Dust Explosions and Solutions

Dust explosions have been an ever present hazard to industry for hundreds of years. Over the years, many casualties and injuries to personnel could have been prevented by having explosion protection solutions in place. Mec-Tric Control Company and Fike Corporation bring Explosion Protection Products, Dust Testing, Design and System Service together. Through years of extensive research and development, Fike has designed explosion containment systems and pressure relief explosion vents. Fike is also a leader in dust testing with many tests available relating to a substances explosibility characteristics.

Mec-Tric's explosion protection design department is involved with reviewing customers applications and works with Fike to bring a tailor made explosion protection solution to hazardous situations found in the workplace. Oftentimes the solution involves containment of the explosion and/or pressure relief of the vessel. Our explosion protection service department is involved in the commissioning of active explosion protection containment systems as well as the repair and preventative maintenance of the systems. The National Fire Protection Association (NFPA) has instituted many guidelines and standards which are used in industry today. NFPA 61, 68, 69, 484, 654, 664 and 655 all offer guidance for prevention and containment of explosions and fires. OSHA is involved with the compliance of these standards and regulations. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations.

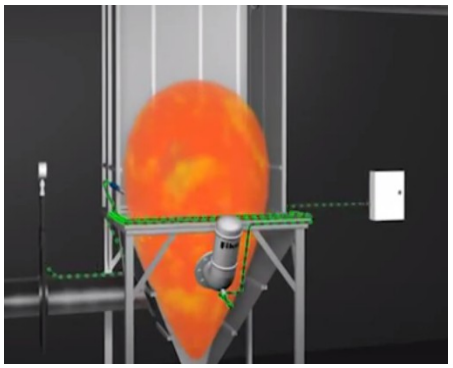
Pressure relief with Explosion Vents.

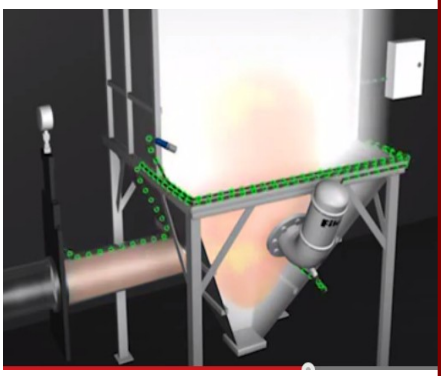
Fike VMAX ® style Explosion Vent

Fike CV-S ® style Explosion Vent

Fike FlameQuench II ® flame arrestor

Explosion Containment with vessel explosion suppression and duct explosion isolation.





Fike Pressure detector

Fike Spark IR detector

Fike EPC

Fike HRD for suppression (SBC)

HRD Lockout

Fike EIV for isolation

Fike Annunciator

Fike SRD for isolation (SBC)

Fike EIPV for isolation

Ventex ® for isolation

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Dust Testing

Fike offers the following tests in addition to other tests not shown below.

- Explosibility Screening (20 L and 1 m3)
- Dust Explosibility (20 L and 1 m3) (Kst & Pmax)
- Minimum Explosible Concentration of Dusts (MEC)
- Limiting Oxygen Concentration for Dusts (LOC)
- Minimum Autoignition Temperature: Dust Clouds (MAIT)
- Minimum Ignition Energy for Dusts (MIE) (w/ & w/o Inductance)
- Minimum Dust Layer Ignition Temperature
- Percent Combustible Material (PCM)
- Dust Burn Rate Screen Test (DBR - SCREEN)
- Dust Burn Rate (DBR)
- Particle Size Analysis (PSA)
- Bulk Resistivity Measurement Test
- OSHA/NEP Package Testing
- Dust, Gas and liquid testing available

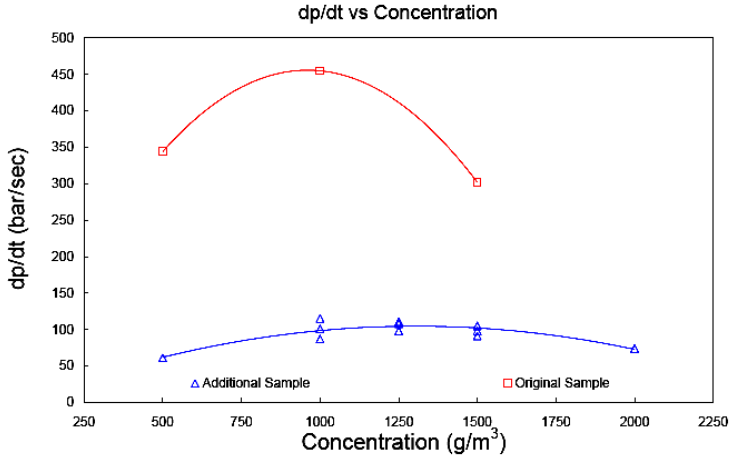
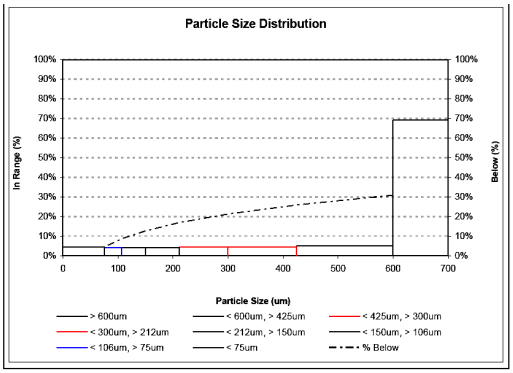
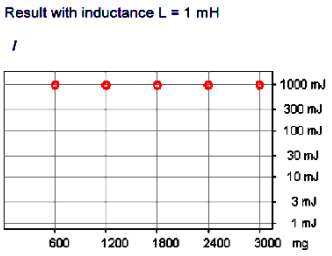


FIGURE 4. EXPLOSION PRESSURE RATE OF RISE MEASURED IN 20L APPARATUS (TRANSDUCER 1)





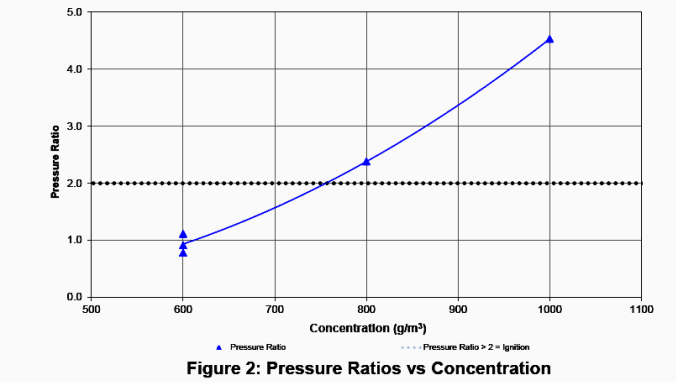


Figure 2: Pressure Ratios vs Concentration

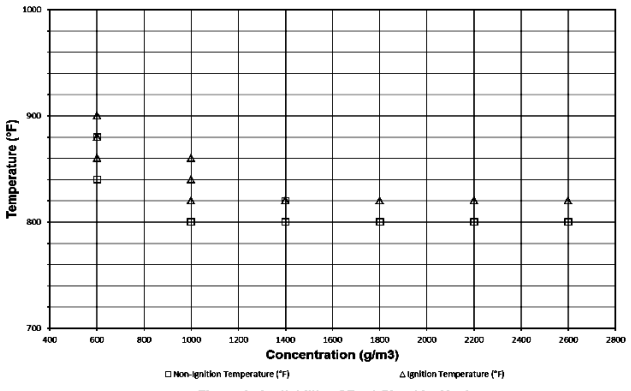


Figure 4 : Ignitability of Dust Cloud by Heat

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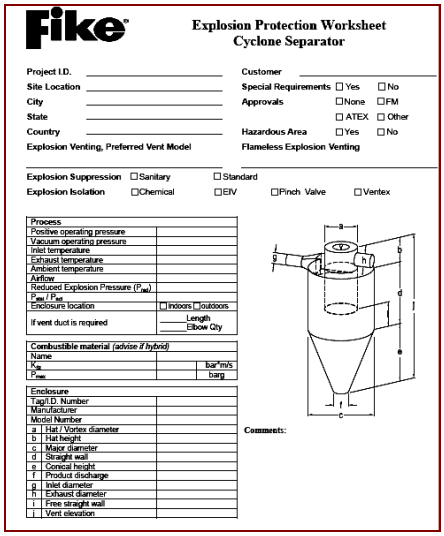
Mec-Tric & Fike Explosion Protection Design

1. Customer completes Explosion Protection Worksheet for specific vessel type to be protected.
2. Mec-Tric completes preliminary evaluation and design with information provided by customer.
3. If Explosion Vent requirement, Fike Vent Calc computer application utilized for vent size and type determination (NFPA 68, 2013.
4. If Active system, Fike Project computer program utilized along with Fike Iso- calc computer application for isolation calculations. Fike EP designer application used for calculations related to Total Suppressed vessel Pressure (TSP).
5. If active system chosen, all design work forwarded to Fike for final review and system engineering drawings.



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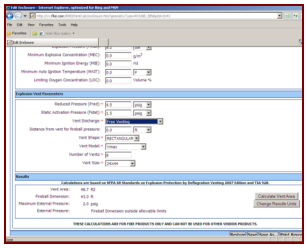

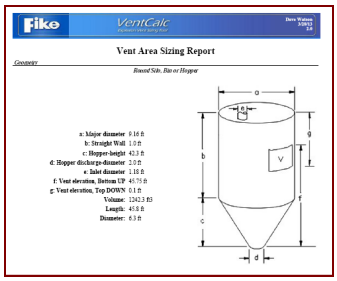

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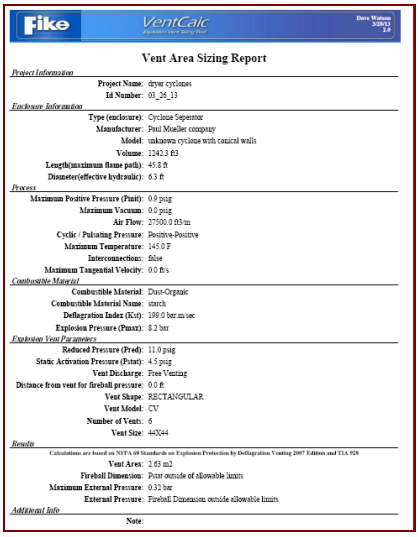

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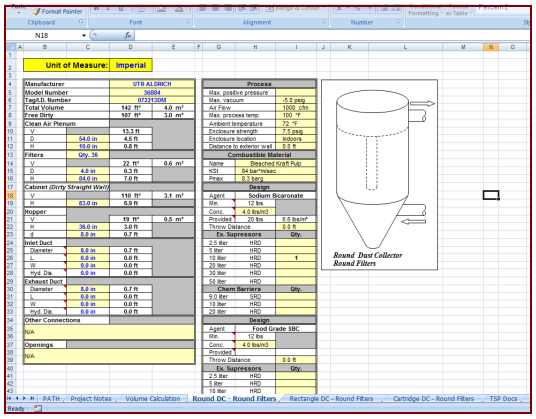

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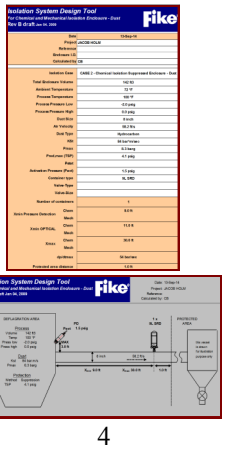

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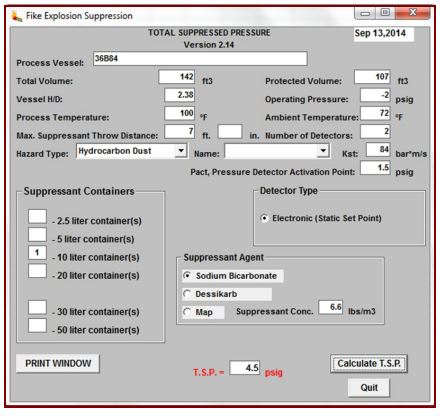

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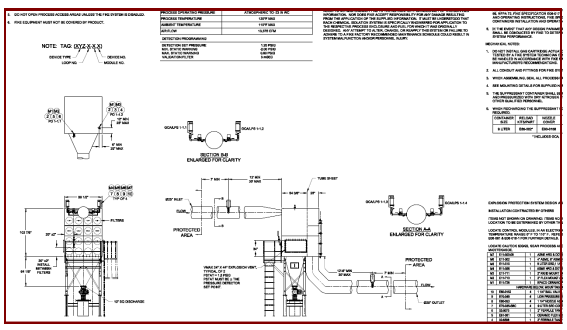

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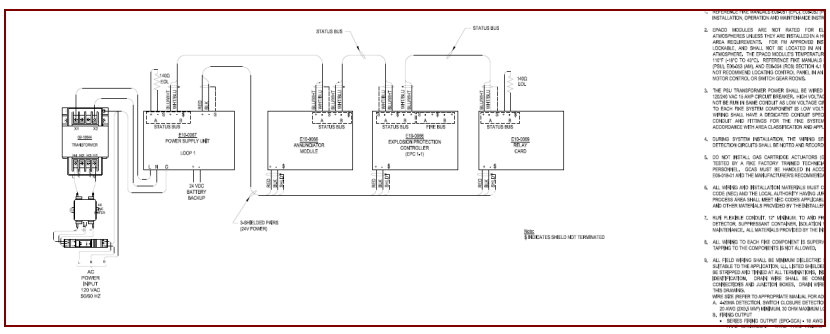

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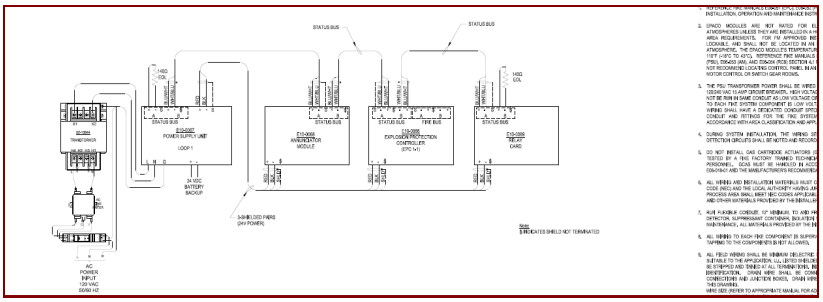
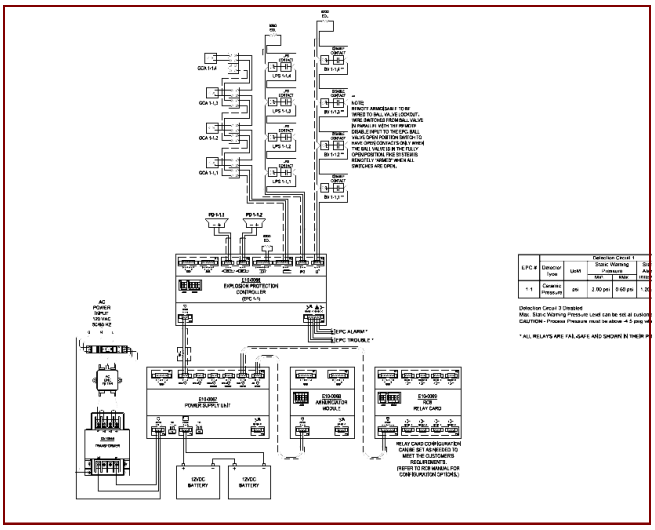
Mec-Tric Service and Commissioning

Mec-tric's Fike factory trained technicians have many years of training and experience involving explosion protection systems. Our commitment to keeping your systems working is second to none. We are well aware of the impact on factory production of explosion protection systems that are down or in need of service as well as the impact that these systems have on the overall safety of the plant in which they are safeguarding. NFPA 69 provides guidance for active systems. Our technicians provide on call support as well as phone support to keep your explosion protection systems in operation. We stock many parts required to keep the systems in operation as well as Explosion Protection system knowledge and Fike support.



Fike Module Schematic



Fike Wiring Schematic

Fike EP Modules

Fike HRD containers (vessel suppression)

Fike SRD container (duct isolation)

Fike HRD container

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