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DUST EXPLOSION TESTING REQUIREMENT UNDER NEW OSHA NATIONAL EMPHASIS PROGRAM PERFORMED BY FAUSKE & ASSOCIATES, LLC

Dust explosions are a serious hazard in industries nationwide. They lead to the loss of production, plant/facility destruction and personnel injury or fatality.

In 2005, the US Chemical Safety and Hazard Investigation Board issued a report stating that between 1980 and 2005, at least 281 deadly dust explosions occurred in the U.S., killing 119 people and injuring 718 others while extensively damaging or destroying facilities. Congressional hearings led to the severe criticism of OSHA for lack of vigilance by the US Chemical Safety Board. As a result, in March 2008, OSHA initiated a National Emphasis Program to lead their inspectors in cracking down on dust explosion hazards.

OSHA Directive Number: CPL 03-00-008 states: "This directive contains policies and procedures for inspecting workplaces that create or handle combustible dusts. In some circumstances, these dusts may cause a deflagration, other fires, or an explosion."

In the wake of February's catastrophic explosion killing 14 and injuring 38 others at the Imperial Sugar Company Port Wentworth Refinery, the OSHA mandate follows what many experts believe to be a no-brainer for all facilities creating dust particles. **The entire industry is now awake** and has resulted in additional Congressional hearings.

Possible combustible dust facilities or plants are those handling chemical, metal and plastic dusts such as:

- Agricultural Produce Packaging and Powder Handling Facilities
- Agglomeration & Briquetting Facilities
- Brick/Clay/Ceramic Industry Plants
- Carbonaceous Dust-Handling Plants/Manufacturers
- Commercial and Residential Furniture Manufacturing Plants
- Construction and Demolition Recycling Facilities
- Erosion Industry Facilities
- Filtration Plants
- Hardware Manufacturing Facilities
- Industrial Hygiene Facilities
- Pharmaceutical Manufacturing Facilities
- Small shop – e.g. Woodworking/Cabinetry Facilities
- Valves, Gates, Airlock Facilities

According to Ashok Ghose Dastidar Ph.D., MBA, Manager, Dust & Flammability Testing and Consulting Services for Fauske & Associates, LLC, "to meet OSHA compliance companies must know their dust explosion hazard potential and address the risk – or face OSHA citations. FAI offers consulting

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services to assess companies' compliance with the OSHA NEP by providing the full suite of dust explosibility tests required to characterize the material explosion hazard potential. FAI provides Dust Explosion Testing for the OSHA National Emphasis Program addressing deflagration, other fire, and combustible dust explosion hazards."

Years ahead of OSHA's new standards, FAI led the industry by performing existing ASTM (American Society for Testing and Materials) and NFPA (National Fire Protection Association) standard testing for their customers. FAI's dust sample testing includes:

- 1) Dust Explosivity: Examines and analyzes explosive characteristics of the dust sample.
- 2) Minimum Ignition Energy, MIE: Identifies minimum energy required to ignite a dust cloud. (Examines sample sensitivity to ignition from electrostatic discharge.)
- 3) Minimum Autoignition Temperature, MAIT: Identifies the minimum temperature at which a dust cloud will autoignite.
- 4) Minimum Explosive Concentration, MEC: Identifies the minimum explosive concentration of a dust cloud.
- 5) Hot-Surface Ignition Temperature of Dust Layer: Identifies the minimum temperature at which a dust layer will ignite.
- 6) Limiting Oxygen Concentration: Identifies the minimum oxygen concentration at which a dust can explode.
- 7) Drop Impact: Identifies the impact force required to ignite a dust layer.
- 8) Friction Sensitivity: Identifies the frictional force required to ignite a dust layer.
- 9) Volume and Surface Resistivity: Measures the conductivity of a dust sample.
- 10) Dielectric Constant: Identifies AC loss characteristics and permittivity of dust sample.
- 11) Differential Scanning Calorimetry, DSC: Identifies the temperature range at which the dust sample undergoes exothermic decomposition or is susceptible to oxidation along with the specific heat of the sample.
- 12) Accelerating Rate Calorimetry: Identifies the dust samples onset temperature for exothermic activity.

For details of the above tests in his article, "Dust Explosion Characterization and Hazard Assessment (Part 1)", *FAI Process Safety News* – Winter 2007, Volume 14, Number 1, please contact Dr. Ashok Dastidar at Fauske & Associates, LLC at 1-877-Fauske1.

A second example of research and expertise in this area is found in the article, "Primary Dust Explosion Strength Required to Instantiate Secondary Dust Explosion" by Dr. Michael Epstein in *FAI Process Safety News* – Spring 2007, Volume 14, Number 2. For this or more information regarding Fauske and Associates, please call (US Toll Free) at 1-877-Fauske1 or 630-887-5213 or visit www.Fauske.com

FAI is the world leader in process chemical and nuclear safety testing. ###