

	<b>Návod na výber, aplikovanie a používanie poistných armatúr proti prenosu plameňa.</b>	<b>TNI CEN/TR 16793</b>  38 9672
--	--	--

Guide for the selection, application and use of flame arresters

Táto technická normalizačná informácia obsahuje anglickú verziu CEN/TR 16793:2016.  
This Technical standard information includes the English version of CEN/TR 16793:2016.

Táto technická normalizačná informácia bola oznámená vo Vestníku ÚNMS SR č. 08/16

**123288**

TECHNICAL REPORT

**CEN/TR 16793**

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

January 2016

---

ICS 23.060.40; 13.220.99

English Version

## Guide for the selection, application and use of flame arresters

Guide pour la sélection, l'application et l'utilisation des  
arrête-flammes

Richtlinie für die Auswahl, die Anwendung und den  
Einsatz von Flammendurchschlagssicherungen

This Technical Report was approved by CEN on 22 December 2014. It has been drawn up by the Technical Committee CEN/TC 305.

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



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

<b>Contents</b>		<b>Page</b>
European foreword.....		4
Introduction .....		5
<b>1</b>	<b>Scope</b> .....	<b>6</b>
<b>2</b>	<b>Normative references</b> .....	<b>6</b>
<b>3</b>	<b>Terms, definitions and abbreviated terms</b> .....	<b>6</b>
<b>3.1</b>	<b>Terms and definitions</b> .....	<b>6</b>
<b>3.2</b>	<b>Abbreviated terms</b> .....	<b>8</b>
<b>4</b>	<b>Explosion risks</b> .....	<b>9</b>
<b>5</b>	<b>Technical measures for explosion protection</b> .....	<b>11</b>
<b>5.1</b>	<b>General</b> .....	<b>11</b>
<b>5.2</b>	<b>Mitigation of the effects of explosion</b> .....	<b>11</b>
<b>5.2.1</b>	<b>General</b> .....	<b>11</b>
<b>5.2.2</b>	<b>Prevention of explosion propagation – explosion decoupling</b> .....	<b>11</b>
<b>5.3</b>	<b>Safety concept</b> .....	<b>11</b>
<b>6</b>	<b>Flame arresters</b> .....	<b>13</b>
<b>6.1</b>	<b>General</b> .....	<b>13</b>
<b>6.2</b>	<b>Principle of operation of flame arresters</b> .....	<b>14</b>
<b>6.3</b>	<b>Types of flame arresters</b> .....	<b>15</b>
<b>6.3.1</b>	<b>End-of-line deflagration flame arrester</b> .....	<b>15</b>
<b>6.3.2</b>	<b>In-line deflagration flame arrester</b> .....	<b>15</b>
<b>6.3.3</b>	<b>In-line detonation flame arrester</b> .....	<b>15</b>
<b>6.3.4</b>	<b>Stabilized burning</b> .....	<b>15</b>
<b>6.3.5</b>	<b>Pre-volume flame arresters</b> .....	<b>16</b>
<b>6.4</b>	<b>Selection of flame arresters</b> .....	<b>16</b>
<b>6.5</b>	<b>Application limits</b> .....	<b>20</b>
<b>6.6</b>	<b>Installation limits</b> .....	<b>21</b>
<b>6.6.1</b>	<b>General</b> .....	<b>21</b>
<b>6.6.2</b>	<b>Arrangement of flame arresters at pipe branches [5]</b> .....	<b>22</b>
<b>6.6.3</b>	<b>In-line deflagration flame arrester</b> .....	<b>23</b>
<b>6.6.4</b>	<b>End-of-line deflagration flame arrester</b> .....	<b>24</b>
<b>6.6.5</b>	<b>Liquid seal flame arrester</b> .....	<b>25</b>
<b>6.6.6</b>	<b>Foot valve flame arrester</b> .....	<b>26</b>
<b>6.6.7</b>	<b>Hydraulic flame arrester</b> .....	<b>26</b>
<b>6.6.8</b>	<b>High velocity valves</b> .....	<b>26</b>
<b>6.7</b>	<b>Insulation and heating</b> .....	<b>26</b>
<b>7</b>	<b>Application of flame arresters</b> .....	<b>27</b>
<b>7.1</b>	<b>General</b> .....	<b>27</b>
<b>7.2</b>	<b>Protection of process units, containments and tanks [5]</b> .....	<b>27</b>
<b>7.2.1</b>	<b>Necessity of flame arresters</b> .....	<b>27</b>
<b>7.2.2</b>	<b>Protection against flame transmission during deflagration or detonation</b> .....	<b>27</b>
<b>7.2.3</b>	<b>Protection against flame transmission during endurance burning</b> .....	<b>28</b>
<b>7.2.4</b>	<b>Operating conditions [5]</b> .....	<b>29</b>
<b>7.3</b>	<b>Changing the process</b> .....	<b>29</b>
<b>8</b>	<b>Installation, operating and maintenance</b> .....	<b>29</b>
<b>8.1</b>	<b>General</b> .....	<b>29</b>

<b>8.2</b>	<b>Safety information.....</b>	<b>30</b>
<b>8.3</b>	<b>Checking and installing .....</b>	<b>30</b>
<b>8.4</b>	<b>Inspection and maintenance intervals .....</b>	<b>31</b>
<b>8.5</b>	<b>Liquid seal flame arrester .....</b>	<b>31</b>
<b>9</b>	<b>Commissioning checklist .....</b>	<b>32</b>
	<b>Bibliography .....</b>	<b>33</b>

## **European foreword**

This document (CEN/TR 16793:2016) 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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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.

## Introduction

The document provided is general in nature and for specific applications further expert advice should be sought.

In addition to the content of operating manuals from manufacturers, the local accident prevention regulations, environmental protection and general safety provisions for the devices' area of use, as well as relevant laws and national directives, this paper will support the user for a proper use of flame arresters.

In Europe, the "Directive 2014/34/EU on equipment and protective systems intended for use in potentially explosive atmospheres" (ATEX – Atmosphères Explosibles) is mandatory for the production and test intended for use of products in potentially explosive atmospheres. Flame arresters are defined as a Protective System.

Flame arresters should be tested according to EN ISO 16852, *Flame arresters – Performance requirements, test methods and limits for use*, to fulfill the health and safety requirements of this directive.

Flame arresters are subjected to an EC type examination and are designed for use in areas at risk from explosion.

The Directive 1999/92/EC of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres - gives the minimum requirements for the improvement of health protection and safety of employers who could be endangered by explosive atmospheres. The main issues are assessment of explosion risk, zone classification and the explosion protection documents (including requirements for personnel to do engineering, equipment selection, installation, maintenance, repair, etc.).

National regulations and/or codes relating to specific industries or applications may exist which have to be followed.

Flame arresters are required to protect against many types of explosion events within equipment.

The safety obtained depends heavily upon correct choice, installation and maintenance of the flame arrester. This cannot be achieved without responsible, informed management.

## 1 Scope

This Technical Report is aimed primarily at persons who are responsible for the safe design and operation of installations and equipment using flammable liquids, vapours or gases.

This document applies to both industrial and mining applications

This document describes possible risks and gives proposals for the protection against these risks by the use of flame arresters.

This document gives some guidance to choice of flame arresters according to EN ISO 16852 for different common scenarios and it gives best practice for the installation and maintenance of these flame arresters.

## 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 60079-20-1, *Explosive atmospheres — Part 20-1: Material characteristics for gas and vapour classification — Test methods and data (IEC 60079-20-1)*

EN ISO 16852:2010, *Flame arresters — Performance requirements, test methods and limits for use (ISO 16852:2008, including Cor 1:2008 and Cor 2:2009)*

EN ISO 28300:2008, *Petroleum, petrochemical and natural gas industries — Venting of atmospheric and low-pressure storage tanks (ISO 28300:2008)*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**