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How ventilation can influence your classification in Ex areas ?

A ventilation is defined by its availability and its degree. A good ventilation can prevent or lower the probability of the presence of an hazardous explosive atmosphere. This newsletter describes how a ventilation can influence the ATEX zoning according IEC 60079-10-1.

Artificial ventilation

With the use of artificial ventilation it is possible to achieve:

- reduction in the type and/or extent of zones
- shortening of the time of persistence of an explosive gas atmosphere
- prevention of the generation of an explosive gas atmosphere

Obstacles, turbulence and circulating air patterns may cause reduced or even no ventilation in certain parts of the area. Special attention should be paid on this phenomena.

Degree and availability of ventilation

The effectiveness of the ventilation in controlling dispersion will depend upon the degree and availability of ventilation:

High ventilation can reduce the concentration at the source of release virtually instantaneously, resulting in a concentration below the lower explosive limit.

Medium ventilation can control the concentration, resulting in a stable zone boundary.

Low ventilation cannot control the concentration and cannot prevent a flammable atmosphere after release has stopped.

Grade of release	Ventilation						
	Degree						
	High			Medium			Low
	Availability						
	Good	Fair	Poor	Good	Fair	Poor	Good, fair or poor
Continuous	Non-hazardous	Zone 2	Zone 1	Zone 0	Zone 0 + Zone 2	Zone 0 + Zone 1	Zone 0
Primary	Non-hazardous	Zone 2	Zone 2	Zone 1	Zone 1 + Zone 2	Zone 1 + Zone 2	Zone 1
Secondary	Non-hazardous	Non-hazardous	Zone 2	Zone 2	Zone 2	Zone 2	Zone 1

Table 1: Influence of independent ventilation on type of zone

Estimation of hypothetical volume V_z

If the volume V_z is smaller than 0.1 m^3 and/or 1% of the volume served by the actual ventilation (V_0), the ventilation can be considered as high. If the volume V_z is bigger than V_0, the ventilation can be considered as low.

To estimate the presence of a potential explosive atmosphere with regards to ventilation, a hypothetical volume V_z is calculated:

$$V_z = \left(\frac{dG}{dt}\right)_{max} * \frac{f}{k * LEL_m} \frac{T}{293} * \frac{1}{C}$$

Where

$(dG/dt)_{max}$	the maximum rate of release at source in kg/s
LEL_m	lower explosive limit in kg/m^3
k	typically k = 0.25 for continuous and primary grades and 0.5 for secondary grade
T	ambient temperature (in Kelvin, K)
C	is the number of fresh air changes per unit time (s^{-1})
f	is the efficiency of the ventilation in terms of its effectiveness in diluting the explosive gas atmosphere, ranging from 1 (ideal situation) to f = 5 (impeded air flow).

The effect of ventilation on the type of the zones can be summarized in table 1.

If you have further questions, please do not hesitate to get in touch with us.

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With best regards
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