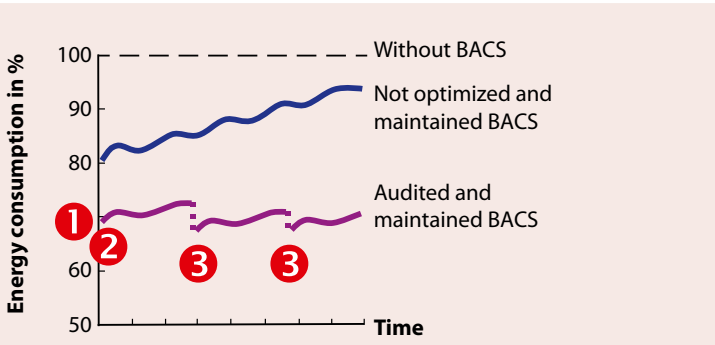
To explain the second way, several practical examples of visibility and usability are given below:

- HEATING (M3-5), COOLING (M4-5) and VENTILATION (M5-5) as the EMMISION AND CONTROL modules are influenced by EN 15500-1 – Control Accuracy; This is used also in the European Voluntary Certification Scheme eubacCERT; EN 15316-2 will take this reference into account and will required certified products values for the EMMISION (HEATING and COOLING); the energy carrier can be water and/or air.
- The DISTRIBUTION/GENERATION standards on HEATING & COOLING will take into account the EN 12098 series.
- The VENTILATION standards introduce «DEMAND CONTROL VENTILATION»; see also the article "The impact of control on the energy use of fans in building ventilation systems" issued in REHVA JOURNAL October 2015. The author, dr. Jürg Tödtli described and developed this concept in the mathematical formulas to be used in this case.
- EN 15232 as EN 16496 and EN 16497 will be the standardized references for the eu.bac- system and basis for the tool for INSPECTION.

Also, these references and BAC techniques will be used for the EU-VCS (Voluntary Certification Scheme).

Implementation of the BAC standards by BAC industry

BAC manufacturers are heavily influenced by the developed BAC (EPB) standards. Their own R&D programs and production to implement the CEN/TC247 standards across Europe and worldwide, is supporting the dissemination activities of the NSB's (National Standard Body's) on national level. The successful rollout to the market place of BAC standards by the industry are supports the transparency and visibility of the whole building construction chain starting with specifications for design, commissioning and use. Taking into account



For illustration purpose only, energy savings can vary from site to site

1 Standardized, energy efficient BACS functionality
- Optimal BACS specification
- Improved cost-benefit ratio

2 Functional verification
- Check ordered and installed functionality in first audit
- Standardized commissioning report

3 Verification of sustainable operation
- Assure equipment availability and system functionality
- Meet comfort requirements
- Check parameterization
- Meet specified energy performance class

Figure 1. Description of the goals of eu.bac system and the relation between EPB and BAC systems.

Table 1. The global overview of the whole work of CEN/TC247.

Reference	Title	Related TR
EN 12098-1	Controls for heating systems - Part 1: Control equipment for hot water heating systems - Modules M3-5,6,7,8	CEN TR 12098-6
EN 12098-3	Controls for heating systems - Part 3: Control equipment for electrical heating systems - Modules M3-5,6,7,8	CEN TR 12098-7
EN 12098-5	Controls for heating systems - Part 5: Start-stop schedulers for heating systems - Modules M3-5,6,7,8	CEN TR 12098-8
EN 15500-1	Control for heating, ventilating and air-conditioning applications - Part 1: Electronic individual zone control equipment - Modules M3-5, M4-5, M5-5	CEN TR 15500-2
EN 15232-1	Energy performance of buildings - Part 1: Impact of Building Automation, Controls and Building Management - Modules M10-4,5,6,7,8,9,10	CEN TR 15232-2
EN 16946-1	Inspection of Building Automation, Controls and Technical Building Management - Module M10-11	CEN TR 16946-2
EN 16947-1	Building Management System – Module M10-12	CEN TR 16947-2

the full buildings live cycle starting with new constructions and existing buildings, using upgrading, evolution, and retrofit techniques for the BAC systems.

Industry associations such as Syndicat ACR in France or eu.bac (European Building Automation and Control Association) in Europe support this action. They provide lunch programs to support the implementation for the usage of the standards to fulfill the requirements of the EPBD recast and national regulation. This also means that there is a strong wish of the BAC Industry that the activities such as REGULATION, STANDARDIZATION, CERTIFICATION and LABELING use the same REFERENCES to describe BAC Systems. This means in practice that the BAC standards could be used and referenced in national regulation and also used as basis for EU Voluntary Certification Scheme and EU Labeling Schemes.

There two important initiatives of eu.bac on EU level: the eu.bac Certification and Labeling Scheme (already in place from 2005 with more than 200 public domain certificates based on EN 15500) and eu.bac system based on EN 15232.

A small description of the goals of eu.bac system and the relation between EPB and BAC systems are shown in **Figure 1**.

Conclusion

With the activity of CEN/TC247/WG6 on basis of the EU-mandate M/480, the BAC visibility and usability has definitely made a huge step ahead in Europe. It is clear that the proposal to make BAC specifications VISIBLE and USABLE at EN and also ISO level will allow a better support for the BAC industry worldwide! ■

Literature

[1] CENTC247 EN standards: see **Table 1.**
[2] www.eubac.org
[3] www.eubaccert.eu
[4] www.acr-regulation.com