

TERMS



ATEX stands for ATmosphere EXplosible. In English: Explosive atmosphere.

An explosive atmosphere can be formed, when fumes, gases, dust or a mist of fine drops are mixed with air in the right concentration. Manufacturers construct and manufacture according to Directive 2014/34/EU that concerns explosion protection of equipment that may be used, where an explosive atmosphere may occur.

Equipment category below will be within group "II", which is equipment that is not covered by equipment for mines under ground:

Gas: Under normal temperatures / pressure

ATEX zone	Areas / time	Equipment category
Zone 0	Area, where continuing, frequently or for a longer time an explosive atmosphere consisting of a mix of air and flammable gas, fume or mist can be.	1, G
Zone 1	Area, where under normal operation an explosive atmosphere consisting of a mix of air and flammable gas, fume or mist occasionally can occur.	1 or 2, G
Zone 2	Area, where under normal operation an explosive atmosphere consisting of a mix of air and flammable gas, fume or mist does probably not occur, and if should occur, it will be of short duration.	1, 2 or 3, G

Gas group:

Every explosive atmosphere has specific explosion properties that depend on the explosive matter. Therefore gases and fumes are divided into explosion groups. The danger is increased from IIA to IIC. See example here:

IIA - Ethyl alcohol, petrol, propane, diesel

IIB - Bygas, ethylene

IIC - Hydrogen, acetylene

Temperature class for electrical material:

Ignition temperature for an explosive atmosphere is the lowest temperature, by which an ignition is possible. This temperature depends on the dangerous matter.

Temperature class	Ignition temperature	Example
T1	$\geq 450^{\circ}\text{C}$	Propane, lighter gas, hydrogen
T2	$\geq 300^{\circ}\text{C}$	Ethyl alcohol, ethylene, acetylene
T3	$\geq 200^{\circ}\text{C}$	Fuel
T4	$\geq 135^{\circ}\text{C}$	Acetaldehyde, ethyl ether
T5	$\geq 100^{\circ}\text{C}$	
T6	$\geq 85^{\circ}\text{C}$	Carbon disulfid

Dust:

(Please, note: Aerosols are also included by dust demands)

ATEX zone	Areas / time	Equipment category
Zone 20	Area, where continuing, frequently or for a longer time an explosive atmosphere consisting of a cloud of flammable dust and air can be.	1, D
Zone 21	Area, where under normal operation an explosive atmosphere consisting of a cloud of flammable dust and air occasionally can occur.	1 or 2, D
Zone 22	Area, where under normal operation an explosive atmosphere consisting of a cloud of flammable dust and air does probably not occur, and if should occur, it will be of short duration.	1, 2 or 3, D

Important choices at filter unit dimensioning:

To be able to dimension and place a unit the information of Kst, Pmax, dust type determination and relief conditions is important.

Kst-value is an expression of explosion aggressivity (bar m/sec):

ST-class	Kst
ST1	Kst-value less than 200 bar m/sec.
ST2	Kst-value between 200 and 300 bar m/sec.
ST3	Kst-value more than 300 bar m/sec.

Pmax value describes the maximum pressure build-up at an explosion (Bar).

Filter unit from Gram Clean Air A/S is standard zoned for:

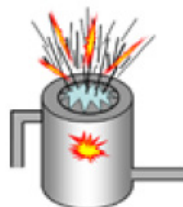
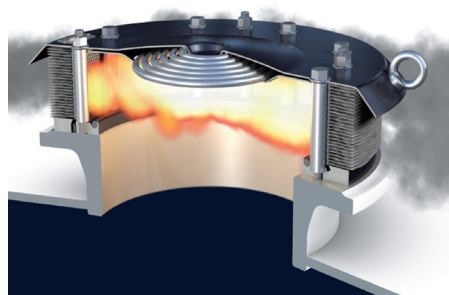
- Kst 300 bar m/sec (ST2)
- Pmax 10 bar
- Pstat 0.1 – 0.2bar (dependent on unit and relief type)
- Pred 0.4bar

Gram Clean Air A/S can deliver the following 3 types ATEX-filter unit:

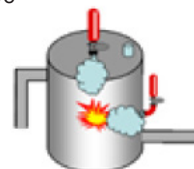
- Relief to the outside by explosion membrane
- Indoor flame-free relief
- Explosion suppression by detection and extinguishing

The curve below shows the difference between relief / suppression or accumulation of energy during the explosion that will cause an uncontrolled rupture with risk of harm to the environment.

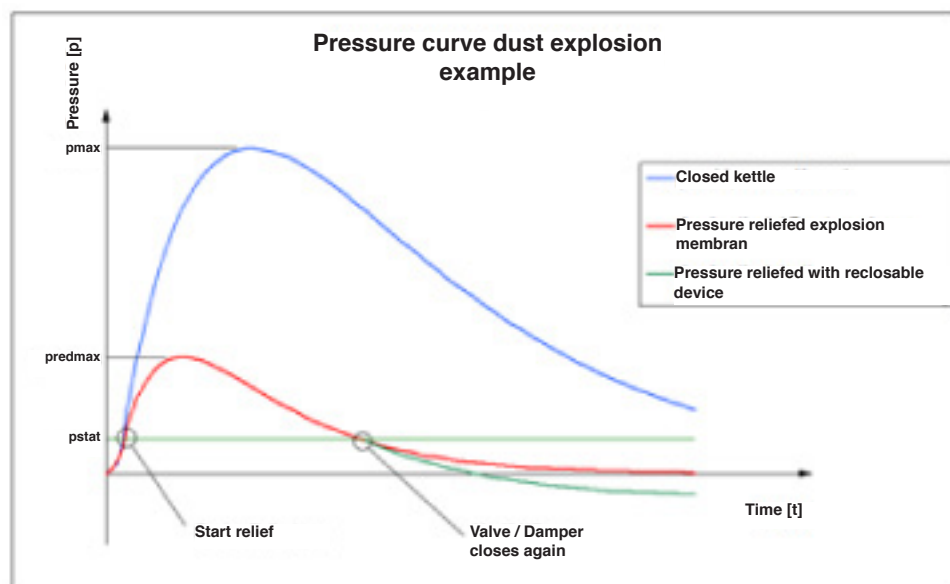
With correct safety equipment and correct dimensioning the explosion would be able to relief within the normal area of the unit.



Relief:
By membrane or flame-free
Hörbiger-valve



Suppression:
By detector and
extinguishing



ATEX

Important choices at fan dimensioning:

Be aware that the clean air side of all our filter units (dust explosion) always is zone 22, so therefore ATEX zone 22 fan must be selected.

Our electro motors are as standard approved and marked for:

Motor for ATEX zone 22: II 3D Ex – IIB T120°C
Motor for ATEX zone 1: II 2G Exe – IIC T3 / II 2G Exde IIC T4
Motor for ATEX zone 2: II 3G Ex – IIC T3

All our ATEX-fans for GAS are with motors for Gas group IIC



Generally




All equipment and machines that are used in connection with ATEX-zones must be potential equalized to approved earthing point in the company to avoid sparks from static electricity.

Connection must be approved < 200 Ohm. In units the bonding circuit must max. have a resistance of 50 Ohm, Gram components 2 - 30 Ohm. Unit surface resistance to earthing must be less than 1G Ohm.

Further info to ATEX:

For further information regarding ATEX and Gram products we refer to Gram Training Center.
Course program: see www.GramCleanAir.com or write to sales@GramCleanAir.com

Construction and marking:

Category 1	Category 2	Category 3
		
ZONE 20 (D) ZONE 0 (G)	ZONE 21 (D) ZONE 1 (G)	ZONE 22 (D) ZONE 2 (G)

Categories:

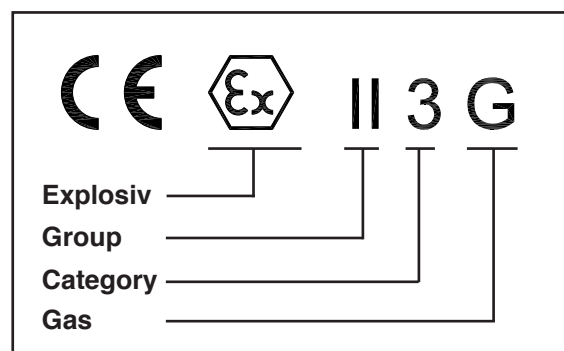
Category 1: Gram Clean Air A/S does not deliver unit for category 1
Category 2: Gram Clean Air A/S delivers all ATEX-products in product range
Category 3: Gram Clean Air A/S delivers all ATEX-products in product range



See group 10

Gram Clean Air A/S meet following legal demands:

EU directive 2006/42/EC (Machinery directive)
EU directive 2014/34/EU (ATEX directive)
EN 1127-1: 2019
ISO 80079-36: 2016
EN 50281-3: 2004
IEC 60034-(1)-(5)-(6)-(7)-(9)-(14)
ISO 13857: 2019
ISO 12100: 2011
EN 60204-1: 2018
EN 60079-14 (2014-04-02)
EN 60079-31 (2014-07-22)



CE-marking example for ATEX



Gram Clean Air A/S
www.GramCleanAir.com