

# How can I protect my mill from tramp metal and other debris?

SUPPLIERS' TIPS

Determining the best way to protect your mill from tramp metal and other debris depends on the feed material, so you must first answer the following questions:

- What's the feed material's size, moisture content, oil or fat content, and bulk density?
- What feeding method are you using and at what material feedrate?
- Are you milling a grain, chemical, food, or industrial feed material?
- Besides tramp metal, what other debris is there? (Tramp metal can be removed with a magnet, while other debris must be removed another way.)
- What's the percentage of the tramp metal and other debris?
- What's the average size, moisture, and bulk density of the debris to be removed?

After answering these basic questions, your equipment supplier will be able to help you determine what equipment is needed to protect your mill.

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A mill can be protected from tramp metal and other debris by installing a circular vibratory screener upstream of the mill. Apertures in the screen should only be as large as necessary for a high percentage of on-size material to enter the mill. Tramp metal and other debris particles that are larger than the screen apertures can be ejected at a discharge spout for disposal. In addition, an inline metal detector positioned between the screener and the mill can remove on-size metal particles that have somehow passed through the screen.

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Protecting a mill from ferrous metal is typically done by placing magnets in transitions between the milling equipment and feeders. It's not uncommon to install several magnets throughout the process, from the beginning conveying line to the final process equipment. It's a good idea to check these magnets on a daily or weekly basis, depending on the amount of tramp metal that's typically found in the feed material. However, protecting a mill from nonferrous metal, such as stainless steel, copper, and brass, is typically done using metal detectors. The metal detectors operate in the material stream to remove tramp metal to a collector.

There are several other ways to remove tramp metal and debris. One method is to use an air separator, which works well if the debris you're removing has a higher density than your feed material. Air separators

move materials by air and gravity, causing the lighter feed material to flow with the airstream and the heavy tramp metal and debris to fall out into some type of collector. Another method is to use a screener or a scalper to remove debris and tramp metal. This works well if the feed material is a consistent size so the screen used can be slightly larger than the process material. However, if the tramp metal and debris is the same size as your process material, the undesirable materials will continue to flow through your system until some other means is used to remove the contamination. Any of these methods can be combined to provide full mill protection against tramp metal and debris.

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*Equipment suppliers are a valuable source of information about equipment and processes. In light of this, we occasionally 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 Alicia Tyznik, Associate Editor, Powder and Bulk Engineering, 1155 Northland Drive, St. Paul, MN 55120; fax 651-287-5650 (atyznik@cscpub.com).*