

English Version

Fire and explosion prevention and protection for bucket elevators

Prévention et protection contre l'incendie et
l'explosion des élévateurs à godets

Brand- und Explosionsschutz für Becherwerke

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European foreword

This document (CEN/TR 16829:2016+AC:2019) has been prepared by Technical Committee CEN/TC 305 “Potentially explosive atmospheres – Explosion prevention and protection”, the secretariat of which is held by DIN.

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⌈AC⌋ This document supersedes CEN/TR 16829:2016. ⌋AC⌋

This document includes Corrigendum 1 issued by CEN on 24 April 2019.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags ⌈AC⌋ ⌋AC⌋.

1 Scope

This European Technical Report applies to bucket elevators that may handle combustible products capable of producing potentially explosive atmospheres of dust or powder inside the bucket elevator during its operation. The precautions to control ignition sources will also be relevant where the product in the bucket elevator creates a fire risk but not an explosion risk.

For the purposes of this report, a bucket elevator is defined as an item of bulk material handling equipment that carries material in powder form or as coarse products such as whole grain, wood chips or flakes, in a vertical direction by means of a continuous movement of open containers.

This Technical Report specifies the principles of and guidance for fire and explosion prevention and explosion protection for bucket elevators.

Prevention is based on the avoidance of effective ignition sources, either by the elimination of ignition sources or the detection of ignition sources.

Explosion protection is based on the application of explosion venting, explosion suppression or explosion containment and explosion isolation rules specifically adapted for bucket elevators. These specific rules may be based on agreed test methods.

This European Technical Report does not apply to products that do not require atmospheric oxygen for combustion.

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 1127-1 *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

EN 13237, *Potentially explosive atmospheres — Terms and definitions for equipment and protective systems intended for use in potentially explosive atmospheres*

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

EN 13463-5, *Non-electrical equipment intended for use in potentially explosive atmospheres — Part 5: Protection by constructional safety 'c'*

EN 13463-6, *Non-electrical equipment for use in potentially explosive atmospheres — Part 6: Protection by control of ignition source 'b'*

EN 14373, *Explosion suppression systems*

EN 14460, *Explosion resistant equipment*

EN 14797, *Explosion venting devices*

EN 14491, *Dust explosion venting protective systems*

EN 15089, *Explosion isolation systems*

EN ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100)*

ISO 281, *Rolling bearings — Dynamic load ratings and rating life*

IEC/TS 60079-32-1, *Explosive atmospheres — Part 32-1: Electrostatic hazards, Guidance*

VDI 2263-1, *Dust fires and dust explosions; hazards, assessment, protective measures; test methods for the determination of the safety characteristic of dusts*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13237, EN 15089 and the following apply.

NOTE The zones for the classification of hazardous areas are defined in Directive 1999/92/EC.

3.1 volume

3.1.1

bucket elevator leg volume

internal volume of pipe section connecting head to the boot

3.1.2

bucket elevator head volume

internal volume above the leg connection, including outlet section and excluding the volume of the pulley

Note 1 to entry: Attached chutes are not included.

3.1.3

bucket elevator boot volume

internal volume below the leg connection, including inlet section and excluding the volume of the pulley

3.2

vent spacing

distance between vents measured from centre to centre

3.3

bucket spacing

distance between buckets measured from centre to centre

3.4

combustible dust

finely divided solid particles, 500 µm or less in nominal size, which may be suspended in air, may settle out of the atmosphere under their own weight, which can burn or glow in air, and may form explosive mixtures with air at atmospheric pressure and normal temperatures