

International Electrotechnical Commission System  
for Certification to Standards Relating to Equipment  
for Use in Explosive Atmospheres (IECEX System)



# IECEX Certification of Dust Collection System Assembly

**IECEX 2018**  
**International Conference**  
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# INTRODUCING

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**Fiditas**  
explosion safety solutions

## Target:

# IECEX certification of specific Equipment Assembly – Dust Collection System

## Challenges:

- Correctly address hazards and extent of these hazards prior to design and operation of assemblies containing explosive dust atmospheres
- The need to test explosive properties of dusts to securely identify explosion risk and mitigation measures
- Lack of product specific ISO/IEC standards

## **Background:**

Generation of finely divided flammable solid particles ( $<500 \mu\text{m}$ ) is a reality in a number of industries. Very fine particles ( $<63 \mu\text{m}$ ) produced in modern industries pose an additional threat.

**Dust Collection System is a common essential element in a facility's explosion risk management program.**

There is an interest from end-users and manufacturers/assemblers of such assemblies for recognized third party assessment - CERTIFICATION.

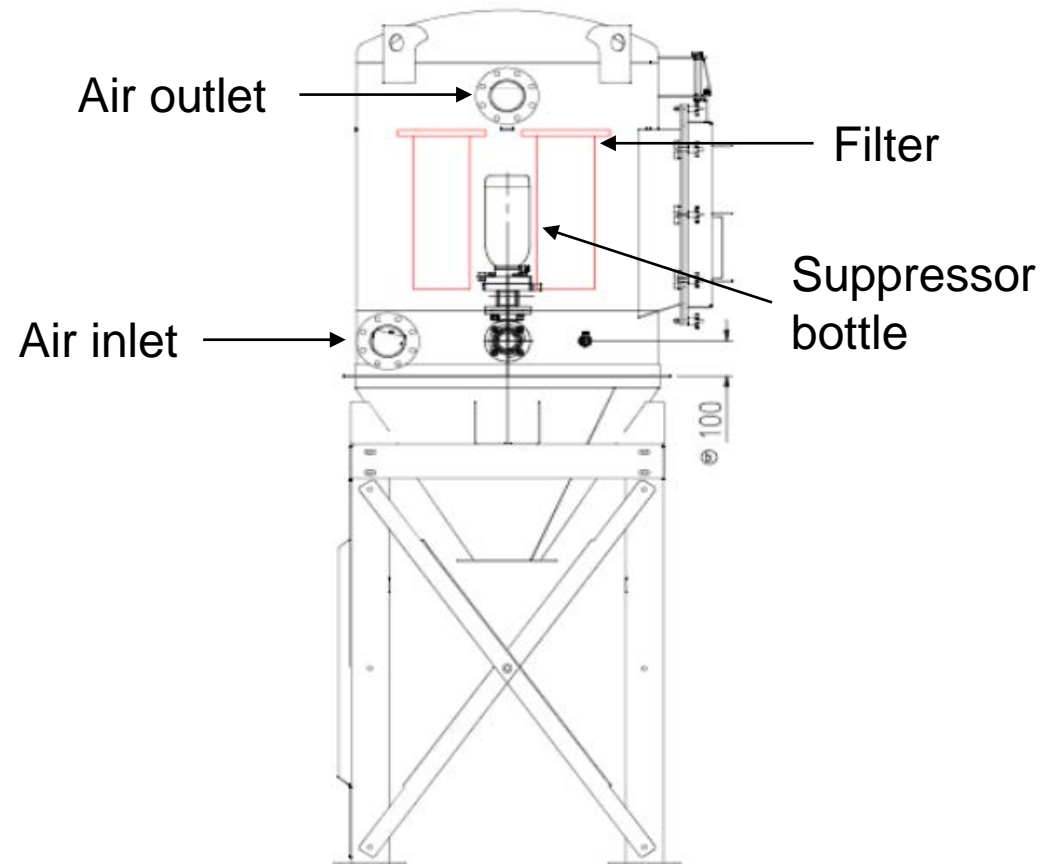
**IECEX is seen as reliable and globally recognized System providing confidence and additional value to certified product.**

# Equipment Assembly

## **Definition:**

Pre-manufactured combination of Ex Equipment, together with other parts as necessary, that are electrically or mechanically interconnected that are pre-assembled prior to being placed into service at the end-user site, and that can be disassembled and then re-assembled at the end-user site  
(IEC TS 60079-46:2017)

# Equipment Assembly - Dust Collection System

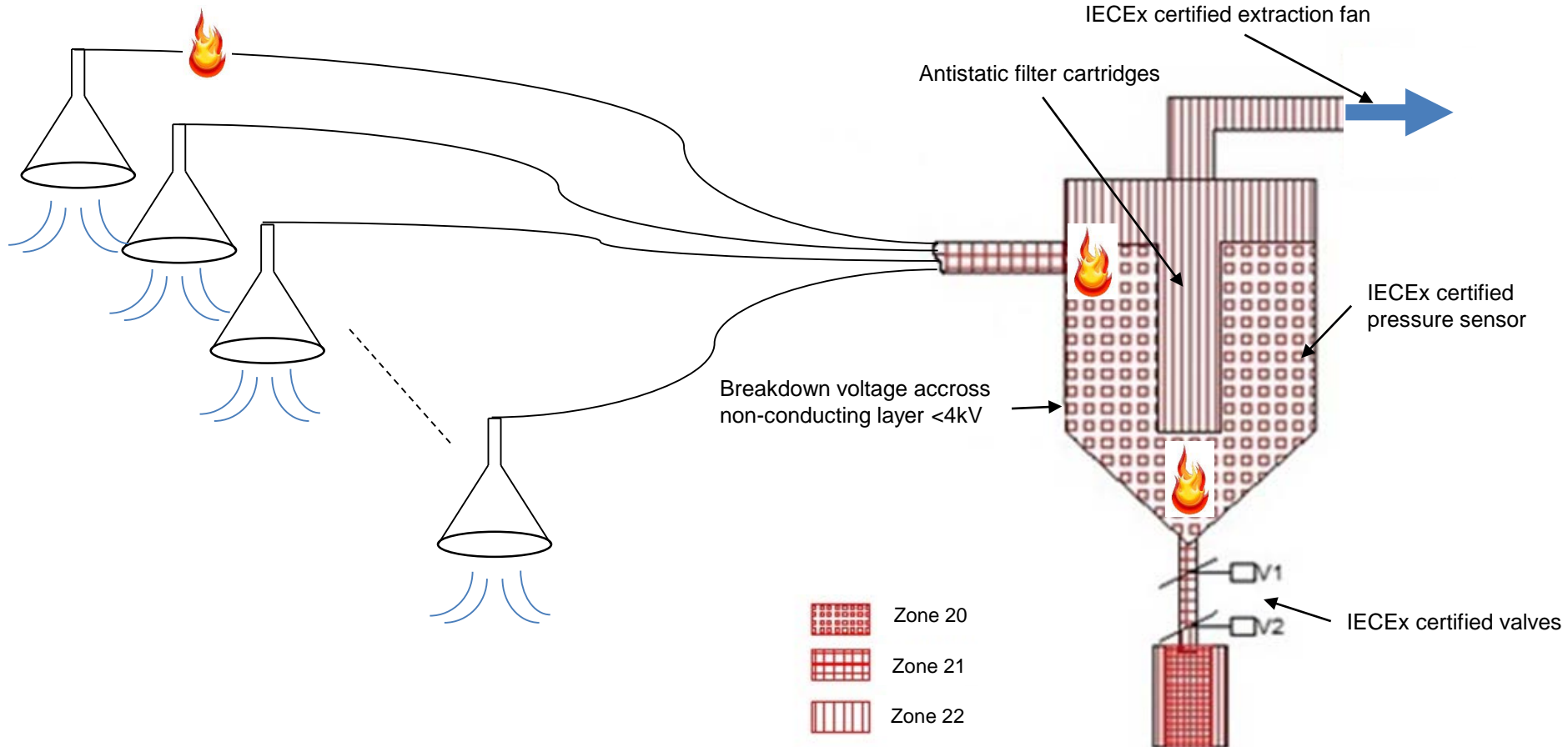


## Typical concerns:

- Hot, ignition capable particles arriving from hoods/pickup points
- Loose metal impacting inside the filter
- Exothermic reaction in the mixture (smoldering in the filter)
- Static charge relaxation between groups of particles with different level of charge (different charging mechanism, length and path design of ductwork, dust properties, one type of dust or different material mixture...)
  - Electrostatic brush discharge, propagating brush discharge or cone discharge



# Equipment Assembly - Dust Collection System



## Essential data to be determined

Laboratory testing results shall provide data for the **design and dimensioning of protective systems** to allow for the safe use of the final assembly – Dust Collection System.

### Laboratory testing:

- Dust group IIIA, IIIB or IIIC (conductive if  $\leq 10^3 \Omega\text{m}$ )
- Explosion Severity Test - ( $K_{St}$ ,  $P_{Max}$  and  $dP/dt_{Max}$ )
- Minimum Ignition Energy - (MIE)
- Minimum Explosible Concentration - (MEC)
- Minimum Ignition Temperature of a Dust Cloud - (MIT)
- Minimum Ignition Temperature of Dust Layer
- Limiting Oxygen Concentration - (LOC)

# Equipment Assembly - Dust Collection System

(ISO 80079-36 Ed.1)

If the only source of ignition of an item comes from the **external process** such items are not considered to have their own source of ignition, and they are **not in the scope** of this part of ISO/IEC 80079.

## Considerations:

Dust Collection System may contain source of ignition created **inside the system** (electrostatic discharge or exothermic reaction), however, ignition sources can be also introduced from the **external process** - normal operation of the system

## Equipment Assembly - Dust Collection System

To allow for the safe use of Dust Collection System, application of additional protective measures is necessary. Such measures may include for example suppression, venting or containment, monitoring and shut-down or combination of those.

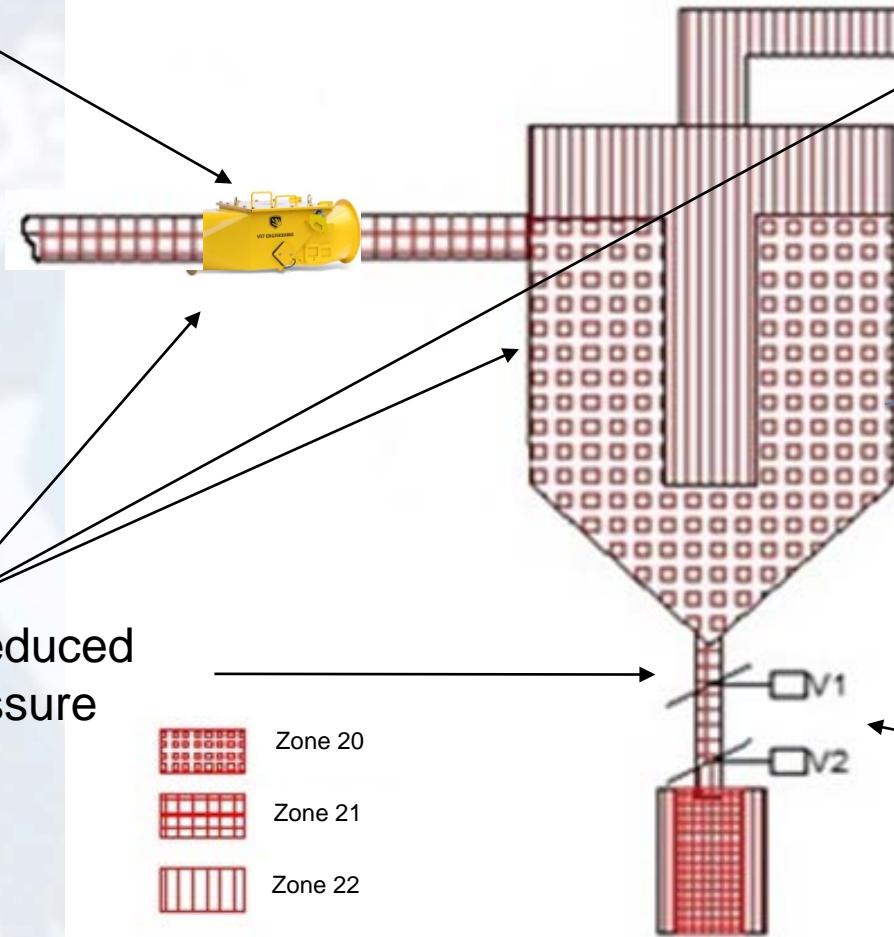
**ISO 80079-36 allows for the certification of a **limited group** of protective systems utilized to build the safe dust collection system assembly (e.g. explosion isolation flap valve which prevents transmission of the dangerous effects of a dust explosion in one direction by separating volumes with potentially explosive atmosphere of industrial dusts)**

**Protective function is not considered, only the EPL!**

## Example:

- Dust Collection System protected by explosion isolation, explosion suppression and venting into safe area combined with filter and pipework construction resistant to reduced explosion pressure
- Explosion suppression activated by pressure sensor
- Isolation activated by back pressure wave
- All electrical parts in the assembly already IECEx certified

Explosion isolation






Venting into safe area

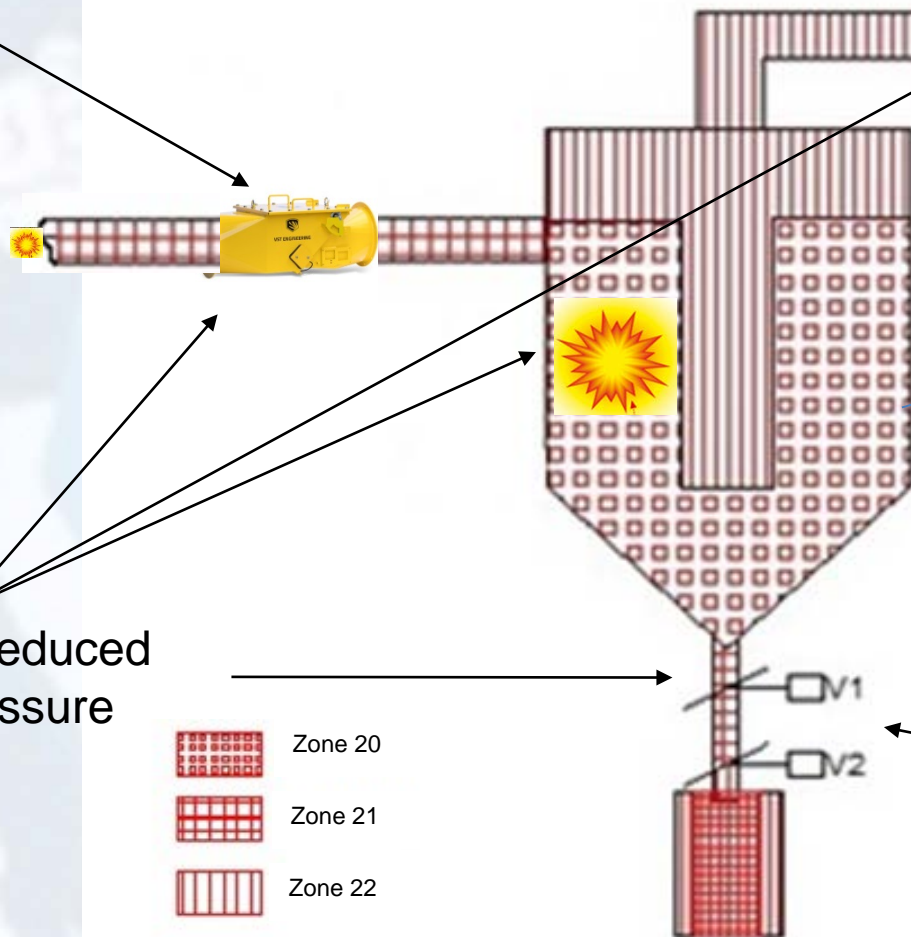
Explosion suppression

Explosion isolation

Resistant to reduced explosion pressure

-  Zone 20
-  Zone 21
-  Zone 22

Explosion isolation



Venting into safe area

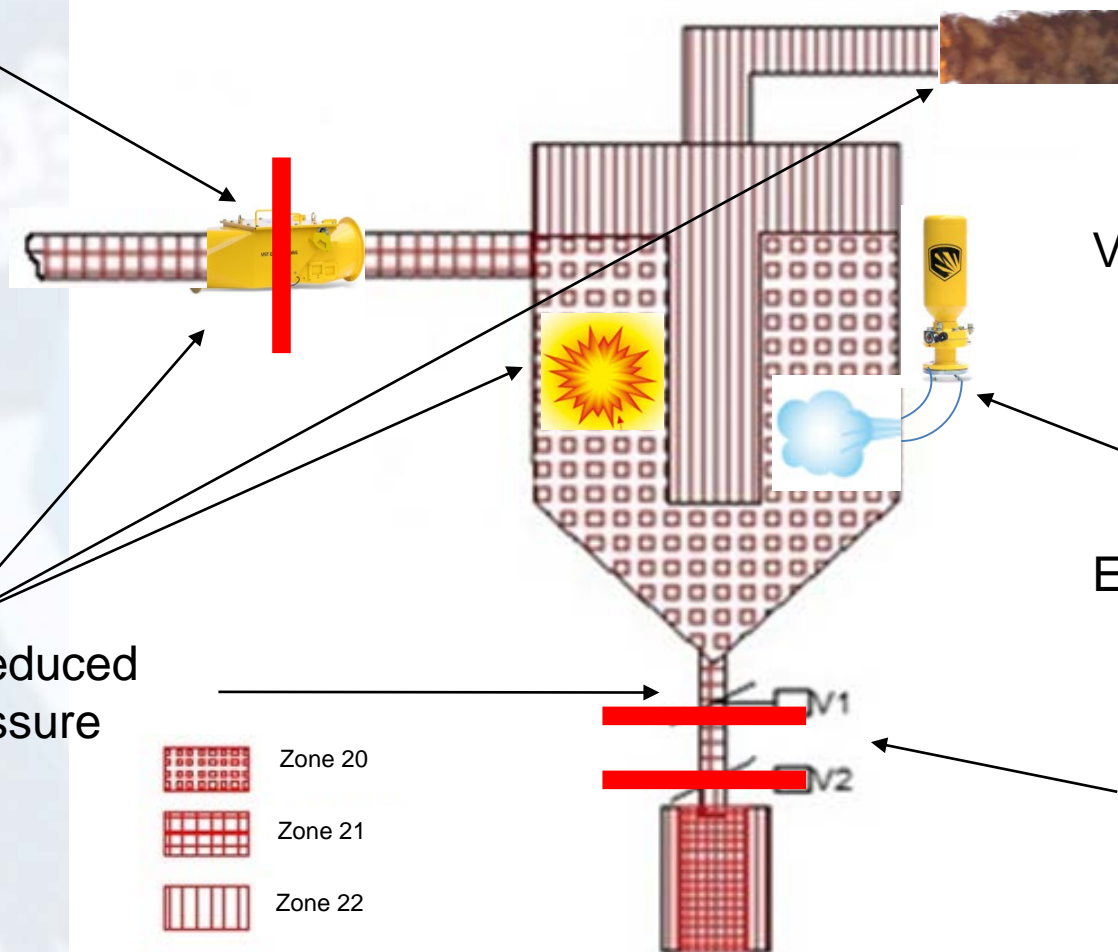
Explosion suppression

Resistant to reduced explosion pressure

- Zone 20
- Zone 21
- Zone 22

Explosion isolation

Explosion isolation



Venting into safe area

Explosion suppression

Resistant to reduced explosion pressure

Explosion isolation

- Zone 20
- Zone 21
- Zone 22



## **Explosion isolation valve IECEx certified (ISO 80079-36)**

- IECEx only provides certification for prevention of ignition source (i.e. the valve will not cause ignition)
- IECEx does not certify the valve will adequately manage an explosion (i.e. block the pressure or flame front from an explosion)
- **IECEx certification of explosion suppression protective system?  
ATEX harmonized standard EN 14373:2005 not applicable under IECEx**

# Explosion Protection Systems

## TC 31/SC 31M/AHG 6

To review ISO 6184, Parts 1-4, transferred to SC31M from ISO, to determine how this material should be integrated into existing SC31M documents or to develop new standards.

## TC 31/WG 42

Safety devices for prevention of ignition

New Technical specification will recognize the addition of explosion mitigation as a factor in assessing the reliability of an ignition prevention control system.

**ISO/IEC standards applicable for the IECEx certification of Equipment Assembly – covering explosion mitigation have not been developed yet (under consideration).**

**ATEX certification is possible by demonstration of conformity with harmonized standards.**

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# Thank you

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**Fiditas**  
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