SLOVENSKI STANDARD
SIST EN 14591-1:2005

01-marec-2005

Preprečevanje eksplozij in protieksplozijska zaščita v podzemnih rudnikih - Zaščitni sistemi - 1. del: Ventilacijske strukture, odporne proti eksplozijskemu tlaku 2 bar

Explosion prevention and protection in underground mines - Protective systems - Part 1: 2-bar explosion proof ventilation structure

Explosionsschutz in untertägigen Bergwerken - Schutzsysteme - Teil 1: 2-bar-Wetterbauwerk

Protection contre l'explosion dans les mines souterraines - Systemes de protection - Partie 1 : Sas d'aérage résistant a 2 bar

Ta slovenski standard je istoveten z: **EN 14591-1:2004**

ICS:

13.230	Varstvo pred eksplozijo	Explosion protection
73.100.20	Prezračevalna, klimatizacijska in razsvetljevalna oprema	Ventilation, air-conditioning and illumination equipment

SIST EN 14591-1:2005 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 14591-1

September 2004

ICS 13.230; 73.100.20

English version

Explosion prevention and protection in underground mines - Protective systems - Part 1: 2-bar explosion proof ventilation structure

Protection contre l'explosion dans les mines souterraines - Systèmes de protection - Partie 1 : Sas d'aérage résistant à 2 bar

Explosionsschutz in untertägigen Bergwerken - Schutzsysteme - Teil 1: 2-bar-Wetterbauwerk

This European Standard was approved by CEN on 30 July 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

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

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

Contents

Page

Figures

Tables

Foreword

This document EN 14591-1:2004 has been prepared by Technical Committee CEN/TC 305 “Potentially explosive atmospheres - Explosion prevention and protection”, 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 March 2005, and conflicting national standards shall be withdrawn at the latest by March 2005.

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 relationship with EU Directives, see informative Annex ZA, which is an integral part of this document.

This European Standard consists of the following parts:

EN 14591-1, *Explosion prevention and protection in underground mines – Protective systems – Part 1: 2-bar explosion proof ventilation structure.*

prEN 14591-2, *Explosion prevention and protection in underground mines – Protective systems – Part 2: Water trough barriers.*

prEN 14591-3, *Explosion prevention and protection in underground mines – Protective systems – Part 3: Water troughs for explosion barriers.*

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

.

1 Scope

This document applies to air shutter frames and air doors for ventilation structures which are to remain functional after the passage of explosions with overpressures of up to 2 bar.

Ventilation structures are protective systems to provide the ventilation flow after the occurrence of an explosion such that the effects of an explosion on the ventilation system can be limited and adequate possibilities remain for escape and rescue.

NOTE These structures may be used when ventilation studies indicate that the air flow in the work place would be reduced considerably providing no safe escape for workers in cases where the structure is destroyed. Explosion proof ventilation structures will be individually evaluated for directional stability of ventilation flows and in order to ensure adequate ventilation flows.

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 10025, *Hot rolled products of non-alloy structural steels — Technical delivery conditions.*

EN 13463-1, *Non-electrical equipment for potentially explosive atmospheres — Part 1: Basic method and requirements.*

EN 13478, *Safety of machinery — Fire prevention and protection.*

ISO 2768-1, *General tolerances – Part 1: Tolerances for linear and angular dimensions without individual tolerance indications.*

3 Terms and definitions

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

3.1
air shutter frame
shutter frame that shuts off a working section except for those openings for haulage way, travel way, conveyor, cables and pipes as well as openings necessary to ensure the required air flow according to existing pressure conditions

3.2
pressure-relief air door
air door with leaves opening and closing in opposite directions

NOTE The forces are balanced by design measures, e.g. connecting rod or turning chain so that only the friction and readjustment forces of the opening and closing device remain to be overcome.

3.3
non-pressure-relief air door
air door that normally opens against the air flow direction with mechanical devices for opening and closing

4 Symbols and abbreviations

Table 1 — Symbols and abbreviations

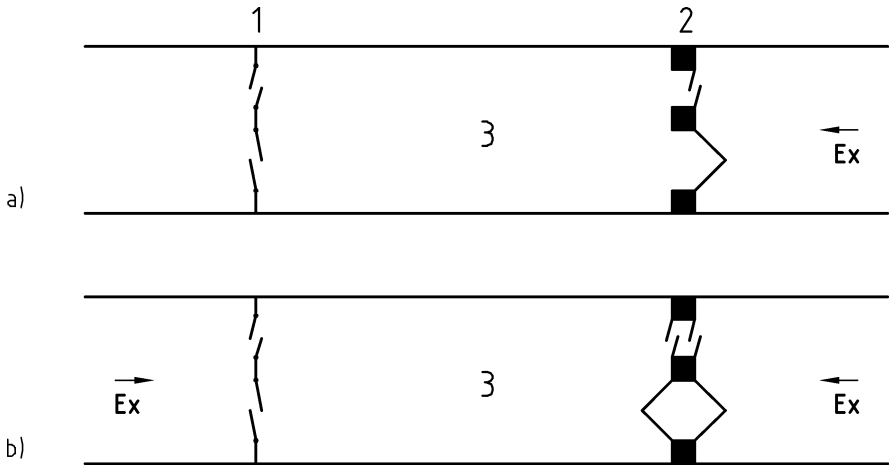
Abbrevi-ation	Dimension	Unit
$l_{D\ 2\ bar}$	Minimum length of air shutter frame	millimetre
a_w	Maximum roadway width/height at ventilation structure	millimetre
σ_{bs}	Tensile bending strength of material used	Newton per square millimetre
R_1, R_2	Rib thickness	millimetre
T	Thickness	millimetre
A	Inside width	millimetre
h_o	Vertical clearance	millimetre
L	Angle steel	-
U	U-steel	-
Fl	Flat-bar steel	-
Bl	Plate	-
Vkt	Square steel bar	-
TB	T-steel	-
Ex	Explosion	-

5 Safety requirements

5.1 General

A ventilation structure for explosion overpressures of up to 2 bar (2-bar explosion proof ventilation structure) comprises at least one air shutter frame according to 5.2. When air doors have to be provided in these air regulators, the former shall be designed, for transport and haulage purposes, as folding leaf doors according to 5.3.3 which are set against the direction of an explosion and as a pressure-relief folding door according to 5.3.2 for the travel way (see Figure 1 a).

Where it is not possible to determine clearly the direction of the explosion, the air doors shall be provided on both sides of the air shutter frame (see Figure 1 b).



Key

1 Normal ventilation structure

2 2-bar explosion proof ventilation structure

3 Air lock

Figure 1 — Schematic representation of a 2-bar explosion proof ventilation structure

5.2 Air shutter frames

5.2.1 Materials and components

The materials and components used shall be non-combustible and approved for use below ground. Only hydraulically-bonded materials having a tensile bending strength of ≥ 3.5 N/mm^2 (7-day value) shall be used.

5.2.2 Air shutter frame length and rib thickness

The minimum length of the air shutter frame is obtained from equation (1):

$$l_{\mathrm{D\,2\,bar}} = \frac{0{,}95 \cdot a_{\mathrm{w}}}{2{,}5 \cdot \sqrt{\sigma_{bs}}} \qquad (1)$$

The values for rib thickness R_1 between the haulage way door and the travel way door and other fixtures (see Figure 2), and for rib thickness R_2 between one fixture and another and between the fixtures and the side-wall or floor of the roadway (see Figure 3), are given in Table 2.