



**SLOVENSKI STANDARD**  
**kSIST prEN 15544:2009**

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**Enkratna kachelgrundöfen/Putzgrundöfen**

One off Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) - Dimensioning

Ortsfest gesetzte Kachelgrundöfen/Putzgrundöfen - Auslegung

Poêles en faïence/kachelöfen - Dimensionnement

**Ta slovenski standard je istoveten z: prEN 15544**

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**prEN 15544**

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English Version

## One off Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) - Dimensioning

Kachelgrundöfen/Putzgrundöfen (poêles de masse en  
faïence/en crépi) - Dimensionnement

Ortsfest gesetzte Kachelgrundöfen/Putzgrundöfen -  
Auslegung

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## Foreword

This document (prEN 15544:2008) has been prepared by Technical Committee CEN/TC 295 "Residential solid fuel burning appliances", the secretariat of which is held by BSI.

This document is currently submitted to the Unique Acceptance Procedure.

This standard specifies a calculation method for the dimensioning of Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) based upon the required nominal heat output of the stove as declared by the producer. If the calculations of this standard are observed, the minimum energy efficiency of 78% and the emission values of carbon monoxide  $1\,500\text{ mg/m}_n^3$  ( $1\,000\text{ mg/MJ}$ ), nitrogen dioxide  $225\text{ mg/m}_n^3$  ( $150\text{ mg/MJ}$ ), organically bound carbon  $120\text{ mg/m}_n^3$  ( $80\text{ mg/MJ}$ ) and dust  $90\text{ mg/m}_n^3$  ( $60\text{ mg/MJ}$ ) will be observed too.

This calculation method for the dimensioning of Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) is based on appropriate literature as well as EN 13384-1, and where empirically determined correlations are used in addition to physical and chemical formulas.

**NOTE** In case of a calculation method for different interior materials than fireclay the proof of the compliance of the emission values should be delivered separately. Furthermore the empiric data of the combustion chamber dimensions, the minimum flue pipe length, the burning rate as well as the combustion chamber temperature and the decrease of the temperature along the flue pipe should also be determined.

## 1 Scope

This standard specifies calculations for the dimensioning of Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) based upon the required nominal heat output of the stove as declared by the producer. The Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) are of individual one-off construction design. The standard can be used for log wood fired Kachelöfen (tile stoves) that burn one fuel load per storage period with a maximum load between 10 kg and 40 kg and a storage period (nominal heating time) between 8 h and 24 h.

This standard is valid for Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) equipped with fireclay as interior material, with an apparent density between 1,750 kg/m<sup>3</sup> and 2,200 kg/m<sup>3</sup>, a degree of porosity from 18 % up to 33 % by volume and a heat conductivity from 0,65 W/mK up to 0,90 W/mK (temperature range 20 °C to 400 °C).

This standard is valid for Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) with sidewise combustion air supply of the combustion chamber and an inflow speed from 2 m/s to 4 m/s, whereas the height of the lowest opening is at least 5 cm above the bottom of the combustion chamber.

This standard is not valid for combinations with water heat exchangers for central heating or other heat absorbing elements like glass plates greater than 1/6 of the combustion chamber surface, open water tanks, etc. It is also not valid for combinations with heating/fireplace elements according to EN 13229. Furthermore this standard is not valid for mass-produced prefabricated or partly prefabricated slow heat release appliances according to EN 15250.

**NOTE** Although for the purposes of this standard these calculations are applicable only to the requirements of this standard, the same calculations can be used for other purposes, e.g. to verify emission levels and energy efficiency in case of burning log wood or wood briquettes according to the producer's manual.

## 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.

EN 13384-1, *Chimneys – Thermal and fluid dynamic calculation methods – Part 1: Chimneys serving one appliance*

## 3 Terms and definitions

- 3.1**  
**construction with air gap**  
construction, with an air gap between the inner and the outer shell
- 3.2**  
**construction without air gap**  
construction, with no air gap between the inner and the outer shell
- 3.3**  
**combustion chamber base**  $A_{BR}$   
area of a horizontal cut through the combustion chamber at the height of the lower edge of the firebox opening
- 3.4**  
**combustion chamber height**  $H_{BR}$   
mean vertical distance between the combustion chamber base and the combustion chamber ceiling

**3.5****combustion chamber surface**  $O_{BR}$ 

sum of the inner surfaces of the combustion chamber

**3.6****mean combustion chamber temperature**  $t_{BR}$ 

value to calculate the thermal lift in the combustion chamber

**3.7****burning rate**  $m_{BU}$ 

mean fuel load divided by burning time

**3.8****combustion chamber admeasurement**  $U_{BR}$ 

admeasurement of the combustion chamber base

**3.9****gas groove**

additional opening for the conduction of the flue gas

**3.10****flue pipe length**  $L_Z$ 

length of the connecting line of all geometric centres of the flue pipe profiles from the combustion chamber exit to the connecting pipe entrance

**3.11****Kachelgrundofen/tiled stove (also Kachelofen)**

one off slow heat release appliance, which is adapted individually to local conditions and whose visible surface is predominantly made of tiles

**3.12****short flue pipe section**

section of the flue pipe, where the length of the section is shorter than the hydraulic diameter

**3.13****minimum flue pipe length**  $L_{Zmin}$ 

minimal acceptable length of the flue pipe

**3.14****maximum load**  $m_B$ 

load of the fuel at nominal heat output

**3.15****minimum load**  $m_{Bmin}$ 

load of the fuel at the lowest reduced heat output

**3.16****nominal heat output**

mean useable heat output of the heating appliance

**3.17****Putzgrundofen/mortared stove (also Putzofen)**

one off slow heat release appliance, which is adapted individually to local conditions and whose visible surface is predominantly plastered

**3.18****storage period (nominal heating time)**

period of time specified by the producer where the nominal heat output is set free

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efficiency**

proportion (in percent) of the nominal heat output multiplied with the storage period to the total heat input

**4 Calculations****4.1 Nominal heat output**

The required nominal heat output ( $P_n$ ) of the stove shall be specified by the producer so that the dimensions of the stove can be calculated in accordance with clauses 4.2 to 4.10.

**4.2 Load of fuel****4.2.1 Maximum load**

The maximum load of fuel shall be calculated as follows:

$$m_B = \frac{P_n \times t_n}{3,25} \quad (1)$$

NOTE To calculate the factor 3,25 in equation (1), a net calorific value of wood of  $4,16 \text{ kWh} \cdot \text{kg}^{-1}$  and an efficiency of 0,78 (78%) was presumed.

where

$m_B$  is the maximum load (kg);

$P_n$  is the specified nominal heat output (kW);

$t_n$  is the specified storage period (h).

NOTE The specified storage period can vary between 8 h and 24 h.

**4.2.2 Minimum load**

The minimum load shall be calculated as 50 % of the maximum load as follows:

$$m_{Bmin} = 0,5 \times m_B \quad (2)$$

where

$m_B$  is the maximum load (kg);

$m_{Bmin}$  is the minimum load (kg).

**4.3 Design of the essential dimensions****4.3.1 Combustion chamber dimensions**

NOTE Designing the dimensions of the combustion chamber serves two main purposes: firstly to ensure that sufficient room is available to contain the fuel needed to be charged and secondly that the requirements for clean combustion are met.