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Safety devices for protection against excessive pressure —

Part 2: Bursting disc safety devices

Dispositifs de sécurité pour protection contre les pressions excessives —

Partie 2: Dispositifs de sûreté à disque de rupture

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 185, *Safety devices for protection against excessive pressure*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This second edition cancels and replaces the first edition (ISO 4126-2:2003), which has been technically revised. The main changes compared to the previous edition are as follows:

— non-applicable references have been removed;

— material references (old Annexes A and B) have been removed;

— new Annex A has been added.

A list of all parts in the ISO 4126 series can be found on the ISO website.

Introduction

A bursting disc safety device is a non-reclosing pressure relief device used to protect pressure equipment such as pressure vessels, piping, gas cylinders or other enclosures from excessive pressure and/or excessive vacuum.

A bursting disc safety device typically comprises an assembly of components including a bursting disc, a bursting disc holder and, where necessary, other components such as back pressure supports, stiffening rings, etc.

The bursting disc is the pressure-sensitive part of the bursting disc safety device and is designed to open by bursting at a specified pressure. There are many different types of bursting disc safety devices manufactured in corrosion resistant materials, both metallic and non-metallic, to cover a wide range of nominal sizes, burst pressures and temperatures.

Safety devices for protection against excessive pressure —

Part 2:
Bursting disc safety devices

1 Scope

This document specifies the requirements for bursting disc safety devices.

It includes the requirements for the design, manufacture, inspection, testing, certification, marking, and packaging.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
bursting disc safety device
non-reclosing pressure relief device actuated by differential pressure and designed to function by the bursting of the *bursting disc(s)* (3.3), and which is the complete assembly of installed components including, where appropriate, the *bursting disc holder* (3.4)

3.2
bursting disc assembly
complete assembly of components which are installed in the *bursting disc holder* (3.4) to perform the desired function

3.3
bursting disc
pressure-sensitive component(s) of a *bursting disc safety device* (3.1), designed to open by bursting at a *specified bursting pressure* (3.11)

Note 1 to entry: It is not considered a pressure-containing part with respect to 4.2.

3.4
bursting disc holder
part of a *bursting disc safety device* (3.1) which retains the *bursting disc assembly* (3.2) in position

Note 1 to entry: It is considered a pressure-containing part with respect to 4.2.

3.5
conventional domed bursting disc
bursting disc (3.3) which is domed in the direction of the *bursting pressure* (3.10)

Note 1 to entry: I.e. where the bursting pressure is applied to the concave side of the bursting disc, see Figure 1.

Note 2 to entry: Also referred to as forward-acting bursting disc.

3.6
slotted lined bursting disc
bursting disc (3.3) made up of two or more layers, at least one of which is slit or slotted to control the *bursting pressure* (3.10) of the bursting disc

3.7
reverse domed bursting disc
bursting disc (3.3) which is domed against the direction of the *bursting pressure* (3.10)

Note 1 to entry: I.e. where the bursting pressure is applied to the convex side of the bursting disc, see Figure 2.

Note 2 to entry: Also referred to as reverse-acting bursting disc.

3.8
flat bursting disc
bursting disc (3.3) having one or more layers, which is flat when installed and can be made of a ductile or brittle material

3.9
graphite bursting disc
bursting disc (3.3) manufactured from graphite, impregnated graphite, flexible graphite or graphite composite and designed to burst due to bending or shearing forces

Note 1 to entry: The following definitions apply:

a) Graphite: A crystalline form of the element carbon.

b) Impregnated graphite: Graphite in which the open porosity is impregnated with a filler material.

c) Flexible graphite: A graphite structure formed by the compression of thermally exfoliated graphite intercalation compounds.

d) Graphite composite: Made up of two or more distinct materials and having different properties to those of the separate materials and in which the proportion of graphite is over 50 per cent by weight.

3.10
bursting pressure
value of the differential pressure between the upstream side and the downstream side of the *bursting disc* (3.3) when it bursts

3.11
specified bursting pressure
bursting pressure (3.10) quoted with a *coincident temperature* (3.14) when defining the *bursting disc* (3.3) requirements

Note 1 to entry: Used in conjunction with a *performance tolerance* (3.15).

3.12
specified maximum bursting pressure
maximum *bursting pressure* (3.10) quoted with a *coincident temperature* (3.14) when defining the *bursting disc* (3.3) requirements

Note 1 to entry: Used in conjunction with *specified minimum bursting pressure* (3.13).

3.13
specified minimum bursting pressure
minimum *bursting pressure* (3.10) quoted with a *coincident temperature* (3.14) when defining the *bursting disc* (3.3) requirements

Note 1 to entry: Used in conjunction with *specified maximum bursting pressure* (3.12).

3.14
coincident temperature
temperature of the *bursting disc* (3.3) associated with a *bursting pressure* (3.10) and which is the expected temperature of the bursting disc when it is required to burst

3.15
performance tolerance
range of pressure between the *specified minimum bursting pressure* (3.13) and the *specified maximum bursting pressure* (3.12), or the range of pressure in positive and negative percentages or quantities which is related to the *specified bursting pressure* (3.11)

Note 1 to entry: See Figure 9.

3.16
operating pressure
pressure existing at normal operating conditions within the system being protected

3.17
differential back pressure
differential pressure across a *bursting disc* (3.3) in the opposite direction to the direction of the *bursting pressure* (3.10), which is the result of pressure in the discharge system from other sources and/or a result of vacuum on the upstream side of the bursting disc

3.18
vent area
cross-section area available for discharge of fluid as calculated by the manufacturer

3.19
batch
quantity of *bursting discs* (3.3) or *bursting disc safety devices* (3.1) made as a single group of the same type, size, materials and *specified bursting pressure* (3.11) requirements where the *bursting discs* (3.3) are manufactured from the same *lot of material* (3.20)

3.20
lot of material
definite quantity of material produced by a single manufacturer under conditions that are presumed uniform

Note 1 to entry: Lots of the following materials used to manufacture bursting discs are defined as:

a) **Metal**: Material of the same specification coming from the same heat number, heat treatment batch and specified thickness with tolerances to an appropriate standard;

b) **Graphite and flexible graphite**: Material of the same specification grade and quality coming from the same graphite manufacturer and the same manufacturing process;

c) **Impregnated graphite**: Graphite of the same lot impregnated with a specific grade of filler material by the same manufacturing process;

d) **Graphite composite**: Graphite and specific grades of other constituents coming from the same mix of raw materials.

3.21
back pressure support
component of a *bursting disc safety device* (3.1) which prevents damage to the *bursting disc* (3.3) due to *differential back pressure* (3.17)

Note 1 to entry: A back pressure support which is intended to prevent damage to the bursting disc when the system pressure falls below atmospheric pressure is sometimes referred to as a vacuum support.

3.22
stiffening ring
component of a *bursting disc assembly* (3.2) used primarily for reinforcing fragile *bursting discs* (3.3), so as to prevent damage

3.23
coating
layer of metallic or non-metallic material applied to components of a *bursting disc safety device* (3.1) by a coating process

3.24
lining
additional sheet or sheets of metallic or non-metallic material forming part of a *bursting disc assembly* (3.2) or *bursting disc holder* (3.4)

3.25
plating
metal layer applied to a *bursting disc* (3.3) or *bursting disc holder* (3.4) by a plating process

3.26
muffled outlet
component of a *bursting disc safety device* (3.1) which disperses the discharge

3.27
temperature shield
device which protects a *bursting disc* (3.3) from excessive temperature

3.28
pressure-containing part
part, whose failure to function as intended results in a release of contained fluid into the environment

4 Materials

4.1 Selection of materials

The selection of materials used for the components of bursting disc safety devices shall take into account:

a) suitability with regard to manufacture;

b) compatibility with the process fluid, the adjoining components and the chemical and physical conditions to which the bursting disc safety device will be subjected when in service.

NOTE For example, the use of corrosion-resistant materials for the downstream side of the bursting disc device may be selected because corrosion of these parts can cause damage which can impair the performance of the bursting disc safety device.

4.2 Material specifications

4.2.1 The material specifications of the bursting disc assembly component(s) shall be defined by the manufacturer of the bursting disc safety device to provide control of the applicable properties.

4.2.2 Materials used for the pressure-containing part(s) of the bursting disc holder of the bursting disc safety device shall be suitable for pressure-containing functions, taking into account their temperature limitations.

Only materials with defined chemical and physical properties and published in a recognized national or international standard shall be used.

NOTE Some examples of published national or international material standards are ASME, ASTM, JIS, and EN.

4.3 Protection from corrosion

Bursting disc safety devices are frequently required to operate in corrosive environments. Therefore, components manufactured from materials affected by corrosion shall be protected by coating, plating or lining, where appropriate.

Coatings and plating shall be applied to give an even and homogeneous coating to the surfaces to be protected. Linings shall be seamless and supplied with the bursting disc safety device so as to preserve them as a set or integral unit.

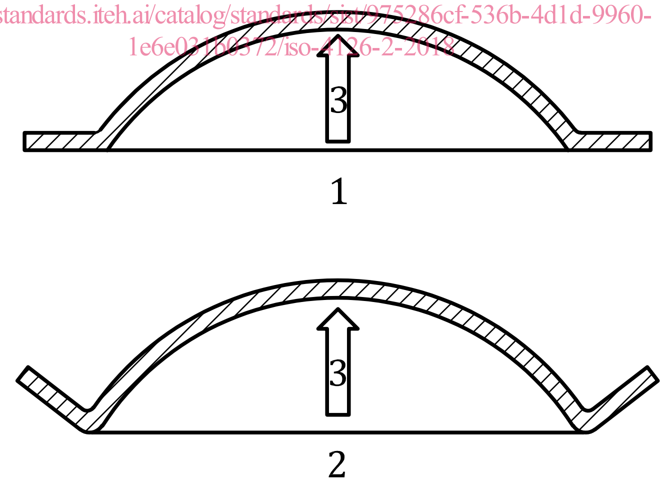
The corrosion protection shall be supplied only by the manufacturer.

The corrosion protection shall not impair the performance of the bursting disc safety device.

5 Types of bursting discs

5.1 Conventional domed bursting discs (Forward acting)

Conventional domed bursting discs shall be designed so that they burst due to tensile stresses when the bursting pressure is applied to the concave side of the bursting disc (see Figure 1).



Key

1 flat seat

2 angle seat

3 flow

Figure 1 — Conventional domed bursting disc (Forward acting)

They shall be domed by a means sufficient to cause a permanent set such that no further plastic flow occurs initially when the bursting disc is subjected to its intended operating condition.

