



Tech Update

Wood Pellet Mills: Dust suppression, spark detection, and extinguishing systems equipment

By Tony Kryzanowski

A boom in the construction of wood pellet manufacturing facilities could be on the horizon with the growing European and North American demand for wood pellets. In Canada, that demand might be best illustrated by the province of Ontario mandating the elimination of coal-fired power generation, which on its own could substantially increase the demand for the production of wood pellets.

An important part of the operation of pellet manufacturing and storage facilities is ensuring that adequate fire prevention and mitigation measures are in place, for overall safe operation and to meet the conditions set for insurance coverage of such facilities.

During a recent presentation at the Wood Pellet Association AGM in Vancouver, Staffan Melin, President of Delta Research Corporation, suggested some mitigation measures companies can take when designing pellet manufacturing facilities.

These include: dust collection at transfer points; spark detection and explosion suppression in contained spaces; explosion venting; ventilation; elimination of exposure to hot surfaces over 225 degrees Celsius or open flame; and monitoring rotating equipment like ball bearings and bushings. These are just a few suggestions.

Below is a list of suppliers of dust suppression, spark detection, and extinguishing system equipment. Though not meant to be exhaustive, it is a good starting point.

FLAMEX

The FLAMEX spark detection and extinguishing system is said to be a cost effective solution for the prevention of baghouse fires and explosions. Drying and hammermill operations can often cause sparks, which are typically the ignition source for process fires in wood pellet facilities.

The FLAMEX System uses infrared detectors to identify sparks being transported through ductwork to a dust collector. It then triggers an extinguishing device that sprays for a fraction of a second to effectively extinguish the sparks. The short spray time results in no downtime or clean-up. The system can also be programmed to activate deluge valves, alarms, abort gates, and equipment shut down.

FLAMEX is the first system of its type to gain Factory Mutual Approval, according to the company. Currently in its fifth generation of development, the FLAMEX system has been successfully used in numerous woodworking and pellet manufacturing facilities throughout North America.

flamex@sparkdetection.com



MPS

Quick response is a very important aspect of fire detection. An alarm is of little use if it's too late. MPS Talentum Fire Detection Sensors are designed to respond to spark or flame in as little as one second. And because they utilize advanced technology and sophisticated processing, they only respond to combustion, ignoring other sources of heat or light, which can result in false alarms for other sensors.

This sensor is appropriate for indoor or outdoor use and for monitoring enclosed areas like dust collection systems and ductwork, as well as large open areas. MPS Talentum sensors are completely self-contained, requiring no external controls. They can operate on just two wires when using the standard 4-20ma current loop (relay contacts are also standard) and they do not ever require calibration.

www.go-mpsinc.com/firedetection.htm.

Hansentek

Hansentek's AN6400 Spark Detection and Extinguishment System is fully expandable up to 64 zones, yet is still competitive even for single zone systems. The company's infrared spark detectors can detect and signal the presence of a spark in less than one millisecond. This quick response, coupled with the system's high-speed solenoid, ensures a full water spray pattern is established across the entire duct in a quarter of a second. The AN6400 was designed to give customers the utmost in protection, information and control with minimum service requirements. The system is Factory Mutual Approved.

www.hansentek.com

Firefly

According to the National Fire Protection Association, material in a pellet production process can ignite from 260°C/500°F.

Firefly offers unique fire protection systems, using worldwide patented infrared detection technology. A Firefly prevention system detects hot black particles and sparks from 250°C/480°F and is completely insensitive to daylight thus minimizing numerous false alarms and costly downtime.

Conventional spark detection systems are incapable of detecting particles at temperatures below 700°C/1290°F and are also sensitive to daylight causing unnecessary false detections, says the company.

The pellet industry handles large material flows that demand a powerful extinguishing system, which is able to fully penetrate that material. Firefly provides unique full-cone water spray nozzles to effectively extinguish dangerous particles. With over 30 years of experience in the pellet industry, Swedish company Firefly has developed tailor-made protection solutions for the entire pellet production process.

www.firefly.se



PyroGuard

The PyroGuard Spark Detection and Extinguishment system provided by Clarke's Sheet Metal Inc. is used to identify and extinguish sparks before they have a chance to enter sensitive dust collection or storage equipment. Clarke's Sheet Metal also manufactures a complete line of HiSpeed abort gates, backdraft dampers and explosion venting.

When applied properly, the PyroGuard System and related devices can virtually eliminate the possibility of harm to plant personnel, and minimize the extent of damage caused by a fire or an explosion, says the company.

www.clarkes-ind.com

Kidde Canada

When it comes to wood pellet manufacturing, fire protection, fire detection and fire suppression are three very different things. The first two are fairly easy and commonly found in most applications. Fire Suppression, however, is a challenge. A fire in this case can be extremely difficult to extinguish, due to the material's natural ability to continue burning and become what is referred to as a "deep-seated" fire.

Kidde Canada recommends the proven technology of HPCO₂, or High Pressure Carbon Dioxide suppression systems. Properly designed with adequate signaling and notice to employees to evacuate prior to discharge, it is very safe and effective. CO₂ is the best choice because it is the only flexible agent, meaning discharge can be extended continuously and uninterrupted for up to 10 minutes or more. This is crucial for getting the agent to the deepest parts of the fire, and more importantly, controlling the situation until fire fighters arrive on scene.

www.kiddecanada.com

GreCon

Spark and ember generation is a constant danger in production facilities where combustible materials are being worked, processed, transported, dried, filtered or exhausted. The statistics provided by insurance companies point out that silos, dust collection filters, bins, and even complete production lines are the areas of greatest risk.

GreCon Spark Detection and Extinguishing Systems, as a preventative measure, can reduce the risk of fires and dust explosions in production equipment, dust collectors and pneumatic conveying systems by extinguishing sparks and embers before they reach the dust collection filters, silos, or bins.

Sensors detect a spark's infrared radiation and automatically activate programmable countermeasures: extinguishment, deluge, abort gates, or automatic machinery shutdown. The extinguishment immediately releases a fine mist of water downstream, extinguishing sparks and embers without interrupting production and greatly reducing the risk of personnel injury, equipment damage, and downtime.

GreCon Spark Detection Systems are multi-microprocessor based, modular designed systems that record all events down



to the millisecond for event analysis. They are powered by an uninterruptible power supply with standby batteries. System testing and diagnostics are conducted automatically. Systems are expandable to over 100 zones of protection and are Factory Mutual Approved.

GreCon's new 5000 series systems with a menu-driven interface for programmable functions are more economically suitable for standard applications.

GreCon 7000 series systems with advance application programmability provide more flexibility, more expandability, and more features for standard and complex configurations.

www.grecon-us.com

Sense-WARE

Spark and ember detection equipment supplier Sense-WARE notes that wood pellet production facilities can work to avoid fires due to sparks and hot embers in ductwork. Wood pellet producers can avoid significant fire damage and loss with a Sense-WARE SenseTronic spark/ember detection system, the company says.

The SenseTronic IR-800/1, Sense-Ware's lowest priced model, is suitable for ducts up to a 20" diameter. Installation involves two detectors on the duct, opposing each other. The alarm output can be connected to a Fire Panel or PLC. Sense-WARE's fibre optics IRL-800/3 or the IRL-800/3REL with an optical self-test are suitable for up to 37" diameter ducts with standard length fibres. Both models have alarm and fault relays as well as a two-wire open collector output. Special order longer fibre optics are available for larger ducts.

www.sense-ware.com

AFEX Systems

The threat of a vehicle fire is always present when operating heavy machinery around combustible materials such as timber and wood debris and materials. Training equipment operators, keeping equipment properly maintained, and using a fire suppression system will reduce the level of risk and, in the event of a fire, reduce damage to the machine.

For over 40 years, AFEX has manufactured purpose-built fire suppression systems for feller bunchers, skidders, chippers, grinders, and other forest industry equipment. When a fire is detected, the AFEX system will automatically actuate, saving valuable time and protecting property. Using the AFEX system may even entitle the company to a discount with insurance carriers. AFEX says that several of their customers have seen the system pay for itself in less than three years.

It has a variety of system configurations available to fit customer needs.

www.afexsystems.com

Henderson Industrial Specialties

Henderson Industrial Specialties designs and manufactures custom industrial process equipment including ExploGuard



fracture clip release panels. The NFPA-compliant panels open to relieve an explosion in many types of equipment including dust collectors at wood processing and drying plants.

When they were in service during explosions at two different wood drying plants, the ExploGuard fracture clip release panels were so effective in quickly eliminating overpressure that the primary rupture diaphragm-style explosion vents did not open during the explosions. This saved the plants a significant amount of money and a lengthy changeout of the vents. Quick replacement of the fracture clips allowed for start-up in short order, after the cause of the incident was mitigated.

The panels are custom made and can be equipped with optional ExploGuard stainless steel abrasion shields, insulation packs (to reduce process heat loss and/or to reduce condensation inside the equipment), switches to work in concert with spark detection systems, diverters, smoke/fire dampers and detectors and fan shutdown circuits. Henderson also manufactures rupture diaphragm vents, which are best suited to certain applications, such as a wood door manufacturing facility.

www.hendersonindustrial.com

Allied Blower & Sheet Metal

Over the last 35 years, Allied Blower & Sheet Metal has designed, supplied, installed and serviced in excess of 200 fire protection systems to the wood industry. That is more than any other supplier, says the company.

In addition to being GreCon's exclusive Canadian representative, Allied-designed systems can offer protection via detect, arrest, suppress and abort functions. Systems supplied from Allied can operate on a stand-alone controller basis or can be integrated with existing PLCs.

www.alliedblower.com.