

## Explosion Protection Requirement Summary



- ❖ Focused on efficient, effective and economical solutions
- ❖ Wide range of application experience regarding both filtration and pneumatic conveying system protection
- ❖ In-house explosion vent sizing

### Overview

As you may know, the Occupational Safety and Health Administration (OSHA) issued a Combustible Dust National Emphasis Program, directive number: CPL 03-00-006, effective October 18, 2007 which was reissued as number CPL 03-00-008 effective March 11, 2008.

This document contains policies and procedures for the inspection of workplaces that create or handle combustible dusts. The directive recommends that NFPA 654, "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids," NFPA 68, "Standard on Explosion Protection by Deflagration Venting," and NFPA 69, "Standard on Explosion Prevention Systems," be consulted for the design requirements associated with the explosion protection of process equipment. This process equipment includes, but is not limited to, bins, tanks, hoppers, silos, and dust collectors. The referenced standards include significant new responsibilities for the owners of en-

closures requiring explosion protection. We would like to review a few of these responsibilities with you while also exploring the manner in which these changes will affect the way Mac Process and yourselves, our valued customers, conduct business.

### Documentation

NFPA 68 and NFPA 69 each contain chapters regarding inspection and maintenance which include sections on required documentation, installation, and inspection. Specifically, these sections detail the information required to be kept up to date and on file by the owner for each protected enclosure. The following list is comprised of a portion of the information required by the NFPA standards. Please reference the specific standard applicable to the form of protection being used on your equipment for a complete listing.

- 1) Manufacturer data sheets/instruction manuals
- 2) Design calculations
- 3) General specifications

- 4) Vent closure or prevention system specifications
- 5) End user inspection/maintenance forms
- 6) User documentation of conformity with applicable standards
- 7) Combustible material properties test report
- 8) Process plan view
- 9) Process elevation view
- 10) Mechanical installation details
- 11) Electrical supervision (if provided) installation details
- 12) Process interlocks (if provided)
- 13) Event deflagration isolation requirements (if required)
- 14) Employee training requirements

Item (7) of the above list requires that a "Combustible material properties test report" be included with the required documentation. The information resulting from the material testing which is used in sizing the explosion vents are Kst and Pmax. Kst, as defined by NFPA 68, is the deflagration index of a dust cloud and is measured in bar-m/sec (pressure rise over time). Pmax is defined as the maximum pressure developed in a contained deflagration and is measured in bar. Section 6.1 and the explanatory material found in A6.1.2 make it clear that Kst and Pmax data for a specific application should no longer be determined by the use of general information found in charts, rather, the particular dust that will be introduced to the vented enclosure must be tested because, according to NFPA 68, these values can vary greatly from other samples of the same dust.

#### Testing & Sizing

Mac Process wants to help you and our other customers meet their obligations under these requirements. If your organization is not already familiar with a facility capable of providing the required combustibility testing, Mac Process will provide you with contact information for a well respected domestic laboratory capable of meeting your dust testing needs.

Once Mac Process has been supplied with the Kst and Pmax test values for the dust or dust mixture that is to be introduced to the Mac Process material handling equip-

ment, we can recommend what form of explosion protection should be used for the equipment in question (i.e. explosion venting, chemical suppression, chemical isolation, etc.). This recommendation would be based on variables such as the tested dust characteristics, type of equipment, and location of equipment within your facility. Finally, a copy of any sizing information that was generated by Mac Process during this process will be provided to you for use in the documentation packet as described above.

In the case that the actual material specific to the process in question is not available, such as the early planning and quoting stage of a project, the current standards allow for the explosion protection systems to be defined based on material characteristics for similar composition materials. This exception, however, does not absolve the customer/end user from attaining the test data specific to the process dust in question when the dust does become available. It is the responsibility of the customer/end user to verify that all variables used in the sizing of vent area will comply with NFPA standard requirements. In the case where the material test data is attained after the process has been put into operation and the level of explosion protection is found to be inadequate, Mac Process will assist the customer in bringing said equipment into compliance. In this case, however, Mac Process can not be held financially responsible for the required changes.

#### Conclusion

At Mac Process we are resolutely focused on delivering the most efficient, effective, and economically beneficial solutions in the industry. Our practical experience is invaluable in determining the most effective methods of managing combustible materials.

We would welcome the opportunity of discussing any questions you have in relation to explosion protection and/or discussing your requirements in greater detail. We look forward to working with you on this and any future projects that you wish to implement.

---

<sup>1</sup> OSHA CPL 03-00-008 can be viewed at [www.osha.gov](http://www.osha.gov)

<sup>2</sup> NFPA documents can be viewed at [www.nfpa.org](http://www.nfpa.org)

Mac Process Inc.  
7901 NW 107th Terrace  
Kansas City, MO 64153-1910  
T +1 800 821 2476  
F +1 816-891-8336  
[sales@macprocessinc.com](mailto:sales@macprocessinc.com)  
[www.macprocessinc.com](http://www.macprocessinc.com)