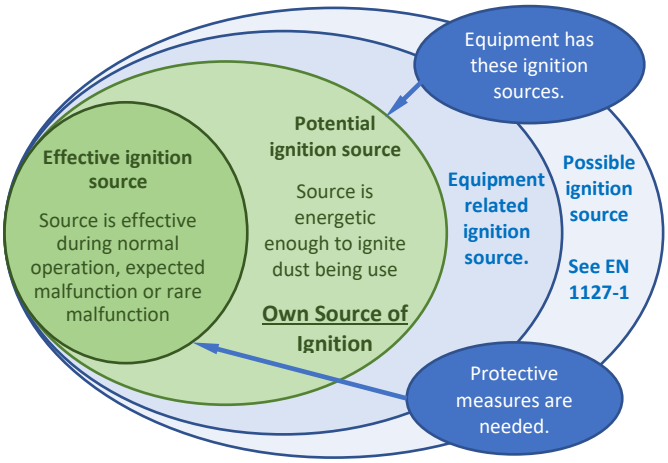
Dust Explosions Sources of Ignition

Part 3 – Own Source of Ignition



ATEX Directive. 2014/34/EU includes the following in its definition of equipment, "*which are capable of causing an explosion through their own potential sources of ignition.*"

Potential ignition sources are equipment related ignition sources which are a sub-set of the possible ignition sources defined in EN 1127-1 and include electric sparks, electrostatic discharges, hot surfaces, flames, mechanically generated sparks etc.

EU guidance "ATEX 2014/34/EU Guidance" states, "*equipment can be said to have its own potential source of ignition, if, when operated as intended … in a potentially explosive atmosphere, it is capable of igniting the latter unless specific safety measures are taken. Therefore, equipment must ensure the required level of protection*"

The guidance also states, "*If the only source of electrostatic charging comes from the process, such items are not considered to have their own source of ignition, and they are not in scope of Directive 2014/34/EU. In these cases they should not be εx or CE marked according to Directive 2014/34/EU.*"

On the other hand the guidance states, "*could become charged ……by the intended use of the equipment,…… if they are placed on the market specifically for this intended use*".

From this guidance, it is clear that equipment, which has its own source of ignition such as an electrical or mechanical spark or that can generate static electricity from rotating non-conductive parts must be in compliance with ATEX directive and as a result must be εx and CE marked. On the other hand, it also indicates that there is some equipment that is on the borderline between requiring certification under the ATEX Directive and not requiring it

because it does not have its own potential source of ignition, particularly if it placed on the market with a specific use that can generate static electricity.

The following examples examine two borderline cases in more detail.

Borderline Example 1 - Hand Operated Valves

Hand operated valves move slowly, with no possibility of forming hot surfaces or mechanical sparks. Some valve designs incorporate polymeric parts, which could become electrostatically charged, but the EU guidance specifically states that these are not covered by the directive.

However, it is clear that if a valve is included in a process system that could generate a lot of static electricity such as a pneumatic conveying system so that an isolated metal part such as the ball in ball valve could become sufficiently charged to ignite the powder being conveyed. Since the pneumatic conveying system, as a whole, could be placed on the market specifically for a use where it has its own potential source ignition, it seems logical that such a system would need to be ATEX certified (one certificate for the whole system) including any manual valves that are part of the system.

Borderline Example 2 - IBC Blender

BS EN ISO 80079-36 "Non-electrical equipment for explosive atmospheres - Basic method and requirements" states that, "*Static autonomous process equipment includes items such as tanks, vessels, fixed pipework and hand operated valves which do not have their own source of energy that could create a potential ignition source during operation*." This indicates, as would be expected, that a static metal intermediate bulk container (IBC) is not covered by BS EN ISO 80079-36 (which is a standard harmonised to the ATEX Directive) and hence not covered by the ATEX Directive since it would not have its own source of ignition.

However, this would not be case for an IBC that contains powder and is being used for powder blending. It to be expected that tumbling powder in an IBC could generate static electricity and were the IBC not earthed via the blender machinery it could generate an electro-static spark powerful enough to ignite any dust cloud generated inside the IBC by the tumbling action. Since an IBC Blender would be specifically placed on the market for an application that could have an effective source of ignition unless protection measures are taken it is reasonable to suggest that the IBC Blender as a system should be ATEX certified.

You can learn more about dust explosions and how to reduce the risk of a dust explosion occurring here:

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