

Nederlandse norm

NEN-EN 13611+A2

(en)

Veiligheids- en regelinrichtingen voor
gasbranders en gasverbruikstoestellen -
Algemene eisen

Safety and control devices for gas burners and
gas burning appliances - General requirements

Vervangt NEN-EN 13611:2007;
NEN-EN 13611:2007/Ontw. A1:2009;
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 Preview

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Nederlands voorwoord

Voor de in deze norm vermelde normatieve verwijzingen bestaan in Nederland de volgende equivalenten:

<u>vermelde norm</u>	<u>Nederlandse norm</u>	<u>titel</u>
EN 549	NEN-EN 549	Rubber voor afdichtingen en membranen voor gasverbruikstoestellen en gasapparatuur
EN 10028-2:2003	NEN-EN 10028-2:2003	Platte producten van staalsoorten voor drukvaten - Deel 2: Ongelegeerde en gelegeerde staalsoorten met gespecificeerde eigenschappen bij hoge temperatuur
EN 10028-3:2003	NEN-EN 10028-3:2003	Platte producten gemaakt van staal voor drukvaten - Deel 3: Lasbaar, fijnkorrelig staal, normaal gegloeid
EN 10028-4:2003	NEN-EN 10028-4:2003	Platte producten van staal voor drukvaten - Deel 4: Nikkelgelegeerde staalsoorten met gespecificeerde eigenschappen bij lage temperatuur
EN 10028-5:2003	NEN-EN 10028-5:2003	Platte producten van staal voor drukvaten - Deel 5: Lasbare fijnkorrelige thermomechanisch gewalste staalsoorten
EN 10028-6:2003	NEN-EN 10028-6:2003	Platte producten gemaakt van staal voor drukvaten - Deel 6: Lasbare fijnkorrelige veredelde staalsoorten
EN 10028-7:2007	NEN-EN 10028-7:2007	Platte producten van staalsoorten voor drukvaten - Deel 7: Roestvast staal
EN 10213-3:1995	NEN-EN 10213-3:1995	Technische leveringsvoorwaarden voor gietstaal voor drukvaten - Deel 3: Staalsoorten voor gebruik bij lage temperaturen
EN 10222-1:1998	NEN-EN 10222-1:1998	Smeedstukken van staal voor drukvaten - Deel 1: Algemene eisen voor vrij smeedwerk
EN 10222-5:1999	NEN-EN 10222-5:1999	Smeedstukken van staal voor drukvaten - Deel 5: Martensitische, austenitische en austenitisch-ferritisch corrosievaste staalsoorten
EN 10272:2000	NEN-EN 10272:2000	Staven van corrosievaste staalsoorten voor drukvaten
EN 13906-1	NEN-EN 13906-1	Cilindrische schroefveren gemaakt van ronde draad of staaf - Berekeningen ontwerp - Deel 1: Drukveren
EN 13906-2	NEN-EN 13906-2	Cilindrische schroefveren gemaakt van ronde draad en staaf - Berekening en ontwerp - Deel 2: Trekveren
EN 60068-2-6	NEN-EN-IEC 60068-2-6	Klimatologische en mechanische beproevingsmethoden voor elektrotechnische producten - Deel 2-6: Beproevingen - Proef Fc: Trilling (sinusvormig)
EN 60127-1	NEN-EN-IEC 60127-1	Miniatuursmeltveiligheden - Deel 1: Definities voor miniatuursmeltveiligheden en algemene eisen voor miniatuur(smelt)patronen
EN 60335-1:2002	NEN-EN-IEC 60335-1:2002	Huishoudelijke en soortgelijke elektrische toestellen - Veiligheid - Deel 1: Algemene eisen
EN 60529	NEN 10529	Beschermingsgraden van omhulsels van elektrisch materieel (IP-codering)
EN 60730-1:2000	NEN-EN-IEC 60730-1:2001	Automatische elektrische regelaars voor huishoudelijk en soortgelijk gebruik - Deel 1: Algemene eisen
EN 60947-5-1:2004	NEN-EN-IEC 60947-5-1:2004	Laagspanningsschakelaars - Deel 5-1: Stuurstroomkringen en schakelelementen - Sectie 1: Elektromechanische stuurstroomkringen
EN 61000-4-2	NEN-EN-IEC 61000-4-2	Elektromagnetische compatibiliteit (EMC) - Deel 4-2: Beproevingen en meettechnieken - Elektrostatische ontlading - Immunitetsproef

EN 61000-4-3	NEN-EN-IEC 61000-4-3	Elektromagnetische compatibiliteit (EMC) - Deel 4-3: Beproevingen en meettechnieken - Uitgestraalde, radiofrequente, elektromagnetische velden - Immunitetsproef
EN 61000-4-4	NEN-EN-IEC 61000-4-4	Elektromagnetische compatibiliteit (EMC) - Deel 4-4: Beproevingen en meettechnieken - Snelle elektrische transiënten en lawines - Immunitetsproef
EN 61000-4-5	NEN-EN-IEC 61000-4-5	Elektromagnetische compatibiliteit (EMC) - Deel 4-5: Beproevingen en meettechnieken - Stootspanningen - Immunitetsproef
EN 61000-4-6	NEN-EN-IEC 61000-4-6	Elektromagnetische compatibiliteit (EMC) - Deel 4-6: Beproevingen en meettechnieken - Immunitet voor geleide storingen, veroorzaakt door radiofrequente velden
EN 61000-4-8	NEN-EN-IEC 61000-4-8	Elektromagnetische compatibiliteit (EMC) - Deel 4-8: Beproevingen en meettechnieken - Magnetische immunitetsproef bij netfrequentie
EN 61000-4-11	NEN-EN-IEC 61000-4-11	Elektromagnetische compatibiliteit (EMC) - Deel 4-11: Beproevingen en meettechnieken - Immunitetsproeven voor kortstondige spanningsdalingen en -onderbrekingen en spanningsvariaties
EN 61000-4-29	NEN-EN-IEC 61000-4-29	Elektromagnetische compatibiliteit (EMC) - Deel 4-29: Beproevingen en meettechnieken - Immunitetsproeven voor kortstondige spanningsdalingen en -onderbrekingen en spanningsvariaties op de voedingspoort voor gelijkspanning
EN 61558-2-6	NEN-EN-IEC 61558-2-6	Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V - Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers
EN 61558-2-17	NEN-EN-IEC 61558-2-17	Veiligheid van energietransformatoren, voedingseenheden en dergelijke - Deel 2-17: Bijzondere bepalingen voor transformatoren voor geschakelde voedingen
EN ISO 228-1:2003	NEN-EN-ISO 228-1:2003	Niet-afdichtende pijpschroefdraad - Deel 1: Afmetingen, toleranties en aanduiding
ISO 7-1:1994	-	-
ISO 65	NEN 3257	Stalen draadpijpen en sokken
ISO 262	NEN-ISO 262	ISO-metrische schroefdraad voor algemene toepassing - Keuze van maten voor schroeven, bouten en moeren
ISO 301	-	-
ISO 7005	-	-
ISO 7637-2	NEN-ISO 7637-2	Wegvoertuigen - Elektrische interferentie door geleiding en koppeling - Deel 2: Overdracht van impulsvormige elektrische verstoringen enkel via voedingskabels
ISO 7637-3	NEN-ISO 7637-3	Wegvoertuigen - Elektrische storingen door geleiding en koppeling - Deel 3: Transmissie van elektrische overgangverschijnselen door capacitieve en inductieve koppeling via kabels anders dan voedingskabels
IEC 61643-1	NEN-EN-IEC 61643-11	Overspannings-beveiligingsmiddelen voor laagspanningsnetten: Deel 11: Gebruikseisen en beproevingsmethoden

English Version

Safety and control devices for gas burners and gas burning appliances - General requirements

Équipements auxiliaires pour brûleurs à gaz et appareils à gaz - Exigences générales

Sicherheits-, Regel- und Steuereinrichtungen für Gasbrenner und Gasgeräte - Allgemeine Anforderungen

This European Standard was approved by CEN on 7 October 2007 and includes Amendment 1 approved by CEN on 5 June 2011 and Amendment 2 approved by CEN on 29 July 2011.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

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Foreword

This document (EN 13611:2007+A2:2011) has been prepared by Technical Committee CEN/TC 58 "Safety and control devices for gas-burners and gas-burning appliances", 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 April 2012, and conflicting national standards shall be withdrawn at the latest by April 2012.

This document includes Amendment 1, approved by CEN on 2011-06-05 and Amendment 2, approved by CEN on 2011-07-29.

This document supersedes EN 13611:2007.

The start and finish of text introduced or altered by amendment is indicated in the text by tags $\langle A_1 \rangle$ $\langle A_1 \rangle$ and $\langle A_2 \rangle$ $\langle A_2 \rangle$.

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 EC Directive(s).

For relationship with EC Directive(s), see informative Annexes ZA or B, which are an integral part of this document.

For additional requirements for safety accessories and pressure accessories as defined in EU-Directive 97/23/EC see normative Annex I.

For controls used in DC supplied gas burners and gas burning appliances see additional requirements in normative Annex I.

This European Standard covers type testing only.

Tests intended for production testing are not specifically included.

This standard recognizes the safety level specified by CEN/TC 58 and is regarded as a horizontal standard dealing with the safety, construction and performance of controls for gas burners and gas burning appliances and to their testing.

$\langle A_2 \rangle$ Primarily in industrial applications it is common practice to rate the safety of a plant based on values describing the likelihood of a dangerous failure. These values are being used to determine Safety Integrity Levels or Performance Levels when the system is being assessed in its entirety.

CEN/TC 58 standards for safety relevant controls do go beyond this approach, because for a certain life span for which the product is specified, designed and tested a dangerous failure is not allowed at all. Failure modes are described and assessed in greater detail. Measures to prevent from dangerous situations are defined. Field experience over many decades is reflected in the CEN/TC 58 standards. Requirements of these standards can be considered as proven in practice.

To be able to provide values for the parameters that are needed for Safety Integrity Level or Performance Level system assessment, the Annexes J and K of this document specifies a possible methodology to derive values for the relevant parameters from the requirements of this European Standard.

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Only controls that comply with the relevant CEN/TC 58 control standard can be assessed for PL classification according to this amendment.

It cannot be presumed that any Safety Integrity Level or Performance Level assessment alone would imply that requirements of a CEN/TC 58 standard have been met.

For particularly slow and long term cycling controls the test method might result in testing durations which are not feasible. An interim appropriate solution would be to determine suitable service intervals (see also EN ISO 13849-1). The responsible working group of CEN/TC 58 aim to find more representative test methods in the short term for specific scenarios. ^{A2}

This European Standard should be used in conjunction with the specific standard for a specific type of control, (e. g. EN 88-1, EN 88-2, EN 125, EN 126, EN 161, EN 257, EN 298, EN 1106, EN 1643, EN 1854, EN 12067-1 and EN 12067-2, EN 12078) or for controls for specific applications. This standard may also be applied, so far as reasonable, to controls not mentioned in a specific standard and to controls designed on new principles, in which case additional requirements may be necessary.

Other control standards should make use of this standard by adapting this standard and stating "addition", "modification" or "replacement" in their corresponding clauses.

This 2nd edition of EN 13611 includes EN 13611:2000/A1:2004 and new 6.5 Electric parts of the control and 6.6. Protection against internal faults for the purpose of functional safety. Annex G contains a list of materials which meet the essential requirements of Pressure Equipment Directive (PED).

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 and United Kingdom.

1 Scope

This European Standard specifies safety, construction, and performance requirements and testing of safety control or regulating devices and sub-assemblies or fittings (hereafter referred to as controls) for burners and gas burning appliances using fuel gases of the first, second or third families and to their testing.

Controls to which this European Standard applies include the following:

- automatic shut-off valves;
- automatic burner control systems;
- flame supervision devices;
- gas/air ratio controls;
- pressure regulators;
- manual taps;
- mechanical thermostats;
- multifunctional controls;
- pressure sensing devices;
- valve proving systems;
- zero pressure regulators.

The methods of test given in this standard are intended for product type testing.

For DC supplied controls Annex H applies.

NOTE 1 When no particular control standard exists, the control can be tested according to this standard and further tests taking into account the intended use.

NOTE 2 This European Standard should be used in conjunction with the specific control standard (see Bibliography).

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 549, *Rubber materials for seals and diaphragms for gas appliances and gas equipment*

EN 10028-2:2003, *Flat products made of steels for pressure purposes — Part 2: Non-alloy and alloy steels with specified elevated temperature properties*

EN 10028-3:2003, *Flat products made of steels for pressure purposes — Part 3: Weldable fine grain steels, normalized*

EN 10028-4:2003, *Flat products made of steels for pressure purposes — Part 4: Nickel alloy steels with specified low temperature properties*

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EN 10028-5:2003, *Flat products made of steels for pressure purposes — Part 5: Weldable fine grain steels, thermomechanically rolled*

EN 10028-6:2003, *Flat products made of steels for pressure purposes — Part 6: Weldable fine grain steels, quenched and tempered*

EN 10028-7:2007, *Flat products made of steels for pressure purposes — Part 7: Stainless steels*

EN 10213-3:1995, *Technical delivery conditions for steel castings for pressure purposes — Part 3: Steel grades for use at low temperatures*

EN 10222-1:1998, *Steel forgings for pressure purposes — Part 1: General requirements for open die forgings*

EN 10222-5:1999, *Steel forgings for pressure purposes — Part 5: Martensitic, austenitic and austenitic-ferritic stainless steels*

EN 10272:2000, *Stainless steel bars for pressure purposes*

EN 13906-1, *Cylindrical helical springs made from round wire and bar — Calculation and design — Part 1: Compression springs*

EN 13906-2, *Cylindrical helical springs made from round wire and bar — Calculation and design — Part 2: Extension springs*

EN 60068-2-6, *Environmental testing — Part 2: Tests — Tests Fc: Vibration (sinusoidal) (IEC 60068-2-6:1995 + Corrigendum 1995)*

EN 60127-1, *Miniature fuses — Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links (IEC 60127-1:2006)*

EN 60335-1:2002, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2001, modified)*

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

EN 60730-1:2000, *Automatic electrical controls for household and similar use — Part 1: General requirements (IEC 60730-1:1999, 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)*

EN 61000-4-2, *Electromagnetic compatibility (EMC) — Part 4: Testing and measurement techniques — Section 2: Electrostatic discharge immunity test — Basic EMC publication (IEC 61000-4-2:1995)*

EN 61000-4-3, *Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2006)*

EN 61000-4-4, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test (IEC 61000-4-4:2004)*

EN 61000-4-5, *Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — Surge immunity test (IEC 61000-4-5:2005)*

EN 61000-4-6, *Electromagnetic compatibility (EMC) — Part 4-6: Testing and measurement techniques — Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:2003 + A1:2004 + A2:2006)*

EN 61000-4-8, *Electromagnetic compatibility (EMC); part 4: testing and measurement techniques; section 8: power frequency magnetic field immunity test; basic EMC publication (IEC 61000-4-8:1993)*

EN 61000-4-11, *Electromagnetic compatibility (EMC) — Part 4-11: Testing and measurement techniques — Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:2004)*

EN 61000-4-29, *Electromagnetic Compatibility (EMC) — Part 4-29: Testing and measurement techniques; Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests (IEC 61000-4-29:2000)*

EN 61558-2-6, *Safety of power transformers, power supply units and similar — Part 2-6: Particular requirements for safety isolating transformers for general use (IEC 61558-2-6:1997)*

EN 61558-2-17, *Safety of power transformers, power supply units and similar — Part 2-17: Particular requirements for transformers for switch mode power supplies (IEC 61558-2-17:1997)*

EN ISO 228-1:2003, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

ISO 7-1:1994, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 65, *Carbon steel tubes suitable for screwing in accordance with ISO 7-1*

ISO 262, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts*

ISO 301, *Zinc alloy ingots intended for casting*

ISO 7005 (all parts), *Metallic flanges*

ISO 7637-2, *Road vehicles — Electrical disturbances from conduction and coupling — Part 2: Electrical transient conduction along supply lines only*

ISO 7637-3, *Road vehicles — Electrical disturbance by conduction and coupling — Part 3: Vehicles with nominal 12 V or 24 V supply voltage — Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines*

IEC 61643-1, *Low-voltage surge protective devices — Part 1: Surge protective devices connected to low-voltage power distribution systems — Requirements and tests*

3 Terms and definitions

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

3.1

control

device which directly or indirectly controls the gas flow and/or provides a safety function within a gas burner or gas-burning appliance

3.2

control function

function providing safe operation of gas burners and gas burning appliances

3.3

closure member

movable part of the control which shuts off the gas flow

3.4

external leak-tightness

leak-tightness of a gas-carrying compartment with respect to atmosphere

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- 3.5**
internal leak-tightness
leak-tightness of the closure member (in the closed position) sealing a gas-carrying compartment with respect to another compartment or to the outlet of the control
- 3.6**
inlet pressure
pressure at the inlet of the control
- 3.7**
outlet pressure
pressure at the outlet of the control
- 3.8**
pressure difference
difference between the inlet and outlet pressures
- 3.9**
maximum inlet pressure
highest inlet pressure declared by the manufacturer at which the control may be operated
- 3.10**
minimum inlet pressure
lowest inlet pressure declared by the manufacturer at which the control may be operated
- 3.11**
flow rate
volume flowing through the control in unit time
- 3.12**
rated flow rate
air flow rate at a specified pressure difference declared by the manufacturer, corrected to standard conditions
- 3.13**
maximum ambient temperature
highest temperature of the surrounding air declared by the manufacturer at which the control may be operated
- 3.14**
minimum ambient temperature
lowest temperature of the surrounding air declared by the manufacturer at which the control may be operated
- 3.15**
mounting position
position declared by the manufacturer for mounting the control
- 3.16**
nominal size
DN
numerical designation of size, for reference purposes, loosely related to manufacturing dimensions, common to all components in a piping system
- [ISO 6708:1995]
- 3.17**
apparatus
single piece of equipment with (a) direct function(s) intended for final use

3.18**system**

combination of apparatus and/or active components constituting a single functional unit and intended to be installed and operated to perform (a) specific task(s)

3.19**installation**

combination of apparatuses, components and systems assembled and/or erected (individually) in a given area

NOTE For physical reasons (e. g. long distances between individual items) it is in many cases not possible to test an installation as a unit.

3.20**fault tolerating time**

time between the occurrence of a fault and the shut down of the burner, which is tolerated by the application without creating a hazardous situation

NOTE Actions other than shut down of a burner are possible if they can show prevention of hazardous situations.

3.21**fault reaction time**

time for a control function, within the fault tolerating time, to react on a fault and initiate a shut down

3.22**normal operation**

use of the control or its associated equipment for the purpose for which it was made and in the manner intended by the manufacturer under the conditions as specified

3.23**defined state**

state of a control with the following characterisation:

- a) control passively assumes a state in which the output terminals ensure a safe situation under all circumstances. When the cause of the transition to defined state is lifted the application starts up only in accordance with the appropriate requirements or
- b) control actively executes a protective action, within the time as specified for the specific control standard, causing it to shut down and/or lock-out or
- c) control remains in operation, continuing to satisfy all safety related functional requirements.

3.24**complex electronics**

denote assemblies which use electronic components with the following characteristics:

- a) Component provides more than one functional output.
- b) It is impractical or impossible to represent the failure mode of such a component by stuck-at and cross-links at the pins or by other failure modes which are described in Annex E.

3.25**reset**

action which provides reset from lock-out to allow the system to attempt a restart

EN 13611:2007+A2:2011 (E)**3.26
failure**

termination of the ability of an item to perform a required function

[191-14-01 of IEC 60050-191:1990]

**3.27
degradation**

undesired departure in the operational performance of any device, equipment or system from its intended performance

[161-11-19 of IEC 60050-161:1990]

NOTE The term "degradation" can apply to temporary or permanent failure.

**3.28
fault**

state of an item characterised by its inability to perform a required function, excluding the inability during preventive maintenance or other planned actions, or due to lack of external resources

NOTE 1 „Failure“ is an event, as distinguished from „fault“, which is a state.

NOTE 2 After failure the item has a fault.

NOTE 3 This concept as defined does not apply to items consisting of software only.

NOTE 4 A fault is often the result of a failure of the item itself, but may exist without prior failure.

[IEC 60191-1]

**3.29
harm**

physical injury and/or damage to health or property

[ISO/IEC Guide 51:1999]

**3.30
hazard**

potential source of harm

[ISO/IEC Guide 51:1999]

**3.31
risk**

probable rate of occurrence of a hazard causing harm and the degree of severity of the harm

[ISO/IEC Guide 51:1999]

**3.32
functional safety**

safety related to the application which depends on the correct functioning of the safety-related control

**3.33
program**

sequence of control operations

NOTE It may consist of switching on, starting up, supervising and switching off, safety shut down or lock out.

3.34**breather hole**

orifice which allows atmospheric pressure to be maintained within a compartment of variable volume

4 Classification**4.1 Classes of control**

Where appropriate, controls are classified by application (e. g. sealing force, performance characteristics, number of operations during their working life). For classification of controls, see also the specific control standard.

4.2 Groups of control

Controls are grouped according to the bending stresses which they are required to withstand (see Table 4).

Group 1 controls

— Controls for use in an appliance or installation where they are not subjected to bending stresses imposed by installation pipework (e. g. by the use of rigid adjacent supports).

Group 2 controls

— Controls for use in any situation, either internal or external to the appliance, typically without support.

NOTE Controls which meet the requirements of a group 2 control also meet the requirements of a group 1 control.

4.3 Classes of control functions

For the evaluation of protective measures for fault tolerance and avoidance of hazards it is necessary to classify control functions with regard to their fault behaviour.

At the classification of control functions their integration into the complete safety concept of the appliance shall be taken into account.

For the purpose of evaluating the design of a control function, present requirements recognise three distinct classes:

Class A: Control functions which are not intended to be relied upon for the safety of the application,

NOTE Examples are: room thermostats, temperature control.

Class 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,

NOTE Examples are: thermal limiter, pressure limiter.

Class C: Control functions which are intended to prevent special hazards such as explosion or whose failure could directly cause a hazard in the appliance.

NOTE Examples are: burner control systems, thermal cut-outs for closed water systems (without vent protection).

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