



SLOVENSKI STANDARD
oSIST prEN 17348:2019
01-april-2019

Zahteve za načrtovanje in preskušanje sesalnikov in zbiralnikov prahu za uporabo v potencialno eksplozivnih atmosferah

Requirements for design and testing of vacuum cleaners and dust collectors for use in potentially explosive atmospheres

Anforderungen an die Konstruktion und Prüfung von Staubsaugern und Staubabscheidern zur Verwendung in explosionsgefährdeten Bereichen

Exigences relatives à la conception et aux essais des aspirateurs et des dépoussiéreurs destinés à être utilisés en atmosphères explosibles

Ta slovenski standard je istoveten z: **prEN 17348**

ICS:

97.080 Aparati za čiščenje Cleaning appliances

oSIST prEN 17348:2019 **en,fr,de**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN 17348:2020

<https://standards.iteh.ai/catalog/standards/sist/90f4a421-e0ce-4dfd-83f8-7f49ba189f79/osist-pren-17348-2020>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 17348

January 2019

ICS 97.080

English Version

Requirements for design and testing of vacuum cleaners and dust collectors for use in potentially explosive atmospheres

Anforderungen an die Konstruktion und Prüfung von
Staubsaugern und Staubabscheidern zur Verwendung
in explosionsgefährdeten Bereichen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 305.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

	Page
European foreword.....	7
Introduction	8
1 Scope.....	9
2 Normative references.....	9
3 Terms and definitions	10
4 Safety requirements and protective measures	16
4.1 General.....	16
4.2 Ignition hazard and significant hazards assessment	16
4.3 Assignment of categories	16
4.4 Assignment of types	17
4.5 Design codes “E” for vacuum cleaner categories	17
4.6 Design codes “M” for the vacuum cleaner types.....	18
5 Safety requirements for all vacuum cleaner categories and types regarding ignition hazards.....	19
5.1 Hot surfaces.....	19
5.1.1 General.....	19
5.1.2 Temperature classification.....	19
5.2 Naked flame.....	20
5.3 Mechanically generated sparks	20
5.4 Exothermic reactions.....	20
5.5 Fans	20
5.6 Electrical components and devices.....	21
5.7 Electrostatic Hazards related to the external parts of the vacuum cleaner	21
5.7.1 General.....	21
5.7.2 Earthing	21
5.7.3 Main body of the vacuum cleaner.....	21
5.7.4 Suction hose, tools and accessories.....	21
5.7.5 Requirements regarding the use of insulating solid materials	22
5.8 General requirements for the internal part of the vacuum-cleaner.....	22
5.8.1 Airflow generating electrostatic charges	22
5.8.2 Cloth filter media.....	22
5.8.3 Protection against sparks generated by single impacts	22
5.8.4 Electrical and non-electrical equipment and components	22
6 Safety requirements for all vacuum-cleaner categories and types regarding significant hazards.....	23
6.1 Mechanical hazards.....	23
6.2 Noise hazards.....	23
6.3 Collapsing due to vacuum	23
6.4 Vibration hazards.....	23
6.5 Material/substance hazards	23
6.5.1 Avoiding dust clouds.....	23
6.5.2 Avoid dust accumulation	24
6.5.3 Prevent spillage	24
6.6 Fastening systems	24

6.7	Compatibility with material being collected	24
6.8	Material containment.....	24
6.9	Metal oxidation (rust).....	24
6.10	Ergonomic hazards	24
7	Additional requirements for electrical vacuum cleaners	24
7.1	General	24
7.2	Detachable supply cords	24
7.3	Through flow and open enclosure motors	25
7.4	Motor temperature control.....	25
7.4.1	Thermal protector.....	25
7.4.2	Thermal overload protection.....	25
7.4.3	Vacuum relief valve.....	25
7.5	Materials for rotating and stationary parts of fans	25
8	Additional requirements for non-electrical vacuum cleaners.....	25
8.1	General	25
8.2	Material pairing.....	25
9	Additional safety requirements for Dry Type dust collectors.....	26
9.1	General	26
9.2	Protection against hazards related to collected dusts present in the working air.....	26
9.3	Protection against collected hot embers or ignited dust	27
9.4	Safety filter	27
10	Additional safety requirements for Wet Type dust collectors	27
10.1	General	27
10.2	Precipitation of the collected dust.....	27
10.3	Moisture capture.....	27
10.3.1	Electrical vacuum cleaners	27
10.3.2	Non-electrical vacuum cleaners	28
10.3.3	Absolute coalescing filter.....	28
10.4	Liquid level indicator	28
10.5	Creation of a gas explosive atmosphere	28
10.6	Degassing vent.....	28
10.7	Vacuum relief vent	28
10.8	Additional filtration level inside the collection tank.....	28
10.9	Safety filter	29
11	Additional safety requirement for Liquid collectors	29
11.1	General	29
11.2	Suction cut-off system.....	29
11.3	Liquid adapted main filter.....	29
11.4	Liquid adapted safety filter.....	29
11.5	Creation of a gas explosive atmosphere	29
11.6	Degassing vent.....	30
11.7	Vacuum relief vent	30
11.8	Accidental spillage	30
12	Type verification and test.....	30
12.1	Temperature measurement	30
12.2	Tests for thermal endurance	30
12.2.1	General	30
12.2.2	Thermal endurance to heat.....	30
12.2.3	Thermal endurance to cold.....	30
12.3	Mechanical tests.....	30

prEN 17348:2019 (E)

12.3.1	Resistance to impact	30
12.3.2	Drop test	31
12.3.3	Stability test	31
12.3.4	Assessment of sparks generated by single impacts.....	31
12.3.5	Resistance to lowest inlet pressure.....	31
12.3.6	Burst strength test	31
12.4	Electrostatic charges tests	31
12.4.1	Connection facilities for earthing conducting parts.....	31
12.4.2	Electrostatic charges on external non-metallic materials	32
12.4.3	Accessible metal parts.....	32
12.5	Type verification and test for filters	32
12.6	Test for motor temperature control systems	32
12.6.1	Thermal protector attached to the motor.....	32
12.6.2	Thermal overload protection in the control switch	32
12.6.3	Vacuum relief valve	32
12.7	Test for wet type dust collector	32
13	Routine test	33
13.1	General.....	33
13.2	Test of performance.....	33
13.3	Test for electrical continuity.....	34
13.4	Seal and filtration efficiency test.....	34
14	Marking.....	34
15	Information for use	36
15.1	General.....	36
15.2	Operation and maintenance manual.....	36
15.3	Technical features.....	36
15.3.1	Seal and filtration efficiency.....	36
15.3.2	Required input air pressure.....	36
15.3.3	Filtration system	36
15.4	Intended use and limitations for use	36
15.4.1	General.....	36
15.4.2	Dry type dust collectors.....	37
15.4.3	Wet type dust collectors and liquid collectors	37
15.4.4	Maximum surface temperatures	37
15.4.5	Other considerations regarding limitations for use.....	37
15.5	Routine inspections, service and cleaning.....	37
15.6	Additional instructions for safe use	39
Annex A (informative)	Methodological approach	41
Annex B (informative)	Location of the power system in vacuum cleaners.....	42
Annex C (informative)	Examples of vacuum-cleaner types	45
Annex D (normative)	Vacuum cleaners assembled with a through flow motor or an open enclosure bypass motor.....	49
D.1	General.....	49
D.2	Safety requirements.....	49
D.2.1	Required safety elements for Category 3D vacuum cleaners.....	49
D.2.1.1	General.....	49
D.2.1.2	Protection against hazards related to air exhaust openings of the vacuum-cleaner	50

D.2.1.3 Protection against hazards related to cooling air intake for vacuum-cleaner using bypass motors with an open enclosure	50
D.2.1.4 Protection against hazards related to cooling air exhaust for vacuum-cleaner using bypass motors with an open enclosure	50
D.2.1.5 Protection against hazards related to working air exhaust.....	51
D.2.2 Required safety elements based on the collected material ("M").....	51
D.2.2.1 General	51
D.2.2.2 Protection against hazards related to presence of combustible dust in working air upstream of the power system	52
D.2.2.3 Moisture capture.....	52
D.2.3 Tests	52
D.2.3.1 General	52
D.2.3.2 Joints.....	52
D.2.3.3 Type tests for dust exclusion by enclosures	53
D.2.4 Marking and information of use.....	53
D.2.5 Examples of vacuum cleaners providing an Ex "t" casing	53
Annex E (normative) Ignition Hazards Assessment.....	55
Annex F (normative) List of significant hazards.....	83
Annex G (normative) Seal and filtration efficiency test.....	87
G.1 General	87
G.2 Test aerosol	87
G.2.1 Monodisperse aerosol.....	87
G.2.2 Polydisperse aerosol	87
G.3 Aerosol generator.....	87
G.3.1 Monodisperse aerosol.....	87
G.3.2 Polydisperse aerosol	87
G.4 Particle counter.....	87
G.5 Test conditions	88
G.6 Test procedure	88
G.6.1 Preparatory checks.....	88
G.6.2 Starting up the aerosol generator.....	88
G.6.3 Test execution.....	88
G.6.4 Test for filtration efficiency	88
G.6.5 Seal test	89
G.7 Evaluation of test results	89
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2014/34/EU.....	90
Bibliography	91

iTeh STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN 17348:2020

<https://standards.iteh.ai/catalog/standards/sist/90f4a421-e0ce-4dfd-83f8-7f49ba189f79/osist-pren-17348-2020>

European foreword

This document (prEN 17348:2019) has been prepared by Technical Committee CEN/TC 305 “Potentially explosive atmospheres — Explosion prevention and protection”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade association and supports essential requirements of EU Directive 2014/34/EU.

This document also covers requirements of EU Directive 2006/42/EU relating to fire and explosion hazards.

For relationship with EU Directive 2014/34/EU, see informative Annex ZA, which is an integral part of this document.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 17348:2020](https://standards.iteh.ai/catalog/standards/sist/90f4a421-e0ce-4dfd-83f8-7f49ba189f79/osist-pren-17348-2020)

<https://standards.iteh.ai/catalog/standards/sist/90f4a421-e0ce-4dfd-83f8-7f49ba189f79/osist-pren-17348-2020>

prEN 17348:2019 (E)**Introduction**

In accordance with EN ISO 12100, this is a type A standard.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered and indicated in the scope of this European Standard.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

This standard supplements and modifies the general requirements of EN 60079-0 and EN ISO 80079-36. Where a requirement of this standard conflicts with a requirement of EN 60079-0 or EN ISO 80079-36 the requirement of this standard takes precedence.

**iTeh STANDARD PREVIEW
(standards.iteh.ai)**

[oSIST prEN 17348:2020](https://standards.iteh.ai/catalog/standards/sist/90f4a421-e0ce-4dfd-83f8-7f49ba189f79/osist-pren-17348-2020)

<https://standards.iteh.ai/catalog/standards/sist/90f4a421-e0ce-4dfd-83f8-7f49ba189f79/osist-pren-17348-2020>

1 Scope

This document specifies requirements for design, construction, testing and marking of hand-held, portable and transportable vacuum cleaners and dust collectors, including their accessories, constructed to Group II categories 2G and 3G and to Group II categories 2D and 3D, intended for the collection of combustible or non-combustible dusts and flammable or non-flammable liquids in potentially explosive atmospheres. A potentially explosive atmosphere may be generated by the equipment during its intended use. It covers equipment driven by electricity and by pneumatic power.

This document deals with all significant hazards, hazardous situations and events relevant to vacuum cleaners and dust collectors, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer.

Typical applications for the concerned equipment are:

- Collection of dust produced by machinery at the point of generation;
- General housekeeping around machinery and of working areas; and/or
- Collection of spills.

For other specific applications a specific assessment shall be performed.

This document does not cover equipment used to collect toxic dusts where there is a health risk if dust passes through the filter element. This document does not cover either the collection of dusts which have explosive and unstable properties (UN transport class 1, class 4.1 and class 5.2).

This document covers vacuum cleaners with an internal dust loaded volume of maximum 200 l.

This document does not apply to pumps, where the inlet nozzle is submerged into a liquid, and all conveying applications.

This document does not apply to Group I vacuum cleaners and dust collectors for mining.

For an easier readability, all types of equipment concerned by this standard are referred as “Vacuum cleaner” in this document.

NOTE Collecting dust is recognized as a suitable action in view to participate to prevention against explosion.

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 1127-1:2011, *Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology*

EN 1822-1, *High efficiency air filters (EPA, HEPA and ULPA) - Part 1: Classification, performance testing, marking*

EN 13237:2012, *Potentially explosive atmospheres - Terms and definitions for equipment and protective systems intended for use in potentially explosive atmospheres*

EN 14986:2017, *Design of fans working in potentially explosive atmospheres*

EN 50495:2010, *Safety devices required for the safe functioning of equipment with respect to explosion risks*

prEN 17348:2019 (E)

EN 60079-0:2012, *Explosive atmospheres - Part 0: Equipment - General requirements*

EN 60079-14:2014, *Explosive atmospheres - Part 14: Electrical installations design, selection and erection*

EN 60079-31:2014, *Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"*

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 16852, *Flame arresters - Performance requirements, test methods and limits for use (ISO 16852)*

EN ISO 80079-36:2016, *Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements (ISO 80079-36:2016)*

IEC/TS 60079-32-1:2013, *Explosive atmospheres — Part 32-1: Electrostatic hazards, guidance*

ISO 1182, *Reaction to fire tests for products — Non-combustibility test*

ISO 29463-1:2017, *High efficiency filters and filter media for removing particles from air — Part 1: Classification, performance, testing and marking*

ISO 29463-5:2011, *High-efficiency filters and filter media for removing particles in air — Part 5: Test method for filter elements*

ITeH STANDARD PREVIEW
(standards.iteh.ai)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1127-1, EN ISO 12100, EN 60079-0, EN 13237 and EN ISO 80079-36:2016 apply.

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

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

3.1**vacuum cleaner**

suction device for the collection of solid debris, dust and liquids

3.2**dust collector**

device for separating solid particles from air or gas and accumulating them in a form convenient for handling

3.3**vacuum cleaner types**

cleaners are assigned a type based on the material they are designed to collect

Note 1 to entry: There are three types of vacuum cleaners: “Dry type dust collector”, “Wet type dust collector” and “liquid collector”

3.4**dry type dust collector**

device designed for the collection of dust. The dust is collected in a collection bag or directly in the collection tank

3.5**wet type dust collector**

device designed for the collection of dust. The collection device is designed to precipitate the collected dust into a neutralizing liquid

3.6**liquid collector**

device designed for the collection of liquids. The liquids are collected directly in the collection tank

3.7**design codes**

two series of design codes “E” and “M” listing the required safety elements the vacuum cleaner shall provide

3.8**design codes “E”**

series of design codes “E” lists the required safety elements the vacuum cleaner shall provide based on the working environment (“E”) where it is used

3.9**design codes “M”**

series of design codes “M” lists the required safety elements the vacuum cleaner shall provide based on the material (“M”) it is used to collect

3.10**transportable**

vacuum cleaner not intended to be carried by a person nor intended for fixed installation and which can be moved when energized

3.11**portable**

vacuum cleaner intended to be carried by a person and which can be moved when energized

3.12**powerhead**

upper part of the vacuum cleaner containing the motor or power system which creates the vacuum

Note 1 to entry: The powerhead can be detached from the filter chamber or from the collection tank

Note 2 to entry: see Figure B.1

prEN 17348:2019 (E)**3.13****motor cabinet**

enclosure containing the motor of the vacuum cleaner

Note 1 to entry: see Figures B.2 and B.3

3.14**collection tank**

part of the vacuum cleaner where the material collected is contained

Note 1 to entry: see Figures B.1, B.2 and B.3

3.15**filter chamber**

part of the vacuum cleaner containing filters

Note 1 to entry: see Figures B.2 and B.3

3.16**through flow motor**

motor where the working air travels through the fan system and is discharged directly over the motor windings as it exits, so the working air also provides cooling for the motor

3.17**bypass motor**

motor where the working airflow is independent from the cooling airflow

Note 1 to entry: The working air does not get into contact with motor windings. A separate fan is used for the cooling air

Note 2 to entry: see Figures C.1 and C.3

iTeh STANDARD PREVIEW

(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/90f4a421-e0ce-4dfd-83f8-7f49ba189f79/osist-pren-17348-2020>

3.18**motor enclosure**

enclosure designed to protect the motor from damages and from contaminants present in the environment it operates

Note 1 to entry: Motor enclosures are categorized as either open or totally enclosed and have an impact on how the cooling air circulate

Note 2 to entry: See Figures D.1 and D.2 for an example of motor with an open enclosure and Figures C.1 and C.3 for an example of motor with a totally enclosed one.

3.19**side channel blower**

non-positive displacement, high volume, pressure, blower that can operate as either a compressor or a vacuum pump

Note 1 to entry: It is also known as other names such as regenerative blower or vortex blower. The blower typically consists of an impeller mounted directly on a motor shaft and is rotated at a high speed

3.20**non-electrical vacuum cleaner**

vacuum cleaner using non-electrical power source to operate

3.21**electrical vacuum cleaner**

vacuum cleaner using electrical power source to operate

3.22**absolute filter**

filter certified in conformance with applicable standards for having a minimum filtration efficiency of 99,95 % as per EN 1822-1 (H13) or as per ISO 29463-1 (ISO 35H)

3.23**coalescing filter**

specifically designed to filter a humidified air flow. It removes liquid and droplets from the air flow

3.24**mist filtration system**

filtration system use as main filter in wet type dust collectors to filter airflow from droplets

3.25**most penetrating particle size**

particle size for which the efficiency of the filter media is at its minimum under test conditions

3.26**main filter**

filter element filtering the air flow upstream of the motor or power system in order to prevent the majority of collected material from entering into the motor or power system and to get released into the environment

Note 1 to entry: A main filter is designed for dust or liquid collectors

<https://standards.iteh.ai/catalog/standards/sist/90f4a421-e0ce-4dfd-83f8-7f49ba189f79/osist-pren-17348-2020>

3.27**collection bag**

bag into which the collected material is accumulated

3.28**suction inlet**

air intake placed on the vacuum cleaner to which the suction hose is connected

3.29**filter blockage indicator**

device indicating the blockage of the filters

3.30**working air**

air allowing to collect dusts and/or liquids in the vacuum cleaner

Note 1 to entry: See Figure B.1 for illustration.

3.31**cooling air**

air used to cool off the motor of the vacuum cleaner

Note 1 to entry: See Figure B.1 for illustration.