

# Guidelines for inspection of air-conditioning systems

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## APPLICATION FIELD

Air-conditioning systems in existing civil buildings, with installed cooling load  $P > 12$  kW, considering:

- the cooling load of a centralized air-conditioning system, or
- the installed cooling load for decentralized air-conditioning, cumulated in the building or area of a building having its own administration.

In air-conditioned buildings/areas, ventilation system inspection will be done, regardless the type of ventilation system (mechanic or natural).

## THE PROCEDURE AND THE INSPECTION STAGES

### A. PREINSPECTION

Documents checking

Aeraulic and hydraulic balance checking of the air and water ducts

Occupants assessment questionnaire about system performance

### B. THE INSPECTION

- Building inspection and assessment of its energetic quality
- Comfort conditions and air quality checking
- Inspection of air distribution in all air ventilation systems and water distribution in the air-water systems
- Checking operation of terminal devices in air - water systems or with direct expansion: VC, LCA, PC water loop, split units, local air conditioners
- Checking of the air handling unit
- Refrigeration system inspection
- Regulation system inspection and Building Management System (BMS)

**C. PROPOSALS TO IMPROVE THE FUNCTIONAL AND ENERGETIC EFFICIENCY  
OF THE BUILDING SERVICES**

**D. PREPARATION OF THE INSPECTION REPORT**

**Annexes**

**Annex A: A1 – Inspection general data**

**A2 - Required list of documents submitted by the beneficiary**

**Annex B - Summary of basic parameters of the system**

**Annex C: C1 - Characteristics and energetic evaluation of the air-conditioned  
building/area**

**C2 - Indicative values of occupancy**

**Annex D – Air-conditioning system description**

**Annex E – Characteristics of the air-conditioning system and energetic and  
functional evaluation**

**Annex F/ F1 – F5 – Refrigeration equipments**

**Annex G - Ventilation system characteristics and energetic and functional  
evaluation**

**Annex H –Users survey results based on the questionnaire**

## **Detailed measurement procedures**

**Annex I,J – Measurement system (1,2) for determining air flow in the ventilation/air duct system.**

**Annex K - Performance index measuring system of air distribution in ventilated / air conditioned rooms, IPDA.**

**Annex L - Fancoils convectors performance measurement system**

**Annex M - Recommendations for using a computer program calibrated under specific conditions of the inspected building/area (benchmark)**

**Annex N - Questionnaire model for building occupants regarding thermal comfort and perceived indoor air quality**

**Annex P - Informative list of proposals to increase system energetic and functional efficiency**

## Reference documents

- **Legea nr. 10/1995 In legatura cu calitatea constructiilor, cu modificările ulterioare, MO, Partea I nr. 12 /24 ianuarie 1995.**
- **Legea nr. 372/2005 Performanta energetica a clădirilor, cu modificările ulterioare, MO, Partea I nr. 1144 / 19 decembrie 2005.**
- **MC 001/2006 Metodologia de calcul al performanței energetice a clădirilor, MO nr. 126 / 21 februarie 2007.**
- **CEN/TR 14788:2006 Ventilation for buildings - Design and dimensioning of residential ventilation systems.**
- **SR EN 15239:2007 Ventilation for buildings - Energy performance of buildings - Guidelines for inspection of ventilation systems**
- **SR EN 15240:2007 Ventilation for buildings - Energy performance of buildings - Guidelines for inspection of air-conditioning systems**

**EX: 3.9. Air handling unit checking, AHU (Filters, heating and cooling coils, humidifiers, heat recovery systems, fans)**

Air handling unit checking is based on the air-conditioning system of the area / building inspected:

- for systems all air, the nominal power of the equipment is checked to correspond to the calculation load of the building/area and if the air treatment is carried out as in project,
- thermal load of the coils in the AHU are compared to thermal load of the building / area,
- For air-water systems, it is checked that the AHU provides the cooling load for fresh air and if the fresh air treatment is done according to the project,
- Check of the air flows on all circuits that come and go from AHU,
- Check of the condition of clogging of air filters and how they are cleaned or changed; changing or cleaning filter frequency is recorded and also the date on the last change and / or cleaning, proper installation of filters, so that there will be no bypass zones, etc.

**Annex E3 Characteristics and energetic and functional assessment of air conditioning system for the building / area. Air Handling Unit**

No.	Article	Details	Observations
1	Location of the air handling unit	<ul style="list-style-type: none"> <li>•In the building basement</li> <li>•On the building terrace</li> <li>•In other space</li> </ul>	
2	Type of air treated in the air handling unit	<ul style="list-style-type: none"> <li>•Fresh air</li> <li>•Recirculated air</li> </ul>	
3	Thermodynamic functions of the air handling unit	<p>WINTER</p> <ul style="list-style-type: none"> <li>•Heating      •Cooling</li> <li>•Humidification</li> <li>•Mixture      •Recovery</li> </ul> <p>SUMMER</p> <ul style="list-style-type: none"> <li>•Heating      •Cooling</li> <li>•Humidification</li> <li>•Mixture      •Recovery</li> </ul>	It will be detailed the type of humidification (water or steam), the type of recovery (sensible or total), type of heating (hot water, steam or electric), type of cooling (chilled water or direct expansion)
4	The way how the air-conditioned system fits the description from the technical project?	<ul style="list-style-type: none"> <li>•Yes    •No</li> <li>•Partially (detailed)</li> </ul>	