Improving Energy Efficiency with Building Automation and Control Systems (BACS)

A plan for promoting improved energy efficiency of BACS with the help of existing EN Standards and a new EUBAC Certification Scheme has been developed by EUBAC, the European Building Automation and Controls Association.

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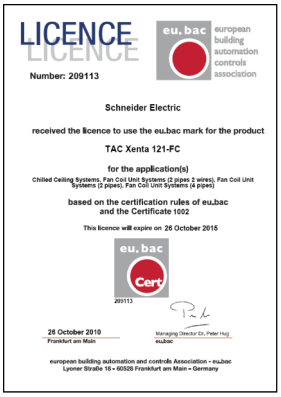
Improved energy efficiency in buildings is a high priority among European decision makers, as well as building owners and EUBAC members. Presently there is one European standard that assists building owners to ensure that a new building being built, or an existing building being refurbished, will have the best available BACS technology to save energy – i.e. 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 of building owners to ensure that their buildings keep performing as well over time, or better, than when they were first commissioned.

The new EUBAC Certification Scheme has been developed to advance the state of the art in energy efficiency of BACS in buildings and specifically providescertifying energy performance of BACS in buildings, at the first delivery and during the lifetime.

EPBD and EN 15232


LICENCE

Number: 209113

Schneider Electric

received the licence to use the eu.bac mark for the product

TAC Xenta 121-FC

for the application(s)

Chilled Ceiling Systems, Fan Coil Unit Systems (2 pipes 2 wires), Fan Coil Unit Systems (2 pipes), Fan Coil Unit Systems (4 pipes)

based on the certification rules of eu.bac and the Certificate 1002

This licence will expire on 26 October 2015

209113

26 October 2010
Frankfurt am Main

Managing Director Dr. Peter Hug
eu.bac

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The Energy Performance of Buildings Directive (EPBD) was a very important step in the effort 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.

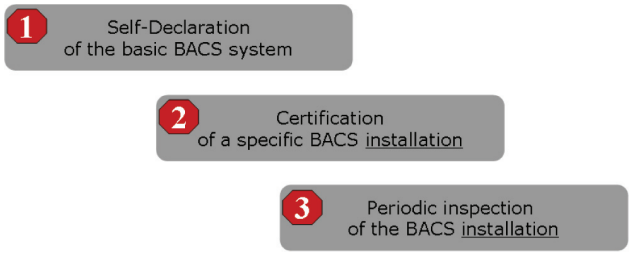
EUBAC certification

Today EUBACprovides certification of products to various applicable EN standardsconcerning Building Automation. 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 were the new EUBAC certification of BACS will play an important role.

Certification procedure for systems

The procedure for EUBAC 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 EUBAC website. Nevertheless 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 authorized 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 not evaluated in this stepbecause there is normally no historical measurement data available.
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 EUBAC who will require the building owner to recertify the installed BACS, or the certificate will be withdrawn.

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 performance indicators and key performance indicators that will help understanding the performance of the installed systems.

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

Technical recommendations

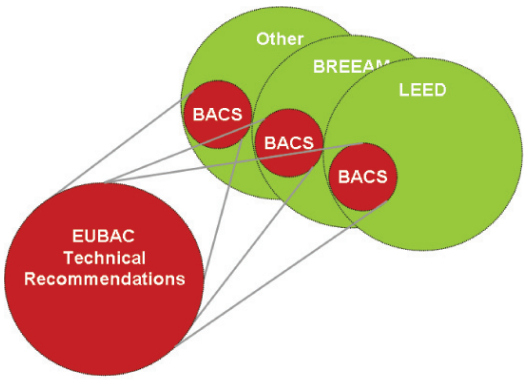
The basis for the certification is the above mentioned standard EN15232. For the purpose of certification the requirements from EN15232 are described in a Technical Recommendations document, which explainshow to interpret and inspect EN15232 functionality. It contains detailed descriptions of each function: Target of the function, conditions, different operating modes, what the inspector should check, etc.

Relationship with other classification systems

Additionally the Technical Recommendations explains the relationship between the functionality described and similar 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 EUBAC Certification Scheme is the description of performance indicators. They are values from the operational data of a BACS that give information about the energy efficiency of a specific part of the BACS component or function. 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 levelin such a way that they can be implemented in any BACS from any vendor.



The most energy relevant of the performance indicators are called Key Performance Indicators and are part of the additional functionality described in the Technical Recommendations, as mentioned above. As such they will be essential to reach the highest level of assessment in the certification.

POINTS AND CLASS SUMMARY				POINTS		CLASS
Section	Description	Importance	Norm. Score	Result	<5%	EN 15232
1	Heating control	10	80	803		C
2	Domestic hot water supply control	2	0	0	1	
3	Cooling control	10	98	976		A
4	Ventilation and air conditioning control	10	95	946		A
5	Lighting control	10	100	1 000		A
6	Blind control	5	0	0		
7	Technical building management	10	100	1 000		A
8	EUBAC kPIs	0				
9	EUBAC Extended Functionality	10	27	268		
TOTAL		62	6 200	4 993		
NORMALIZED TOTAL (0-100)				81		C

Check-list

The check-list is a Microsoft Excel based tool to record the functionality implemented in a building.

It is designed to follow a natural sequence of inspection in real buildings. While the EN 15232 groups functionality in heating, cooling, ventilation, lighting, blinds, etc., the check-list groups functionality in rooms, air handling units, heating and cooling plants, domestic hot water and technical building management. Each group covers all aspects of the BACS installation.

The check-list also provides sufficient details for an accurate classification by allowing different spaces to be recorded separately because they are equipped differently, and weighted together depending on space area, use time, capacity, etc., whichever is relevant.

Classification

The purpose of classification is to establish a relationship between the class and the capability of energy efficiency for the installed BACS. EN 15232 has an A-B-C-D classification where C is considered the current normal standard of BACS, D is not acceptable, but B and A are the better and best alternatives.

The new EUBAC points system is based on a 0-100 scale were100 is the best. Each basic alternative function in the Technical Recommendations and the check-list is assigned a number of points. Each group of functions is weighted together and summarized in a section of functions, which in turn are weighted together to produce an end result.

The calculations are done automatically in the check-list and all details are available for analysis.

Opportunities

The EUBACcertification 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.

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 expense and makes the building more 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 EUBAC 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.