



**SLOVENSKI STANDARD**  
**SIST EN 161:2011/oprA1:2011**  
**01-junij-2011**

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**Samodejni zaporni ventili za plinske gorilnike in plinske aparate - Posebne zahteve za določanje nivojev delovanja (performance level PL) - Dopolnilo A1**

Automatic shut-off valves for gas burners and gas appliances - Special requirements to determine the performance level (PL)

Automatische Absperrventile für Gasbrenner und Gasgeräte - Besondere Anforderungen zur Bestimmung des Performance Levels (PL)

**Ta slovenski standard je istoveten z: EN 161:2011/prA1**

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23.060.20	Zapirni ventili (kroglasti in pipe)	Ball and plug valves
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## Automatic shut-off valves for gas burners and gas appliances - Special requirements to determine the performance level (PL)

Automatische Absperrventile für Gasbrenner und  
Gasgeräte - Besondere Anforderungen zur Bestimmung  
des Performance Levels (PL)

This draft amendment is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 58.

This draft amendment A1, if approved, will modify the European Standard EN 161:2011. If this draft becomes an amendment, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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COMITÉ EUROPÉEN DE NORMALISATION  
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## Foreword

This document (EN 161:2011/prA1:2011) 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 document is currently submitted to the CEN Enquiry.

**EN 161:2011/prA1:2011 (E)**

*Introduce the following modification to EN 161:2011:*

**Foreword**

*Add the following wording after 8<sup>th</sup> paragraph of EN 161:2011, Foreword:*

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/TC58 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. The PL assessment in Annex AA is only applicable to automatic shut-off valves which are already certified to this European Standard. It can not 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.

To be able to provide parameters to allow for any formal Safety Integrity Level or Performance Level system assessment the Annexes AA and BB of this document define a methodology to derive the relevant parameters from the requirements of this standard.

*Add the following normative Annex AA "Method for the determination of Performance Level (PL)" and the normative Annex BB "Model of a FMEA for valves" after the last Annex I and before the Annex ZA of EN 161:2011.*

## Annex AA (normative)

### Method for the determination of Performance Level (PL)

This European Standard applies with the following supplements or modifications of the corresponding clauses:

#### AA.1 Scope

Shall be according to Clause 1 with the following addition:

This Annex is only applicable to valves or valve functions which are declared to comply with performance level requirements (PL) according to EN ISO 13849-1:2008, clauses 1, 2, 3, 4.1, 4.2, 4.5, 7, 8, 9, 10, 11, and annexes C.4, E, and F.

This Annex specifies a set of additional requirements to EN 161:2011 to determine the *probability of dangerous failures per hour for continuous or high demand mode* (PFH<sub>D</sub>) and the performance level (PL) for electromechanical valves or valve functions used in industrial and thermoprocessing applications (e. g. EN 746-2).

#### AA.2 Normative references

Shall be according to EN 13611:2007/prA2:2009, Clause K.2.

#### AA.3 Terms and definitions

Shall be according to EN 13611:2007/prA2:2009, Clause K.3.

#### AA.4 Performance

##### AA.4.1 Operation mode

Shall be according to EN 13611:2007/prA2:2009, K.4.1.

##### AA.4.2 PL and field data evaluation

Shall be according to EN 13611:2007/prA2:2009, K.4.2.

##### AA.4.3 Hardware failure tolerance (HFT)

For automatic valves according to this standard the hardware failure tolerance is always 0 (HFT = 0).

##### AA.4.4 Common cause failure (CCF)

Shall be according to EN 13611:2007/prA2:2009, K.4.4 with the following addition:

The minimum score of 65 points is fulfilled by meeting the requirements of this European Standard (see Table AA.1).



Table AA.1 – Scoring result of EN 13611:2007/prA1:2009 for valves

No.	Measure against CCF	Score
<b>1</b>	<b>Separation/segregation</b>	
	Fulfilled by requirements in this standard.	<b>15</b>
<b>2</b>	<b>Diversity</b>	
	Not fulfilled by requirements in this standard.	<b>0</b>
<b>3</b>	<b>Design/application/experience</b>	
3.1	Fulfilled by requirements in this standard.	<b>15</b>
3.2	Fulfilled by requirements in this standard.	<b>5</b>
<b>4</b>	<b>Assessment/analysis</b>	
	Depending on the results of the failure mode and effect analysis: 0 or 5 points.	<b>0 or 5</b>
<b>5</b>	<b>Competence/training</b>	
	Not fulfilled by requirements in this standard.	<b>0</b>
<b>6</b>	<b>Environmental</b>	
6.1	Fulfilled by requirements in this standard.	<b>25</b>
6.2	Fulfilled by requirements in this standard.	<b>10</b>
	<b>Total (depending on FMEA)</b>	<b>70 or 75</b>

#### AA.4.5 Safe failure fraction (SFF)

Shall be according to EN 13611:2007/prA2:2009, K.4.5 with the following addition:

For estimation of SFF a failure modes and effect analysis (FMEA) according to Annex BB, Figure BB.1 and Table BB.1 shall be performed with classification of failures into “dangerous” or “safe”.

#### AA.4.6 Determination of the $B_{10d}$ value

##### AA.4.6.1 Requirement

Shall be according to EN 13611:2007/prA2:2009, K.4.6.1 with the following addition:

The manufacturer shall determine at which intervals (e. g. every 100 000 or 200 000) during the endurance test, as described in 7.107.2, the valve or the safety relevant sub-assemblies shall be tested to check conformance with 7.2, 7.3, 7.9 and 7.101 to 7.104.

##### AA.4.6.2 Test

Shall be according to EN 13611:2007/prA2:2009, K.4.6.2 with the following addition:

**EN 161:2011/prA1:2011 (E)**

The  $B_{10d}$  value shall be carried out according to 7.107.2 of this standard. The number of operating cycles above those required to 7.107.2 shall be carried out at maximum ambient temperature, of this 20 % at worst case ambient temperature, if not maximum ambient temperature.

The valve shall fulfil the requirements according to AA.4.6.1.

**AA.4.7 Determination of performance level (PL)**

Shall be according to EN 13611:2007/prA2:2009, K.4.7.

**AA.5 Marking, installation and operating instructions****AA.5.1 Marking**

Shall be according to 9.1.

**AA.5.2 Installation and operating instructions**

Shall be according to 9.2 with the following addition:

- a) hardware failure tolerance HFT;
- b) common cause failure CCF in points;
- c) safe failure fraction SFF in %;
- d)  $B_{10d}$  and  $T_{10d}$  values;
- e) probability of dangerous failures per hour,  $PFH_D$  or  $\lambda_D$ , in 1/h, including maximum number of operating cycles  $n_{op}$  and maximum operating time for these values;
- f) performance level PL;
- g) mean time to dangerous failure  $MTTF_D$  in years.

**AA.5.3 Warning notice**

Shall be according to 9.3.