



SLOVENSKI STANDARD
oSIST prEN 15780:2021
01-junij-2021

Prezračevanje stavb - Kanali - Čistoča prezračevalnih sistemov

Ventilation for buildings - Ductwork - Cleanliness of ventilation systems

Lüftung von Gebäuden - Luftleitungen - Sauberkeit von Lüftungsanlagen

Ventilation des bâtiments - Réseaux de conduits - Propreté des systèmes de ventilation

Ta slovenski standard je istoveten z: prEN 15780

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ICS:

91.060.40	Dimniki, jaški, kanali	Chimneys, shafts, ducts
91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems

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EUROPEAN STANDARD
NORME EUROPÉENNE
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Will supersede EN 15780:2011

English Version

Ventilation for buildings - Ductwork - Cleanliness of ventilation systems

Ventilation des bâtiments - Réseaux de conduits -
Propreté des systèmes de ventilation

Lüftung von Gebäuden - Luftleitungen - Sauberkeit von
Lüftungsanlagen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 156.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents	Page
European foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Symbols and units	5
5 Criteria for cleanliness and assessment	5
5.1 General	5
5.2 Assessment of the need for cleaning	6
5.3 Design and handing over information	6
5.4 Determination of cleaning interval	6
5.5 Assessment of the result of cleaning	7
6 Methodology	7
6.1 General	7
6.2 Assessment of methodology	9
6.2.1 General	9
6.2.2 Inspection plan	9
6.2.3 Evaluation methods of dust accumulation	10
6.3 Cleaning plan	10
6.4 Cleaning methods	11
7 Evaluation and reporting	11
7.1 General	11
7.2 Evaluation of cleaning	11
7.3 Cleaning report	11
Annex A (informative) Cleanliness quality Air ventilation systems	14
Annex B (informative) Example of cleaning plan for Air ventilation system	17
Annex C (informative) Air Handling Units – specific guidance	20
Annex D (informative) Specific guidance for Filters in Air Handling Units	23
Annex E (informative) Specific guidance for Humidifiers in Air handling units	24
Annex F (informative) Ductwork – Specific installation guidance for Air ventilation system	25
Annex G (informative) Terminal devices and units – Specific guidance Air ventilation system	28
Annex H (informative) Measurement methods for dust accumulation - Air ventilation system	29
Annex I (informative) European Vacuum test method for measuring Dust Accumulation in Air ventilation systems	32
Annex J (informative) Kitchen Extract Equipment – Specific guidance	34
Annex K (informative) Wiping test method to Evaluate Cleanliness on Site	41
Bibliography	43

European foreword

This document (prEN 15780:2021) has been prepared by Technical Committee CEN/TC 156 “Ventilation for buildings”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 15780:2011.

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1 Scope

This document applies to both new and existing ventilation, air conditioning systems and kitchen extract system and specifies the assessment criteria of cleanliness, cleaning procedures of these systems. The validation of the effectiveness of cleaning applies also to products, which conform to EN 1505, EN 1506, EN 13053, EN 13180 and EN 13403, used in air conditioning and ventilation systems for human occupancy defined in the scope of CEN/TC 156. This document does not apply to installations for industrial, medical and laboratory facilities.

This document specifies general requirements and procedures necessary in assessing and maintaining the cleanliness of ducted ventilation, for air ventilation systems and kitchen extract systems.

The main target groups of this document are specifiers of the cleanliness quality classes and cleaning methods primarily system designers who also specify the system of access, building owners, services companies, maintenance companies, end users and consultancy and control companies.

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 12599, *Ventilation for buildings - Test procedures and measurement methods to hand over air conditioning and ventilation systems*

EN 12792:2003, *Ventilation for buildings - Symbols, terminology and graphical symbols*

EN 14799:2007, *Air filters for general air cleaning — Terminology*

EN 12097, *Ventilation for Buildings - Ductwork - Requirements for ductwork components to facilitate maintenance of ductwork systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12792:2003 and EN 14799:2007 and the following apply.

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 or for kitchen extract equipment, adhered grease deposits are detected visually on the duct surface after cleaning and the system can reach an acceptable cleanliness level according to a defined measurement method

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

3.3

acceptable dust accumulation level (new ductwork)

acceptable cleanliness level on new ductwork as handed over from builder to user

Note 1 to entry: In practice this means the quantity of pollution which is deemed acceptable

3.4

cleanliness

state or level of pollution defined as acceptable according to specification and a particular measurement method

Note 1 to entry: Cleanliness is not absolute, it is defined by limit values. Dirtiness is the exceeding of such a defined limit value

3.5

cleanliness quality class

level of cleanliness quality standard to be applied to various buildings and type of system, consisting of three levels

- A: Low
- B: Medium
- C: High

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3.6

visual inspection

subjective method to evaluate cleanliness level of surfaces

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4 Symbols and units

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For the purpose of this document, the symbols and units given in EN 12792:2003 apply.

5 Criteria for cleanliness and assessment

5.1 General

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

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 installation. The following requirements, as well as the methodology described in Clause 6, applies to the ductwork but can be also applied to air handling units (according to EN 13053) and entire systems (see EN 16798-3 and Annex A of this document) 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 whole of the lifetime. The design and installation issues shall include (as a minimum):

- cleanliness quality class;
- cleanliness criteria and measurement method;
- production of the system components;
- delivery to site;

prEN 15780:2021 (E)

- site storage;
- installation;
- protection of components after installation;
- handing over the system according to EN 12599

NOTE Annex A presents, as a common classification, three classes of cleanliness, application examples for ductwork, and recommendations for the frequency of regular inspections in accordance with EN 16798 part 17.

5.2 Assessment of the need for cleaning

Inspection of functionality and cleanliness of ventilation system is a part of proper maintenance of the ventilation systems. Mostly the inspection of the cleanliness may arise from two purposes:

- to check if ventilation system is dirty and needs to be cleaned (exceeding of a “target level” of cleanliness);
- 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 the existing documentation and recommendations to complete and update the documents.

Specific considerations for kitchen extract equipment, the frequency of cleaning should be sufficiently frequent that grease deposit limits are not exceeded.

5.3 Design and handing over information

In the handing-over documents 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 give consideration to 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 doors shall be provided in the ductwork. Additionally, special care shall be taken regarding obstacles to cleaning such as dampers, sound attenuators etc., which are mounted in the ducts. In many cases additional cleaning doors are needed after or before such obstacle. Requirements for location of and distance between access doors are presented in EN 12097 and EN 16798-3.

5.4 Determination of cleaning interval

The cleaning interval shall in principle be defined 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 Annex A.

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

5.5 Assessment of the result of cleaning

Methods for assessment of the need for cleaning can be also applied for assessment of the result of cleaning.

The preferred methods of post-clean verification are given in Annex A.

6 Methodology

6.1 General

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

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. Objective measurements are needed if the visual inspection results in disagreement or uncertainty about cleanliness or need for cleaning. See Figure 1 for an explanatory flow-chart.

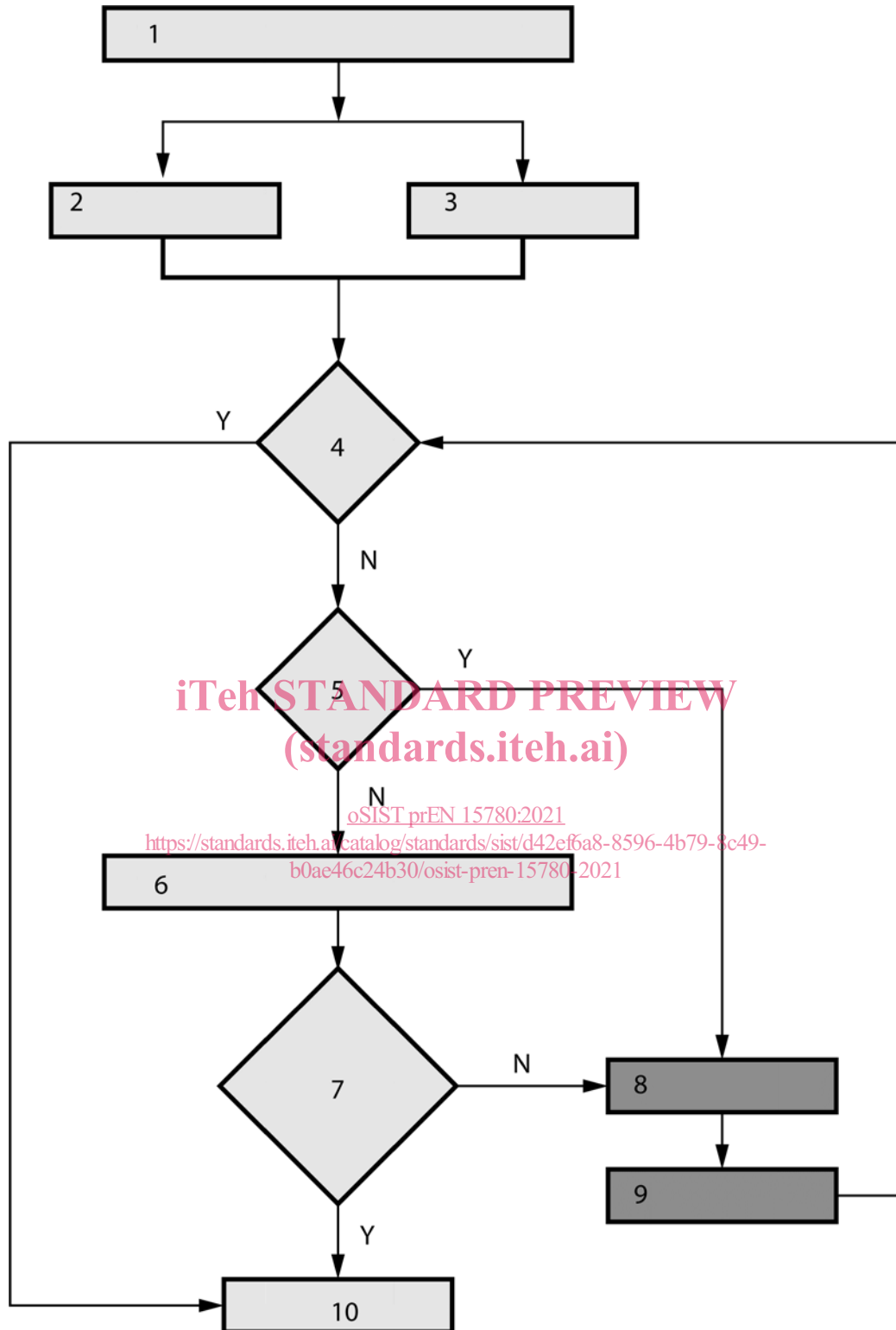
Objective measurements may be defined in advance as part of the cleaning or inspection plan.

NOTE 1 REHVA Guideline and some national guidelines like VDI 6022 and FiSIAQ Guideline give more detailed guidance on product selection and specification from the hygienic point of view.

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**Key**

1	control and maintenance of cleanliness of air handling system	7	acceptable cleanliness level
2	commissioning	8	cleaning
3	periodic inspection	9	verification
4	visually clean	10	documentation
5	clearly unclean	Y	yes

6 objective measurements N no

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 random checking of the system cleanliness (compliance with the documentation). See also 6.2.2.

The methods applied for objective measurements and verifications need to be consistent so that the result of inspection is acceptable and give reliable grounds for decision making to order 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 2 Annex I describe the preferred method of objective measurements.

NOTE 3 An example of acceptable levels of cleanliness (or dirtiness) is explained in Annex G.

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, and thus target values given for the cleaning shall be accompanied by a description of the measurement method.

6.2 Assessment of methodology

6.2.1 General

Assessment of the characteristics of the contamination of the system is important in order to define the cleaning method to be used.

System components are considered to be polluted when visual inspection and analytical verification (according Annex I) give evidence of unacceptable dust level, microbial, or other contamination. Assessment will be carried out through inspection. Dust accumulation, 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 at least:

- Air Handling Units (AHU's). AHU's assessment should include 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;
- supply air ductwork, including all types of terminal devices and terminal units, sound attenuators, duct-mounted heating and cooling coils, dampers and valves;
- extract air ductwork, including all types of components;
- return and recirculation ductwork, including all types of components;
- fresh air intake ductwork.

6.2.2 Inspection plan

The inspection plan consists of the following information:

prEN 15780:2021 (E)

- review plan and reports, including cleanliness quality class and measurement methods;
- determining which systems will be inspected;
- determining where to inspect and sample (see note);
- 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.

For new buildings, the owner, specifier and builder may agree a particular inspection plan to suit their requirements.

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 good rule of thumb 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 usually a good indication of the cleaning needs.

System cleanliness inspections should also make reference to other parts of the 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

Different methods to evaluate cleanliness of ventilation systems are available. The simplest methods are based on more or less subjective visual observation of the cleanliness of ventilation system combined with use of some special instrumentation. The advanced techniques are able to 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 and limit values are given which relate to various cleanliness quality classes, and to post-clean verification of cleanliness.

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 summary of the assessment including the list of the systems and parts that need to be cleaned;
- detailed time schedule of cleaning;
- cleaning methods to be applied;
- description of how access will be gained to ducts and equipment not visible in the rooms (ducts, air handling units);

- list of components to be removed for cleaning, and components to be replaced (when relevant);
- protection of the rooms in which the cleaning equipment is used;
- how and when the occupants are informed (including protection and safety considerations);
- microbiological considerations when relevant, including considerations for the use of disinfection;
- 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 Annex A;
- 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 generally.

7 Evaluation and reporting

7.1 General

This chapter 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.

Objective verification of post-clean cleanliness shall be carried out where necessary or as a result of dispute or uncertainty.

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

7.3 Cleaning report

A report shall be prepared and signed. The report shall include at least the following details:

Details of the company executing the cleaning:

- the address and name;
- name of the responsible person carrying out the cleaning;
- the date of the inspection, cleaning and evaluation.

Details of the object (building, ventilation system, etc.):

- the address, name, or other unique identifier of the property;
- the owner or manager of the building.