
Pelletni gorilniki za male kotle za gretje - Definicije, zahteve, preskušanje, označevanje

Pellet burners for small heating boilers - Definitions, requirements, testing, marking

Pellet Brenner für kleine Heizkessel - Definitionen, Anforderungen, Prüfung, Kennzeichnung

Brûleurs à granulés pour petites chaudières de chauffage - Définitions, exigences, essais, marquage

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: EN 15270:2007
SIST EN 15270:2008
<https://standards.iteh.ai/catalog/standards/sist/699796cc-1614-47e1-a282-d1c240152c12/sist-en-15270-2008>

ICS:

97.100.30

SIST EN 15270:2008

en

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

SIST EN 15270:2008

<https://standards.iteh.ai/catalog/standards/sist/099758cc-1614-47e1-a282-d1c240152c12/sist-en-15270-2008>

English Version

Pellet burners for small heating boilers - Definitions, requirements, testing, marking

Brûleurs à granulés pour petites chaudières de chauffage -
Définitions, exigences, essais, marquage

Pelletbrenner für kleine Heizkessel - Definitionen,
Anforderungen, Prüfung, Kennzeichnung

This European Standard was approved by CEN on 3 November 2007.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists 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 Management Centre has the same status as the official versions.

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

SIST EN 15270:2008

<https://standards.iteh.ai/catalog/standards/sist/099758cc-1614-47e1-a282-d1c240152c12/sist-en-15270-2008>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Page

Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms, definitions and symbols.....	4
4 Classification and groupings for pellet burners.....	8
5 Requirements	9
6 Testing	16
7 Conformity evaluation	25
8 Marking	25
9 Operating instructions	25
10 Test report	27
Annex A (informative) Vocabulary	29
Annex B (informative) Fireproof non-metallic materials for pellet burners.....	32
Annex C (normative) Requirements for electronic burner start up functions and pellet-air ratio controls.....	34
Annex D (informative) Example of risk assessment to prevent back burning.....	36
Annex E (informative) Example of risk assessment and the allocation of safety level for control functions using electronic devices for pellet burners.....	38
Annex F (informative) Long term stability test (optional).....	40
Annex G (informative) Measurement methods for some physical parameters.....	41
Annex H (normative) Determination of organic gaseous compounds content	44
Annex I (informative) Conformity evaluation.....	46
Bibliography	49

Foreword

This document (EN 15270:2007) has been prepared by Technical Committee CEN/TC 57 “Central heating boilers”, the secretariat of which is held by DIN.

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 June 2008, and conflicting national standards shall be withdrawn at the latest by June 2008.

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 15270:2008

<https://standards.iteh.ai/catalog/standards/sist/099758cc-1614-47e1-a282-d1c240152c12/sist-en-15270-2008>

1 Scope

This European Standard relates to pellet burners having a maximum heat input of not more than 70 kW, intended for fitting with appropriate boilers for hot water, and intended for high quality pellets in accordance with CEN/TS 14961:2005 Annex A. This standard contains requirements and test methods for safety, combustion quality, operating characteristics and maintenance of pellet burners and covers and also all external equipment that influences the safety systems. This standard also contains information on how to enable a correct match between pellet burner and boiler.

Pellet burners that are sold as a complete unit together with their own dedicated boilers are not covered.

NOTE Other fuels will be considered in future amendments to this standard.

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 230:2005, *Automatic burner control systems for oil burners*

EN 298:2003, *Automatic gas burner control systems for gas burners and gas burning appliances with or without fans*

EN 12067-2:2004, *Gas/air ratio controls for gas burners and gas burning appliances – Part 2: Electronic types*

CEN/TS 14961:2005, *Solid biofuels – Fuel specifications and classes*

EN 15036-1, *Heating boilers – Test regulations for airborne noise emissions from heat generators – Part 1: Airborne noise emissions from heat generators*

CEN/TS 15404, *Solid recovered fuels – Methods for the determination of ash melting behaviour by using characteristic temperatures*

prEN 15456, *Heating boilers — Electrical power consumption for heat generators — System boundaries - Measurements*

EN 60335-2-102, *Household and similar electrical appliances — Safety — Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections (IEC 60335-2-102:2004, modified)*

EN 60529, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN 60730-1:2002, *Automatic electrical controls for household and similar use — Part 1: General requirements (IEC 60730-1:1999, modified)*

EN 60730-2-5:2002, *Automatic electrical controls for household and similar use — Part 2-5: Particular requirements for automatic electrical burner control systems (IEC 60730-2-5:2000, modified)*

3 Terms, definitions and symbols

For the purpose of this standard, the following terms and definitions apply.

NOTE For reference use only the equivalent terms in Danish, English, French, German and Swedish, are found in informative Annex A.

3.1**pellet burner**

device for burning pellets where the control can be of different types; on-off, mechanical, modulating or multi stage. The pellets can be fed horizontally, from above or from below

3.2**modulating burner**

burner where the throughput may be infinitely varied between the lower and upper limits

3.3**multistage burner**

burner where several firing stages can be utilised. Burners with only two firing rates are included in this category

3.4**ignition device**

device used to ignite the pellets in the burner head of a pellet burner, it can be either manual, automatic or with a basic fire bed. The ignition can be caused by a hot air element, automatic ignition with liquid or gaseous fuels, electric coil or electric glow plug

3.5**basic fire bed**

quantity of glowing embers which ensures ignition of the test fuel to be charged

3.6**conveyor system, auger, feed screw**

mechanical arrangement, normally incorporating a feed screw, used for transporting the pellets from the fuel hopper to the burner head

3.7**fuel hopper**

fuel store from which fuel is fed to the pellet burner

[SIST EN 15270:2008](https://standards.iteh.ai/catalog/standards/sist/099758cc-1614-47e1-a282-d1c240152c12/sist-en-15270-2008)

<https://standards.iteh.ai/catalog/standards/sist/099758cc-1614-47e1-a282-d1c240152c12/sist-en-15270-2008>

3.8**storage with external fuel hopper**

external fuel store from which fuel is fed to the pellet burner and which is separate from the pellet burner. It can be located either inside or outside the room where the pellet burner is located

3.9**storage with integral fuel hopper**

integral fuel store container from which fuel is fed to the pellet burner and which is integral with the pellet burner

3.10**burner head**

part of a pellet burner where the pellets are burned

3.11**back burning**

situation in which the flames from the burning pellets in the burner head propagate and ignite the pellets in the conveyor system

3.12**temperature limiter**

safety level B device that causes the safe shutdown and lockout of the fuel supply and/or the combustion air supply respectively if the limiter value exceeds a pre-set limit. According to EN 14597 it is a device of Type "TB"

3.13

safety temperature limiter

safety level C device that causes the safe shutdown and lockout of the fuel supply and/or the combustion air supply respectively if the limiter value exceeds a pre-set limit. According to EN 14597 it is a device of Type "STB"

3.14

sprinkle system

safety device that allows small droplets of water to be released onto the pellets in the conveyor system if back burning occurs

3.15

drop chute

sloping channel, through which the pellets fall from a conveyor system into a burner head or into moving equipment

3.16

cell feeder

device that intermittently interrupts the fuel stream thus only allowing a small amount of pellets at a time to be supplied to the burner, thereby preventing the flue gases from reaching the hopper

3.17

fire damper

mobile closure within a duct which is designed to prevent the passage of fire

3.18

combustion air supply

air required by the pellet burner to ensure the safe and efficient combustion of pellets and supplied into the combustion chamber, which is entirely or partially used to burn the pellets in the burner head

3.19

ash discharge

arrangement for removing the ash from the burner head or the combustion chamber which may be automatically controlled

3.20

non volatile lockout

shutdown condition such that a restart can be accomplished only by a manual reset and by no other means

3.21

volatile lockout

shutdown condition such that a restart can be accomplished by restoration of the electrical supply after its loss or by manual reset

3.22

heat input, in kW,

amount of heat as a function of time released by the burner at a given throughput

3.23

maximum heat input, in kW,

maximum heat input, at continuous burning, as specified by the manufacturer

3.24

minimum heat input, in kW,

minimum heat input, at continuous burning, as specified by the manufacturer

3.25

excess air ratio

ratio between the effectively introduced quantity of air and the theoretically required quantity of air

3.26**safety device**

device providing one or more safety related functions or parts of a safety related function, built in one physical unit

3.27**safety system**

system including the entire set of safety related controls and safety related measures or a part of it to provide the safety of the pellet burner or the part of it

3.28 Symbols, descriptions and units

Symbols used in this standard are listed in Table 1.

All gaseous volumes are expressed in m³, and referred to 0 °C and 1,013 bar.

Table 1 — Symbols, descriptions and units

Symbol	Description	Unit
a	Ash content in the test fuel at dry bases	mass fraction in %
B _d	Mass of test fuel referred to the test duration	kg/h at dry bases
B _w	Mass of test fuel referred to the test duration	kg/h at firing
C _C	Carbon content of the test fuel	mass fraction in %
C _{CO}	Carbon monoxide content of the dry flue gases	volume fraction in %
C _{CO2}	Carbon dioxide content of the dry flue gases	volume fraction in %
C _{OGC}	Calculated content of organic gaseous compounds	mg/m ³ dry flue gas at 10 % O ₂
C _r	Carbon content of residues referred to quantity of test fuel	mass fraction in %
C _{THC,m}	Measured total hydrocarbon content expressed in mg/m ³ methane equivalents in wet flue gas	mg/m ³ methane
C _{THC,p}	Measured total hydrocarbon content expressed in mg/m ³ propane equivalents in wet flue gas	mg/m ³ propane
G _d	Actual specific dry flue gas volume	m ³ /kg fuel
G _w	Actual specific wet flue gas volume	m ³ /kg fuel

Table 1 — (continued)

Symbol	Description	Unit
C _H	Hydrogen content	mass fraction in % s
m _r	Total residue in boiler after test	kg
O _{2, m}	Measured oxygen content in dry flue gas	% as mean value
OGC	Organic gaseous compound	
Q _{ib}	Heat input	kW
R	Total residue referred to the mass of test fuel	mass fraction in %
t	Test duration	h
THC	Total hydrocarbon content	mg/m ³
T _{amb}	Ambient temperature	°C
T _{return}	Return temperature	°C
T _{flow}	Flow temperature	°C
C _w	Moisture content	mass fraction in %
λ	Excess air ratio	

4 Classification and groupings for pellet burners

4.1 Classification

For the purpose of this standard pellet burners are classified in accordance with the following:

Methods of control and grouped as detailed in 4.2;
[SIST EN 15270:2008](http://standards.iteh.ai/catalog/standards/sist/099758cc-1614-47e1-a282-d1c240152c12/sist-en-15270-2008)
<http://standards.iteh.ai/catalog/standards/sist/099758cc-1614-47e1-a282-d1c240152c12/sist-en-15270-2008>

Means of ignition and grouped as detailed in 4.3;

External or integral fuel hopper;

Combustion chamber;

Monobloc or other type of burner.

4.2 Methods of control of pellet burner

Methods of control are grouped as follows:

- On-off control;
- Modulating control;
- Multi-stage control.

4.3 Means of ignition

Means of ignition are grouped as follows:

- Manual ignition;
- Automatic electric ignition;

- c. Pilot fire;
- d. Hot air element;
- e. Automatic ignition with liquid or gaseous fuels.

5 Requirements

5.1 Design

5.1.1 General design

5.1.1.1 Materials

The quality of materials, form and dimensioning of the components shall ensure that the pellet burner is capable of operating safely and during a reasonable economic life time, if installed, operated, maintained and adjusted correctly under the conditions specified by the manufacturer and exposed to the related mechanical, chemical and thermal stresses.

The materials of construction shall withstand all normally occurring chemical, mechanical and thermal stresses.

The construction of the burners shall be such that no instability, distortion or breakage likely to impair its safety can occur.

Levers and similar devices which have to be operated by the installer or user shall be appropriately identified and they shall not show any changes that could affect their normal functioning under normal conditions of use, maintenance and adjustment.

Housings not made of corrosion-resistant material shall be suitably protected with an efficient anti-corrosion coating.

Asbestos or asbestos-containing materials shall not be used.

Fireproof materials for construction, lining and insulation see Annex B.

5.1.1.2 Design

The construction and design of the pellet burner shall be such that when burning the correct fuel in accordance with the scope of this standard it operates safely at the specified input (input range) given by the manufacturer and that the performance requirements given in 5.3 are met.

Constructional parts accessible during use and maintenance shall be free from sharp edges and corners that might cause damage or personal injury during use or maintenance.

The feed screw in the burner shall mechanically withstand blocking without permanent damage to mechanical or electrical components.

5.1.1.3 Mounting

The pellet burner shall be so designed so that it can be easily attached to the boiler as defined in the installation manual of the manufacturer.

The connection shall be designed to withstand a possible gas explosion inside the boiler.

The pellet burner components shall be arranged and secured in such a manner that the correct operating position and above all, the correct position of the burner orifices cannot be altered during operation. Means shall be provided to ensure that the correct position shall be maintained, if the components are dismantled and reassembled. Accidental dismantling shall not be possible.

Parts of the burner that are set or adjusted at the stage of manufacture and which should not be adjusted by the user or installer shall be sealed. Instructions on how to make the seal between the burner and the boiler shall be provided, and all necessary materials shall be supplied with the burner.

The burner shall be fitted with means of securely attaching it to the boiler. A bolted joint shall only be accepted if the burner is accessible for ash removal without dismantling of the bolted joint.

Burners that can be withdrawn or swivelled out of position without the use of tools shall be interlocked (e.g. by means of limit switches) in such a way that they cannot be operated in the withdrawn or swivelled position. The interlock device shall be fail safe in design and, where it is a limit switch, it shall comply with H.27 of EN 60730-2-5:2002.

5.1.1.4 Accessibility for maintenance and use

Components requiring regular maintenance shall be arranged or designed so that they are easily detachable. Furthermore, they shall be designed or marked in such a way that if the manufacturer's instructions are followed they cannot be replaced incorrectly.

Any parts subject to wear shall be accessible for replacement.

Sensors for the safety systems must be accessible for inspection and cleaning.

The manufacturer shall give information on how to clean the feed screw, especially when a water sprinkler system has been actuated.

5.1.1.5 Handling of ashes

The burner shall be so designed that ashes can easily be removed. When this necessitates removing the burner, it shall be easy to perform.

If the burner is fitted with an automatic ash discharge system, this shall be in the form of an enclosed system or discharge the ashes into a water container.

If it is a necessity to use a special tool to remove the ashes from the burner, this shall be provided by the manufacturer.

5.1.2 Equipment

5.1.2.1 Motors and fans

Motors and fans shall be so protected by suitable guards, shields or screens of adequate size, strength and durability that they are not liable to be touched accidentally. The degree of protection shall be at least IP 20, according to EN 60529. Removal of such guards, shields or screens shall only be possible with the use of tools.

Mechanical drives (belt, chain drives etc), when used, shall be so designed or positioned as to afford protection to the operator. The correct tension is important. This can be achieved either by automatic means or manually. In the latter case access shall only be possible by the use of tools.

5.1.2.2 Burner controls

All controls and safety devices shall perform correctly at ambient temperature between 0 °C and 60 °C. If a lower minimum or a higher maximum temperature is declared by the manufacturer, then the control or safety devices shall perform at that lower or higher temperature.

The long term performance test according to EN 230 shall take place with the above min and max temperature values.

Electronic parts of safety devices shall not be exposed to temperatures higher than their maximum design temperature.

Safety related devices shall fulfil the fault requirements specified in 5.2.12.1.

If the burner is equipped with any of the following functions or components, they shall fulfil the requirements given in Annex C:

- a) Automatic burner control including flame detector device;
- b) Pellet-air ratio control device.

5.1.2.3 Ignition devices

The ignition device shall ensure safe ignition under the normal conditions of operation.

5.1.2.4 Fuel hopper

For a burner incorporating an integral fuel hopper, the hopper shall be made of non combustible material. The hopper shall have a tight fitting lid with a closing device that ensures a proper sealing, e.g. a spring catch, so that the leakage rate does not exceed 10 m³/h at 5 Pa positive pressure.

Any integral fuel hopper shall incorporate a device that interrupts the supply of fuel, if the lid is open. The device shall fulfil the requirements according to H.27 of EN 60730-2-5:2002.

5.1.2.5 Cell feeder or a fire damper

For burners with a cell feeder or a fire damper, the leakage through the device shall not exceed 1 m³/h at 5 Pa positive pressure.

5.1.2.6 Water sprinkler system

If the burner is equipped with a water sprinkler system, the water container shall have a level switch or a pressure switch and a volume of at least 5 l.

5.1.3 Interface to boiler

The manufacturer shall provide sufficient information to ensure that the burner matches the boiler to which it is intended to be installed.

The requirements for the boiler to which the burner can be attached shall be described in the technical documentation and shall specify at least the following items:

- a. combustion chamber: minimum dimensions for volume, length, width, height (the direction of the flame and the position of the burner head shall be considered here). Those minimum dimensions shall be used in the testing boiler;
- b. dimension of opening in the boiler required to fit the burner;

- c. with/without additional combustion air supply openings in the boiler;
- d. size of surface and efficiency of heat exchanger and boiler water temperature. This may be described as rated output of the boiler for oil and the estimated equivalent for pellets;
- e. maximum heat output;
- f. pressure range in the combustion chamber;
- g. water content;
- h. mechanical and electrical connections;
- i. need of any controls and safety devices on the boiler;
- j. type and dimensions of chimney.

5.2 Safety

5.2.1 General

Potential hazards caused by the burner or the operation of the burner with consideration of the behaviour of the boiler shall be avoided by either constructional means or by the use of safety devices. Safety shall be maintained in the event of possible failures in the safety device itself.

The manufacturer shall undertake a risk assessment covering all potential hazards of the burner and the measures how to avoid or control them including allocation of safety levels. The safety levels are defined as follows:

1. safety level A: Control functions which are not intended to be relied upon for the safety of the application. A functional safety assessment is not required;
2. safety level B: Control functions which are intended to prevent an unsafe state of the appliance. Failure of the control function will not lead directly to a hazardous situation. A single fault assessment of the control including software class B according to EN 60730-1 is required;
3. safety level C: Control functions which are intended to prevent special hazards such as explosion or whose failure could directly cause a hazard in the appliance. A second fault assessment of the control including software Class C according to EN 60730-2-5 is required.

This risk assessment shall cover at least the following:

- a. elements given in 5.2.2 to 5.2.11;
- b. burner functions start-up, purge, ignition, flame supervision, flue gas flow, control of heat demand, pellet-air ratio control.

In the risk assessment one of the above mentioned safety levels shall be allocated to any identified hazard.

An example of risk analysis for back burning is given in Annex D and an example of the risk analysis with allocation of the appropriate safety levels for control functions using electronic devices is given in Annex E.

The actuation of any safety system shall at least result in cutting off the fuel feed.

5.2.2 Safety against back burning

Back burning in any state of operation differing from normal operation shall be prevented either by constructional means or by use of safety devices or any other means that gives an equal level of safety.

The hazard of back burning is classified as a risk corresponding to safety level C in accordance with 5.2.1.

The failure of the feed screw drive shall not result in any dangerous situation.

The burner shall have at least two different safety systems to prevent back burning from the burner head.

At least one of the safety systems shall operate regardless of the state of the power supply. If one of the safety systems of the burner is in the form of an emergency discharge of the fuel, this shall be discharged into the boiler. The discharge shall be limited to the amount of fuel in the feed screw. The content of the hopper shall not be discharged in this manner. In this case the burner shall have an emergency power supply (e.g. electrical battery back up or mechanical-thermo-mechanical device). At least one of the safety systems shall continue to provide protection in the event of interruption of the fuel feed (e.g. blockage of the feed screw).

Any loss of power supply shall result in neither smoke leakage from the pellet burner nor back burning.

In normal operation the temperature in the fuel supply shall not exceed 85 °C. Sensors for the safety systems shall be actuated before the temperature exceeds 95 °C.

If the burner is equipped with a drop chute, the difference between the upper and lower fuel levels in the drop chute shall be at least 150 mm as measured from the highest point of the lower pellets level. This distance must be at least 250 mm if the maximum heat input of the burner exceeds 15 kW.

5.2.3 Safety against fuel overload of the boiler or interruption in fuel supply

The operation of the burner with the feed screw set to operate continuously at maximum speed shall not result in any dangerous situation.

The test at overload mode according to 6.6.1.3 can be omitted if a safety device, safety level C according to 5.2.1 prevents an overload mode.

The boiler shall be equipped with a safety device that stops the fuel supply in the event that there is either insufficient or no combustion in the burner head.

The test for interruption of fuel supply according to 6.6.1.3 can be omitted if a safety device, safety level B or C according to 5.2.1 is used.

In the ignition phase a safety device shall stop the fuel supply after a safety time which shall be declared by the manufacturer of the burner start up function, if there is no or insufficient combustion. At the end of the safety time there shall be no critical amount of fuel in the burner head, if the ignition of the fuel fails. A failure in the safety device to detect insufficient combustion shall not lead to a dangerous situation.

5.2.4 Voltage variation

In the case of variation in the electrical power supply between 85 % and 110 % of the nominal value, there shall be no deterioration, which prohibits the normal use of the burner.

A decrease of the electrical power supply to below 85 % of the nominal value shall not lead to a dangerous situation.

Automatic restart of the burner after a power failure is permitted only if by self checking of the burner control system first has verified that all the safety systems are in operation.

Loss of power supply or decrease of power supply to the burner shall not cause back burning or smoke passing out through the pellet burner.