



BSI Standards Publication

Ventilation for buildings — Ductwork — Cleanliness of ventilation systems

National foreword

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The UK participation in its preparation was entrusted to Technical Committee RHE/2, Ventilation for buildings, heating and hot water services.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Propreté des systèmes de ventilation

Lüftung von Gebäuden - Luftleitungen - Sauberkeit von
Lüftungsanlagen

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European foreword

This document (EN 15780:2025) has been prepared by Technical Committee CEN/TC 156 “Ventilation for buildings”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2026, and conflicting national standards shall be withdrawn at the latest by January 2026.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 15780:2011.

EN 15780:2025 includes the following significant technical changes with respect to EN 15780:2011:

- addition of kitchen extract ventilation system (Annex J);
- addition of wiping test method to evaluate cleanliness on site (Annex K).

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

This document provides test methods and classifications for cleanliness in ventilation systems.

This document is made with informative annexes that can be revised, completed and further added in future revisions of this document for specific system types, and products or applications in the system.

See Annexes A, B, C, D, E, F, G, H, I, J and K for further information.

1 Scope

This document specifies general requirements and gives guidelines for ventilation systems except for industrial, medical and laboratory facilities.

This document also specifies cleanliness criteria and procedures necessary in assessing and maintaining the cleanliness of ventilation systems over their lifetime from design and installation to maintenance.

This document is applicable to both new and existing ventilation systems with, and without, air conditioning and kitchen extract systems.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12792, *Ventilation for buildings — Symbols, terminology and graphical symbols*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1
acceptable cleanliness level
amount of dust or other contaminants not to be exceeded according to the specified measurement method

3.2
acceptable post-clean level
no loose dust (clean-swept condition) or no adhered grease deposits are detected visually on the duct surface after cleaning and the system can reach an acceptable cleanliness level according to a specified measurement method

Note 1 to entry: In case of conflict (for example, between the building owner and the user), or uncertainty, objective methods are needed to assess the cleanliness/dirtiness.

3.3
cleanliness
state or amount of pollution according to specification and a particular measurement method

Note 1 to entry: Cleanliness is not absolute; it is defined by limit values.

3.4
dirtiness
value above limit value for cleanliness

3.5

grease separator

device for the efficient separation of airborne solid or liquid particles, based on the effect of mechanical forces that deflect the particles out of the airflow

[SOURCE: EN 16282-6:2020, definition 3.2, modified – term “separator” is replaced by “grease separator”]

4 Symbols and units

For the purpose of this document, the symbols and units in EN 12792 apply.

5 Criteria for cleanliness and assessment

5.1 General considerations

The key issue is to design, build and maintain the whole ventilation system so that it can be kept clean enough during the whole lifetime of the system. The requirements in this document, as well as the methodology described in Clause 6, apply to the ductwork but can be also applied to air handling units according to EN 13053, entire systems and kitchen extract systems. Therefore, it is necessary to specify the cleanliness quality class from the beginning and include in the specification both design and installation issues, and means to maintain a sufficiently clean ventilation system for the its whole lifetime.

The design and installation document should include the following, which are described in EN 16798-3, EN 16798-17, and EN 12599:

- a) cleanliness quality class;
- b) cleanliness criteria and measurement method;
- c) production of the system components;
- d) delivery to site;
- e) site storage;
- f) installation;
- g) airtightness;
- h) protection of components after installation;
- i) handing over the system;
- j) inspection.

5.2 Assessment of the need for cleaning

Cleanliness of ventilation systems is a part of proper maintenance of the ventilation systems. Mostly the inspection of the cleanliness can arise from two purposes:

- a) to check if ventilation system is dirty and needs to be cleaned (exceeding of a “target level” of cleanliness);
- b) to evaluate cleanliness after the cleaning work.

NOTE The assessment methodology is presented in 6.2.

For existing buildings, the inspection shall include a study of existing documentation regarding cleanliness and ductwork/ventilation system that requires cleaning. The inspection can result in recommendations in updating these documents.

5.3 Design and handing over information

In the handing-over documents according to EN 12599, the cleanliness quality class, cleanliness criteria and measurement methods shall be specified. Recommendations for cleaning methods and guidelines for reaching the points to be cleaned shall also be given.

The design information shall consider the expected cleaning method. Where the system has been designed to be cleaned by wet cleaning methods, warning regarding conditions and restrictions of use should be given. For example, wet methods are applicable only where ducts are sufficiently moisture-tight, internal surfaces are smooth, and slope and drainage arrangements have been provided so that fluid and contaminant can be evacuated.

A sufficient number of access/cleaning panels shall be provided in the ductwork. The position and size of each opening shall be marked clearly in the as-built drawings. Additionally, special care shall be taken regarding obstacles to cleaning such as dampers, sound attenuators which are mounted in the ducts. In many cases additional cleaning panels are needed after or before such obstacle. Requirements for location of and distance between access panels are presented in EN 12097 and EN 16798-3.

5.4 Determination of cleaning interval

The cleaning interval shall be determined by reference to the cleanliness or dirtiness of the system. Cleanliness or dirtiness shall in the first instance be assessed visually and this may be confirmed by means of measurement, see Annexes A and K for dry dust. See Annex J for kitchen extract systems.

The inspection interval to determine the need for cleaning shall be specified in the system documentation in order to assist with maintenance planning or design considerations related to cleaning methods.

5.5 Assessment of the cleanliness level after cleaning

Methods for assessment of the cleanliness level before cleaning also be applied after cleaning.

The preferred methods for assessment of the cleanliness level after cleaning are given in Annex A. See Annex J for kitchen extract systems.

6 Methodology

6.1 General

Clause 5 refers to ducted ventilation, for air ventilation systems. See Annex J for kitchen extract systems.

Figure 1 presents a procedure to control and maintain cleanliness of ventilation system. It does not include the design stages or selection and specification of the system, or any of its components.

The system shall be first checked visually, both in assessing the need for cleaning and in verification of the result of cleaning. Measurements are needed if the visual inspection results in disagreement or uncertainty about cleanliness or need for cleaning, see Figure 1.

The number and location of objective measurements can be specified in advance as part of the cleaning or inspection plan.

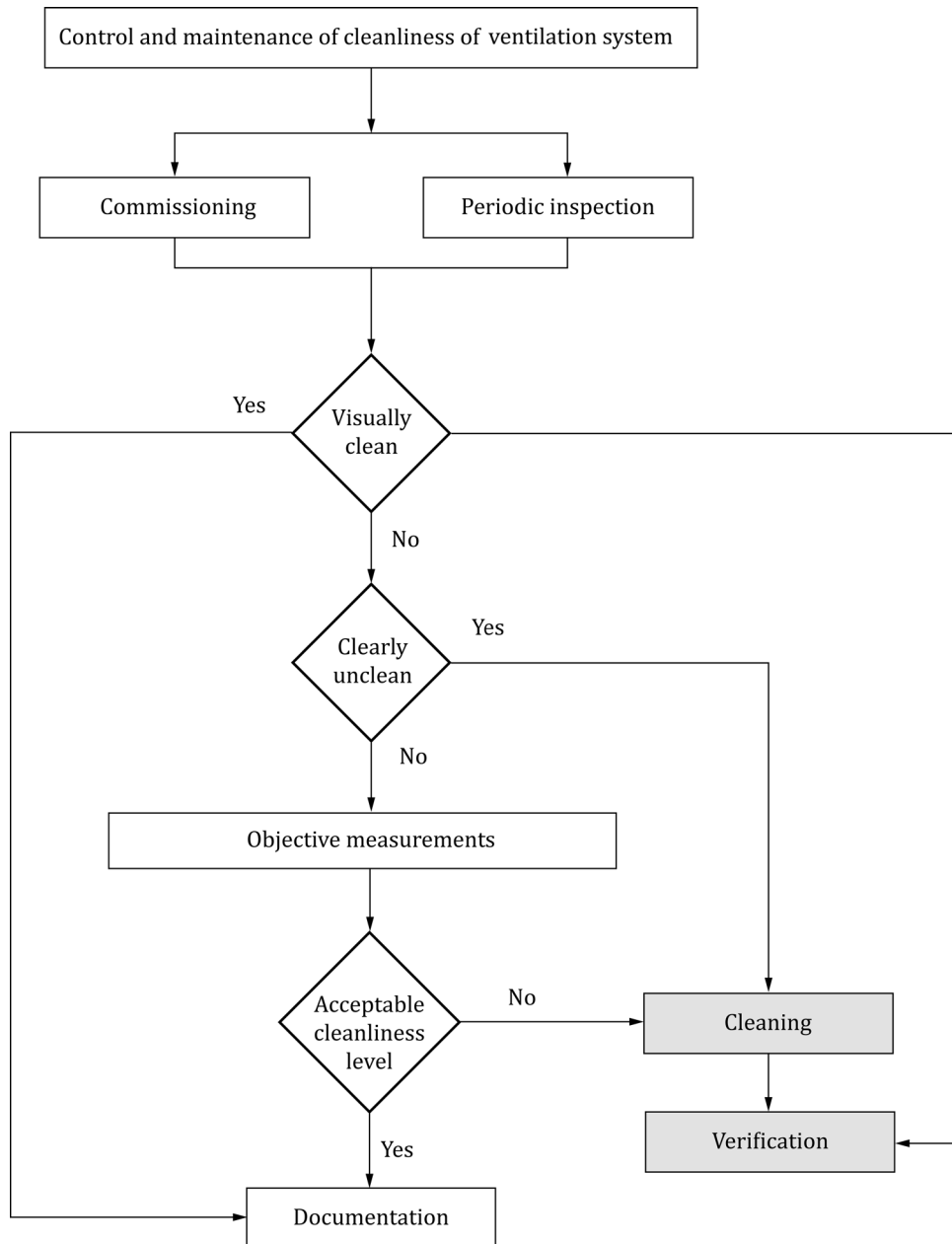


Figure 1 — Schematic flow chart for procedures to maintain cleanliness of ventilation system

If the components are certified for cleanliness or the cleanliness after production is otherwise verified, and if the cleanliness instructions are properly documented, the commissioning may be reduced to checking the documentation and sample-checking of the system cleanliness (compliance with the documentation), see 6.2.2.

The methods applied for objective measurements and verifications shall be consistent so that the result of inspection is acceptable and give reliable grounds for decision making for cleaning work of the system when needed. Verification after cleaning is needed for quality control of the cleaning work, and to verify the cleaning result.

NOTE Examples of acceptable levels of cleanliness (or dirtiness) are explained in Annexes A, J and K.

Objective methods are needed if any guidelines or demands on cleanliness are set in official or in voluntary documents. The methods to evaluate the cleanliness vary. Target values for the cleaning shall be accompanied by a description of the measurement method.

6.2 Assessment methodology

6.2.1 General

The characteristics of the contamination shall be assessed in order to determine if cleaning is required and if so, which method shall be used.

System components are considered as polluted when visual inspection and/or analytical verification give evidence of unacceptable dust level, microbial, or other contamination, see Annex H. The characteristics of the contamination shall be assessed to determine if cleaning is required and if so, which method shall be used. Dust accumulation and the type of pollutants, such as “bacterial growth”, should determine the need for cleaning, cleaning methods to be used and the required environmental controls.

Elements to be inspected for cleanliness start from the outdoor air intake and should include:

- a) Air Handling Units (AHU), including all their components and sections: outdoor air intake, any mixing sections, fan section, filters, plenums, heating and cooling coils, condensate trays, sound attenuators, heat recovery section, and humidifier section including droplet eliminators;
- b) supply air ductwork, including all types of terminal devices and terminal units, sound attenuators, duct-mounted heating and cooling coils, dampers and valves;
- c) extract and exhaust air ductwork, including all types of components;
- d) recirculation ductwork, including all types of components;
- e) fresh air intake ductwork.

6.2.2 Cleanliness inspection plan

The inspection plan shall consist of the following information:

- a) maintenance plan and reports, including cleanliness quality class and measurement methods;
- b) determining which systems will be inspected;
- c) determining where to inspect and sample;
- d) choosing equipment and tools.

Additionally, the inspection plan describes the requirements of the specific qualification and experience for inspectors before they are authorized to carry out inspection work. The assessment frequency shall be specified.

Recommendations for assessment frequency are given in Annex A. To obtain objective results, a representative number of samples from representative parts and sites in the ventilation system should be selected for evaluation of the cleanliness of the whole system.

A sound method for choosing sites, or taking samples, is to select areas where the dust deposits are obvious or liable to cause reduced indoor air quality (IAQ). For inspecting and sampling, the ventilation system can be divided in two parts, the ductwork and the rest of the system. Before inspection or sampling, the sites should be selected at random with the aid of the design documents. The sampling sites in the ductwork should be selected from the main duct starting from the AHU, main ducts, and branch

ducts. The sampling sites should include straight duct lengths and ducts with changes of direction or terminations. In the rest of the system, filters or humidifiers give a good indication of the cleaning needs. System cleanliness inspections should also refer to other parts of the system as described in 6.2.1, and with particular reference to critical components such as filters and wet areas.

6.2.3 Evaluation methods of dust accumulation

There are different methods to evaluate cleanliness of ventilation systems. The simplest methods are based on visual inspection of the cleanliness of the ventilation system combined with the use of some special instrumentation. The advanced techniques can give relatively accurate results that are comparable to given limit values.

NOTE The various methods available are discussed in Annex H. In Annex A, preferred measurement methods which relate to various cleanliness quality classes, and to post-clean verification of cleanliness, and limit values are given. For normal ventilation systems, Annex K describes methods and standards for simple onsite measurement of dry dust; Annex J describes methods and standards for kitchen extract systems.

6.3 Cleaning plan

If, as assessed according to 6.2, cleaning is needed, a cleaning plan shall be provided. The cleaning plan shall include:

- a) a summary of the assessment including the list of the systems and parts that need to be cleaned;
- b) detailed time schedule of cleaning;
- c) cleaning methods to be applied;
- d) description of how access will be gained to ducts and equipment not visible in the rooms (ducts, air handling units);
- e) list of components to be removed for cleaning, and components to be replaced (when relevant);
- f) protection of the rooms in which the cleaning equipment is used;
- g) how and when the occupants are informed (including protection and safety considerations);
- h) microbiological considerations when relevant, including considerations for the use of disinfection;
- i) criteria to assess the need for involvement of a specialist on microbiological issues; technical data, including an estimate of the present level of dust and impurities, and target levels for cleanliness after cleaning; see Annexes A, J and K;
- j) evaluation methods for cleanliness after cleaning.

One example of technical cleaning plan is presented in Annex B.

6.4 Cleaning methods

Cleaning methods shall be sufficient to achieve the required level of cleanliness without damage to the system, to building users' health and safety, and to the environment.

7 Evaluation and reporting

7.1 General

Clause 7 refers to ducted ventilation, for air ventilation systems. Kitchen extract systems are dealt within Annex J.

7.2 Evaluation of cleaning

The final evaluation of cleaning shall be made after all parts of the ductwork or system subject to cleaning have been assessed as visually clean. Duct sections not cleaned sufficiently shall be listed in the cleaning report including the reason why the sections were not cleaned, and with clear markings on the ductwork drawings in order to inform the operator/end-user that some duct sections were not cleaned sufficiently. This information can be used as basis for risk analysis and/or maintenance plan and/or rearrangement of duct sections, if deemed necessary.

The methods and limit value for post-clean verification of cleanliness are given in Annex A, J or K. Methods may be selected voluntarily by agreement of parties to a cleaning contract.

7.3 Cleaning report

The report shall include the following:

- a) details of the company executing the cleaning including:
 - 1) the address and name,
 - 2) name and competency of the responsible person of issuing the cleaning report,
 - 3) the date of the inspection, cleaning and evaluation;
- b) details of the object (building, ventilation system, etc.) including:
 - 1) the address, name, or other unique identifier of the property,
 - 2) the owner, manager, or responsible person of the building;
- c) list of the documents provided, including documentation of the product certificates and manufacturer's or supplier's instructions, whenever available;
- d) details of the systems inspected including physical descriptions of the systems subject to inspection and cleaning;
- e) inventory of equipment;
- f) methods and equipment used for cleaning, and assessment before and after cleaning (visual, measured) including:
 - 1) results of assessment before cleaning,
 - 2) scope of cleaning (entire system/ part of system),
 - 3) results of assessment after cleaning,
 - 4) photographic evidence before and after cleaning including location of each sampling point,

- 5) a clear statement, including location, of any sections of ductwork not sufficiently cleaned;
- g) documentation of the methods and equipment.