

ATEX

Because safety
comes first!



What is ATEX?

We at m-tec would like to give you a brief introduction to the subject of ATEX. This document is intended to help you to gain an overview, it can not replace a qualified ATEX specialist.

ATEX derives its name from the French „ATmosphère EXplosible“ (explosive atmosphere) and is defined in the EU directives 94/9/EC and 99/92/EC.



94/9/EG

The directive 94/9/EC, also called ATEX 95, describes the requirements for equipment used in explosive environments and clarifies the responsibilities of the manufacturer. In accordance with this directive, the manufacturer must verify that its equipment is suitable for safe operation in the intended zone.



99/92/EG

The directive 99/92/EC, also called ATEX 137, describes the requirements for the workplace and the responsibilities of the employer. The employer is responsible for the protection of their workers and the overall concept of their explosion protection measures.

Do the ATEX directives affect me?

The ATEX directives affect you as soon as you process or store substances that can burn or explode.

The properties of the substances you use can be taken from the manufacturer's data sheets.

What do I have to do?

As the employer, you must analyse the actual hazards at your plant and set down the measures needed to counteract these.

All of the hazards you identify and the countermeasures you choose form part of the explosion protection document you are required to draw up.



What is the procedure?

1

As a first step, you must examine whether you have or use explodable substances. This information can be found on the manufacturers data sheets.

Some important attributes are for example:

- LEL (lower explosive limit) (g/m^3)
- UEL (upper explosive limit) (g/m^3)
- autoignition temperature ($^{\circ}\text{C}$)
- glowing temperature ($^{\circ}\text{C}$)
- average particle size

2

If you find that you do use explodable substances, you must examine whether these can form explosive atmospheres in your plant or processes. In the case of powders, deposits are particularly important as well because they can prevent cooling in motors and machinery.

3

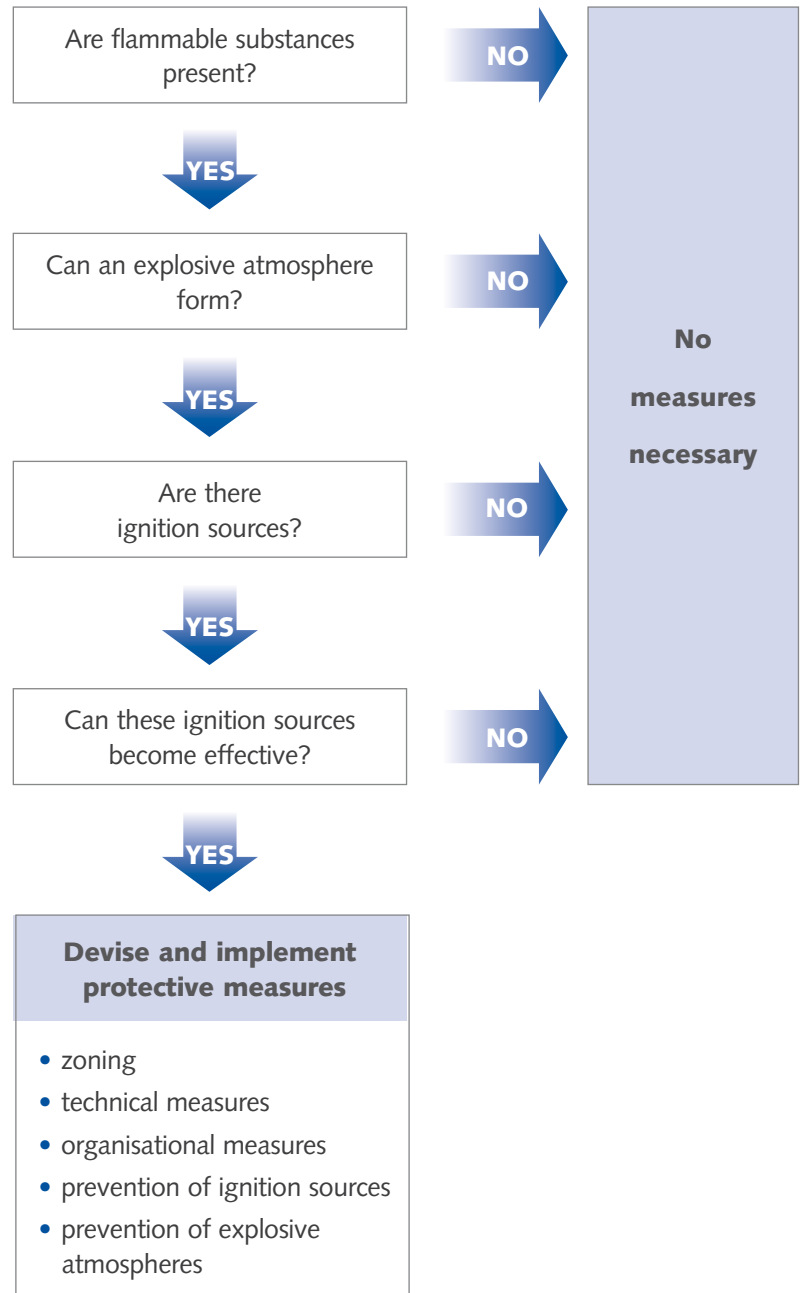
If hazardous atmospheres can form you must look for potential sources of ignition, e.g. electrostatic buildup, impact sparks, frictional heat, electromagnetic radiation.

4

If you have a hazardous atmosphere and there is a potential source of ignition, you must implement technical and organisational measures to reduce these risks to an "acceptable" level.

Risks must be assessed according to the probability of their occurrence and their potential effects.

The first measure involves dividing the affected area into zones.



What are zones?

Zones are areas subject to safety measures whose range and severity depend on the likelihood of an explosive atmosphere forming in these areas. Zones 0, 1, and 2 apply to gases; zones 20, 21, and 22 to dusts.

How are zones defined?

Zones divide explosive areas according to how often and how long hazardous explosive atmospheres form.

GAS	Zone 0	An area in which an explosive atmosphere caused by a mixture of air and flammable gases, vapours, or mists is present at all times, over long periods, or frequently .
	Zone 1	An area in which normal operations may occasionally give rise to an explosive atmosphere caused by a mixture of air and flammable gases, vapours, or mists.
	Zone 2	An area in which normal operations do not normally or only very briefly give rise to an explosive atmosphere caused by a mixture of air and flammable gases, vapours, or mists.
DUST	Zone 20	An area in which an explosive atmosphere caused by a cloud of combustible dust and air is present at all times, over long periods, or frequently .
	Zone 21	An area in which normal operations may occasionally give rise to an explosive atmosphere caused by a cloud of combustible dust and air.
	Zone 22	An area in which normal operations do not normally or only very briefly give rise to an explosive atmosphere caused by a cloud of combustible dust and air.

Which zones are found where?

The zones 0 and 20 could occur in the following cases:

- during the production of pure additive mixtures
- in a filter dust collector

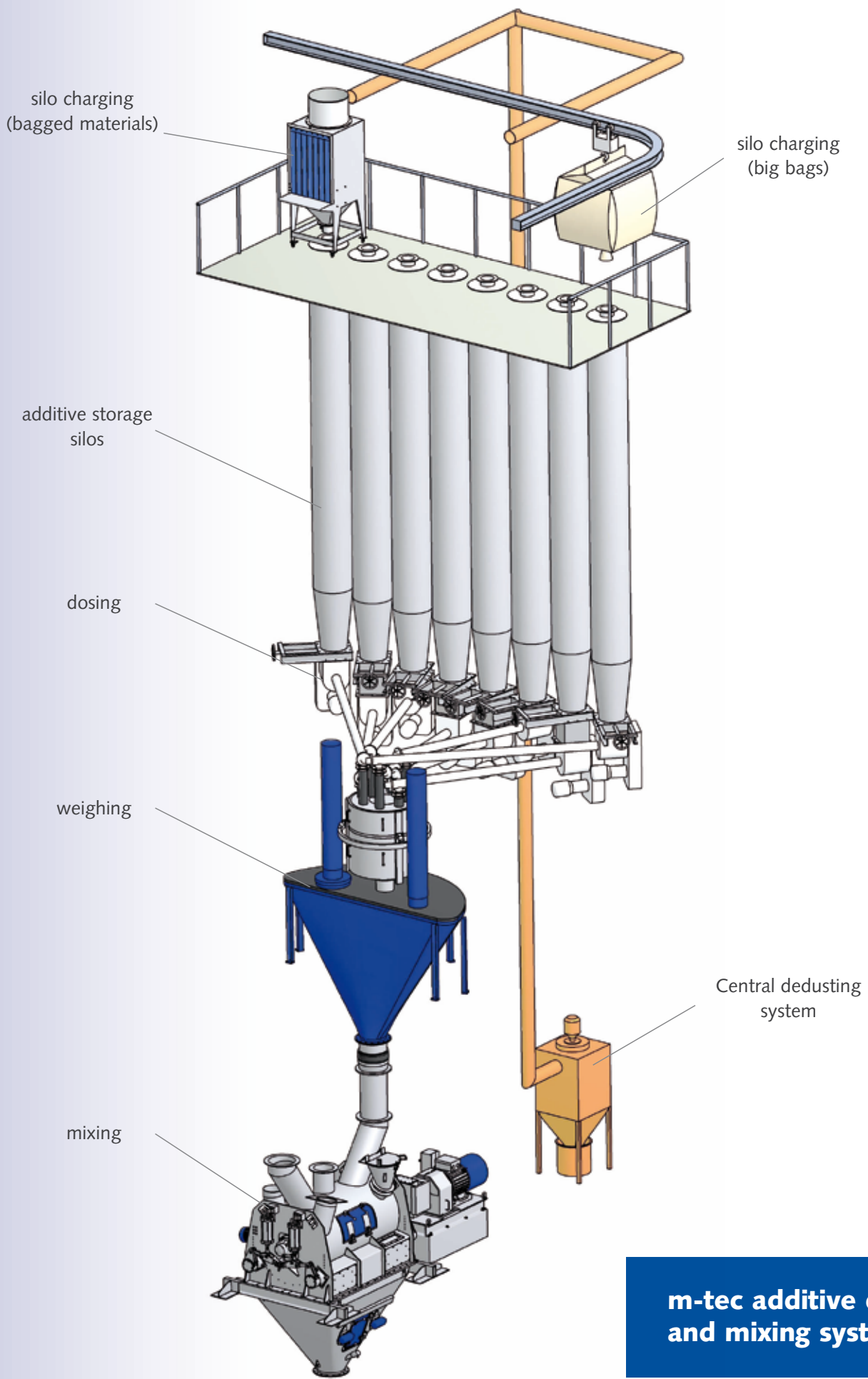
The zones 1 and 21 could occur in the following cases:

- at the feeding hoppers when they are used to recharge the additives silos at regular intervals
- inside the main mixer of the tower mixing plant

The zones 2 and 22 could occur in the following cases:

- near the main mixer
- in the additives stores

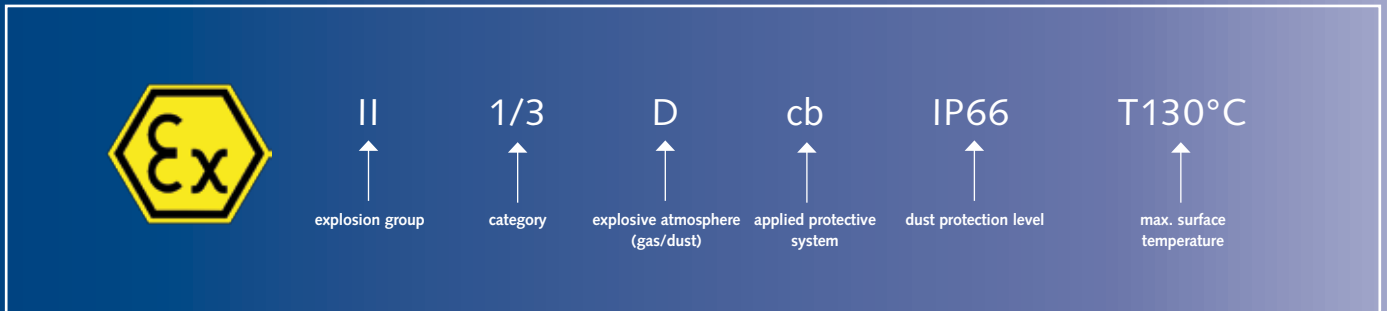
We recommend analysing the production process for a precise classification into zones.



m-tec additive dosing and mixing system

How do I know if equipment is suitable?

An example ATEX code for dust:



Equipment approved for use in ATEX zones are divided into categories: the lower the category, the greater the protection provided. The type of forming atmosphere is

described by the following letter: "G" for gas or "D" for dust.

Category	1		2		3	
Forming atmosphere	G	D	G	D	G	D
Suitable for zone	0,1 und 2	20, 21 und 22	1 und 2	21 und 22	2	22

In addition to the category and type of atmosphere, with dust you must also consider the temperature classification and the dust protection level. Depending on

its complexity, the equipment may exhibit several different zones (e.g. inside and outside).

Do you need assistance?

Whether you are intending to upgrade an old installation (e.g. with a new mixer) or are planning an all new plant, m-tec is your competent ATEX consultant.

Our equipment and machinery fulfil the highest demands and ensure the highest level of safety.

m-tec today is the technology of tomorrow.

What does the m-tec need to know from me?

If we are to design your machinery and plant correctly, we must first know the zones they are to operate in. The safety measures for Zone 20 are different to those for Zone 21, and these in turn are different to those for Zone 22. Zone 20 work involves potentially great danger, so the machinery and plant used in this zone must be subjected to type tests before approval by a “+notified body”.

In addition to the intended zones, we also need details on the planned raw materials.

Of particular interest are the ignition temperature, glowing temperature, lower explosive limit, and dust explosion class. Most of these details can be found in the “Physical and chemical properties” section on the manufacturer’s data sheets.

**For a better overview, you can use the table below:
Please enclose the data sheets for the raw materials with your request.**

Raw materials table	1	2
Manufacturer		
Commercial name		
Product number		
CAS number		
Type/use		
Revision date ¹		
Minimum ignition energy (MIE) [mJ] ²		
Ignition temperature [°C] ³		
Autoignition temperature [°C]		
Glowing temperature [°C]		
Flash point [°C]		
Autodecomposition point [°C]		
Dust explosion class [St]		
Dust explosion constant [barxm/s]		
Max generated pressure (pmax) [bar]		
Lower explosive limit (UEG) [g/m ³]		
Upper explosive limit (OEG) [g/m ³]		
Average particle size [µm] ⁴		
Critical oxygen concentration [vol.-%]		
Electrically conducting [yes / no]		

¹ Max three years old. New safety data sheets are available from the raw materials supplier. ² With/without induction
³ Specify the method, e.g. Godbert-Greenwald (G-G) or BAM-oven (BAM). ⁴ Specify the method, e.g. VDI.

+Notified body

Notified bodies of the European Union are neutral, independent organisations that an EU member state has accredited to assess the conformity of products in the free movement of goods.

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