

MOLLET

provides:

Level measuring devices and silo equipment for the potentially explosive atmospheres



with **ATEX** certification:

 **II 1D** or

 **II 1/2D** or

 **II 1/3D**

Level measuring devices and silo equipment for the potentially explosive atmospheres



+



with **ATEX** certification:

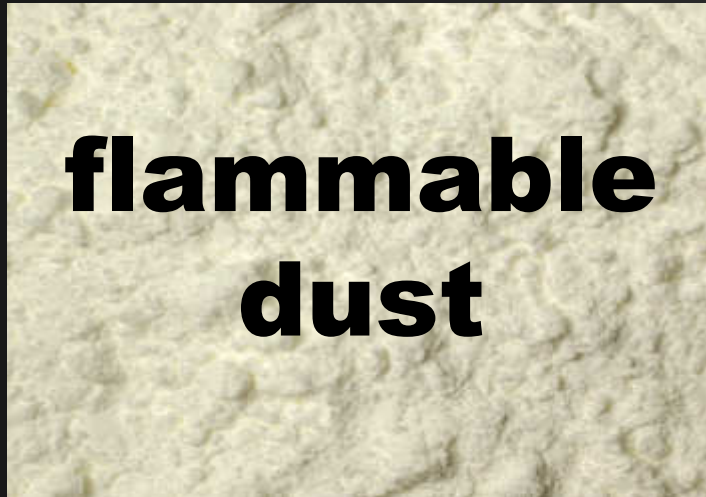


II 2G IIC or



II 1/2G IIC

Level measuring devices and silo equipment for the potentially explosive atmospheres



+



= hybrid mixtures

with **ATEX** – certification:



II 1GD/-c IIC

or



II 1GD/2GD c IIC

Level measuring devices and silo equipment for
potentially explosive atmospheres with

**deviant
atmospheric conditions**

Vessel pressures from - 80 mbar up to + 80 mbar

Low pressure caused by aspiration or high pressure caused by
filter resistance during pneumatic filling.

MOLLET – Rotary blade level indicators are certified for this
pressures !!!

Level measuring devices and silo equipment for
potentially explosive atmospheres with

**not atmospheric
conditions**

with bulk goods temperatures up to **+ 260 °C**

with the **ATEX** - approved
temperature decoupling bell housing
for all categories in gas and dust atmospheres.

Level measuring devices and silo equipment for
potentially explosive atmospheres with

**not atmospheric
conditions**

with vessel- (process-) pressures from

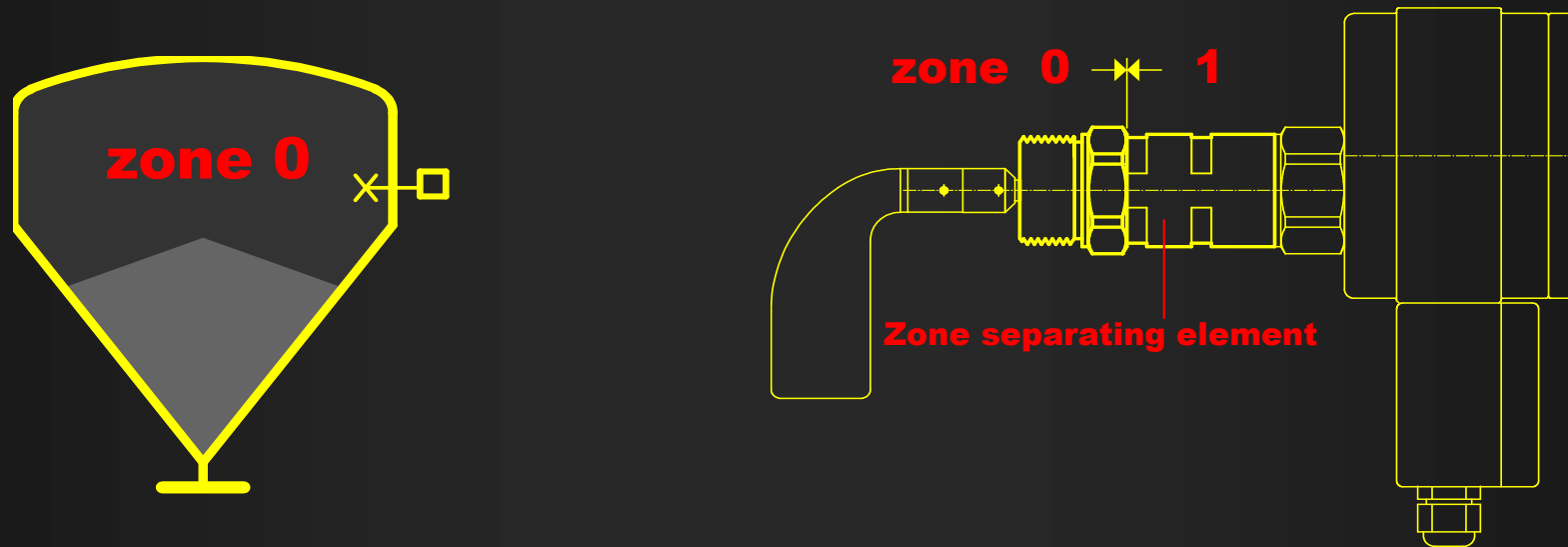
- 0.9 bar up to +10 bar

with the **ATEX** - approved

pressure decoupling bell housing
for all categories in gas and dust atmospheres.

Level measuring devices and silo equipment for potentially explosive atmospheres with

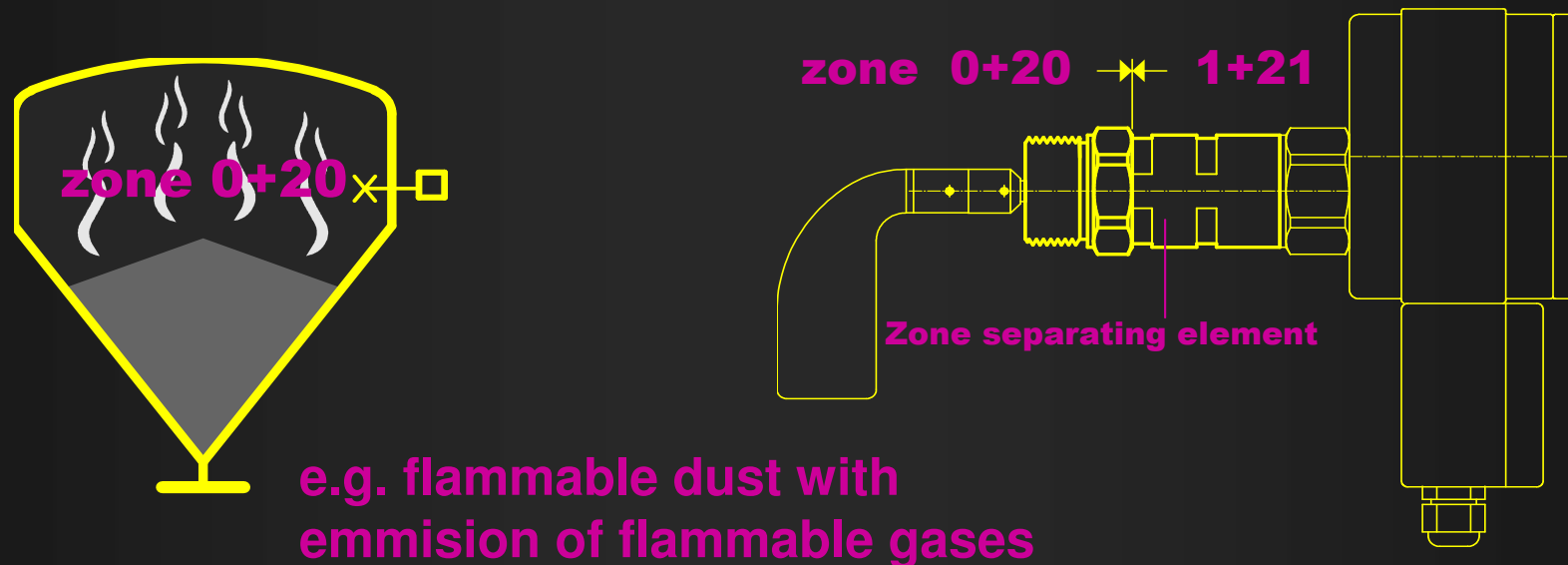
zone 0



with the **ATEX** - approved
zone separating element Ex II 1/2G
for flammable gases.

Level measuring devices and silo equipment for
potentially explosive atmospheres with

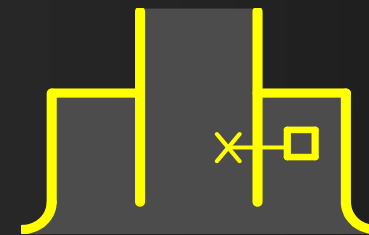
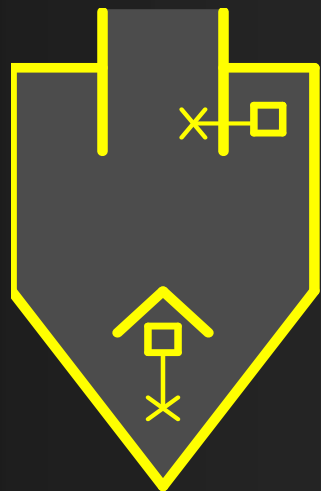
hybrid mixtures

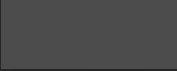


with the **ATEX** - approved
zone separating element Ex II 1GD/2GD
in flammable dust with flammable gases.

Level measuring devices and silo equipment for **complete** mounting in potentially explosive atmospheres with

zone 20



 = zone 20
(flammable dust)

with **ATEX** – certification:

 **II 1D**

ATEX

**has to be used by
atmospheric conditions:**

Total pressures from **0.8 bar** up to **1.1 bar**

Ambient temperatures from **- 20 °C** up to **+ 60 °C**

The atmospheric conditions:

Total pressures from 0.8 bar up to 1.1 bar (absolute)

- - - equates - 0.2 bar up to 0.1 bar - - -

are **no** vessel pressures and have nothing to do with high or low pressures inside of the vessel.



These conditions are weatherrelated pressure differences caused by e.g. high-pressure and low-pressure areas.

Hence the name: „atmospheric conditions“
generated by the atmosphere.

The atmospheric conditions:

Ambient temperatures from - 20 °C up to + 60 °C
are **no** process temperatures.

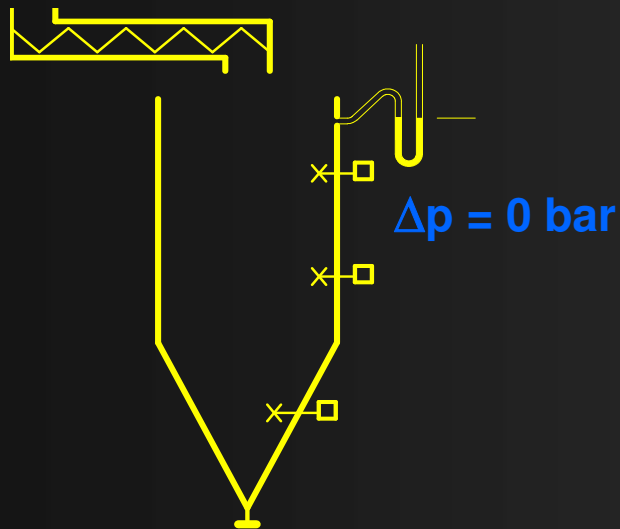


These conditions are temperature differences caused by the weather.

Hence the name: „atmospheric conditions“
generated by the atmosphere respectively by the climate.

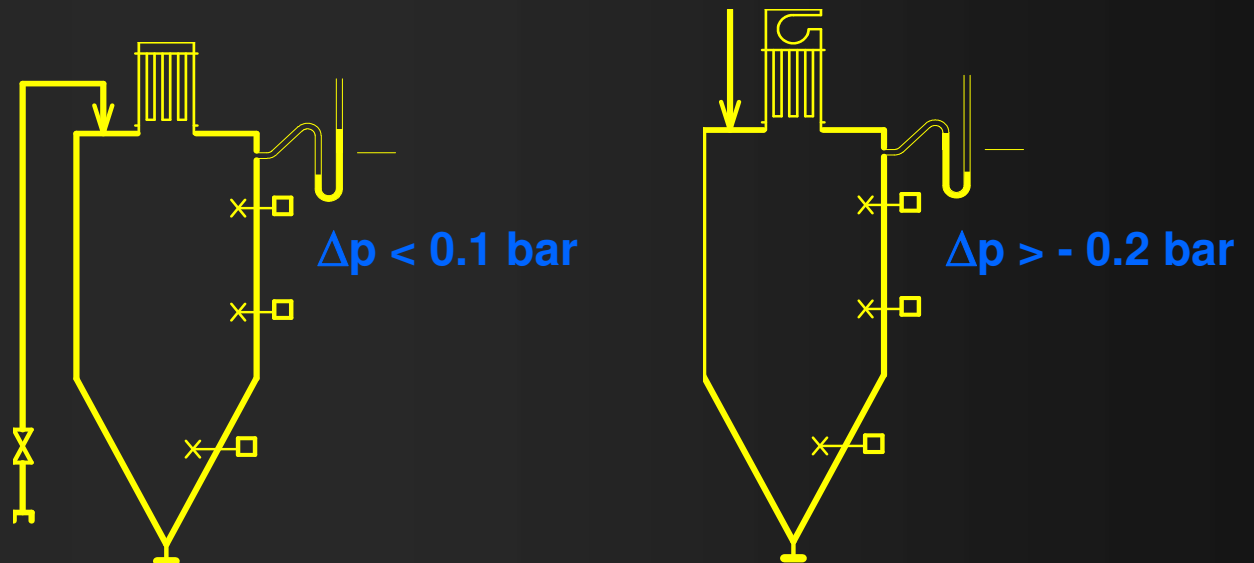
? what are

deviant atmospheric conditions



In open vessels prevail inside as well as outside atmospheric conditions.

(pressure equalization)



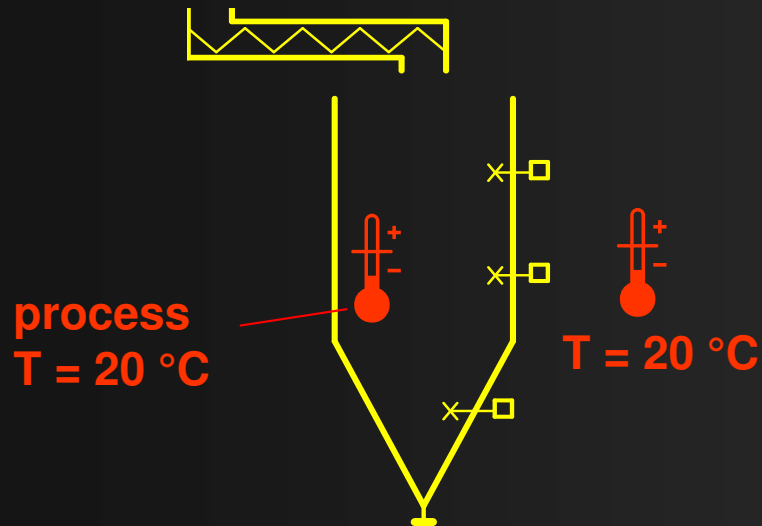
If high pressure from 0 up to 0.1 bar or low pressure from 0 up to -0.2 bar

exist inside the vessel than are these

deviant atmospheric conditions.

? what are

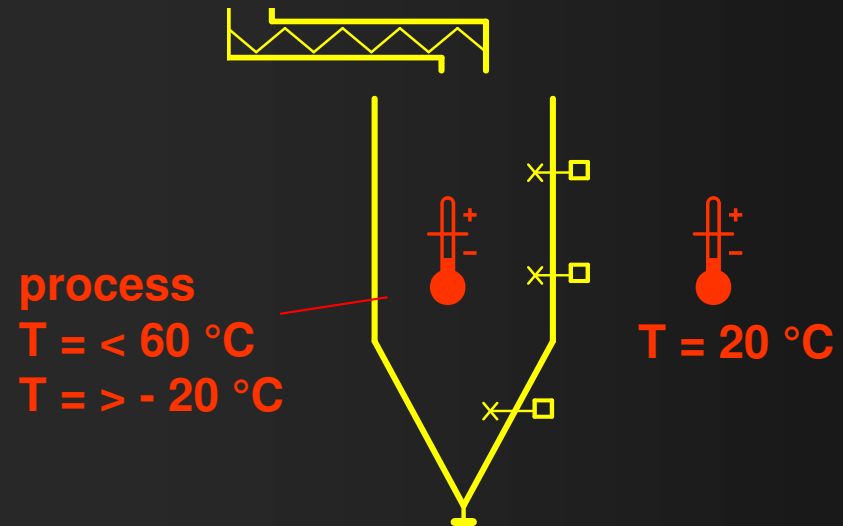
deviant atmospheric conditions



Same temperature inside of the vessel and outside

=

inside and outside atmospheric conditions



Higher or lower temperature in the vessel than outside (ambient) but still inside the temperature range from - 20 °C up to 60 °C

=

inside deviant atmospheric conditions.

? what are not atmospheric conditions

Vessel pressures above 0.1 bar
Vessel low pressures below - 0.2 bar
(process pressures inside of vessels)

=

not atmospheric conditions

ATTENTION!!! The explosion pressure increased by the vessel pressure.

? what are not atmospheric conditions

**Ambient- and/or
mixed temperatures
below - 20 °C or
above + 60 °C**

=

not atmospheric conditions

ATTENTION!! In dusty environments the minimum ignition energy fall from e.g. 100 mJ at 20 °C to 2 mJ at 200 °C.

? what are

hybrid mixtures

That are explosive mixtures of flammable gases, vapour or mists in combination with flammable dust.

Hybrid mixtures are so dangerous as they need less ignition energy and are higher explosive than the particular gas or dust for each alone.

Operating equipment for potentially explosive atmospheres with hybrid mixtures need special approvals for the use in such atmospheres.

? what is a

hazardous area

An area where dangerous explosive atmosphere could occur.

An area where explosive atmosphere in not to be expected in a dangerous quantity does not apply as hazardous area.

Operating equipment for hazardous areas is proofed for the use in

potentially explosive atmosphere

? what is a

dangerous potentially explosive atmosphere

- **potentially explosive atmosphere**
- **in dangerous quantity**

**Operating equipment for hazardous areas is
proofed for the use in**

potentially explosive atmosphere

? what is a

potentially explosive atmosphere

A potentially explosive atmosphere is a mixture of air and flammable gases, vapour, mists and/or dust under atmospheric conditions, in which after ignition has occurred, combustion spreads to the entire unburned mixture.

**Operating equipment for hazardous areas is
proofed for the use in**

potentially explosive atmosphere

? what is a

dangerous quantity

In explosion-endangered manufacturing facilities the presence of a dangerous quantity is expected, when

- in enclosed rooms more than 10 liter or**
- in rooms $< 100 \text{ m}^3$ more than $1/10000$ of the room volume**

**of potentially explosive atmosphere
could coherently arise.**

? What is

flammable dust

means dust, fibers or suspended particles which can burn or glow in the air and could explode in atmospheric conditions .

? what is

dust

consists of very small and finely divided dust particles of any shape, structure and density with a particle size of less than 500 μm in the atmosphere. These particles settle due to their own weight, but remain airborne as a dust/air mix for a time. They have an increased reactivity and a lower thermal conductivity due to the large specific surface area. Products like powder, flours and similar (e.g. Aluminium powder, wheat flour or powdered sugar) are included.

Settled, flammable dust could cause glow and smoldering fires after ignition.

Dispersed dust/air mixtures could be the reason for deflagration and dust explosions after ignition.

? what means

ATEX

The term ATEX stand for the French abbreviation of
ATmosphère EXplosive.

ATEX is used as a popular synonym for the ATEX directive of the
European union.

This directive actually contain two European guidelines for explosion
hazards under atmospheric conditions, namely the

ATEX product guideline 94/9/EG

and the

ATEX operation guideline 1999/92/EG

? What is it for

ATEX product guideline 94/9/EG

The ATEX product guideline 94/9/EG (although named "ATEX 95") is relevant for **equipment and protective systems.**

It set the rules for the placing on the market of products intended for use in **potentially explosive atmospheres .**

Primary purpose of the guideline is the protection of persons, that are working in potentially explosive atmospheres or could be affected by explosions.

The guideline contain essential health and safety requirements that have to be observed by the manufacturer and verified through appropriate **conformity assessment procedures.**

? What is it for

ATEX product guideline 94/9/EG

The guideline contain essential health and safety requirements that have to be observed by the manufacturer and verified through appropriate conformity assessment procedures.

The products have to be marked with the



sign.

? What is it for

ATEX operation guideline 1999/92/EG

The ATEX operation guideline 1999/92/EG (although named "ATEX 137") defines the minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.

In the context of a risk assessment the employer has to create an explosion protection document and areas with potentially explosive atmospheres have to be divided into zones.

The areas with potentially explosive atmospheres have to be marked with the warning triangle:



? What is it for

ATEX operation guideline 1999/92/EG

The guideline includes additionally basic safety requirements which the plant operator/employer has to implement.

That includes:

- 1. Avoiding or limiting the generation of explosive atmosphere (primary explosion protection)**
- 2. Avoiding of effective ignition sources (secondary explosion protection)**
- 3. Limitation of the effect of probable explosion to a harmless level (tertiary or constructive explosion protection)**



**1,5 kg pulverized brown coal
distributed in the air at the testing area of IBExU**



and ignited as a dust explosion on 28.09.2006



caused a fire ball with a diameter of 15 m.