

**Explosiv atmosfär – Förebyggande av och skydd
mot explosion i gruvor under jord –
Skyddssystem –
Del 2: Passiv vattentrågsjärr**

**Explosion prevention and protection in
underground mines – Protective systems –
Part 2: Passive water through barriers**

Europastandarden EN 14591-2:2007 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 14591-2:2007.

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Systèmes de protection - Partie 2: Arrêts-barrages passifs
à bacs à l'eau

Explosionsschutz in untertägigen Bergwerken -
Schutzsysteme - Teil 2: Passive Wassertrogsperrren

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Contents

Page

Foreword.....	5
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 Construction requirements of water troughs	10
4.1 General.....	10
4.2 Dimensions, specifications	10
5 Testing of water troughs.....	11
5.1 General.....	11
5.2 Construction tests	11
5.2.1 Shape, capacity, dimensions.....	11
5.2.2 Strength, shape retention	11
5.2.3 Water level indicator.....	11
5.3 Testing of electrostatic properties.....	12
5.3.1 Test method.....	12
5.3.2 Assessment.....	12
6 Additional fittings for water troughs.....	12
7 Marking of water troughs	12
8 Construction of concentrated and distributed water trough barriers.....	12
8.1 General.....	12
8.2 Framework structures	12
8.3 Arrangement of troughs in the roadway cross-section.....	13
8.4 Configuration of water trough barriers in mine workings.....	13
9 Marking of water trough barriers	15
10 Information for use	16
Annex A (normative) Construction of quick-deploy passive water trough barriers	17
A.1 General.....	17
A.2 Trough frames.....	17
A.3 Ropes and chains	17
A.4 Attachment supports.....	17
A.5 Arrangement of the quick-deploy water trough barriers in the roadway.....	17
A.6 Volume of water to be contained by quick-deploy water trough barriers	18
Annex B (normative) Example of acceptable test procedure for water troughs	19
B.1 Testing of heat reaction properties.....	19
B.1.1 Test procedure	19
B.1.2 Test arrangement.....	19
B.1.3 Procedure	20
B.1.4 Assessment.....	20
B.2 Testing of explosion properties	20
B.2.1 Testing of water dispersion	20
B.2.2 Testing the extinguishing efficiency in full-scale tests	22
B.3 Testing of fire-resistance properties	22
Annex C (informative) Example of marking of water troughs	23

Annex D (informative) Examples for configuration of water troughs	24
Annex E (informative) Example for marking of water trough barriers	44
Annex F (normative) Instructions for water trough barriers	45
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 94/9/EC	46
Bibliography	48

Figures

Figure 1 — Trough group, plan view	9
Figure 2 — Water trough type A (side elevations)	10
Figure 3 — Water trough type B (side elevations)	10
Figure 4 — General rules for water trough barriers in mine workings	15
Figure A.1 — Quick-deploy water trough barrier (example)	18
Figure B.1 — Test arrangement for determining heat reaction properties	19
Figure B.2 — Test arrangement for investigating water dispersion	21
Figure D.1 — Location of water troughs, sectional view	24
Figure D.2 — Arrangement of troughs in roadway cross-section – coverage.....	25
Figure D.3 — Arrangement of troughs in roadway cross-section – horizontal distances	26
Figure D.4 — Arrangement of troughs in the roadway cross-section – vertical distances.....	27
Figure D.5 — Arrangement of troughs in the roadway cross-section – vertical distances.....	27
Figure D.6 — Arrangement of troughs in the roadway cross-section – transverse and longitudinal position.....	28
Figure D.7 — Arrangement of troughs in the roadway cross-section – Obscurement by supports or fixtures.....	29
Figure D.8 — Arrangement of troughs in the roadway cross-section – Obscurement by supports or fixtures.....	30
Figure D.9 — Arrangement of troughs in the roadway cross-section – Obscurement by troughs	30
Figure D.10 — Arrangement of vertically-offset troughs in the roadway cross-section, distance < 1.2 m	31
Figure D.11 — Barrier cordon for a roadway intersection	32
Figure D.12 — Barrier cordon for shafts and insets	33
Figure D.13 — Barrier cordon for closely spaced roadway intersections	34
Figure D.14 — Barrier cordon for closely spaced junctions – Calculation examples for explosion-barrier setting distances.....	35

EN 14591-2:2007 (E)

Figure D.15 — Barrier cordon for closely spaced junctions – Calculation examples for explosion-barrier setting distances 36

Figure D.16 — Setting distances for concentrated and distributed water trough barriers..... 37

Figure D.17 — Roadway drivage with concentrated water trough barriers..... 38

Figure D.18 — Roadway drivage with concentrated water trough barriers – Calculation examples a) and b) 39

Figure D.19 — Roadway drivage with dispersed water trough barrier 40

Figure D.20 — Roadway drivage with concentrated and dispersed water trough barrier 41

Figure D.21 — Water trough barriers at the face/gate intersection 41

Figure D.22 — Explosion barriers in advance gate-roads 42

Figure D.23 — Arrangement of water trough barriers when retreating to the main seam road 43

Figure E.1 — Example for marking of water trough barriers 44

Tables

Table 1 — Maximum container dimensions and water content for 40 litre water troughs 11

Table 2 — Container dimensions and water content for 90 litre water troughs..... 11

Table ZA.1 — Relationship between this European Standard and Directive 94/9/EC 46

Foreword

This document (EN 14591-2:2007) 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 document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2007, and conflicting national standards shall be withdrawn at the latest by September 2007.

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 Directive(s), see informative Annex ZA, which is an integral part of this document.

EN 14591 *Explosion prevention and protection in underground mines — Protective systems* consists of the following parts:

Part 1: 2-bar-explosion-proof ventilation structure

Part 2: Water trough barriers

Part 4: Automatic extinguishing systems for road headers

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.

EN 14591-2:2007 (E)

Introduction

Water trough barriers are autonomous protective systems by reducing the effects of combustible dust and/or firedamp explosions in underground mines to a sufficient level of safety. They are used for preventing the propagation of explosions in roadways in underground coal mines. The purpose of water trough barriers is to extinguish explosion flames in roadways in underground mines and in this way to limit propagation of explosions.

Water trough barriers are designed and arranged in such a way that explosions are prevented from spreading through dangerous chain reactions and incipient explosions do not become detonations.

Water trough barriers will only be effective as a configuration of individual water troughs in accurately defined arrangements. Water troughs are the components for this protective system.

Their effectiveness in the event of explosions is based on the distribution of water acting as a fire-extinguishing medium held in individual water troughs, with the blast wave preceding an explosion destroying individual water troughs, thus evenly distributing water, the extinguishing medium, throughout the cross-section of a roadway and extinguishing the explosion flame that follows.

The water trough barriers described in this standard are the result of research and testing of many years above ground and underground. The results of these tests can be used as a basis for type examination.

1 Scope

This standard specifies the requirements for concentrated and distributed passive water trough barriers, and quick-deploy water trough barriers.

This standard specifies the requirements and test methods for water troughs which are used as components of the "water trough barrier" protective system for underground coal mines.

This standard does not apply to active water trough barriers.

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

EN ISO 4589-2, *Plastics — Determination of burning behaviour by oxygen index — Part 2: Ambient-temperature test*

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*

3 Terms and definitions

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

3.1

explosion barrier

device intended effectively to suppress coal-dust and firedamp explosions and to limit their physical impact

3.2

water trough barrier

explosion barrier in which the extinguishing medium, namely water, is contained in water troughs

3.3

water trough

container to hold the extinguishing medium, namely water, together with matching cover

3.4

trough group

any troughs located within a roadway section of no more than 3 m in length in the distributed barrier

NOTE See Figure 1. A group can be composed of 1 to 3 rows of troughs.

3.5

roadway cross-section

area bounded by the roadway floor and lagging or, where no lagging is installed, by the surrounding rock

EN 14591-2:2007 (E)

3.6
volume of roadway section
product of the mean roadway cross-section and relevant length

NOTE In the case of concentrated water trough barriers, the relevant length is the distance between the start and the end of the water trough barrier. In the case of distributed water trough barriers, the relevant length is the distance between two adjacent trough groups.

3.7
passive water trough barrier
fixed or mobile water trough barrier in which the extinguishing medium, namely water, is dispersed solely by the blast pressure of the explosion

3.8
active water trough barrier
fixed or mobile water trough barrier in which the extinguishing medium, namely water, is dispersed independently of the blast pressure of the explosion

3.9
concentrated water trough barrier
water trough barrier which contains a minimum of 200 l of water per square metre of roadway cross-section and which has a length of at least 20 m

NOTE The concentrated water trough barrier contains a minimum of 5 l of water per cubic metre of roadway section between the start and the end of the water trough barrier.

3.10
distributed water trough barrier
water trough barrier which contains a minimum of 1 l of water per cubic metre of roadway section in each trough group measured up to the adjacent trough group

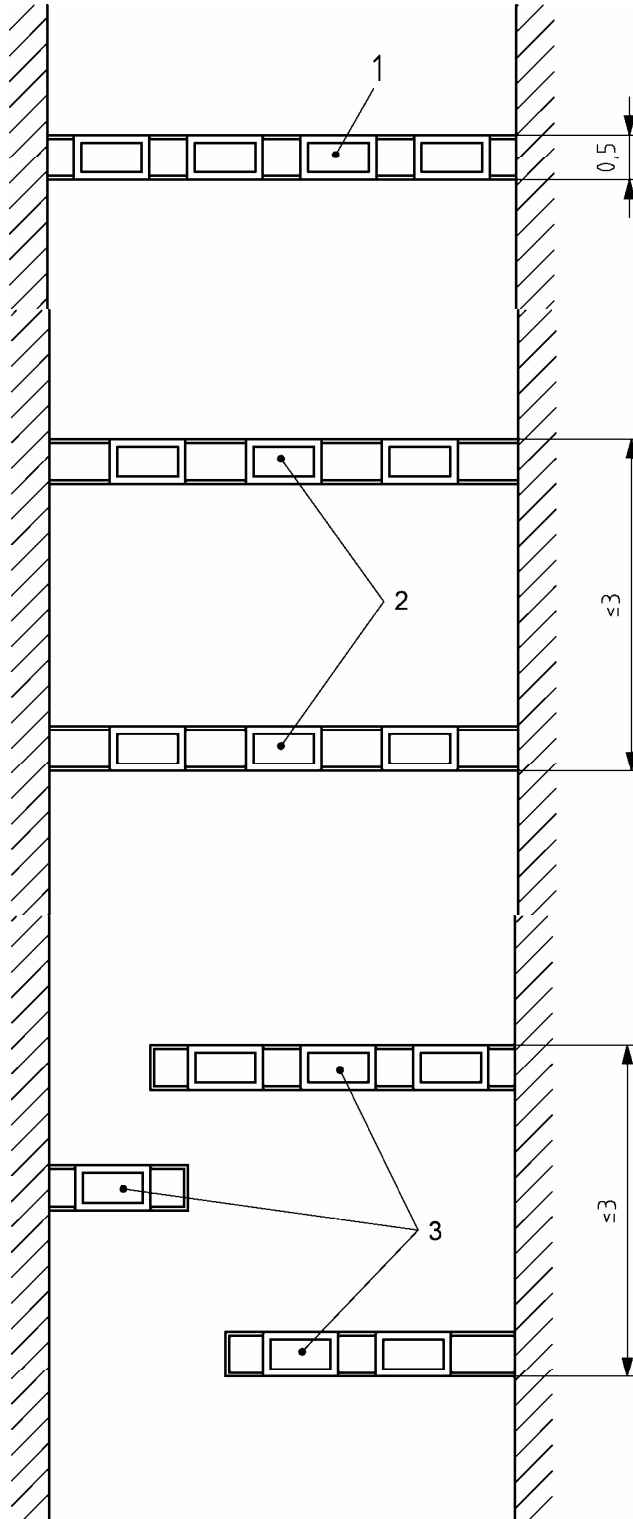
NOTE The clear interval between adjacent trough groups does not exceed 30 m (or 50 m in case of cross-sections up to 10 m²).

3.11
quick-deploy water trough barrier
quick-deploy water trough barriers are used in the case of rescue action, when concentrated or distributed water trough barriers are not provided between areas where the rescue teams are working and the potential fire source

NOTE Quick-deploy water trough barriers contain at least 60 l of water per square metre of roadway cross-section.

3.12
blast pressure
pressure exerted by a current of air on a free-standing static plate positioned at right angles to the direction of flow

Dimensions in metres



Key

- 1 Trough group of one trough row
- 2 Trough group of two trough rows
- 3 Trough group of three trough rows

Figure 1 — Trough group, plan view