



Dust Explosions Hazardous Area Classification

Part 2 – Blanket Ex Zones. An unnecessary evil?

Recently I read an article by Luke Matchett (see link below), which reminded me of one of my hazardous area classification bêtes noires, blanket Ex zoning.

Luke starts his article thus:

"Specifying ATEX rated equipment as a one stop shop in controlling explosion risk.

This problem stems from the engrained belief in blanket zoning which was prevalent before DSEAR and still persists today. Although the hierarchy of control is written into the legislation many engineers and designers go straight to ignition source control in the form of ATEX rated equipment."

Hierarchy of Controls

The hierarchy that Luke refers to is covered by Regulation 6 section 4 of Dangerous Substances and Explosive Atmospheres Regulations (DSEAR).

"4) The following measures are, in order of priority, those specified for the purposes of paragraph (3)(a)—

- (a) the reduction of the quantity of dangerous substances to a minimum;
- (b) the avoidance or minimising of the release of a dangerous substance;
- (c) the control of the release of a dangerous substance at source;
- (d) the prevention of the formation of an explosive atmosphere, including the application of appropriate ventilation;
- (e) ensuring that any release of a dangerous substance which may give rise to risk is suitably collected, safely contained, removed to a safe place, or otherwise rendered safe, as appropriate;
- (f) the avoidance of
 - (i) ignition sources including electrostatic discharges"



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(Note: The EU ATEX Workplace Directive 1999/92/EC has a similar but simpler hierarchy of controls)

As can be seen the avoidance of ignition sources is the sixth item on the list of priorities and as Luke points out, blanket zoning leads to a focus on ignition sources for controlling explosion risk rather than the other five higher priorities. With blanket zoning there is no impetus to examine in detail measures to reduce the size of hazardous zones by reducing the quantity of flammable substances, minimising or controlling releases or to preventing the formation of explosive atmospheres.

Put simply blanket zoning is a very poor way of reducing the risks from flammable substances.

Why has blanket zoning become so engrained?

In my experience this is for two reasons, firstly the ease of maintenance and secondly future proofing.

It appears that many companies find it easier to carry out maintenance if all the equipment is Ex rated to the same specification. Maintenance staff may find it much easier to avoid mistakes when an area is blanket zoned.

Blanket zoning helps future proofing by ensuring that it is possible to introduce additional manufacturing equipment into an area or modify a process without the need to change the ancillary equipment such as lighting, power supplies, electric motors etc.

Is it possible to reconcile these conflicting demands?

For electrical ignition sources this is relatively straightforward to achieve by making use of the concept of equipment protection levels (EPL) as detailed in IEC 60079 Parts 0 and 14. Using this approach it is possible to separate the specification and selection of electrical equipment from the exercise reducing the risks associated with flammable substances.

The electrical department can select a blanket EPL rating for an area based on the worst case hazardous zone within the area. They can then show the location of the blanket EPL zones on their arrangement drawing or room data sheets. It would be up to the electrical department to maintain the records of the EPL zones.

As a separate exercise the process safety team can focus on minimising the risks associated with flammable materials based on the priorities cover by DSEAR (and Directive 1999/92/EU). The results of this exercise then can be recorded correctly as a detailed hazardous area classification that has truly minimised the risks.

It is therefore possible to have best of all worlds with reduced maintenance issues, future proofing AND full risk minimisation.

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Link to Luke Matchett's article

<https://www.dekra-process-safety.co.uk/common-issues-in-the-management-of-explosion-risk?Linkedin>

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

ICHEME Online Training

<https://www.icheme.org/career/training/online-courses/dust-explosion-risk-reduction/>

<https://www.icheme.org/career/training/online-courses/dust-explosions/>

Youtube Videos

<https://www.youtube.com/embed/kWvgTKh3RtY>

<https://www.youtube.com/embed/k0cqo0hANK0>