

# CASE STUDY

## Explosion Protection for Dairy Industry Drying Process



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A leading International Dairy Industry Group consulted IEP Technologies SAS located in France when an expansion project for one of their Production Sites in Western France led to the requirement for the upgraded process plant to be protected against the potentially dangerous and costly effects of industrial explosions. The company had decided to invest in the plant to increase its production capacity of dairy based ingredients which are used in the food industry, however as part of the design review the company's Global Insurance Underwriter judged that the new fluid bed drying and powder cooling plant as well as the upgraded dust collection equipment all needed to have "state of the art" explosion protection to meet or exceed their own internal engineering safety standards and rules.

In addition to the Dairy and Food Industries, many manufacturing processes are at risk of dust explosions which may occur when fine particulates, dispersed in air, are exposed to an ignition source within a contained environment.



These types of contained environments are commonly present throughout industry – for example piping and ducting, process vessels, dust collectors, and numerous types of special process machinery. The ignition source may originate from several conditions, including hot materials or surfaces, flames, self-heating clusters, friction or uncontrolled electrostatic discharges. Such ignition sources should always be minimised or eliminated through a combination of engineering and safety controls, effective management and operator training and awareness, however even with these in place the explosion risk cannot be ignored in abnormal or fault conditions and therefore techniques to mitigate the potentially catastrophic effects of such an event must be employed.

In this specific case, the upgrading of the Spray Drying process formed part of a much larger plant expansion which included a new External Fluid Bed Dryer for final drying and effective powder cooling. In addition to this, the Cyclones currently in use were replaced with a totally new Process Bag Filter. IEP Technologies was first contacted by the Project Integrator in March 2018, and after an initial meeting where material explosion data and process specifications were collected, IEP Technologies responded with the first protection concept and budgetary proposal within a tight four-day turnaround. The existing drying chamber (10 metres in diameter) was already equipped with explosion venting panels and these were judged to be sufficient enough to provide explosion relief for this part of the process, however it was necessary to isolate the chamber to reduce the risk of explosion propagating to the associated new equipment, at the same time as providing explosion suppression for the External Fluid Bed and the Process Bag Filter.

Deep discussions followed with the End User, Integrator and Insurance Company, to ensure that IEP's proposal fully complied with the Insurer's in-house standards and requirements as well as the pre-requisite local safety regulations and the European ATEX Directive.

During this phase, an extremely effective ongoing working partnership was formed between IEP France and the local Integration Manager and it is considered that this open and honest relationship facilitated a smooth execution of the overall project.

The key elements of the protection system selected consisted of SmartDS dynamic explosion detection solution to provide early detection of developing explosions and to initiate the High Rate Discharge (HRD) Explosion Suppressors installed on the External Fluid Bed and Process Bag Filter. HRD Suppressors actuate within 1.5 milliseconds of receiving an activation signal from the control unit, discharging the optimal quantity of powdered extinguishant through a special design nozzle system. The SmartDS is a SIL 2 certified rate of pressure rise detector which uses multiple algorithms that constantly interrogate pressure data to allow robust explosion detection while providing excellent false alarm immunity, thereby avoiding costly plant downtime. Additionally, in view of the relatively short distances involved, IR-13 Optical Detectors were installed on the process ducts to enable a suppressant isolation barrier to be rapidly activated before the flame front propagates through to associated equipment and creates a secondary explosion. The overall system is monitored and controlled by an EX-8000 multi-zone unit with the capability to selectively control discreet functions to initiate the appropriate protection devices only where and when they are needed.



IEP France was finally awarded the contract in July 2018 and all the elements of the Explosion Protection System were delivered in October and Commissioned in December, well within the project timeline. IEP's local service team will be responsible for ongoing planned periodic maintenance, and the company has also purchased an inventory of running spares to minimise any downtime in the event of any system activations.

The tight time scales involved in this project - from initial contact, through protection concept design, proposal, acceptance, delivery, installation and commissioning, as well as the need to comply with Insurance Company internal standards truly illustrates IEP's capability as a Trusted Industrial Explosion Protection Partner, comprising engineering review and design, system supply and ongoing maintenance, training and support. IEP Technologies is part of the global HOERBIGER Safety Solutions network, with sales, service and support centres located across Europe, North America, Latin America, Middle East/Africa and Asia/Pacific.

To learn more about Industrial Explosion Protection or to find your local IEP Technologies, service and support centre visit [www.ieptechnologies.com](http://www.ieptechnologies.com) or contact +33 (0) 1 5803 3980.

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