

HAZARDOUS AREA CLASSIFICATION AND WHY YOU NEED IT

Any industry from chemical manufacturing, paint spraying to food processing utilises flammable gases, vapours or dusts in their process. Under forthcoming legislation it will become a legal obligation to undertake Hazardous Area Classification (HAC). What we have set out to accomplish with this article is provide terms of reference for HAC work and clarify your obligations and responsibilities to employees under new and existing safety regulations.

WHAT IS A HAZARDOUS AREA CLASSIFICATION

Hazardous Area classification identifies those areas in a plant where flammable atmospheres can be found and additionally provides an estimate of how often they may be found there.

Flammable atmospheres are generally mixtures with air of flammable gas, vapour, aerosol (mist) or dust.

For example, the head space in a tank containing a flammable solvent and the space surrounding the tank may both be classified as hazardous areas, but their classification would be different on grounds that a flammable atmosphere could be continually present in one but rarely in the other.

DO YOU NEED TO UNDERTAKE HAZARDOUS AREA CLASSIFICATION FOR YOUR PLANT?

Most people would agree that safety is significantly enhanced if it is known where flammable atmospheres could occur on their plant. In fact HAC is growing in importance. Originally HAC was used simply to enable process companies to make the correct choice of electrical equipment – to prevent electrical ignition of the flammable solvent atmosphere by the equipment. Now HAC is being applied to help in wider risk assessment work and to help prevent other ignition sources occurring such as electrostatic sparks. And, of course, it is not only applied to areas where solvent vapours, gases or mists may be found, but also where flammable dust clouds can occur. For this reason HAC is needed not only in chemical plant but in a whole range of other industries from food processors to power generation.

HAC AND THE LAW

HAC and methods of performing HAC have been around in various national standards for a long time already - which brings with it a pressure to conform. In some European countries (e.g. Belgium) HAC is required under existing law. In all European Union countries HAC is to become mandatory as the ATEX Directives** are incorporated into the national laws of all member states. In fact, HAC will be required beginning mid 2003.

**ATEX 100a (Directive 94/9/EC)

ATEX 137 (Directive 99/92/EC)

HOW IS HAC DETERMINED

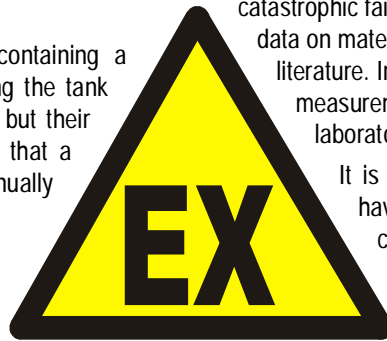
HAC is determined by site audit work. It requires a study of the flammable materials used on site and examination of plant and equipment. The basic idea is to establish where flammable atmospheres occur as part of routine operations and also as a result of failure of whatever type, excluding catastrophic failure of plant. The study requires flammability data on materials which are sometimes available from the literature. In other cases they have to be determined by measurement in a specialist process safety laboratory.

It is clear for example that a dust collector will have a flammable dust cloud inside the dust collection chamber for much of the time, but a flammable atmosphere may also occur by the explosion panel in the event of accidental rupture. Furthermore, if a collection bin is fitted, then its replacement or emptying could generate a flammable atmosphere. These different regions would be classified as different 'zones'

WHAT ARE HAC 'ZONES'

Zones where flammable atmospheres could occur are defined on the basis of the frequency of the presence of a flammable atmosphere. Three zones (Zone 0, 1 and 2) have been defined for gases, vapours and mists, and three zones (Zone 20, 21 and 22) for dusts. Although the zone designations are different for gases and dusts, the actual definitions are essentially identical, as shown below:

- **Zone 0 (gas) or Zone 20 (dust)**
A place in which an explosive atmosphere is present continuously or for long periods or frequently.
- **Zone 1 (gas) or Zone 21 (dust)**
A place in which an explosive atmosphere is likely to occur in normal operation occasionally.
- **Zone 2 (gas) or Zone 22 (dust)**
A place in which an explosive atmosphere is not likely to occur in normal operation but, if it does occur, will persist for a short period only.



HOW DO YOU USE HAC PROJECT DATA

Depending on the plant under study a HAC may produce a drawing indicating the various zones defined above. Sometimes more wide-spread zoning is specified (e.g. whole areas of a plant or building are similarly zoned) but this may have cost implication when it comes to selecting equipment in conservatively classified areas.

If electrical equipment is to operate in a classified hazardous area then it should be selected with the appropriate level of protection for the type of flammable atmosphere that it may encounter. For a given HAC zone, this will mean selecting equipment based on the Gas Group of any flammable vapour atmosphere as well as its auto-ignition temperature (or temperature class). Where powders are present, ignition temperatures of the dust cloud and of powder layers are used to specify equipment maximum temperature ratings. The required IP rating (measure of protection from ingress of liquid and solids) of the equipment also is derived from area classification data.

Although historically HAC was designed for the protection against electrical ignition sources, increasingly it is recognised as a valuable tool in establishing precautions against static electricity and all other potential ignition sources. In fact, shortly it will be required by law in all member states of the European Union (under ATEX

Directives) to specify both electrical and non-electrical equipment according to an equipment category. For the industry other than mining, the choice of categories depends on the HAC zone and three categories have been defined:

- Category 1 (very high level of protection),
- Category 2 (high level of protection),
- Category 3 (normal level of protection).

HOW CHILWORTH CAN HELP

We have many years experience in helping companies with HAC. Examples include:

- Consulting for new and existing processes.
- Periodic re-auditing to maintain continuity of safety assessment.
- Data collection (determination of gas groupings by measurement, ignition temperature measurement etc)
- Preparation of a full report describing the proposed HAC and the reasons for the classification
- In-company training to enable companies to undertake their own HAC studies.

For further help or information please faxback the form below.

faxback

Please faxback to Marketing on +44 (0)23 8076 7866

Name: Job Title

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Hazardous Area Classification..... Dust/Gas/Vapour Explosion

Electrostatic Hazards / Problems..... ATEX audits.....

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I would like to talk to a consultant about a process safety matter.....

I would like a visit from a consultant next time one is in my area

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