

# Dust explosions in bucket elevators

How much dust is needed?

Are we covered by the ATEX regulations?



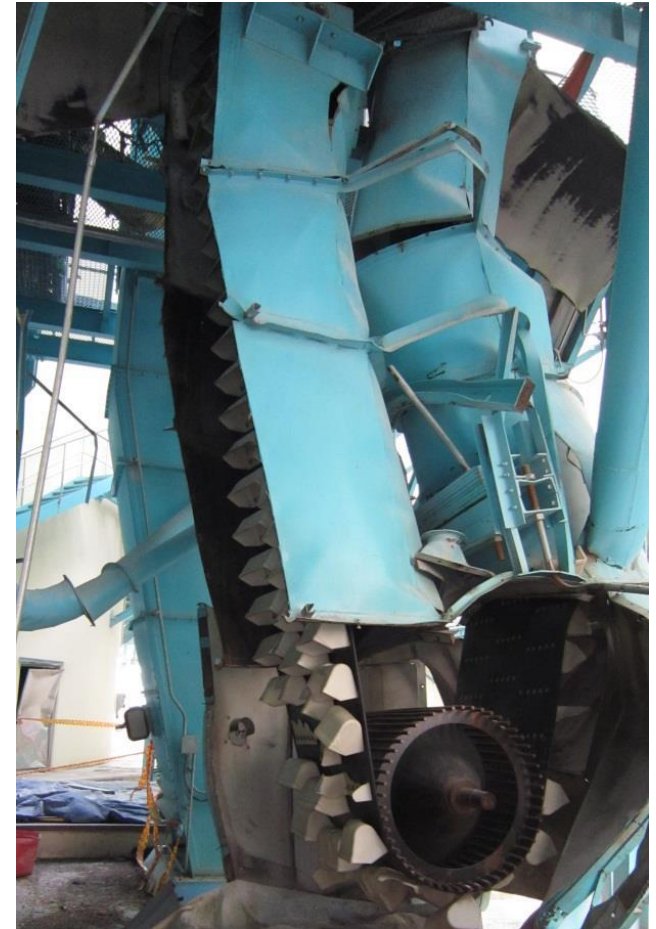


## Guide for explosion venting off bucket elevators

Bucket elevators transporting a combustible product with an average particle size less than 500 microns, or a product containing a significant amount of dust particles, are likely to exceed the lower explosion limit (LEL).

The lower explosion limit of dust in grain and feed industry is typically between 30 and 60 g / m<sup>3</sup>.  
To create a dust explosion, the amount of dust has to be above the lower explosive limit.

The lower explosive limit should not be confused with the limit value for dust in the air, from the authority for Working Environment.



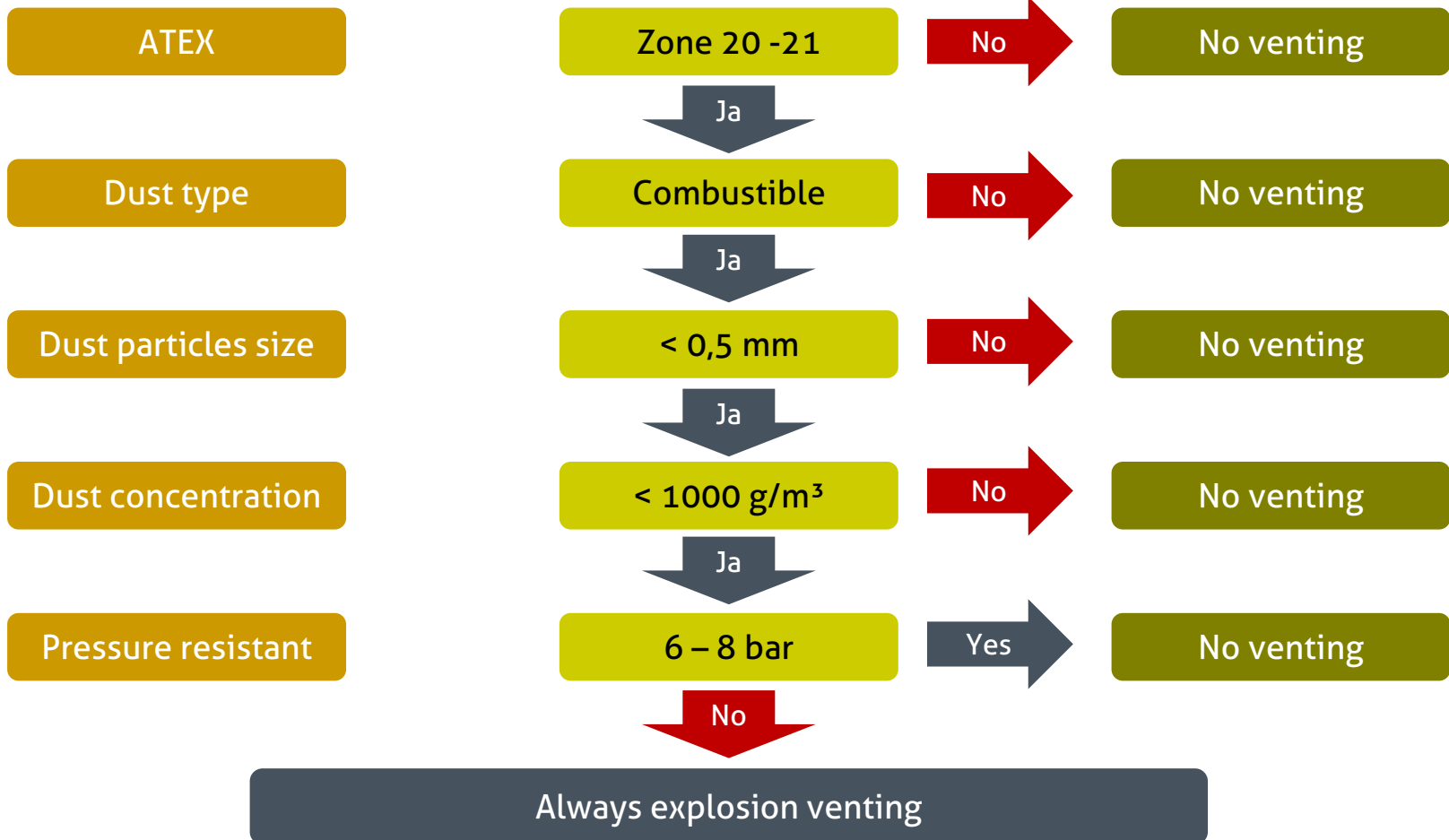


Combustible dust (and therefore potential explosion risk) can be present in processes where grain, feed, vitamins, pellets and other fuel materials is being processed.

You should be aware that also coarse products that not immediately appear to dust, may contain fine dust in quantities large enough to explode, if it swirls up.

At higher temperatures the risk of explosion increases. The finer the dust is - the more explosive it is.  
For example, a ton of grain that just contains 0.5 percent off fine dust can make a room of 80 m<sup>3</sup> explosive.

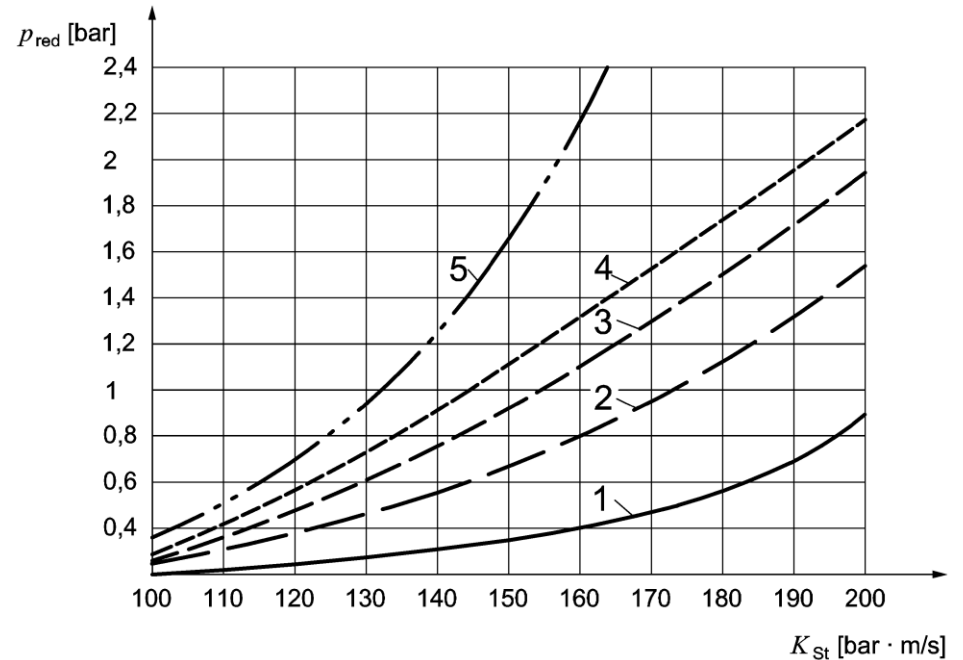






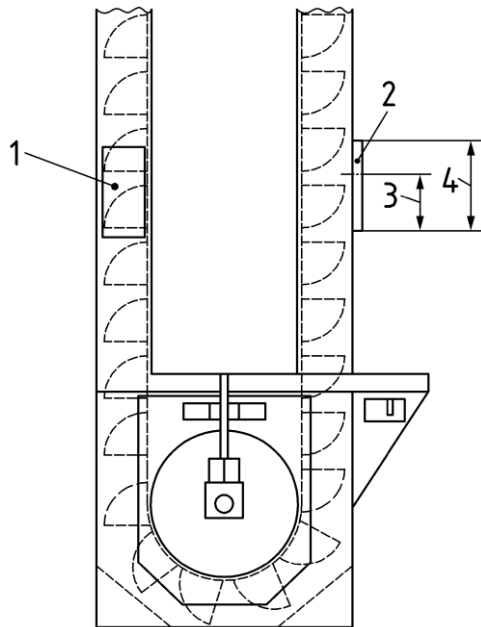
Explosion venting is not allowed, if the vented products to persons are dangerous or harming the environment (eg. due to toxic substances)

Curve No.	Vent configuration (installation distance)
1	Head + boot + legs (3 m distance)
2	Head + boot + legs (6 m distance)
3	Head + legs (3 m distance)
4	Head + legs (6 m distance)
5	Head + legs (12m distance) or only head with max. length of the legs 12 m

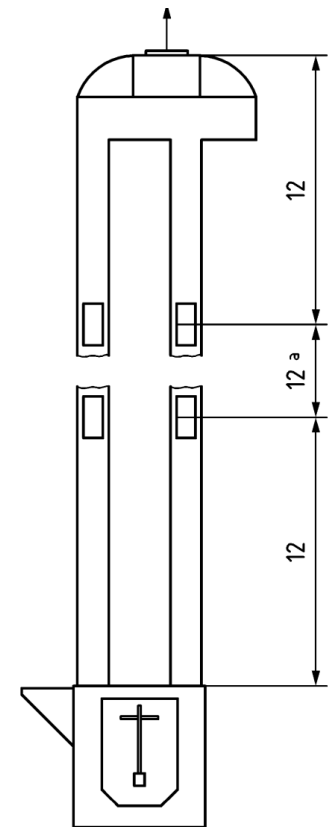
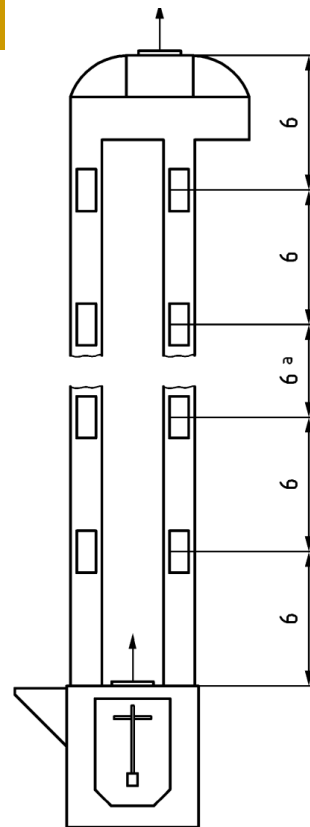




The explosion venting area be equal to or greater than the internal cross-sectional area of the legs of the bucket elevator.



Bucket spacing  $< 280$  mm;  
Required vent height  $\geq 1,5 \times$   
bucket spacing;

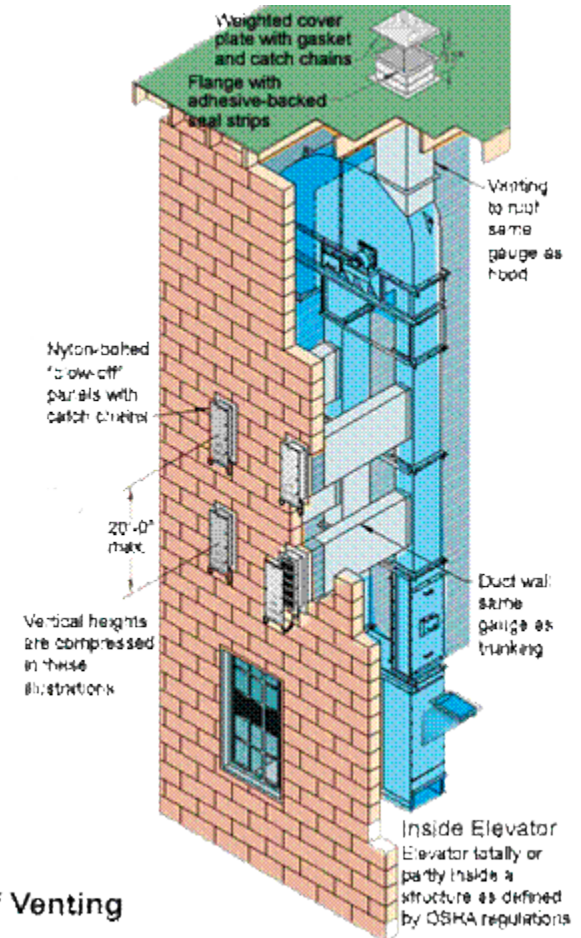




## Limitation of a possible explosion

It is important to think about how damage caused by a possible explosion can be minimized.

First of all, think of how the pressure from the explosion could be offset without causing major damage. Establish explosion panels and create openings to areas where there is no risk of personal injury. When a dust explosion occurs the pressure can stir up deposited dust to dust clouds, which then can ignite and lead to a secondary dust explosion. Therefore, it is important to keep the environment clean for dust.



Explosion Relief Venting



You also have the option to relieve an explosion indoors if you choose to install a flame barrier after relief panel.

Flameless explosion venting devices typically consist of an explosion venting device in combination with a flame quenching element to avoid the transmission of flames into the surroundings. They are used to allow explosion venting in situations where otherwise the hazards of flames and pressure resulting from the venting would harm personnel or damage structures.





# SBK



- 1.) Rolled explosion panel
- 2.) Flat explosion panel
- 3.) Flameless explosion venting
- 4.) Belt misalignment detector
- 5.) Rotation guard
- 6.) Level indicator
- 7.) Temperature sensor

It can be difficult and sometimes even impossible to calculate the necessary relief areas, as one in advance has to know the relief efficiency of the panel you choose to use. We strongly recommend that you always contact your supplier of explosion protection products and leave the calculations to them. The supplier performs the correct calculation, there can be enclosed as documentation to customers.

