Selecting the Right Explosion-proof Fan for Hazardous Environments

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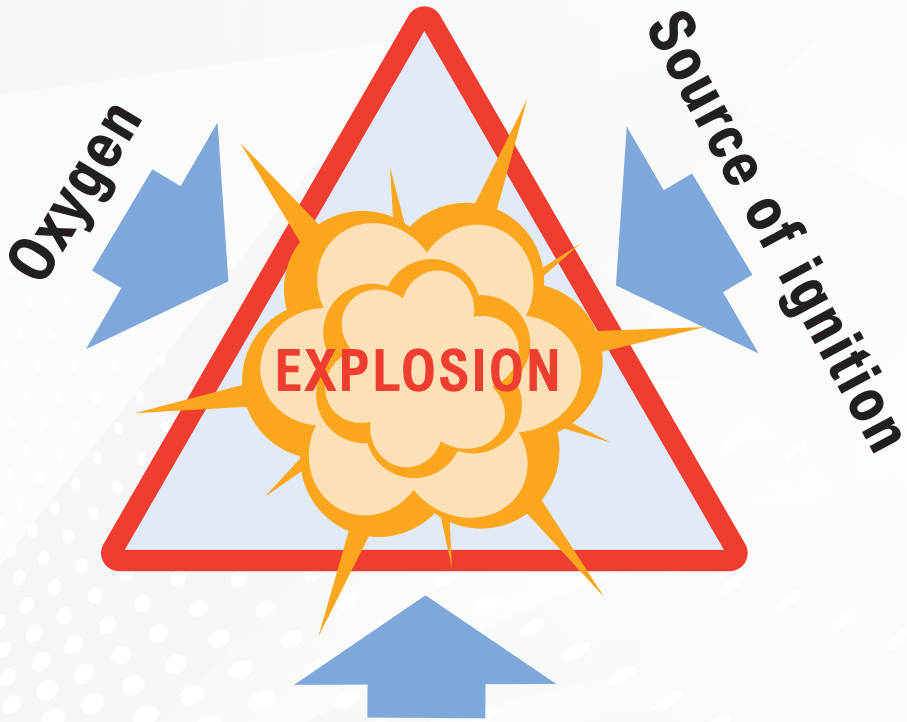
Why **venting** is necessary in **O&G** field process industries, storage industries etc.?

For an explosion to occur, the following three factors are to be present at same point of time. These are extremely likely to occur in Oil & Gas, process industries and hazardous storages.



Effective ventilation reduces the chance of occurrence of them together and when selecting ventilation system, it should be ensured that they are suitable for the application and area served.

Explosive atmosphere are always being created

If flammable substances are involved, there is always the danger that an explosive atmosphere can form during production, storage, processing and transport.

Application examples	Process	Substances / gases
Refinery 	Production of various products that are liquid, solid or gaseous	Explosive gas mixture
Hazardous materials room 	Storage of explosive liquids and gases	Explosive gas mixture
Paint Shop 	Formation of explosive mixtures in the painting process	Explosive gas mixture
Electro-chemical processes 	Formation of explosive mixtures in electrochemical process	Explosive gas mixture
Petrol station 	Leakage of petrol vapors at the petrol pump	Explosive gas mixture

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How to select the **Right Explosion-proof Fan Model**

1. Understand the Application and Environment served.

Explosion proof fans are classified in accordance with the severity of hazardous environments served by them and their specifications varies accordingly. The classification is typically determined by following parameters:

- **Group -** Defines the location of use

I - Mining & underground

II - All other sectors

- **Class -** Defines the type of material present.

G - Flammable gases or vapors

D - Combustible dust

- **Category -**

Category 1 - Needs very high level of protection.

Category 2 - Needs high level of protection.

Category 3 - Needs normal level of protection.

- **Division/Zone -** Defines the likelihood of hazardous material being present.

Zone 0/20 - Continuously present or present for longer periods

Zone 1/21- Could happen under normal operating condition

Zone 2/22 - Unlikely to happen during normal operating conditions, however contamination risks persist.

Selecting the category on the basis of the zone:

ZONE	CATEGORY
0 or 20	1
1 or 21	1 or 2
2 or 22	1,2 or 3

Selecting the zone on the basis of the category:

CATEGORY	ZONE
1	All
2	1,21, 2 or 22
3	2 or 22

Zone	Aggregation state of the flammable substance	Frequency of occurrence of explosive atmosphere	Requirement	Equipment Protection Level	Equipment Category	Equipment Group
0	**Gas, vapor, mist**	perpetual, long-term or frequent	very high degree of safety	Ga	1G, (1)G	II
1	**Gas, vapor, mist**	occasional	high degree of safety	Gb	2G, (2)G	II
2	**Gas, vapor, mist**	infrequent and brief	normal degree of safety	Gc	3G, (3)G	II
20	**Dust**	perpetual, long-term or frequent	very high degree of safety	Da	1D, (1)D	II
21	**Dust**	occasional	high degree of safety	Db	2D, (2)D	II
22	**Dust**	infrequent and brief	normal degree of safety	Dc	3D, (3)D	II

• Gas Group -

Gases are classified according to the ignitability of the air gas mixture as defined in EN/IEC 60079-20-1

Explosion Group and Temperature Class						
Explosion Group	**Temperature Class**					
	T1	**T2**	**T3**	**T4**	**T5**	**T6**
II A	Acetone Ethane Ethylic acetate Ethyl chloride Ammoniac Benzene Acetic acid Carbon monoxide Methane Methanol Methyl chloride Propane Town gas Toluene	Amyl-i acetate Butane N-butyl alcohol Cyclohexane Dichloroethane 1, 2 Acetic anhydride	Petrol Otto fuels Aviation fuel Fuel oils Hexane	Acetaldehyde		
II B		Ethylic alcohol Ethylene Ethylene monoxide	Hydrogen sulphide			
II C	Hydrogen	Acetylene				Carbon disulphide

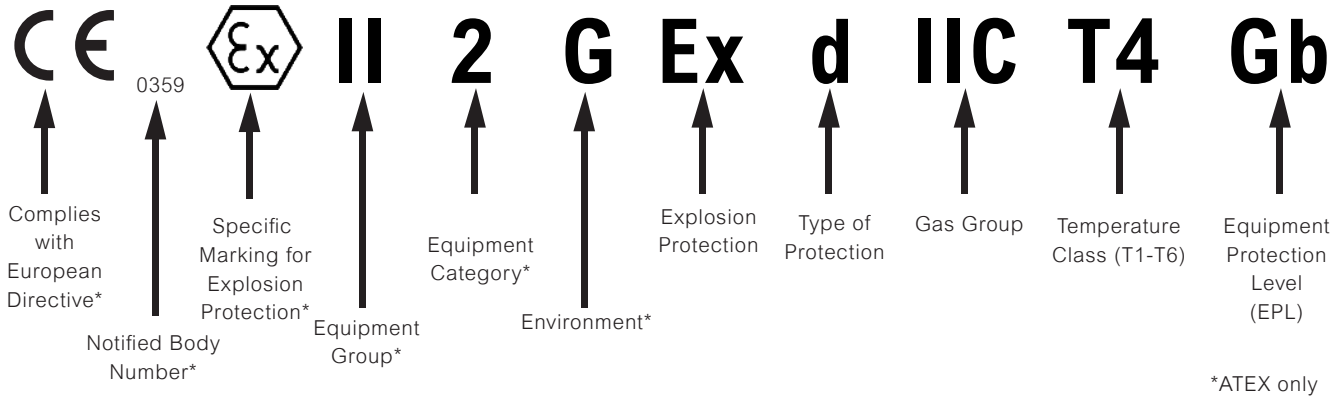
• Temperature Class -

The fans has to be selected to have temperature class below the ignition temperature of the flammable materials present so that they don't become an ignition source.

Explosion Group and Temperature Class	
Temperature Class	**Max Surface Temperature**
T1	>450 °C
T2	>300 °C
T3	>200 °C
T4	>135 °C
T5	>100 °C
T6	>85 °C

Decoding of Explosion-proof fan marking.

Typical ATEX and IECEx Marking



2. Match the Fan to the Hazardous Classification

Verify that the fan is certified for your specific hazardous location rating (e.g., ATEX Zone 1, Class 1 etc.) Ensure all fan components—including the motor and control system—meet these requirements.

- **ATEX** – European directive for equipment in explosive atmospheres
- **IECEx** – International Electrotechnical Commission system for certification

- **Axial Fans** – Ideal for high volume, low pressure applications
- **Centrifugal Fans** – Suitable for high pressure and ducted systems
- **Wall or Panel Mount Fans** – For confined spaces or direct exhaust

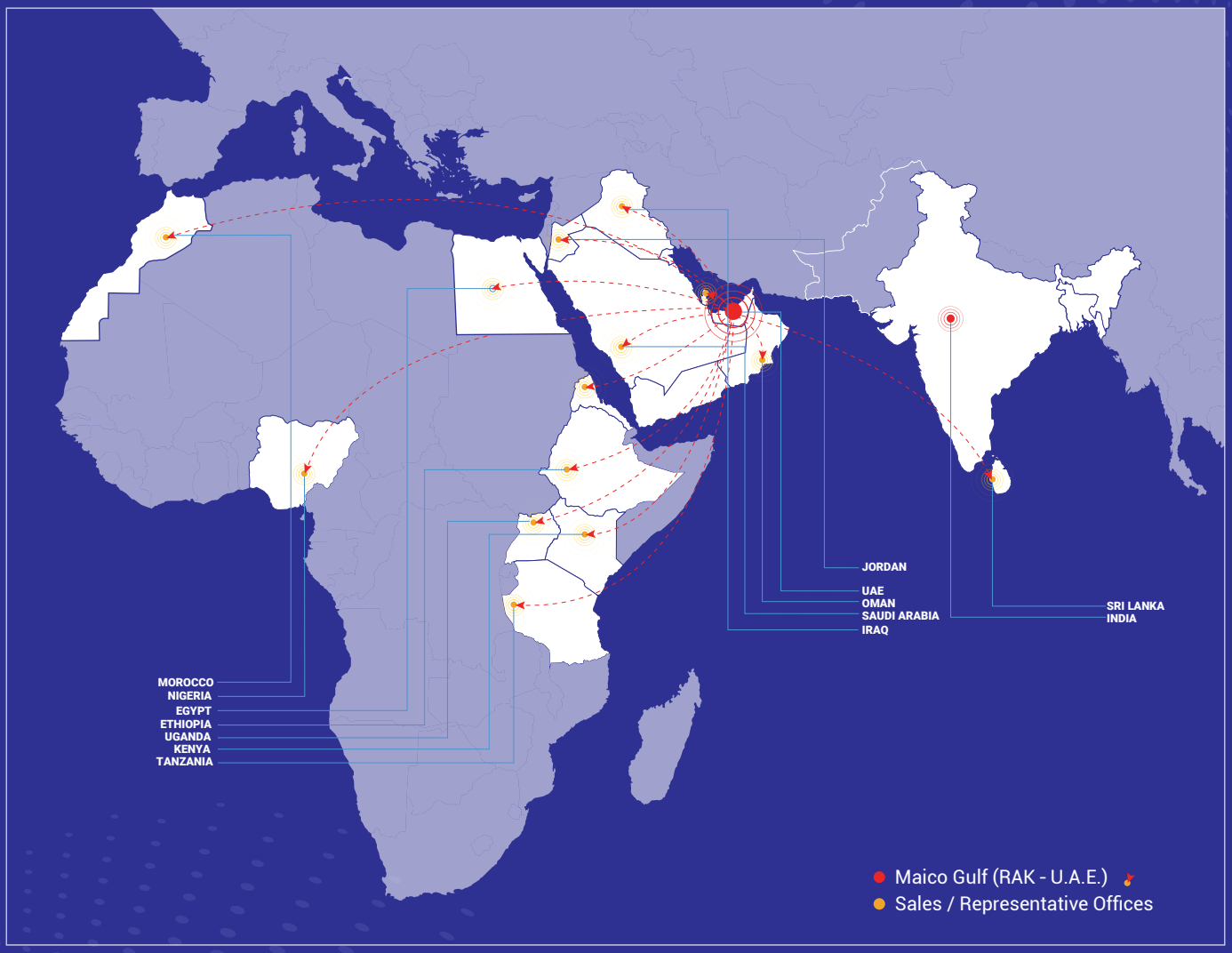
>450 °C	T1
>300 °C	T2
>200 °C	T3
>135 °C	T4
>100 °C	T5
>85 °C	T6

4. Verify Performance Specifications

- **Air Volume** – Volume of air the fan moves (CFM, CMH etc)
- **Static Pressure** – Resistance in the system the fan must overcome (Pa, in etc)
- **Noise levels** – For personnel safety and comfort.

Selecting an explosion proof fan involves more than just airflow capacity - it requires proper understanding of the hazardous environment, regulatory standards, and performance needs. By carefully considering these factors and working with certified manufacturers, you can ensure safe, efficient, and code-compliant ventilation in hazardous areas.

Worldwide Sales Network



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