

SLOVENSKI STANDARD SIST EN 298:2012

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Naprave za samodejni nadzor gorilnikov in aparatov na plin ali tekoča goriva

Automatic burner control systems for burners and appliances burning gaseous or liquid fuels

Feuerungsautomaten für Brenner und Brennstoffgeräte für gasförmige oder flüssige Brennstoffe (standards.iteh.ai)

Systèmes automatiques de commande pour brûleurs et appareils utilisant des combustibles gazeux ou liquides 23124e3cff6a/sist-en-298-2012

Ta slovenski standard je istoveten z: EN 298:2012

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27.060.20	Plinski gorilniki	Gas fuel burners

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Automatic burner control systems for burners and appliances burning gaseous or liquid fuels

Systèmes automatiques de commande pour brûleurs et appareils utilisant des combustibles gazeux ou liquides

Feuerungsautomaten für Brenner und Brennstoffgeräte für gasförmige oder flüssige Brennstoffe

This European Standard was approved by CEN on 9 March 2012.

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

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Foreword

This document (EN 298:2012) has been prepared by Technical Committee CEN/TC 58 "Safety and control devices for burners and appliances burning gaseous or liquid fuels", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by November 2012, and conflicting national standards shall be withdrawn at the latest by May 2015.

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.

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(s).

For the relationship of this document with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

This document supersedes EN 230:2005 and EN 298:2003.

This document refers to clauses of EN 13611:2007+A2:2011 and adapts them, indicating the changes by stating "with the following modification", "with the following addition", "is replaced by the following" or "is not applicable". It also adds clauses or sub-clauses to the structure of EN 13611:2007+A2:2011 which are particular to this standard (EN 298:2012). Additional sub-clauses or annexes are either numbered starting from 101 or are designated as Annex AA, BB, CC etc. It should be noted however that these clauses and sub-clauses are not indicated as additions in the text.

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The following is a list of significant technical changes between this document and the previous editions:

- Alignment with EN 13611:2007+A2:2011;
- Integration of the requirements from EN 230 (EN 230 is merged into prEN 298);

NOTE If, due to the reference of EN 13611 the term "gas" will be part of a requirement or test, then the term "gas" shall be substituted by the term "fuel"

- Requirements from the flame supervision and the reactions in case of loss of flame have been adapted to modifications made in EN 267 and EN 676 and optimised for better understanding;
- Requirements and tests for "independent flame detectors" have been integrated;
- New requirements concerning "common cause" have been added;
- Requirements for the new function "remote reset from lock-out" have been added.

EN 298 compliance for burner control systems or flame detector devices cannot be claimed based upon SIL classification according to EN 61508.

SIL classification cannot be claimed based upon compliance with this standard only. A supplementary method for SIL determination is specified in EN 13611:2007+A2:2011, Annex J.

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, Croatia, 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, Turkey and the United Kingdom.

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1 Scope

This European Standard specifies the safety, construction and performance requirements for automatic burner control systems, programming units and flame detector devices, intended for use with gas and oil burners and gas and oil burning appliances, with or without fans and similar use.

This European Standard is applicable to automatic burner control systems that include additional functions.

This European Standard does not cover automatic burner control systems utilizing thermo-electric flame supervision devices.

NOTE 1 European Standards for burners, appliances or processes which use automatic burner control systems, programming units or flame detectors can override the requirements of this standard.

NOTE 2 Provisions for production control are not part of this European Standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 267:2009+A1:2011, Automatic forced draught burners for liquid fuels

EN 1643, Valve proving systems for automatic shut-off valves for gas burners and gas appliances

EN 13611:2007+A2:2011, Safety and control devices for gas burners and gas burning appliances — General requirements

EN 14459:2007, Control functions in electronic <u>systems_for_gas</u> burners and gas burning appliances — Methods for classification and assessment teh.ai/catalog/standards/sist/29e78a73-525f-4c85-b403-

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EN 60730-1:2011, Automatic electrical controls for household and similar use — Part 1: General requirements (IEC 60730-1:2010 (modified))

EN 60730-2-5:2002+A1:2004+A11:2005+A2:2010, Automatic electrical controls for household and similar use — Part 2-5: Particular requirements for automatic electrical burner control systems (IEC 60730-2-5:2000+Am1:2004+Am2:2008, (modified))

EN 60947-5-1:2004, Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices (IEC 60947-5-1:2003)

IEV 191, International Electrotechnical Vocabulary — Chapter 191: Dependability and quality of service (Consolidated version included Amendment 1 and Amendment 2); Identical with IEC 60050-191:1990-12 (Consolidated with IEC 60050-191/A1:1993-03 and IEC 60050-191/A2:2002-01)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13611:2007+A2:2011 and the following apply.

3.101

flame detector device

device by which the presence of a flame is detected and signalled (see Figure 1)

Note 1 to entry: Flame detector devices can consist of a flame sensor, an amplifier and a relay for signal transmission. These parts, with the possible exception of the actual flame sensor, can be assembled in a single housing for use in conjunction with a programming unit.



Figure 1 — Basic functional chain of a typical flame supervision

3.102

independent flame detector device

flame detector device which operates independent of the programming unit to provide the class C control function (see Figure 2)

Note 1 to entry: Self-checking functions are incorporated in this type of flame detector device.



Key

- 1 independent flame detector device (see 3.102)
- 2 flame
- 3 flame sensor (see 3.103)

- 6 threshold
- 7 flame signal (see 3.107)
 - 8 flame failure detection time (see 3.105.2)
 - 9 sensed flame (see 3.106)

4 amplifier 5 filter

Figure 2 — Basic functional chain of an independent flame detector device

3.103

flame sensor

device which reacts to the presence of the flame by providing an output signal that is used for further signal processing

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3.104 shut-off valve

safety device which releases the fuel flow when energized and stops the fuel flow automatically when deenergized

Note 1 to entry: For further information refer to EN 961 of EN 9261 for gas and EN ISO 23553-1 for oil, or to other similar devices if mentioned in the relevant appliance standard dards/sist/29e78a73-525f-4c85-b403-23124e3cff6a/sist-en-298-2012

3.105

time in case of flame failure

3.105.1 flame failure response time FFRT

response time between the loss of a sensed flame and the resulting de-energizing of the shut-off valve terminals

Note 1 to entry: FFRT may be referred to as "extinction safety time" in appliance standards.

3.105.2

flame failure detection time

FFDT

response time of an independent flame detector device between the loss of a sensed flame and the flame signal indicating the absence of a flame

3.106

sensed flame

physical value monitored by the flame sensor

3.107

flame signal

signal given by the flame detector device in case of sensed flame

3.108

flame simulation

condition which occurs when the flame signal indicates the presence of a flame when in reality no flame is present

3.109

programming unit

unit which executes the program, reacts to signals from control and safety devices, gives the control commands, controls the start-up sequence, supervises the burner operation and causes controlled shut-down, and if necessary, safety-shut-down and lock-out

Note 1 to entry: The programming unit follows a predetermined sequence of actions and always operates in conjunction with a flame detector device.

3.110

automatic burner control system

system comprising at least a programming unit and all the elements of a flame detector device

Note 1 to entry: The various functions of an automatic burner control system can be in one or more housings.

3.111

start position

stage where the system is not in lock-out position and has not yet received the start signal but can proceed with the start-up sequence when required

Note 1 to entry: At this stage, the output terminals for any shut-off valve and ignition device are not energized.

3.112

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start signal (e.g. from a thermostat) which releases the system from its start position and commences the predetermined program SIST EN 298:2012

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3.113

purge

forced introduction of air through the combustion chamber and flue passages in order to displace any remaining fuel/air mixture and/or products of combustion

3.114

pre-purge

purge which takes place between the start signal and the energization of the shut-off valve or, in the case of gas, the energization of the ignition device, if this comes first

3.115

post-purge

purge which takes place immediately following shut-down

3.116

first safety time

interval between the pilot shut-off valve, the start shut-off valve or the main shut-off valve, as applicable, being energized and the pilot shut-off valve, start shut-off valve or the main shut-off valve, as applicable, being deenergized if no flame signal is present

Note 1 to entry: Where there is no second safety time, this is called the safety time.

3.117

second safety time

where there is a first safety time applicable to either a pilot or start fuel flame only, the second safety time is the interval between the main shut-off valve being energized and the main shut-off valve being de-energized if no main flame signal is present

3.118

running position

position of the system in which the burner is in normal operation under the supervision of the programming unit and its flame detector device

3.119

controlled shut-down

process by which the power to the shut-off valve(s) is removed before any other action takes place as a result of the action of a controlling function

3.120

safety-shut-down

process which is effected immediately following the response of a protection device or the detection of a fault in the automatic burner control system and puts the burner out of operation

Note 1 to entry: The resulting state of the system is defined by deactivated terminals for the shut-off valves and the ignition device.

3.121

lock-out

Note 1 to entry: Lock-out can mean non-volatile lock-out or volatile lock-out.

3.121.1

non-volatile lock-out safety-shut-down condition of the system, where a restart can only be accomplished by the manual reset of the system and by no other means (standards.iteh.ai)

3.121.2

volatile lock-out

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safety-shut-down condition of the system, where a restart can only be accomplished by either the manual reset of the system, or an interruption of the main power and its subsequent restoration

3.122

Ignition restoration

spark restoration

process by which, following loss of flame signal, the ignition device is switched on again without total interruption of the fuel supply

3.123

recycling

process by which, after a safety-shut-down, a full start-up sequence is automatically repeated

3.124

timings

3.124.1

waiting time

<gas> for burners without fans, interval between the start signal being given and the energization of the ignition device or shut-off valves, whichever comes first

Note 1 to entry: During this time natural ventilation of the combustion chamber and the flue passages can take place.

3.124.2

waiting time

<oil> interval between the start signal being given (and air registers in purge position, if applicable) and the energization of the ignition device

Note 1 to entry: During this time natural ventilation of the combustion chamber and the flue passages takes place.

3.124.3

pre-purge time

<gas> period during which purging takes place at the proven air rate prior to the energization of the ignition device or shut-off valves, whichever comes first

3.124.4

pre-purge time

<oil> period preceding the signal to open the shut-off valve during which the combustion chamber is compulsorily ventilated

3.124.5

post-purge time

<gas> period during which purging takes place at the proven air rate between any shut-down and the moment the fan is switched off

3.124.6

post-purge time

<oil> period following the signal to close the shut-off valve during which the combustion chamber is compulsorily ventilated

3.124.7

inter-purge time

period during which purging of the combustion chamber takes place at the proven air rate after unsuccessful ignition and prior to the next recycle attempt DARD PREVIEW

3.124.8

inter-waiting time

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period during which natural ventilation of the combustion chamber takes place after unsuccessful ignition and prior to the next recycle attempt <u>SIST EN 298:2012</u>

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3.125 sequences

3.125.1

start-up sequence

sequence of actions executed by the system which brings the burner from the start position to the running position

3.125.2

first stage

part of the start-up sequence which allows the release of start fuel into the combustion chamber

3.125.3

second stage

part of the start-up sequence which allows the release of further fuel into the combustion chamber

3.126

system for permanent operation

system that is designed to remain in the running position for longer than 24 h without interruption

3.127

system for non-permanent operation

system that is designed to remain in the running position for less than 24 h

3.128

self-checking function of the flame detector device

automatic internal function of the system which checks the operation of the flame detector device

3.129

air flow simulation

condition which occurs when the air flow sensor indicates the presence of air flow when in reality no air flow is present

3.130

spark supervision

process of monitoring the ignition spark

3.131

pilot or start fuel flame proving period

interval between the end of the first safety time and the beginning of the second safety time which is used to prove that the pilot or start fuel flame is stable

3.132

intermittent first stage

first stage that is ignited prior to ignition of the main flame and is shut off simultaneously with the main flame

3.133

interrupted first stage

first stage that is ignited each time the burner is started up and which is extinguished at the end of the second safety time **Teh STANDARD PREVIEW**

3.134

burner ignition systems

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3.134.1 https://standards.iten.avcatalog/standards/sist/29e78a/ ignition by supervised gas-fired pilot burner³124e3cff6a/sist-en-298-2012

system which releases the main fuel when the ignition burner flame is present

3.134.2

ignition by non-supervised gas-fired pilot burner

system in which the release of the main fuel is not prevented by the absence of the flame of the pilot burner

3.135

ignition timings

3.135.1

total ignition time

period during which the ignition device is energized

Note 1 to entry: This time includes pre-ignition, ignition and post-ignition times.

3.135.2

pre-ignition time

period between the energization of the ignition device and the start of the safety time

3.135.3

ignition time

period between the start of the safety time and the first detection of a flame signal

Note 1 to entry: The maximum ignition time ends prior to or simultaneous with the safety time when no flame signal has been detected.

3.135.4

post-ignition time

period between the first detection of the flame signal and the de-energization of the ignition device

3.136

maximum throughput

mass of oil consumed during one hour at the highest throughput stated by the manufacturer

Note 1 to entry: Maximum throughput is expressed in kilograms per hour (kg/h).

[SOURCE: EN 267:2009+A1:2011, 3.2.1.1]

3.137

common cause failures

failures of different items, resulting from a single event, where these failures are not consequences of each other

Note 1 to entry: Common cause failures should not be confused with common mode failures.

[SOURCE: IEV 191-04-23]

4 Classification

4.1 Classes of control

Classification is not given for burner control systems or for flame detector devices.

4.2 Groups of control

EN 13611:2007+A2:2011, 4.2 is not applicable: EN 298:2012

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4.3 Classes of control functions 23124e3cff6a/sist-en-298-2012

Shall be according to EN 13611:2007+A2:2011, 4.3 with the following addition:

- The burner control system is a class C control function;
- The flame detector device, if independent from the programming unit, is a class C control function.

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5 Units of measurement and test conditions

5.1 Dimensions

Shall be according to EN 13611:2007+A2:2011, 5.1.

5.2 Pressures

Shall be according to EN 13611:2007+A2:2011, 5.2.

5.3 Bending moments and torques

EN 13611:2007+A2:2011, 5.3 is not applicable.

5.4 Test conditions and measurement tolerances

Shall be according to EN 13611:2007+A2:2011, 5.4 with the following modifications: