MC²

solutions for powder handling

ATEX FORM

General Information

Hazardous materials and environments are more and more frequent and need to be carefully evaluated before machinery and equipment are designed and manufactured for purpose. To do this, all information is critical and necessary: to properly and safely supply all required components the customer needs to submit all fundamental information concerning work space and materials regularly used in the process.

This is the sort of information required:

- how is the mixer loaded?
- what is the environmental temperature during loading operations?
- what is the product temperature during loading operations?
- what is the product humidity during handling?
- what is the process temperature?
- what ingredients are used (solids, liquids, gases)?
- is oxygen present or removed during the process (e.g. replaced by nitrogen)?
- is the process achieved under pressure (or negative pressure)?
- are heating/cooling operations involved during the process?
- what cleaning methods and routines are used ?

Materials data

Materials need to be classified according to type and dealt with accordingly:

1- Gases (mists, vapours)
Gases (and dusts) are extremely sensitive to temperature, in terms of ignition (i.e. the temperature of a surface with which the gas, vapour or mist will come into contact and at which it will spontaneously ignite, without the need for a source of ignition like a spark or a flame). According to the risk of ignition of each gas, three categories have been drawn up, with ascending severity:

IIA - gases like acetone, methane, propane, etc.
IIB - gases like hydrogen sulphide, ethylene, etc.
IIC - gases like hydrogen, acetylene, etc.

2- Dusts
Just like gases, dusts too are very sensitive to **temperature**, in terms of ignition. Smouldering is the initial stage at which a dust, coming into contact with a hot surface, will initiate ignition even if not in presence of an ignition source (flame, spark). Thickness of the layer of dust is a crucial parameter, and is inversely proportional to the smouldering temperature. By convention, a 5mm layer thickness is referred to when assessing the ignition temperature of a particular dust.
For dusts, as well as temperature, the **minimum ignition energy** (MIE) also needs to be taken into account. MIE is the lowest quantity of electrical energy required to ignite a flammable dust, if released. According to their MIE (whose value is expressed in mJ) all flammable dusts have been divided into three categories, with increasing risk of ignition:

(see table)

Susceptibility	MIE (mJ)	Protection measures
Normal	>10 mJ	Prevent ignition sources
Significant	≥3 ≤10 mJ	Expert consultancy required, case by case
High	<3 mJ	Prevent explosive atmosphere and ignition sources by introducing explosion protection measures

Please bear in mind that, if no MIE value is submitted, an assumed >10 mJ will be considered.

In terms of **conductivity**, dusts are once more subdivided into three categories, depending on ignition characteristics:

IIIA - suitable for flammable suspended particles
IIIB - suitable for flammable suspended particles and non-conductive dusts
IIIC - suitable for flammable suspended particles and non-conductive dusts and conductive dusts

Once more, please be reminded that, in case of no information, the dusts will be assumed to be included in group IIIA.

If explosion suppression systems are necessary, the determination of the maximum rate of explosion pressure rise of dust clouds $\mathbf{K_{ST}}$ needs to be taken into account. For this, and in accordance with EN 14034-2:2006, dusts have been divided into three groups, as follows:

ST1 >0-200 bar m/s
ST2 201-300 bar m/s
ST3 >300 bar m/s

Finally, the **minimum ignition temperature** (MIT) of a dust cloud (according to EN 50281-2-1:1999) needs to be determined and declared. Many different types of dust have been repeatedly tested and included in reference tables (e.g. grain dust 490 °C, sugar 480 °C, flour 400 °C, aluminium dust 650 °C, etc.)

When defining ATEX rated installations, you should always consider the following points:

- can foregin bodies or smoulder spots be reasonably excluded?
  If not, measures to ensure this must be taken (use inert gases to replace oxygen, keep concentration of explosive mixes lower than the lower explosion level LEL, etc.). These measures are the user/owner's responsibility.
- have measures for preventing potentially explosive atmospheres been adopted?
- will structural explosion-proof measures be provided (such as extinguishing agents, structural strengthening measures, guaranteeing deformation rather than bursting).

Zoning

Zoning is an activity that the user/owner of the installation needs to carry out, with the help of experts, and declare when setting up a production facility in presence of hazardous materials and conditions.
The zone is assessed according to the frequency with which the conditions that cause the onset of hazardous explosive atmpspheres may occur.
According to the zone into which the work space and surrounding spaces fall, specific equipment will have to be manufactured and supplied.
Depending on how frequently potentially explosive atmospheres may occur, the following zones are defined:

Gas	Dust	Equipment category	Frequency of occurrence
0	20	1	An area in which a potentially explosive atmosphere is present constantly, for long periods or frequently.
1	21	2	An area in which an explosive atmosphere is likely to occur occasionally during normal operation.
2	22	3	An area in which an explosive atmosphere is not likely to occur during normal operation but, should it occur, will persist for a short period only.

Please now take time to carefully fill in the following ATEX form and foward it to us for analysis and evaluation.

Company: .....
Contact: .....
Telephone: .....
E-mail: .....
Project: .....

1- Is there presence of explosive atmospheres? Yes ◯ No ◯

2- Process parameters and description:

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.....

3- Material data

Gases (if present)	Dusts
Types used: - - - -	Types used: - - - -
Ignition temperature: °C	Ignition temperature: °C
Ignition group: IIA ◯ IIB ◯ IIC ◯	Smouldering temperature: °C
	MIE (min. ignition energy) mJ
	Ignition group: IIIA ◯ IIIB ◯ IIIC ◯
	Explosion class: ST1 ◯ ST2 ◯ ST3 ◯

4- Minimum Ignition Temperature (MIT): °C

5- Can foreign bodies/smoulder spots be ruled out? Yes ◯ No ◯

6- Measures used to avoid explosive atmospheres?

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7- Will structural explosion protection measures be adopted?
Yes ◯ No ◯

8- Zoning

	Gases	Dusts
Inside mixer/reactor	No Zone ◯ Zone 0 ◯ Zone 1 ◯ Zone 2 ◯	No Zone ◯ Zone 20 ◯ Zone 21 ◯ Zone 22 ◯
Outside mixer/reactor	No Zone ◯ Zone 0 ◯ Zone 1 ◯ Zone 2 ◯	No Zone ◯ Zone 20 ◯ Zone 21 ◯ Zone 22 ◯
		Will layers/build-up of dust be avoided by means of procedural measures? Yes ◯ No ◯

9- Is there presence of hybrid mixes (gas/dust)? Yes ◯ No ◯

10- Ambient temperature:
The machine(s) is/are designed for temperatures between +5 °C and +30 °C.
If this temperature range is insufficient for your requirements, please contact us.

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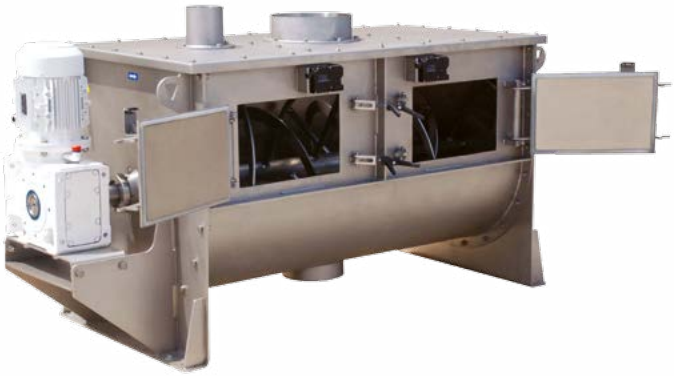
Place / Date Signature / Stamp



*the ultimate **mixing** solution!*

MC² solutions for powder handling

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