

SUPPLIERS' TIPS

How can I safely screen a combustible bulk solid material?

You can generally screen a combustible bulk solid material safely by ensuring that the screener is fully enclosed, operates under a blanket of pressurized nitrogen, and is equipped with an explosion-proof motor (or motors) and control panel. It should also be equipped with an anti-static grounding system and air-tight connections to upstream and downstream equipment. However, the Class, Division, and Group of the environment must be established, and the screening system designed and equipped accordingly, to ensure safe operation in any specific hazardous application.

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In order for a material combustion to take place, it requires fuel, oxygen, and an ignition source. Typically, if you can eliminate two of these three requirements, you'll be able to process the material safely. Additionally, you need to limit the creating any airborne dust, as these fine particles have the highest risk of combustion. To safely screen a combustible bulk solid, I'd recommend keeping the material in an inert atmosphere during the entire process. This means that you need to introduce nitrogen or argon directly into the feed source before even processing. Once the oxygen level is within the acceptable process parameters, you can begin to introduce material into the process. Ideally, you have nitrogen or argon purges in all collection chambers, the sieving machine, and in the feeder itself. You need an outlet boot for the oxygen to escape as the heavier gases will force the oxygen up and out of these ports. Oxygen meters should be placed in the sieving machine itself, the feeder, and especially in the fines collection chamber. Everything, including the operator needs to have a ground to it as well. This will eliminate the potential for their being a static spark (ignition). It's imperative to have all components of the machine grounded and to double check these grounds with a meter.

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Safely screening combustible materials can involve various methods, including:

Proper grounding. The screener must be properly grounded to prevent static buildup that can occur during processing. This may require multiple ground points or ground straps connected between screen decks on multilevel screeners. Ground straps should always be connected to a confirmed ground point and not to structures or other equipment that is assumed to be grounded.

Dust control. Venting the screening deck, if possible, will minimize the dust cloud formation that's the main contributing factor to dust explosions. Venting lines should be sized to minimize carrying velocity through the duct.

Inert gas. Displacing or reducing the oxygen levels within the screener with an inert gas such as nitrogen or argon can minimize the explosion potential since fire needs oxygen for combustion. When considering this option, special care needs to be taken to reduce the risk of oxygen deficiency to workers in the surrounding area. Oxygen level sensors that are worn on the individual or that are a part of the process room monitoring system are commercially available.

Vibration control. If applicable for the screener, only use the necessary level of vibration needed for efficient screening. This can help reduce the dust formation within the screener and possibly reduce the amount of static charge buildup.

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Equipment suppliers are a valuable source of information about equipment and processes. In light of this, each month we ask suppliers a question of concern to our readers. Answers reflect the suppliers' general expertise and don't promote the suppliers' equipment. If you have a question you'd like suppliers to answer, send it to Kayla Carrigan, Associate Editor, Powder and Bulk Engineering, 1155 Northland Drive, St. Paul, MN 55120; fax 651-287-5650 (kcarrigan@cscpub.com).