Chilworth Technology
the experts in process safety

DSEAR Compliance For the Food Industry

Datasheet

Many materials are handled within the Food Industry that have flammable or explosible properties but their hazards are often overlooked as they are considered 'everyday' products. These materials may be in either powder or liquid form and can be produced naturally or chemically. Published data indicates that the Food Industry experiences more recorded explosions than any other segment of industry with over 30% of all reported incidents involving food or animal feed.

ATEX & DSEAR

Today, the use of materials that can create potentially explosive atmospheres is governed in Europe by the CAD & ATEX Directives, which have been implemented into UK legislation in the form of the Dangerous Substances Explosive Atmospheres Regulations, 2002 (DSEAR). These regulations cover all aspects of process safety from initial discharge of tankers, through primary storage, transfer to manufacturing processes, production and packaging.

Picture courtesy of Associated Press

Sugar Factory Explosion

In order to comply with DSEAR it is best to initially divide operations into areas that use powders and those that use liquids.

Powder Handling

Due to the nature of food production, materials are normally handled in bulk, with raw substances being delivered by road and sea. Bulk materials, such as sugar, wheat and flour are charged into storage silos for future processing within the factory. The movement of such large quantities of materials can generate the potential for electrostatic discharges and the creation of significant quantities of fine dust, which can be dispersed in the plant with the inherent risk of fire and/or explosion.

Under DSEAR, a company must demonstrate that the explosion risk has been recognised and an appropriate Basis of Safety is in operation. For the tanker discharge operation, this may be avoidance of ignition sources, in particular electrostatic discharges, whereas the primary storage silos may rely on explosion protection techniques such as explosion relief panels or doors; these panels or doors must not only be of the correct size but must also release into a safe area away from operating personnel.

From the primary silos the bulk material normally passes to the main plant for processing where there may be some intermediate storage, screening, milling, blending and other items of process equipment such as dryers and dust extraction units. These mechanical processing operations will result in an obvious increase in the quantity of fine dust in the plant.

DSEAR makes specific reference to the need for explosion isolation that will prevent the often devastating consequences of secondary dust explosions. However explosion isolation between items of plant can be problematic in the Food Industry where mechanical conveying is used extensively and it is often overlooked.

Much of the food industry produces blends of products that contain colourings, flavours, spices or 'sugar free' alternatives. Many of these additives are synthetically produced and as a consequence can have flammability characteristics that are much more hazardous than familiar products such as flour and sugar.

Many of the materials used in the Food Industry contain high levels of moisture. Therefore, drying is often a common part of food or animal feed production. In order to ensure safe operation of these dryers it is necessary to have not only flammability and explosibility information but also thermal stability data that is specific to the type of dryer being used.

Liquids

Although the majority of food production is aqueous based some areas use solvents, fats or oils in the production process. These liquids may also be at an elevated temperature or processed above their flashpoint. A similar risk assessment based approach to powder handling should be taken with a suitable Basis of Safety being implemented for each operation.

Waste

Under DSEAR waste products should also be addressed in the same way as other materials found on site, whether the products are produced intentionally or accidentally.

Compliance Requirements

Under the legislation a risk assessment must be performed that will indicate where flammable atmospheres can be generated, and identify all potential sources of ignition. It must also state the scale of the anticipated effects and whether isolation techniques have been considered. To do this effectively it will be necessary to provide flammability and thermal stability data on all materials being processed.

Hazardous Area Classification (HAC) is required wherever a potential flammable atmosphere may occur. It is also necessary to review all potential ignition sources such as electrical equipment, mechanical action and electrostatic discharges.

Training is essential to ensure that all personnel working with potentially explosive atmospheres have a suitable understanding of the hazards. Training can also assist personnel in the future management and maintaining compliance with DSEAR.

Finally before a process can become DSEAR compliant it must be verified as fit for purpose by a person who is competent in the field of explosion protection.

How Chilworth can Help

Chilworth Technology has a wealth of knowledge from working with process industries handling potentially dangerous and flammable materials. With respect to the Food Industry the following four phase approach is often recommended:

Phase 1: An initial site audit and report to identify the Basis of Safety for the hazardous areas along with recommendations for prevention and protection of plant in the event of dust and/or vapour fires and explosions. The report is often used to set a plan of action for full compliance.

Training: To raise safety awareness and provide an understanding of hazardous areas, fire/explosions, and electrostatic hazards. Such training can be tailored to suit your specific requirements and may be included at the time of the audit. After training, it is possible for selected engineers to accompany the Chilworth engineer on the site audit and therefore obtain further on-site training.

Subject to the result of the first phase, **Phases 2 & 3** consists of obtaining flammability data, performing detailed hazard and risk assessments and completing the hazardous area classification.

Phase 4: The final audit and verification. This may include assistance with the preparation of documentation to demonstrate compliance with the legislation.

Chilworth's aim is to work with companies to obtain full compliance and to train personnel to be able to maintain compliance in the future.

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***My particular interests are*:-**

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