



**SLOVENSKI STANDARD**  
**oSIST prEN 16282-5:2011**  
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**Oprema za komercialne kuhinje - Sestavni deli za prezračevanje v komercialnih kuhinjah - 5. del: Zračni kanali - Projektiranje in dimenzioniranje**

Equipment for commercial kitchens - Components for ventilation in commercial kitchens - Part 5: Air duct - Design and dimensioning

Großküchengeräte - Einrichtungen zur Be- und Entlüftung von gewerblichen Küchen - Teil 5: Luftleitungen

Équipement pour cuisines professionnelles - Éléments de ventilation pour cuisines professionnelles - Partie 5: Conduit d'air - Conception et dimensionnement

**Ta slovenski standard je istoveten z: prEN 16282-5**

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**ICS:**

91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning
97.040.99	Druga kuhinjska oprema	Other kitchen equipment

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EUROPEAN STANDARD  
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**prEN 16282-5**

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ICS 97.040.99

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## Equipment for commercial kitchens - Components for ventilation in commercial kitchens - Part 5: Air duct - Design and dimensioning

Équipement pour cuisines professionnelles - Éléments de  
ventilation pour cuisines professionnelles - Partie 5:  
Conduit d'air - Conception et dimensionnement

Großküchengeräte - Einrichtungen zur Be- und Entlüftung  
von gewerblichen Küchen - Teil 5: Luftleitungen

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

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.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (prEN 16282-5:2011) 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.

The activities of CEN/TC 156, WG 14, cover the calculation of the air volume and the design and testing of major components of ventilation equipment for commercial kitchens.

The structure of the standard series is as follows:

prEN 16282 *Equipment for commercial kitchens – Components for ventilation in commercial kitchens*

- **Part 1: General requirements including calculation method**
- **Part 2: Kitchen ventilation hoods; Design and safety requirements**
- **Part 3: Kitchen ventilation ceilings; Design and safety requirements**
- **Part 4: Air inlets and outlets; Design and safety requirements**
- **Part 6: Aerosol separators; Design and safety requirements**
- **Part 7: Installation and use of fixed fire suppression systems**
- **Part 8: Installation for treatment of cooking fumes; Requirements and testing**
- **Part 9: Ventilation of buildings – capture and containment performance of extraction systems for commercial kitchen – test methods**

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## 1 Scope

This standard applies to air ducts of ventilation systems in kitchens and other food processing facilities which are, according to their type and construction, intended for commercial use. It does not apply to domestic kitchens and the space between the kitchen ventilation ceiling and the ceiling of the building situated above it (ceiling pressure rooms).

This standard specifies specific requirements for the design, installation and maintenance of air passages including safety-relevant, ergonomic and sanitary features and their examination.

## 2 Normative references

The following referenced documents are indispensable for the application 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.

DIN 1946-2, *Ventilation and air conditioning; technical health requirements*

DIN 4102-4, *Fire behaviour of building materials and building components; synopsis and application of classified building materials, components and special components*

DIN 4102-6, *Fire Behaviour of Building Materials and Building Components; Ventilation Ducts; Definitions, Requirements and Tests*

DIN 10516, *Food hygiene - Cleaning and disinfection*

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prEN 16282-1, *Equipment for commercial kitchens – Components for ventilation in commercial kitchens – Part 1: General requirements including calculation method*

prEN 16282-2, *Equipment for commercial kitchens – Components for ventilation in commercial kitchens – Part 2: Kitchen ventilation hoods; Design and safety requirements*

prEN 16282-3, *Equipment for commercial kitchens – Components for ventilation in commercial kitchens – Part 3: Kitchen ventilation ceilings; Design and safety requirements*

prEN 16282-4, *Equipment for commercial kitchens – Components for ventilation in commercial kitchens – Part 4: Air inlets and outlets; Design and safety requirements*

prEN 16282-6, *Equipment for commercial kitchens – Components for ventilation in commercial kitchens – Part 6: Aerosol separators; Design and safety requirements*

prEN 16282-7, *Equipment for commercial kitchens – Components for ventilation in commercial kitchens – Part 7: Installation and use of fixed fire suppression systems*

prEN 16282-8, *Equipment for commercial kitchens – Components for ventilation in commercial kitchens – Part 8: Installation for treatment of cooking fumes – Requirements and tests*

prEN 16282-9, *Ventilation of buildings – capture and containment performance of extraction systems for commercial kitchen – test methods*

EN 779, *Particulate air filters for general ventilation - Determination of the filtration performance*

EN 933-4, *Tests for geometrical properties of aggregates - Part 4: Determination of particle shape; shape index*

**prEN 16282-5:2011 (E)**

EN 10088-2, *Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general and construction purposes*

EN 12237, *Ventilation for buildings - Ductwork - Strength and leakage of circular sheet metal ducts*

EN 12599, *Ventilation for buildings - Test procedures and measuring methods for handing over installed ventilation and air conditioning systems*

Standards of the series

EN 50164, *Lightning protection components (LPC)*

VDI 2081 Sheet 1, *Noise generation and noise reduction in ventilation and air-conditioning systems*

VDI 2087, *Air ducts - Operating and construction fundamentals*

VDI 3803, *Air-conditioning systems - Structural and technical principles*

VDI 6022 Sheet 3, *Hygienic standards for ventilation and air-conditioning systems in production facilities and business enterprises*

**3 Terms and definitions**

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

NOTE Some terms receive acronyms which are used in the drawings of the planning and construction phases.

**3.1****Kitchen exhaust air****AB**

Air discharged out of the kitchen (line with negative pressure)

**3.2****Fire spread shut-off device**

Device limiting spread of fire through air ducts, preventing alone or together with other elements (e.g. detaching devices) the spread of fire and/or fume through air ducts for a specified period of time

**3.3****Outside air****AU**

Air sucked in from the outside

**3.4****Tightness class**

Measure for the tightness of an air duct system defined by the upper limit of the air leakage rate

NOTE The tightness of air ducts is classified in accordance with EN 12237 as class A, B or C.

**3.5****Fire resistance period**

Minimum time in minutes during which an element of ventilation air ducts is meeting the specified requirements

**3.6****Fire rating**

Classification for an element of a ventilation duct on the basis of its fire resistance period.

NOTE The fire rating of elements of ventilation ducts is determined in accordance with DIN 4102-6 Table 1.



Table 1 — of DIN 4102-6 L and K fire rating

Fire rating of pipes and pipe fittings of air ducts	Fire rating of shut-off devices against spread of fire in air ducts (fire protection flaps)	Fire resistance period in minutes
L 30	K 30	≥ 30
L 60	K 60	≥ 60
L 90	K 90	≥ 90
L 120	--	≥ 120

**3.7****Outlet air****FO**

Air discharged to the outside (line with positive pressure)

**3.8****Air leakage factor**

Airtightness of an air duct defined as air leakage rate per air duct casing area unit.

NOTE The air leakage factor is given in  $\text{m}^3 \cdot \text{s}^{-1} \cdot \text{m}^{-2}$ .

**3.9****Air leakage rate**

Leakage of an air duct which is exposed to an air pressure.

**3.10****Air duct**

(in case of fire protection equipment: ventilation duct)

Conduit for transporting air, used to transport air into and out of rooms

**3.11****Volumetric air flow rate**

Quotient of air volume and time

**3.12****Components**

Elements installed in air ducts such as fans, silencers, sensors, filters, flaps and so on

**3.13****Kitchens**

Rooms and parts of a building where food is stored, meals are prepared, served and distributed, and dishes, pots, pans and instruments are cleaned

**3.14****Kitchen supply air****ZU**

Air supplied to the kitchen

**3.15****Flexible air duct**

Air duct which can be, by hand and in longitudinal direction, compressed or decompressed as well as bent, without any lasting damage to the cross sectional area

## 4 Design and function

### 4.1 General

Unless otherwise specified, the requirements will be checked by way of inspection and/or measurement.

### 4.2 Functional requirements

#### 4.2.1 General

Air ducts are to be planned and constructed in a way to ensure low energy consumption, low leakage, low heat losses and favourable sanitary conditions during their operation.

Any adverse hygienic effects on the food are to be excluded with due care.

The stability of the air ducts, their connection and mounting elements has to be dimensioned appropriately to ensure that it will permanently withstand the stress and load caused by operation.

Flexible supply air ducts shall be avoided as far as possible due to their difficult cleaning.

#### 4.2.2 Design and loss of pressure

Air ducts are to be planned in a way to ensure minimum loss of pressure.

This can be achieved by:

- longitudinal and cross-connections which are flush at the inside,
- stiffening elements that are placed on the outside to avoid high air resistance,
- air rerouting without sharp edges, inner radius at least 100 mm, junctions preferably with guiding elements,
- no sudden changes in cross section,
- in case of changes in cross section angle of inclination less 45°, smooth internal walls.

#### 4.2.3 Special requirements for exhaust and outlet air ducts

Exhaust and outlet air ducts and their connections shall be aerosolate-proof and no visible escape of aerosolate is allowed

Soldered/brazed or welded connections or connections with permanently elastic and aerosolate-resistant sealing materials are deemed appropriate.

The use of flexible air ducts is not allowed.

Chinamans hat type exhaust air outlets shall not be used.

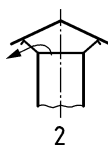


Figure 1 - Chinamans hat type

#### 4.2.4 Tightness

Outside and supply air ducts with round and rectangular cross section shall meet at least the requirements of EN 12237, tightness class A.

Exhaust and outlet air ducts with round and rectangular cross section shall meet the requirements of EN 12237, tightness class B.

#### 4.2.5 Silencers

Only materials which are harmless for health and which cannot become a culture medium for micro organisms are allowed to be used for the fabrication of silencers.

In operating state, silencer materials shall not release any harmful substances, parts of fibres or gases.

Their surface shall be abrasion-proof, in exhaust and outlet air ducts smooth, water-resistant, easy to clean, aerosolate and acid-resistant and stable

To avoid any contamination of the silencers they have to be packaged appropriately for transport and storage.

Silencers have to be dismantable with usual tools.

#### 4.2.6 Dimensioning of air ducts

##### 4.2.6.1 General

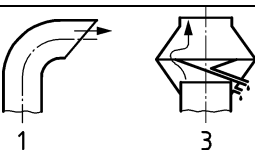
Flow, acoustic and heat characteristics have to comply with the requirements of VDI 2081 Sheet 1 and VDI 2087.

With respect to their design and state, air ducts shall be appropriate to meet the functional specifications of prEN 16282-1 and DIN 1946-2.

##### 4.2.6.2 Flow velocity guide values

For dimensioning air ducts, the flow velocity guide values as shown in table 2 have to be used, subject to the permissible sound pressure and pressure loss.

Table 2 — Flow velocity guide values

Element of the ventilation and air-conditioning system		Velocity of flow m/s width	
		suction side <sup>a</sup>	pressure side <sup>a</sup>
Extractor hood	 1 outlet air bend      3 deflector cap	4	6 to 8