
BACS COMPLIANCE VERIFICATION CHECKLIST

INTRODUCTORY NOTES

eu.bac has supported European policymakers in the implementation of the Energy Performance of Buildings Directive (EPBD (EU) 2018/844) since its approval. Through exchanges with national level consultants and legislators, it became clear that further guidance is necessary on how to ensure compliance with the requirements introduced by Article 14 and Article 15, paragraph 4.

“Member States shall lay down requirements to ensure that, where technically and economically feasible, **non-residential buildings** with an effective rated output for heating (Art.14)/air-conditioning (Art.15) systems or systems for combined space heating/air-conditioning and ventilation of **over 290kW** are equipped with building automation and control systems by 2025.”

“The building automation and control systems shall be capable of:

- (a) continuously monitoring, logging, analysing and allowing for adjusting energy usage;
- (b) benchmarking the building’s energy efficiency, detecting losses in efficiency of technical building systems, and informing the person responsible for the facilities or technical building management about opportunities for energy efficiency improvement;
- (c) allowing communication with connected technical building systems and other appliances inside the building, and being interoperable with technical building systems across different types of proprietary technologies, devices and manufacturers.”

It is necessary to prove the compliance of Building Automation and Control Systems (BACS) in the buildings falling within the set scope. This would help national market surveillance authorities distinguish between buildings complying with the legislation and those that do not comply, and which must therefore improve the BACS to the level required. Taking all this into consideration eu.bac has developed a [checklist](#) complemented by a [self-declaration form](#) for building owners to assess their level of BACS compliance.

This tool developed by industry experts at eu.bac is a clear, effective, and usable guide on BACS compliance with the EPBD. In this framework, eu.bac is not providing policy suggestions but rather acting as an expert body detailing the existing legal requirements.

WHO IS THE CHECKLIST FOR?

BUILDING INSPECTOR

Compliance needs to be confirmed by the national market surveillance authorities, for instance, a building inspector. Therefore, the checklist includes spot-checks intended to confirm whether all the necessary aspects of functionality can be provided by the installed BACS. The verification mechanism eu.bac proposes is simple and can be used by an inspector with limited BACS knowledge.

BUILDING OWNER

In order to make the compliance verification more efficient and more effective eu.bac proposes a separate self-declaration designed to be used by the building owner or a technical expert representing the building owner. This will help the owner assess their BACS compliance in preparation for the compliance verification by the national market surveillance authorities. Furthermore, it will inform the owner about the necessary supporting documentation and the checks carried out by the building inspector.

BUILDING DESIGNER

The technical specifications of new buildings and renovation projects in the design phase shall include the requirements for supporting records to ensure the EPBD BACS capabilities are met. The checklist provides the designer with the necessary clarifications to overcome any ambiguity within the compliance requirements in the legislation.

NATIONAL POLICYMAKER

Following the formal transposition of the EPBD, many Member States will need to approve further implementing decrees, specifying technical aspects which were not included in the first transposing provisions. While eu.bac suggests, consistently with previous guidelines, to translate these requirements into a requirement of EN 15232 level B for all buildings in scope, the checklist will be a helpful practical tool for the legislator to clarify details about what the functionalities mean in practice.

THE CHECKLIST STRUCTURE

The BACS compliance verification checklist is structured in a table form. The top row introduces the columns which either raise a question, provide information, or must be filled in by the inspector.

The “ID” column provides a reference indicator for each compliance check.

The “self-declaration compliance question” column shows the inspector, what aspect of the requirements the owner has been asked to comply with and for what purpose.

The “self-declaration compliance supporting records” column lists the set of documentation the owner has to provide in order to demonstrate compliance and offers examples of suitable records. Using any of these examples as evidence would be acceptable. Similar records to the ones described in the examples would also suffice as long as they fulfil the purpose of the specific check.

The “compliance verification checks” column describes the set of actions the inspector will have to take to confirm the individual aspects of compliance.

The “response” column is where the inspector indicates whether the individual aspects of compliance have been met.

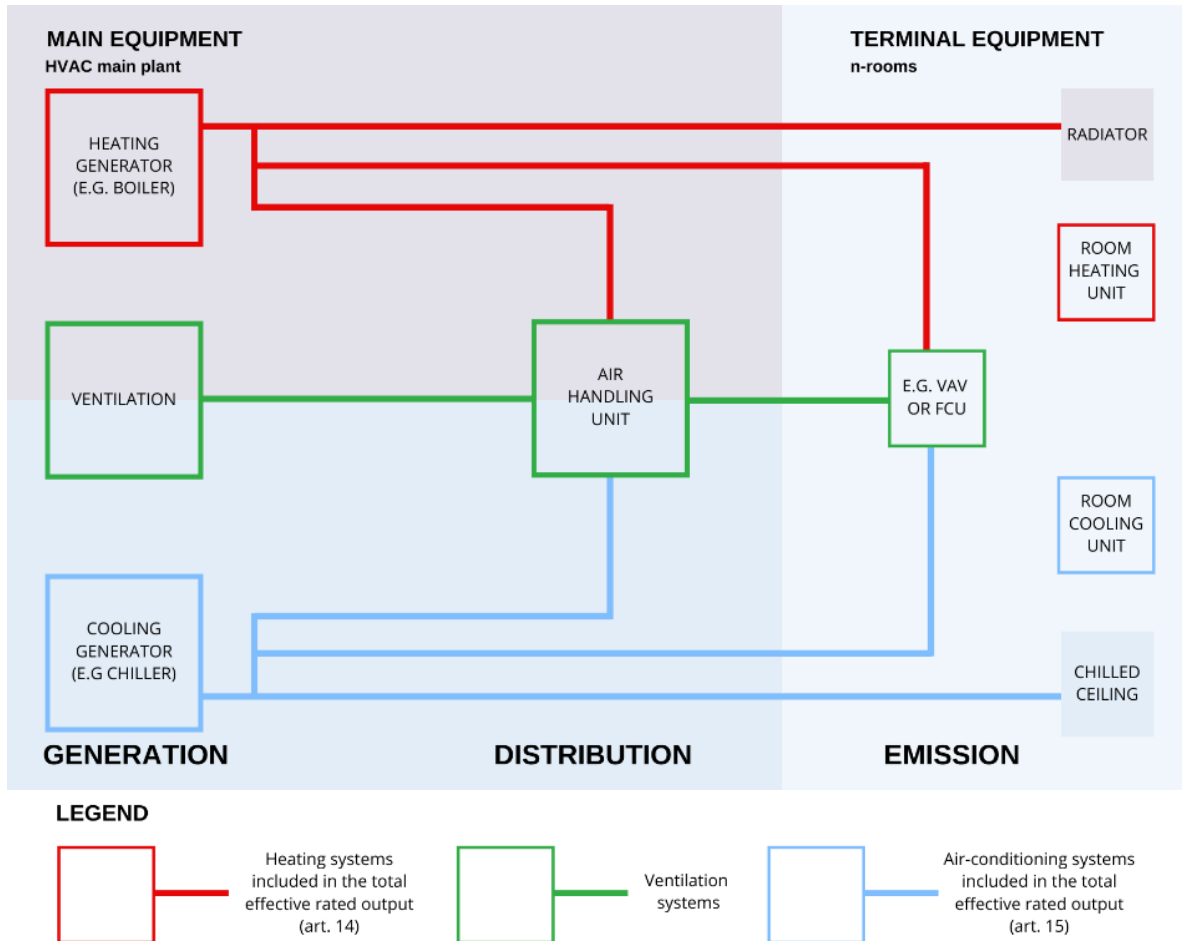
The “boundary conditions/prerequisites” column is an informative description of what additional conditions should be in place in order to exploit the full potential of the BACS capabilities and ensure optimal performance. These additional requirements are not included in the law and are therefore not specifically mandated by the EPBD. The additional column is at the end of the row to clearly separate the legal requirements from recommendations.

The boundary condition inputs serve two purposes by providing:

- The owner and the building designer with information on prerequisites for the BACS capabilities to be effective, e.g. if no responsible person is nominated, the capability of BACS to inform a responsible person would be wasted
- Policymakers with information on additional possible requirements they can set at the national level, in addition to the ones found in the EPBD

STEP 3: The building automation and control systems shall be CAPABLE of:					
ID	SELF-DECLARATION COMPLIANCE QUESTIONS (answered by Building Owner)	SELF-DECLARATION COMPLIANCE SUPPORTING RECORDS (provided by Building Owner)	COMPLIANCE VERIFICATION CHECKS (conducted by Building Inspector)	RESPONSE	Boundary Conditions / PREREQUISITES for the BACS capabilities to be effective
(a) CONTINUOUSLY MONITORING, LOGGING, ANALYSING and ALLOWING for ADJUSTING ENERGY USAGE					
A1	Is the building energy meter data including (minimum the thermal energy for space heating, space cooling and electrical energy) integrated and analysed in BACS with at least hourly data granularity to identify energy optimisation opportunities in the building? (according to Class B: 7.4.1 Trending functions and consumption determination)	PDF energy consumption reports for building electricity, heating and cooling consumption respectively that compare energy values in different time periods, e.g. cumulated daily values from last month (before the inspection) compared to the daily values for the same month from last year	Check the availability of energy consumption reports that compare current values with previous periods and indicates deviations	YES <input type="checkbox"/> NO <input type="checkbox"/>	Energy metering should cover minimum 80% of total HVAC building energy consumption. A process to audit/validate/certify the meters readings should be in place. The energy data measuring systems relevant for HVAC shall be regularly checked for their function and accuracy. Monitoring and logging are prerequisites for the analysing capability. Data should be retained for historical analysis, so trends can be observed.

Before the core section of the checklist, there are two preliminary sections. These ensure that the building falls under the scope of the EPBD BACS compliance requirements. The sample HVAC architecture graphic below demonstrates the scope of the equipment covered by the BACS compliance verification checklist.



Please note the following definitions from the EPBD:

Heating system refers to the combination of the components required to provide a form of indoor air treatment, by which the temperature is increased.

Air-conditioning system refers to the combination of the components required to provide a form of indoor air treatment, by which temperature is controlled or can be lowered.

Effective rated output refers to the maximum calorific output, expressed in kW, specified, and guaranteed by the manufacturer as being deliverable during continuous operation while complying with the useful efficiency indicated by the manufacturer.

STEP 1: “The BACS compliance verification shall be conducted only if the effective rated output for heating (Art.14)/air-conditioning (Art.15) systems or systems for combined space heating/air-conditioning and ventilation in the building is over 290kW.” (EPBD)

Through a series of questions, this section provides information on the individual values of the effective rated output for the technical building systems in this particular building. When technical building systems are not present in a building the respective BACS checks will not be applicable and should be clearly marked with N/A.

ID	SELF-DECLARATION COMPLIANCE QUESTIONS (answered by Building Owner)	SELF-DECLARATION COMPLIANCE SUPPORTING RECORDS (provided by Building Owner)	COMPLIANCE VERIFICATION CHECKS (conducted by Building Inspector)	RESPONSE	Boundary Conditions / PREREQUISITES for the BACS capabilities to be effective
	STEP 1: The BACS compliance verification shall be conducted only if the effective rated output for heating (Art.14)/air-conditioning (Art.15) systems or systems for combined space heating/air-conditioning and ventilation in the building is over 290kW.				
I	Information Section: 290 kW COVERAGE				
	STEP 2: The compliance verification shall be conducted only if building automation and control systems (BACS) capabilities apply to a considerable extent in the building				
S	Starting Section: BACS COVERAGE				

STEP 2: “The compliance verification shall be conducted only if building automation and control systems (BACS) capabilities apply to a considerable extent in the building.” (eu.bac)

For the BACS capabilities to have the EPBD intended impact on the building energy performance there should be a minimum coverage of BACS-controlled heating, ventilation, and air-conditioning building systems. In this section a series of questions confirm the proportion of technical building systems which are controlled by BACS. eu.bac recommends that the compliance verification shall be conducted only if BACS apply to a considerable extent in the building.

After ensuring the building can be considered eligible for the compliance check, individual compliance checks are clustered in three different groups (each of them representing one of the three capabilities listed in Art. 14/15 par.4). References to relevant control functions in EN 15232 are noted where necessary.

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	STEP 1: The BACS compliance verification shall be conducted only if the effective rated output for heating (Art.14)/air-conditioning (Art.15) systems or systems for combined space heating/air-conditioning and ventilation in the building is over 290kW.				
I	Information Section: 290 kW COVERAGE				
	STEP 2: The compliance verification shall be conducted only if building automation and control systems (BACS) capabilities apply to a considerable extent in the building				
S	Starting Section: BACS COVERAGE				
	STEP 3: The building automation and control systems shall be CAPABLE of:				
(a)	CONTINUOUSLY MONITORING, LOGGING, ANALYSING and ALLOWING for ADJUSTING ENERGY USAGE				
(b)	benchmarking the building's energy efficiency, detecting losses in efficiency of technical building systems, and informing the person responsible for technical building management about opportunities for EE improvement				
(c)	ALLOWING COMMUNICATION with CONNECTED TBS and OTHER APPLIANCES inside the building, and BEING INTEROPERABLE with TBS across DIFFERENT TYPES of PROPRIETARY TECHNOLOGIES, DEVICES and MANUFACTURERS				

The building inspector is to use the “RESPONSE” column checkboxes “YES” and “NO” to mark the result of the specific check for each row. For each compliance verification check if the answer in the self-declaration was positive, the supporting records are available and the spot-check has confirmed it, “YES” should be marked in the checkbox. If any of these are missing “NO” should be marked. To comply with the legal requirements, all rows in the three groups of functionalities must be marked with a “YES”. If any is negative, the BACS do not comply with the legal requirements and must therefore be improved to the required state.

THE SELF-DECLARATION

A separate self-declaration designed to be used by the building owner or a technical expert representing the building owner is the final element of the BACS compliance verification toolkit. The owner can use the list to answer the self-declaration questions and provide the necessary supporting records. The self-declaration starts with a building information section to be filled in and signed accordingly. The building inspector column is visible only for information purposes to anticipate what checks will be carried out.

BUILDING INFORMATION

BUILDING NAME	
BUILDING ADDRESS	
FLOOR AREA	
BUILDING OWNERS NAME	
OWNERS SIGNATURE AND DATE	
RESPONSIBLE EXPERT	
EXPERTS SIGNATURE AND DATE	

SELF-DECLARATION

STEP 1: The BACS compliance verification shall be conducted only if the effective rated output for heating (Art.14)/air-conditioning (Art.15) systems or systems for combined space heating/air-conditioning and ventilation in the building is over 290kW.					
ID	SELF-DECLARATION COMPLIANCE QUESTIONS (answered by Building Owner)	RESPONSE	SELF-DECLARATION COMPLIANCE SUPPORTING RECORDS (provided by Building Owner)	Boundary Conditions / PREREQUISITES for the BACS capabilities to be effective	COMPLIANCE VERIFICATION CHECKS (conducted by Building Inspector)
I	Information Section: 290 kW COVERAGE				
I1	<p>"What is the effective rated output (calorific output as per EPBD) of the Heating equipment in the building Heating systems (output of all heat generators in the building including main Heating equipment in plantrooms, e.g. boiler, solar heat system, CHP and heat-generating terminal equipment in rooms, e.g. electric direct heater)?</p> <p>NOTE: Every heat generator that adds heat to the building space regardless of its locations (generation in main HVAC plant, distribution and emission in the room) should be added in the sum for the output."</p>	<kW>	PDF list of Heating system main equipment with indication of the maximum calorific output, expressed in kW, per piece of equipment		Check equipment nameplates of main Heating systems equipment in main HVAC plant or the building Operation & Maintenance Manual

ABBREVIATIONS USED

BACS	Building Automation and Control System
EPBD	Energy Performance of Buildings Directive
HVAC	Heating, Ventilation, and Air-conditioning
TBS	Technical Building Systems
FCU	Fan Coil Unit
VAV	Variable Air Volume

SOURCES AND REFERENCES

Revised Energy Performance of Buildings Directive

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.156.01.0075.01.ENG&toc=OJ:L:2018:156:TOC

eu.bac, Guidelines for the transposition of the new Energy Performance Buildings Directive

https://www.eubac.org/cms/upload/eu.bac_guidelines_on_revised_EPBD_June_2019.pdf

Waide Strategic Efficiency Limited, The impact of the revision of the EPBD on energy savings from the use of building automation and controls

https://www.eubac.org/cms/upload/downloads/position_papers/EPBD_impacts_from_building_automation_controls.pdf

EU.BAC

eu.bac is the European Building Automation and Controls Association. It represents the major European manufacturers of products and systems for home and building automation. Its vision is a world where everyone lives in buildings that are smart, decarbonised, and efficient. eu.bac has founded the European Association of Energy Services Companies (eu.esco) for promoting Energy Performance Contracting as the economically sustainable solution for improving the energy performance of existing buildings using the guaranteed energy savings to pay for the installation. For a full and updated overview of our membership, please see www.eubac.org.



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