

Our products have been approved by many different certification authorities.  
 HUMMEL AG is a certified manufacturer and supplier of electro-mechanical devices.

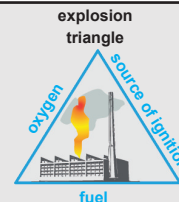


### What is an explosion?

For an explosion to occur, three conditions must be fulfilled; see the explosion triangle diagram.

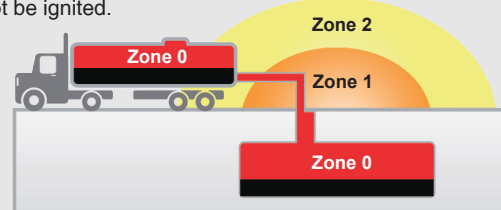
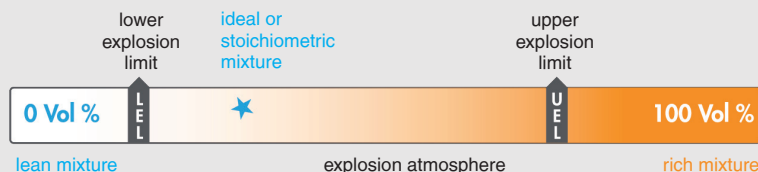
1. Fuel
2. Oxygen
3. Source of Ignition

By eliminating one of these three conditions, an explosion cannot occur.



### Potentially Explosive Atmosphere

A potentially explosive atmosphere is understood to be a mixture of a combustible material and oxygen. Oxygen is generally present as a component of air. Combustible materials can be gases, fluids, vapors, mist or dusts. If the proportion of oxygen falls below a certain value dependent on the material, known as the oxygen limit concentration, then this mixture cannot be ignited.



#### European Zones / IEC / CENELEC / ATEX Classification

#### Definition of Zone or Division

#### North American Classification

<b>Zone 0 (Gases)</b>	Relates to areas in which a potentially explosive atmosphere consisting of a mixture of air and gases, vapors or mist exists continuously (Zone 0), or a mixture of dust and air exists continuously (Zone 20) for long periods or frequently	<b>Class I, Division 1 (gases)</b>
<b>Zone 20 (Dust)</b>		<b>Class II, Division 1 (dust)</b>
<b>Zone 1 (Gases)</b>	Relates to areas in which a potentially explosive atmosphere of gases, vapors or mist (Zone 1) or a mixture of dust and air (Zone 21) occurs occasionally	<b>Class I, Division 1 (gases)</b>
<b>Zone 21 (Dust)</b>		<b>Class II, Division 1 (dust)</b>
<b>Zone 2 (Gases)</b>	Relates to areas in which it is unlikely that a potentially explosive atmosphere of gases, vapors or mist might occur (Zone 2) or (note the difference between conductive and non-conductive dust!) relates to areas in which it is unlikely that a potentially explosive atmosphere of suspended dust might occur (Zone 22), but if it does, only seldom and for a short period of time	<b>Class I, Division 2 (gases)</b>
<b>Zone 22 (Dust)</b>		<b>Class II, Division 2 (dust)</b>
		<b>Class III, Division 1 (fibers)</b>
		<b>Class III, Division 2 (fibers)</b>

### Apparatus Group and Device Category EPL

#### Group I Mining

- M1 High Degree of Safety EPL Ma
- M2 High Degree of Safety EPL Mb

#### Group II Non-Mining

- 1 Very High Degree of Safety
  - Gas (Zone 0, 1, 2) EPL Ga
  - Dust (Zone 20, 21, 22) EPL Da
- 2 High Degree of Safety
  - Gas (Zone 1, 2) EPL Gb
  - Dust (Zone 21, 22) EPL Db
- 3 Normal Degree of Safety
  - Gas (Zone 2) EPL Gc
  - Dust (Zone 22) EPL Gc

### Gases and Dust

Gas		Dust	
IIA	Propane	IIIA	Combustible Dust
IIB	Ethylene	IIIB	Non-Conductive Dust
IIC	Hydrogene	IIIC	Conductive Dust

### Temperature Classes

Temperature Class	Highest Permissible Surface Temperature of the Operating Facility	Ignition Temperature of Combustible Materials
T1	450°C	> 450°C
T2	300°C	> 300°C < 450°C
T3	200°C	> 200°C < 300°C
T4	135°C	> 135°C < 200°C
T5	100°C	> 100°C < 200°C
T6	85°C	> 85°C < 100°C

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