



ATEX Questionnaire

Before completing the ATEX questionnaire,
please read the information on explosion protection and
on how to fill in the ATEX questionnaire (page 3 onwards).

Customer:
Contact:
Project / machine:

Phone:
email:

1. Process description / process parameters

Please outline briefly!

2. Is there a potentially explosive atmosphere: Yes No (If the answer is "no", no further information is required!)

2.1 Gases / vapours / mist <input type="checkbox"/> No <input type="checkbox"/> Yes	2.2 Dusts <input type="checkbox"/> No <input type="checkbox"/> Yes
Materials/substances used:	Materials/substances used:
Ignition temperature: °C	Ignition temperature: °C
Ignition group: <input type="checkbox"/> IIA <input type="checkbox"/> IIB <input type="checkbox"/> IIC	Glow point/smouldering temperature: °C
	Minimum ignition energy (MIE): mJ
	Conductive dust <input type="checkbox"/> No <input type="checkbox"/> Yes
	Dust explosion class: <input type="checkbox"/> St1 <input type="checkbox"/> St2 <input type="checkbox"/> ST3

3. Determination of the permissible surface temperature (conducted by Lödige)

For gases / vapours / mist (where applicable)	For dust (where applicable)
t _{max.} : °C x 80 % = °C	t _{max.} for dust layer: - 75 K = °C
	t _{max.} for dust cloud: 2/3 x °C = °C

4. Will foreign bodies / smoulder spots, as an ignition source, be excluded? No Yes

If the answer is "no", please explain the measures!



ATEX Questionnaire

5. Measures for the avoidance of an explosive atmosphere, e.g. inerting No Yes

Explanation if applicable!

6. Will structural explosion protection be provided, e.g. pressure resistant design? No Yes

Explanation if applicable!

7. Zone determination (frequency of the occurrence of an explosive atmosphere)

	Gases / vapours / mist	Dust
In the mixer/reactor	<input type="checkbox"/> Zone 0 <input type="checkbox"/> Zone 1 <input type="checkbox"/> Zone 2 <input type="checkbox"/> no zone	<input type="checkbox"/> Zone 20 <input type="checkbox"/> Zone 21 <input type="checkbox"/> Zone 22 <input type="checkbox"/> none
Outside the mixer/reactor	<input type="checkbox"/> Zone 0 <input type="checkbox"/> Zone 1 <input type="checkbox"/> Zone 2 <input type="checkbox"/> no zone	<input type="checkbox"/> Zone 20 <input type="checkbox"/> Zone 21 <input type="checkbox"/> Zone 22 <input type="checkbox"/> no zone Dust layers/accumulations shall be avoided by organisational measures. <input type="checkbox"/> Yes <input type="checkbox"/> No

7.1 Additional information on the zoning (periphery, included devices, e.g. switch cabinet etc.)

Drawing / sketch enclosed

Remark: **Please explain**

Place / date

Signature / stamp

Should you require any further information, please call your contact at Lödige or contact our ATEX representative Klaus-Peter Bröker directly, tel.: +49 5251 309-187, email: broeker@loedige.de

Information on explosion protection and on filling in the ATEX questionnaire

The following information is intended to give you a brief insight into explosion protection and assist you with filling in the ATEX questionnaire.

A. Measures to prevent or reduce the risk of explosion

A.1 Avoidance of a potentially explosive atmosphere:

Wherever possible, measures should be taken to prevent a potentially explosive atmosphere.

Such measures are:

- Maintaining the concentration of the combustible substance outside the explosive range, i.e. below the lower explosive limit (LEL) and/or above the upper explosive limit (UEL).
- Lowering the oxygen concentration to a value below the limiting oxygen concentration (LOC) by inerting.

A.2 Avoidance of any possible effective ignition source

Knowing that an explosive atmosphere often cannot be avoided, this represents the standard way to proceed and is also conducted for measures according to A.1 or A.3. For this the mixer/dryer/granulator etc. (in the following referred to as "mixer") are subjected by Lödige to a risk analysis with regard to possible ignition sources (not part of the customer documentation). Wherever possible, all potential ignition sources are prevented by implementing suitable measures. If the avoidance of a potential ignition source is not possible, measures are taken to prevent this ignition source from becoming effective (**ignition source monitoring**). This applies to, for example, sealing. By monitoring the sealing temperature, the mixer is switched off before the permissible surface temperature is reached.

Attention: The risk analysis takes the potential ignition sources that could emanate from the mixer into consideration! It does NOT take any hazards emanating from the process (responsibility of the owner/user) - e.g. the ingress of foreign bodies or smoulder spots that could become a potential ignition source - into consideration. If these potential ignition sources cannot be excluded by the owner/user, further measures according to A.1, A.3 or with regard to the process management must be taken accordingly. For this, please refer to question 4.

A.3 Structural explosion protection

In contrast to the two preceding measures, in this case the occurrence of an explosion is assumed. The structural protection measures include:

- Design resistant to pressure blasts from explosions (the vessel may deform during an explosion, however, not burst)
- Design resistant to pressure from explosions (the vessel may not deform during an explosion)
- Explosion pressure relief, e.g. the use of blow-out channels, bursting disks
- Explosion suppression, e.g. by fast distribution of extinguishing agents; extinguishing cartridges
- Explosion decoupling, e.g. by fast closing valves, rotary feeders, star feeders

Explanations to the questions of the ATEX questionnaire

To 1: Process description / process parameters

The process management and/or process parameters are necessary for the overall evaluation of the situation concerning the risk of explosion.

Please provide a brief description, e.g. filling, ingress of material, inlet temperature, additions (added materials) and temperatures, inerting, vacuum/pressure, heating and cooling cycles, cleaning parameters and temperatures, heating temperatures.

The temperature limits for the pre-alarm and switch-off of the machine are specified within the framework of ignition source monitoring. (Ensure that these temperature limits do not conflict with the operating parameters.)

To 2: Is there an explosive atmosphere?

Describe the potentially explosive atmosphere. Distinguish between gases/vapours/mist and dust. Description of which gases/vapours/mist or dust are present and the relevant explosion characteristic values.

Please appreciate that it is mandatory that you provide us with this information. Possible moisture content of the product etc. should also be taken into consideration.

No references to data sheets or similar please!

Ignition temperature:

The ignition temperature is the temperature of a hot surface (determined under prescribed test conditions) that causes the ignitable mixture of gas/vapour/mist and/or mixture of dust and air to ignite.

The ignition temperature is required for determining the permissible surface temperature.

Glow point/smouldering temperature (auto-ignition temperature) of the dust layer:

The glow point/smouldering temperature is the lowest temperature of a hot surface (determined under prescribed test conditions) at which a layer of dust of a specific thickness (5 mm) ignites on this hot surface.

The smouldering temperature decreases as the thickness of the dust layer increases.

If the glow point/smouldering temperature is not known, it can be determined in a suitable laboratory.

As long as dust layers/accumulations are reliably prevented by organisational measures such as cleaning at suitable intervals, the glow point/smouldering temperature will not be taken into consideration when determining the permissible surface temperature. Please specify in the questionnaire accordingly.

Remark: The smouldering/auto-ignition temperature of a layer of dust is always lower than the ignition temperature of a dust cloud.

Minimum ignition energy (MIE):

The MIE is the minimum amount of electrical energy stored in a capacitor that when discharged is capable of igniting an ignitable mixture of a potentially explosive atmosphere under prescribed test conditions.

Dust is classified in 3 categories:

Susceptibility	MIE [mJ]	Necessary explosion protection measures
Normal susceptibility to ignition	> 10	Avoidance of effective ignition sources
Particularly susceptible to ignition	$\geq 3 \leq 10$	Expert decision
Highly susceptible to ignition	< 3	Preventive explosion protection by avoidance of a potentially explosive atmosphere or avoidance of ignition sources and structural explosion protection measures.

Attention: Due to the fluidised layer formed (exception: coater, ring layer mixer) in the mixer, brush discharge can be expected. The energy of brush discharge is sufficient to ignite an atmosphere containing dust that is highly susceptible to ignition. In this case, preventive or structural protection measures are necessary. For atmospheres containing dust that is particularly susceptible to ignition, it is necessary to consult an expert. Also refer to the table.

Moisture content etc. should also be taken into consideration for this.

If no specifications are made with respect to the MIE, it will assumed that the dust in the atmosphere is normally susceptible to ignition (MIE > 10 mJ)!

Ignition group for gases

The ignition risk of the gas increases from ignition subgroup IIA to IIC.

Group	Ignition energy [μJ]	Gas (example)
	280	Methane
II A	>180 μJ	Propane
II B	60 - 180 μJ	Ethylene
II C	< 60 μJ	Hydrogen

Attention: Due to the fluidised layer formed (exception: coater, ring layer mixer) in the mixer, the formation of brush discharge can be expected. The energy of brush discharge is sufficient to ignite an atmosphere containing a gas mixture.

For this reason, preventive explosion protection measures such as inerting or structural explosion protection measures (e.g. pressure impact resistant design) must be taken!

Exception: Due to the product characteristics, the risk of discharge in the fluidised layer is excluded.

Conductive dust:

This information is necessary for the selection of the electrical components. Dust with a conductivity $\leq 1000 \text{ Ohm} \cdot \text{m}$ (EN 50281) is deemed conductive. The protection type IP 6x is required for conductive dust instead of IP 5x.

If no information is specified for conductivity, it will be assumed that the dust is not conductive!

KST value

(This information is only required if explosion suppression systems are to be used)

This value quantifies the severity of a dust explosion.

There are 3 dust explosion classes:

- ST 1: > 0 - 200 bar m/s
- ST 2: 201 - 300 bar m/s
- ST 3: > 300 bar m/s

This information is only required if explosion suppression systems are to be used.

To 3: Determination of the permissible surface temperature (informative, conducted by Lödige)

The max. permissible surface temperature is calculated as follows:

- Gases / vapours / mist

$$t_{\max.} = 80 \% \text{ of the ignition temperature of the gas}$$

- Dust

$$t_{\max.} \text{ dust cloud} = 2/3 \text{ of the ignition temperature of the dust}$$

$$t_{\max.} \text{ dust layer} = \text{glow point/smouldering temperature (auto-ignition temperature)} - 75 \text{ K}$$

The max. permissible surface temperature corresponds to the lower of the two values.

To 4: Will foreign bodies / smoulder spots, as an ignition source, be excluded?

If they cannot be reliably excluded, it is necessary to

- take measures to prevent an explosive atmosphere, e.g. by inerting, maintaining the concentration of the potentially explosive mixture below the lower explosive limit (LEL) OR
- measures for preventing the ingress of foreign bodies, e.g. using magnetic separators, screens etc. OR
- structural measures, e.g. pressure impact resistant design OR
- control measures

The last measure involves reducing the rotational speed to a circumferential speed of < 1 m/s during the filling and discharge process. In addition, the choppers (if applicable) must not run during these phases.

Acceleration to operating rotational speed and switching on of the choppers is only permitted once a sufficient filling level, i.e. saturation of the atmosphere above the upper explosive limit (UEL) has been reached. The same measures are to be taken during the discharge process if a potentially explosive atmosphere is to be expected during this stage.

This measure is to be realised within the framework of process management and is the responsibility of the owner/user.

To 5: Measures for preventing a potentially explosive atmosphere

Shall measures be taken to prevent a potentially explosive atmosphere, e.g. by inerting or maintaining the proportion of potentially explosive material under and/or above the limiting concentrations (LEL/UEL)?

Are the control loops designed in accordance with the safety requirements?

If applicable, please describe and take into consideration for zone determination.

To 6: Will structural explosion protection be provided?

As described under A.3, it is assumed for these protective measures that an explosion is possible. Please describe the extent of the structural explosion protection.

Please note that if our mixer is to be of pressure resistant design or pressure impact resistant design, further measures such as explosion pressure relief, explosion decoupling, explosion suppression may be necessary to protect additional machine components. This normally requires consultancy by companies specialising in explosion protection.

To 7: Zone determination (frequency of the occurrence of a potentially explosive atmosphere)

The frequency of the occurrence of a potentially explosive atmosphere defines the zone and thus the necessary equipment category for the purpose.

For this, it is necessary to take the chamber containing the potentially explosive atmosphere AND any outlets into consideration.

The correct zone determination has a considerable effect on the measures required and thus the cost of realisation.

Carefully consider which units are located in the potentially explosive area (drives, electrical consumers, switch cabinet, control point etc.). Where can leaks occur and potentially explosive atmosphere escape, how far can it spread?

Where in the mixer is a potentially explosive atmosphere to be expected?
- Mixer, filters, dispersion into suction pipes etc.?

Where is a potentially explosive atmosphere to be expected outside the mixer?

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

If you have any questions or suggestions, please call your contact at Lödige or contact Klaus-Peter Bröker directly, tel.: +49 5251 309-187, email: broeker@loedige.de