

“eu.bac System”

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Promoting Energy Efficiency with BACS

eu.bac, the European Building Automation and Controls Association, has developed a plan for promoting improved energy efficiency of Building Automation and Control Systems (BACS) with the help of existing EN Standards and a new eu.bac Certification Scheme.

Improved energy efficiency in buildings is a high priority among building decision makers, as well as building owners, operators and eu.bac members. Presently there is one European standard that assists building owners to ensure that a new building being built, or an existing building being refurbished, will have the best available BACS technology to save energy. This standard is called the EN 15232: Energy performance of buildings – Impact of Building Automation, Controls and Building Management standard. However, there are no standards available that address the difficult challenge facing building owners to ensure that their buildings keep performing as well or better over time as when they were first commissioned.

The new eu.bac Certification Scheme (eu.bac System) has been developed to advance the state of the art in energy performance of BACS in buildings. It specifically provides certification of energy performance of BACS in buildings, at the first delivery and throughout its lifetime.

EPBD and EN 15232

The Energy Performance of Buildings Directive (EPBD) is a very important step in the efforts of the European Union to improve the energy efficiency of the large building stock in Europe.

As a result of the EPBD, about 40 EN standards were developed to harmonize the energy calculation methods concerning buildings. EN 15232 is the standard that concerns the energy impact of building automation, controls and building management.

eu.bac Certifications

Today eu.bac provides certification of products to various applicable EN standards concerning building automation and controls products. This is available for individual zone controllers and will shortly be available for heating controllers and sensors. Certifications of more types of products are planned. The goal of the certification is to assure energy efficient functionality provided by the products.

Certification of energy performance of products is very important but will not be possible for all types of products used in a BACS installation; neither will it cover the system wide aspects of energy efficient control of a building. That is where the new eu.bac certification of BACS will play an important role.

Certification Procedure for Building Automation Systems

The procedure for eu.bac certification is designed as a three step process:



1. The first step is a self-declaration by the provider of BACS that a particular system is capable of delivering the functionality described in the Technical Recommendations. For a manufacturer of BACS this will typically be a self-declaration for a specific product family, while for a systems integrator it may be for the mix of products that is provided. The self-declarations will be made available in the eu.bac website. Never-the-less it must be understood that a BACS only can

provide such functionality where the corresponding physical equipment has been installed and is working properly, e.g. presence detectors must be present to provide demand based control.

2. The second step is the certification of a BACS installation in a specific building. This is done by an authorised inspector who makes a site visit. As a starting point for the inspection the inspector should receive a check-list prepared by the building owner or maybe more often by the systems integrator. The purpose of the inspection is to verify that the claimed functionality is available in the building and that it is functional. The performance of the functions is most likely not evaluated in this step because there is normally no historical measurement data available. However, if key performance indicator logic had been implemented earlier, historical values would be available for performance assessments.
3. The third step is the periodic inspection of the BACS installation. This is to verify that the certified functionality is still available and working properly. If this is not the case the inspector will notify eu.bac who will require the building owner to recertify the installed BACS. Otherwise the certificate will expire. However, the main purpose of the periodic inspection is to evaluate the energy performance of the BACS, and of the building as a whole. This is done with the help of key performance indicators that will help understanding the performance of the installed systems and show infringements of expected performance (functionally and energy performance wise).

The periodic inspection helps counteract the fact that systems have a tendency to deteriorate in terms of energy performance over time, unless they are maintained properly. This is an inherent issue because of the analog and mechanical nature of the installed systems.

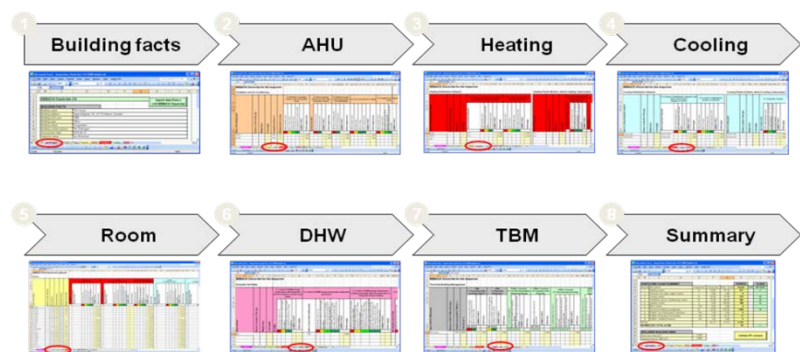
Technical Recommendations

The basis for the certification is the above mentioned standard EN 15232. For the purpose of certification, the requirements from EN 15232 are described in a Technical Recommendations document, which explains how to interpret and inspect EN 15232 functionality. It contains detailed descriptions of each function: Target of the function, conditions, different operating modes, what the inspector should check, etc.

BACS Inspection and classification

According to the methodology of EN 15232 a checklist allows an auditor to inspect all performance – relevant controls components and its weight in regard to space size, usage profile and effective implemented functionality.

Building type (determines e.g. importance of individual functions against each other) and other site relevant data is asked to be filled in.



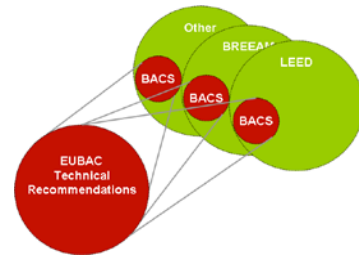
The workflow is oriented according to the energy flow in the building. All control components are adding up an overall BACS rating (according to their relevance (e.g. space, usage)). The checklist continuously adds the parts up while maintaining an “open action list” for areas into which the auditor still has data to enter. While interviewing a site specialist and visiting plant rooms the checklist gets completed and right on the spot the result is calculated in the “summary page”. Before finishing off critical (most energy relevant) areas get reviewed with local operations to avoid mistakes, wrong understanding or bugs while entering data.

The overall result is a normalized point value between 0 and 100.

- ➔ As an approximate evaluation the calculation of an expected energy reduction (after improvement) is an estimation based on the efficiency factors out of EN 15232 in combination with a weighted calculation model. The conclusion is that an improvement of 10 points will result in up to 5% improvement of energy use. The finally achievable reduction in the real environment may be different, for instance because of a different user profile, but this calculated value allows at least a rough estimation of the impact of the intended improvements.

Relationship with other – sustainability - classification systems

Additionally the method explains the relationship between the functionality described in other – wider - classification systems, e.g. LEED, HQE, BREEAM, etc. This simplifies the process if the building is also submitted to any of these classification systems.



Key Performance Indicators

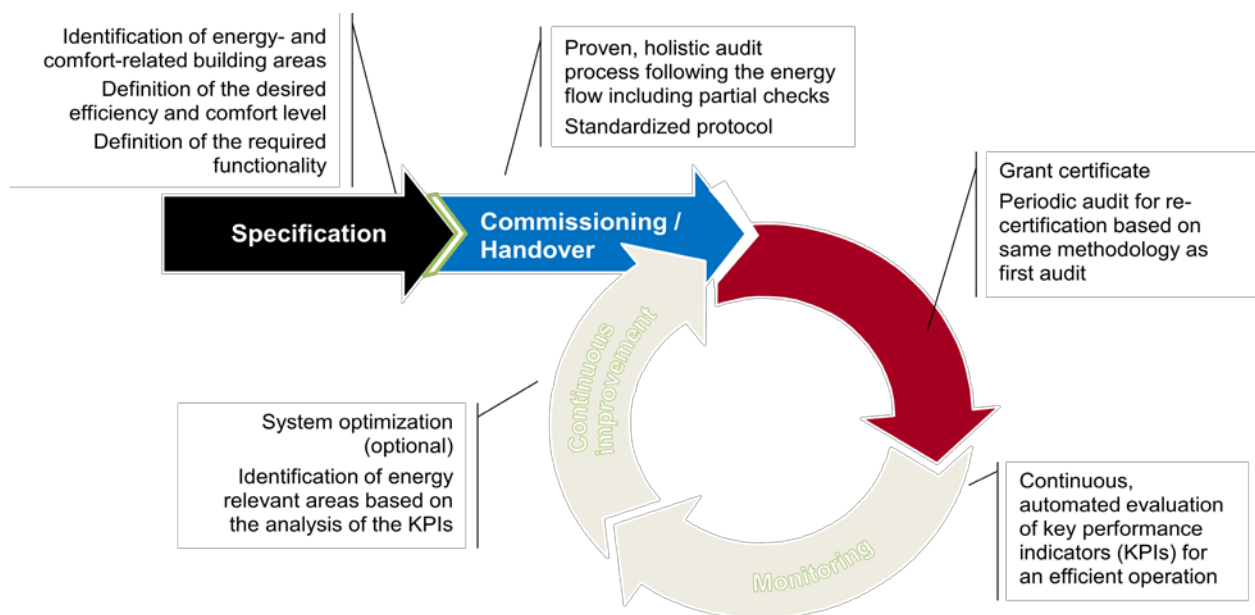
An important part of the eu.bac Certification Scheme is the specification of performance indicators. They are values from the operational data of a BACS that give information about the functions implemented and the energy performance of a specific part of the BACS component or function. Since these KPI's adapt their function automatically according to operational parameters (like e.g. set points and schedulers) a manual configuration is NOT required. A KPI generates one “key-value” per day which does occupy little resources even in small control products.

An evaluation of these values over a certain observation period may be used to understand the efficiency of the BACS component or function. They are defined from the room level, equipment level and up to the building level in such a way that they can be implemented in any BACS from any vendor.

Opportunities

The eu.bac certification scheme serves the purpose of helping building owners to put the right requirements for energy saving measures to be delivered in their installations of BACS. It helps them (or their consultant) to specify best practice energy saving measures to an extent that they are willing to pay for– i.e. to set expectations at the right level.

The eu.bac System certification offers that the BACS performs efficient throughout the entire lifecycle.



New buildings / systems:

eu.bac System supports all major phases in the definition, tender, build up solution, commissioning and especially hand over to the operations. Since the major functionalities are clearly defined and KPI's are gathered right after the installation the process of the commissioning is highly supported by the method and the existing KPI values.

Existing buildings / systems:

When the building has been built it also helps the building owner to verify that the specified functionality of the BACS actually has been implemented in his building, and that it works, not only

initially but over the life-time of the system. Ultimately, this allows the building owner to save money on energy and operational expense and makes the building more productive, valuable and marketable.

Additionally it provides a visual evidence of the energy performance quality of the building control system in his building.

Altogether it is a very strong message to the market that should help manufacturers and system integrators to provide more energy saving measures and services, to the benefit of the environment.

Summary

The eu.bac Certification Scheme promotes improved energy efficiency of Building Automation and Control Systems because it provides guidelines to energy efficient functionality, provides a mechanism to check that a BACS installation actually includes the expected functionality, and that – maybe most important of all – with periodic inspections the functionality provides equal or better performance over time.