

GRIT REMOVAL IN LIME SLAKING SYSTEMS

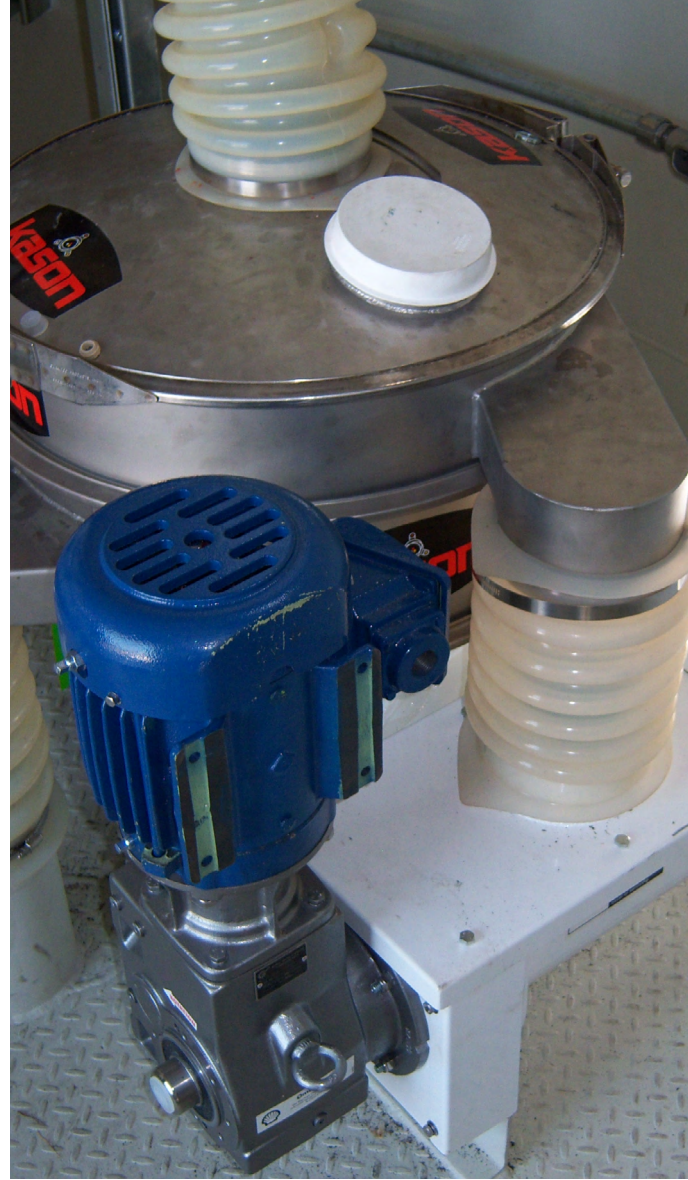
WHY USE A VIBRATORY GRIT SCREEN IN LIEU OF AN INCLINED SCREW?

Grit removal is an important step in the lime slaking process to reduce abrasion to your equipment when pumping and piping slurry. Effective grit removal (particularly for detention and paste slakers) can help extend equipment life, reduce scaling in pipes, and even improve the chemistry of the final slurry for certain applications. Finding an effective method for grit removal is particularly important when high-purity slurries are required.

WHAT IS GRIT?

In the production of quicklime, limestone (calcium carbonate) is fed through a kiln and calcined at extremely high temperatures to drive off carbon dioxide and form calcium oxide. If the heat does not fully penetrate the limestone pebble during this process, it leaves an uncalcined calcium carbonate core in the quicklime.

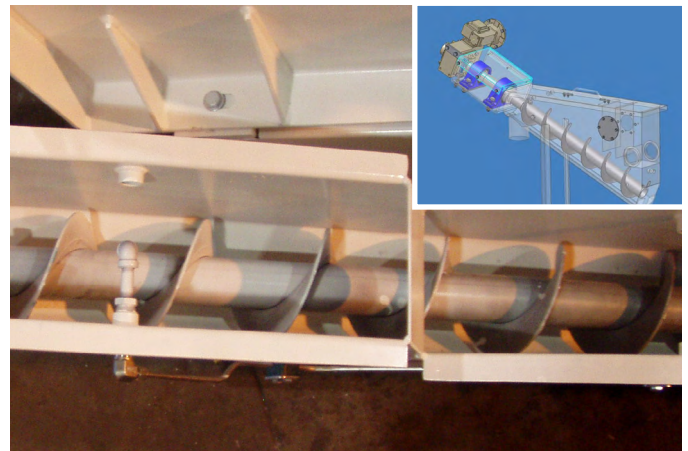
While a very small amount of calcium carbonate 'core' is healthy to leave in the quicklime to promote the lime's reactivity, when slaked, this core and other impurities present in the quicklime are unable to break down, resulting in grit. It is important to note that all commercially available quicklimes will have some amount of grit to remove.



GRIT REMOVAL METHODS

FOR DETENTION SLAKERS AND PASTE SLAKERS

Grit is a waste product that can reduce lime slurry reactivity and increase wear on equipment. To prevent this, grit must be effectively managed and disposed of before it can make it to your downstream process. Two of the most common types of grit removal systems are vibratory screens and inclined screws.



VIBRATORY GRIT SCREENS

As the name suggests, vibratory grit screen systems use vibrating screens with a specific mesh size to separate solids from solids-laden slurries. This process, called liquid scalping, removes oversized solids while allowing the on-size solids to pass through the screen and remain in the slurry. Depending on the need, installations can utilize single-deck or multi-deck screeners.

Depending on how pure a slurry is required, degritting screens can range from 16 mesh down to 60 mesh, although 16 mesh to 30 mesh screens are most common. Once separated, the grit exits the screener and is directed to a grit bin for disposal. The remaining slurry then flows through a slurry chute and into a tank for storage.

INCLINED SCREWS

Inclined screw systems operate on the principle that, in a liquid, larger solids will settle to the bottom, while finer particles remain in suspension. When using one of these systems in slurry production, the slurry must transfer into a secondary, unmixed chamber after slaking where the larger solids (the grit) are allowed to settle out of suspension.

To minimize agitation, these grit particles are then elevated out of the tank by slowly rotating an auger positioned at an incline from the base of the chamber. As this screw rotates, it lifts grit above the surface of the slurry and discharges it into a separate bin for disposal. Generally, inclined screw systems take up very little room, and are often used in coordination with a paste slaker.



ADVANTAGES OF USING A VIBRATORY SCREEN OVER AN INCLINED SCREW

When comparing vibrating grit screens and inclined screws for grit removal, there are a few considerations to take into account.

- **Accurate Size Separation:** In general, vibratory grit screens offer more accurate size separation compared to inclined screws which offer less precise control over what particles are removed.
- **Fine Grit Removal:** For applications that require high-purity slurries, vibratory grit screens are more effective at removing finer grit, which can be controlled by the mesh size used.
- **Protecting Downstream Equipment:** In the event of an upset condition, such as the slaker being overfed, there is a significant difference in impact when using a vibratory grit screen compared to an inclined screw.
 - When a screen is overfed, there is not enough time for the grit to be properly washed, causing some useful lime report to the grit bin. While this leads to some mess in the bin, it will still prevent the grit itself from impacting downstream processes.
 - When an incline screw is overfed, there is not enough time for the grit to settle and ultimately be removed by the screw. This scenario increases the chance that grit will overflow into the process itself, potentially damaging tanks, pipes, pumps, or causing plugging downstream.

EVALUATING YOUR NEEDS

Choosing the right solution for lime slaking and grit removal can depend significantly on your site and application needs. For clear technical guidance, contact our Carmeuse Systems team.

Our experts are well-versed in lime slaking systems and can help design a solution to meet your specific production requirements.



YOUR LIME HANDLING EXPERTS™

Carmeuse Systems is your trusted partner for designing, integrating, and upgrading lime handling systems. As part of the Carmeuse Group, our teams have unrivaled expertise in understanding the role of lime handling equipment within your operation. From selecting the appropriate raw material, to system engineering, enhancements, and maintenance, our teams provide End-2-End support and guidance. We make complex projects seem simple and help our customers every step of the way. Let's start a conversation, contact us at:

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