

THE LIMESTONE PROCESSING

HANDBOOK



FROM THE FEECO
MATERIAL PROCESSING SERIES

FEECO
INTERNATIONAL

TOMORROW'S PROCESSES, TODAY.

FEECO.com

CONTENTS

INTRO

About FEECO 1

Intro to Limestone..... 3

Types of Lime 3

Pelletized Lime vs. Alternatives 4

PROCESSING

Limestone Material Characteristics..... 8

Pelletizing Limestone..... 9

The Benefits of Adding A Pin Mixer to a Limestone Pelletizing System..... 11

Drying Limestone 12

A Look at Limestone Handling Systems 14

CONSIDERATIONS

Challenges in Processing Limestone..... 17

Limestone Process & Product Development 18

Additional Resources 20

The FEECO Commitment to Quality..... 21

Introduction

FEECO International was founded in 1951 as an engineering and manufacturing company. We quickly became known as the material experts, able to solve all sorts of material processing and handling problems, and now serve nearly every industry, from energy and agriculture, to mining and minerals.

As experts in the fields of particle size enlargement and thermal processing, FEECO has been an expert in limestone processing since the 1950s. We've helped our customers process hundreds of materials into value-added products, eliminating handling and transportation problems, improving product characteristics, and creating marketable products.

For further information on our limestone processing capabilities, [contact a FEECO expert](#) today.

FEECO US Headquarters

3913 Algoma Rd. Green Bay, WI 54311, USA

Phone: (920)468.1000

[FEECO.com/contact](https://www.feeeco.com/contact)

Find us on:



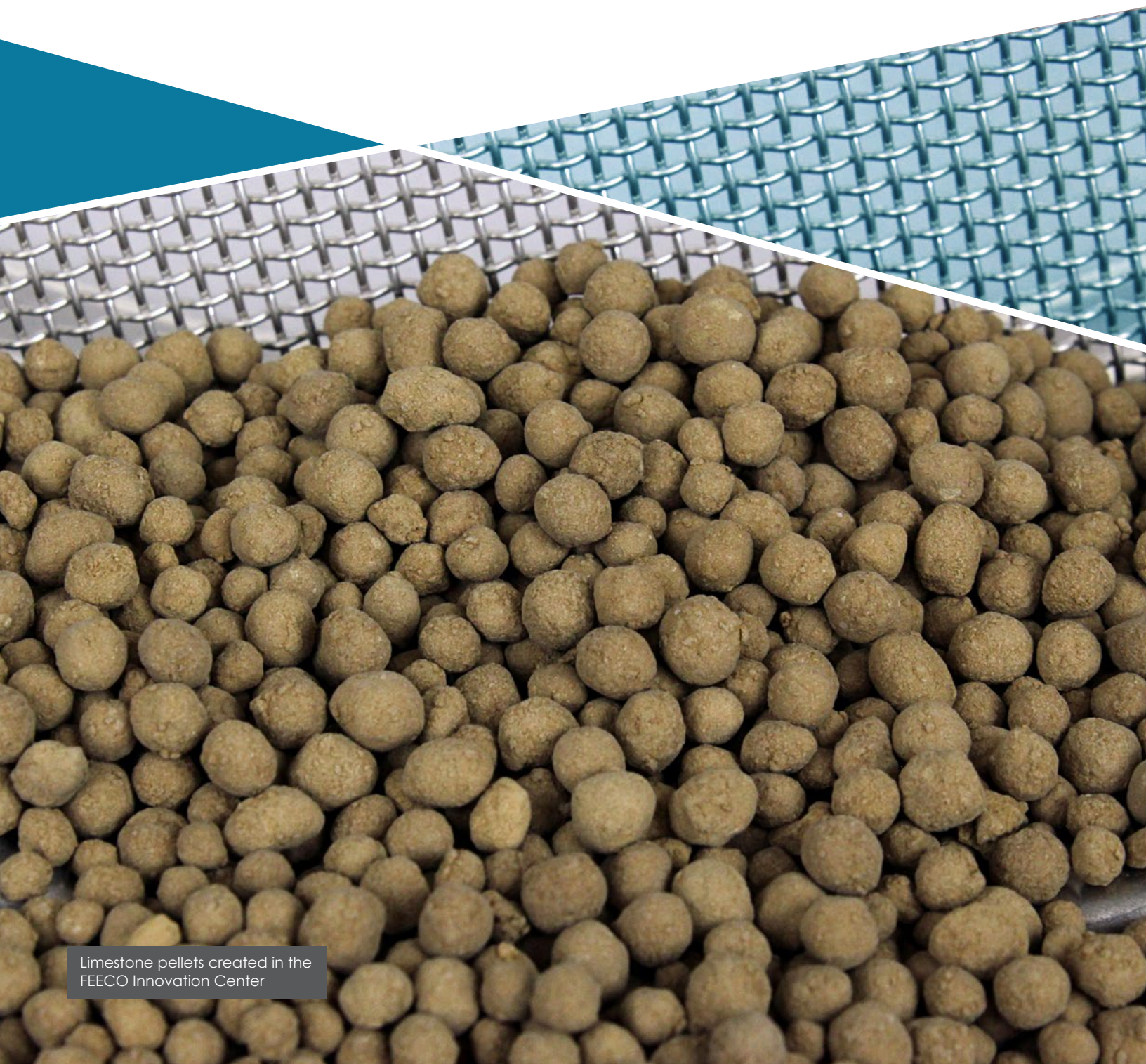
DISCLAIMER

FEECO is committed to publishing and maintaining this Handbook. As we continue to grow and evolve, information in this document is subject to change without notice. FEECO does not make any representations or warranties (implied or otherwise) regarding the accuracy and completeness of this document and shall in no event be liable for any loss of profit or any commercial damage, including but not limited to special, incidental, consequential, or other damage.

Please note that some images may display equipment without the proper safety guards and precautions. This is for photographic purposes only and does not represent how equipment should be properly and safely installed or operated. FEECO shall not be held liable for personal injuries.

An Overview of **LIMESTONE**

INTRO | TYPES OF LIME | PELLETIZED LIME VS. ALTERNATIVES



Limestone pellets created in the
FEECO Innovation Center

AN INTRO TO LIMESTONE

Limestone is a sedimentary rock, primarily made up of calcium carbonate (calcitic limestone), or a mix of calcium carbonate and magnesium carbonate (dolomitic limestone). Found abundantly throughout the world, limestone has been used for centuries in a variety of applications, including aggregates, building materials, and soil amendments, among others.

This handbook focuses on processing limestone for use as a soil amendment—a topic that has garnered an increasing amount of attention as of late.

Soil pH naturally becomes acidic over time, locking up nutrients and making them unavailable for plant uptake, resulting in reduced yields and compromised plant health. Limestone's high calcium content makes it an effective way to neutralize soil pH and again unlock nutrients for plant uptake. For this reason, limestone is commonly used as a soil amendment in everything from large-scale agricultural applications, to small farms, and even consumer lawn and garden products.

Limestone use in agricultural and professional turf settings has become an industry in itself, with many types of lime products available. As with any industry though, the limestone industry has evolved over time. The problems that traditional limestone products have presented, such as delayed results, dust issues, and the like, have resulted in the demand for a product that is more easy to handle, transport, and apply, as well as something that provides quick, but lasting results, and does not incur wasted product lost as dust.

All of these issues have prompted the development of a premium limestone product: pelletized lime. In fact, many ag operations and turf professionals are quickly learning why limestone pellets are both a problem-solving product and a beneficial game-changer when dealing with soil pH-related issues. And with the development of this sought-after product, processing limestone into a pelletized product has become a popular topic, with many questions to answer and options to explore.

If you're considering pelletizing your limestone into a premium soil amendment product, the following text will provide an overview on the benefits of pelletizing limestone, the processing methods used in limestone pelletizing, and challenges faced in processing.

TYPES OF LIME

Before highlighting the benefits of pelletized lime, let's first review commonly used lime products. There are a variety of lime products on the market, and while they each have their own advantages and disadvantages, as you'll see, pelletized lime outperforms them all.

AG LIME

Agricultural lime, or ag lime, is a crushed, coarse limestone product used in agricultural applications. This type of lime can take years to break down, delaying nutrient delivery and making field conditions difficult to predict.

POWDERED LIME

Powdered lime is created when crushed limestone



Limestone pellets created in the FEECO Innovation Center

rock is further processed into a finely ground, powdered product. While this allows for faster nutrient delivery, it increases dusting and is more difficult to accurately apply.

QUICKLIME

Quicklime is created when limestone is heated. Quicklime raises pH very quickly, but can damage plants if used at incorrect application rates, or at times of the year when plants are sensitive. Also, it can be potentially harmful to people, so application needs to be managed with care.

HYDRATED LIME

Hydrated lime is created when water is added to quicklime. This product also raises pH quickly, but again, can be harmful to plants and people if not used correctly and applied with care.

LIQUID LIME

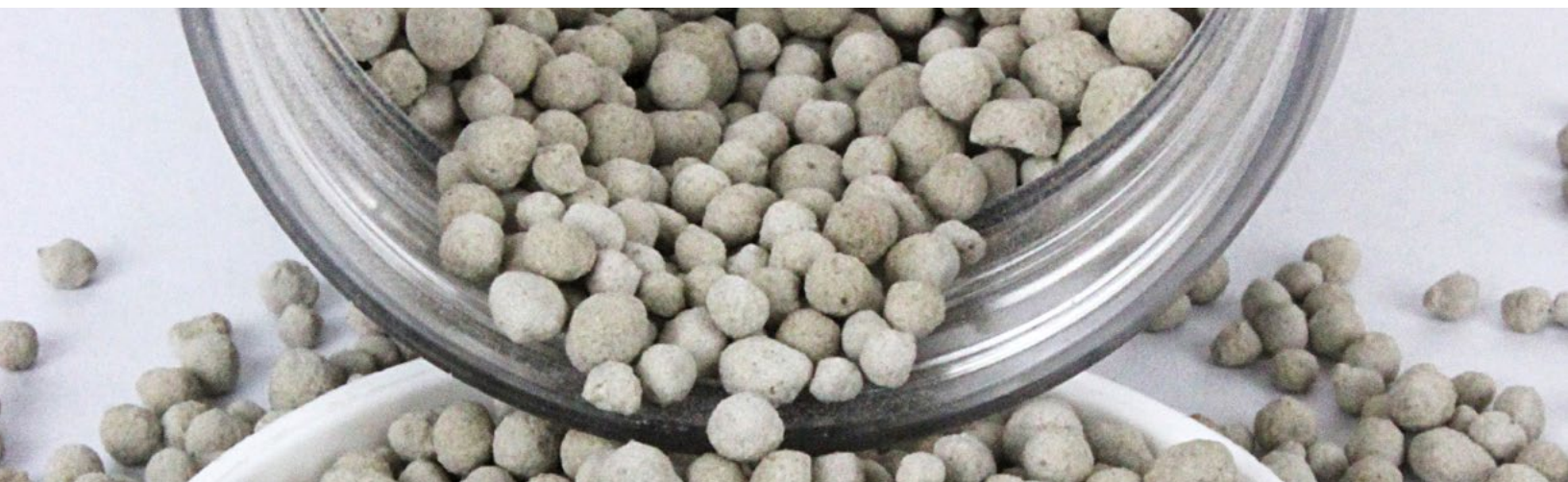
Liquid lime is a mixture of lime and water. Liquid lime incurs higher application costs, because both water and lime are being transported. Growers using this product often experience under-liming and require more frequent lime applications.

PELLETIZED LIME VS. ALTERNATIVES

Lime's ability to effectively alter soil conditions is directly related to the applied product's size and the quality of limestone being used. Smaller particles create an increased total surface area exposed to the soil's acidity, providing the necessary neutralization benefits to raise soil pH and improve soil conditions. Smaller particle size also contributes to faster breakdown and neutralization results versus other lime applications. So what does this mean for the aforementioned lime amendments most often used in agricultural operations?

PELLETIZED LIME VS. AG LIME

For ag lime, its inconsistent sizing and coarse particles require more time to break down, usually 3-5 years, making results difficult to anticipate and optimum crop production slow to occur. While pelletized lime is easily spread with most spreaders, ag lime requires a specialty spreader. This may not be an issue for large-scale operations, but for smaller operations, the purchase of an ag lime spreader for use every few years is typically not cost-conducive. For this reason, small- to mid-size operations often hire a professional



to come in and spread ag lime. In comparison, pelletized lime can be uniformly applied with traditional standard spreaders, as well as blended with other fertilizer products, making it the easier and more efficient choice.

PELLETIZED LIME VS. POWDERED LIME

When comparing pelletized lime to powdered lime, the major difference comes down to ease of handling. While both pelletized and powdered lime utilize finely ground material to break down quickly, powdered lime is dusty, and as such, is challenging to transport, and difficult to accurately apply. It can also blow into undesired areas and render applications messy and ineffective. In comparison, pelletized lime was created as a solution to the issues posed by powdered lime. By pelletizing the powdered lime, material applications are made easier and dust-related issues are eliminated.

PELLETIZED LIME VS. OTHER LIME PRODUCTS

As mentioned, quicklime and hydrated lime may deliver rapid results, but they can be damaging to plants and harmful to those handling it. These types of

lime can even burn existing plants and root systems, and therefore are often applied when plants are not in the ground. Safety precautions must be taken to avoid exposure to the skin and eyes of those handling and applying the lime. In addition, these types of lime often come in the form of powder, so the problems associated with powdered lime apply here as well.

The chart on the following page summarizes the benefits and effectiveness of pelletized lime in comparison to other lime products. As can be seen, the best lime solution for agricultural operations is pelletized lime. While all lime application products work to improve soil conditions, pelletized limestone is the quickest, most consistent, and most effective solution for raising soil pH. Even better, the benefits incurred from a small particle size are maintained in pelletized lime, because the pellets break down easily. The consistent pellet size also allows for accurate applications and easy-to-anticipate neutralization results. In addition, handling issues associated with powdered lime, quick lime, and hydrated lime are prevented, because limestone pellets are easy to transport and apply.

Other pelletized lime benefits include:

- Increased nutrient absorption
- Improved water retention
- Bigger root systems in plants
- Reduced soil erosion
- Decreased occurrence of soil crust formations
- Maintained soil aggregate structure

ENHANCED PELLETIZED LIME

In addition to the benefits that pelletized lime naturally offers, the process of pelletizing lime offers the opportunity to create an enhanced, premium product. Additives such as micronutrients, polymers, and organic

acids can be added during processing to create an all-in-one pellet that contains everything needed to meet desired crop production needs. All of these can help in creating ideal conditions for lime and nutrients to be absorbed, providing fast and lasting results.

With so many benefits and improvements, it's no wonder why countless agricultural operations have turned to pelletized limestone to solve their soil pH issues.

TABLE: PELLETIZED LIME VS. ALTERNATIVES

The following chart summarizes the key differences between pelletized lime and the two most common alternatives: ag lime and powdered lime. *Note: Hydrated lime and quick lime were not included in this chart, because pelletized lime is most commonly compared with ag lime and powdered lime.*

	Pelletized Lime	Ag Lime	Powdered Lime
Easy to Apply	●		
Quick Nutrient Delivery	●		●
Easy to Transport	●	●	
Suitable for Garden Applications	●		●
Suitable for Agricultural and Commercial Applications	●	●	●
Reduced Dust Issues	●	●	

LIMESTONE PROCESSING

MATERIAL CHARACTERISTICS | PELLETIZING | PIN MIXER PROCESSING | DRYING
MATERIAL HANDLING



Limestone pellets created in
the FEECO Innovation Center



LIMESTONE MATERIAL CHARACTERISTICS

While pelletizing limestone may be a fairly straightforward process, there are a number of material characteristics to contend with before a quality limestone pellet can be produced. The following material characteristics have key influences on the limestone pelletizing process:

1. ABRASIVENESS

Mined limestone is abrasive as a raw material. As a result, robust equipment is needed in order to withstand the rigorous processing of a limestone pelletizing operation.

Various customizations may be recommended for different processing equipment in order to withstand the abrasion of limestone processing.

2. VARYING COMPOSITION

Limestone can vary considerably in texture, porosity, and composition. All of these issues can have an effect on the limestone pelletizing process. For this reason, testing is recommended to define the best processing methods and confirm process specifications,

such as how the material will react with the binder, or how much binder will be required for optimal agglomeration.

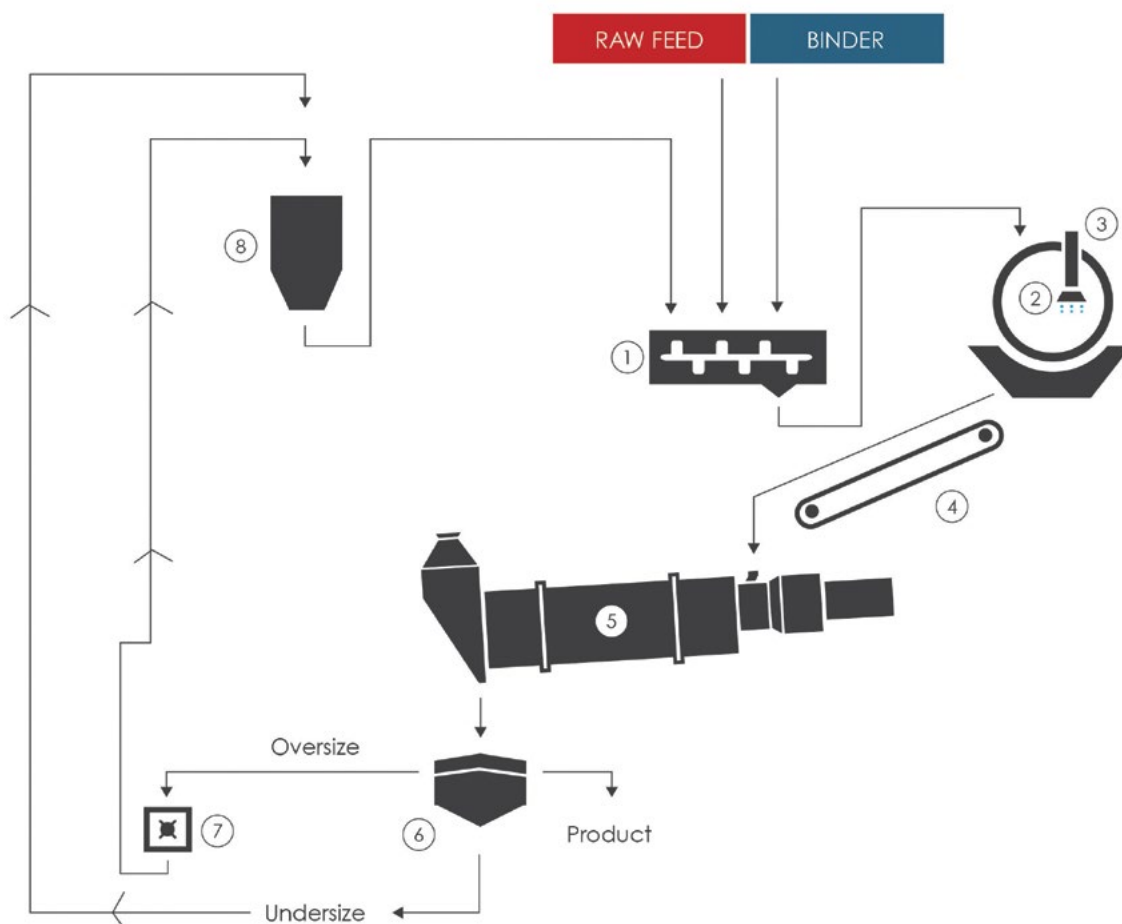
3. CLUMPING

Powdered limestone can tend to clump if not properly dried, which is why many limestone manufacturers utilize a drying process before storing the material. Clumping can also occur during drying of the final pellets, so a knocking system may be necessary to dislodge any potential clumping within the rotary dryer.

4. QUALITY

While quality may not have a direct effect on the processing of limestone, it does have a considerable effect on the end product. Low-quality pelletized lime products reduce the advantages that are sought after when selecting a pelletized lime product. For example, inconsistent pellet sizes in low-quality pelletized lime may create issues with application accuracy. In addition, the calcium content of the raw limestone plays a major part in product quality and effectiveness. Therefore, it is always important to not only start with a quality raw lime, but also to have a process that produces a high quality, uniform product.

FLOW DIAGRAM OF A TYPICAL LIMESTONE PELLETIZING PROCESS



PELLETIZING LIMESTONE

Pelletizing limestone has proven to be an effective solution to many of the problems presented by more traditional forms of lime. But exactly how does lime go from a finely ground powder to a premium pellet product? The following steps outline a typical pelletizing process and the limestone processing equipment used.

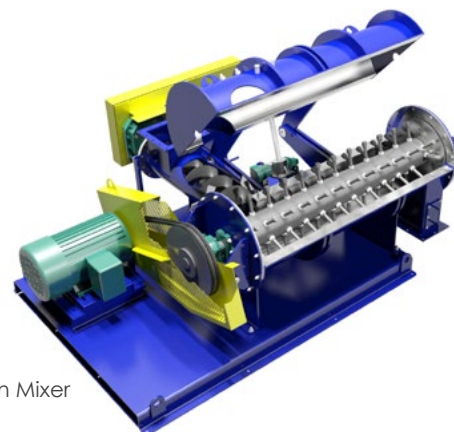
PRECONDITIONING

Mined limestone is first crushed into a fine powder. If necessary, a rotary dryer is used to dry the mined limestone before it is crushed. Next, a raw material feed bin is used to introduce the crushed limestone to a pin mixer, where a liquid binder is applied, and the mixture is put through an

DIAGRAM KEY:

1. Pin Mixer
2. Disc Pelletizer
3. Liquid Spray System
4. Transfer Conveyor
5. Rotary Dryer
6. Vibrating Screen
7. Oversize Mill
8. Surge Hopper

intense spinning action, resulting in a densification within the material and a reduction of air and water volume between particles. While pin mixers are not always used, systems that employ a pin mixer will enjoy a higher throughput, use less binder, and yield more on-size pellets. In processes where this preconditioning step is not utilized, crushed limestone is fed directly onto a disc pelletizer and binder is applied.



FEECO Pin Mixer

PELLETIZING

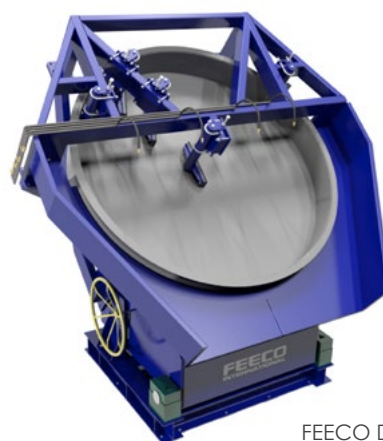
The limestone is fed onto a [disc pelletizer](#) where it undergoes tumble growth agglomeration. Here, as material and moisture are continuously fed at a controlled rate, the limestone fines roll against themselves, creating and “growing” pellets, similar to rolling a snowball. Once pellets have reached the desired size, they exit the disc.

DRYING

The limestone pelletizing process adds moisture to the pellets, making drying a necessary step before storing or bagging the product. [Rotary dryers](#) are a common drying choice due to their efficiency and ability to handle a high amount of volume and variability in feedstock. Flights within the dryer lift and cascade the limestone pellets as they travel through the dryer’s rotating drum to create optimal heat transfer. Similarly, if cooling is required, a rotary cooler is also commonly used. This equipment provides the same lifting and cascading motion as a rotary dryer, but reduces the temperature of a product using a counter-current, chilled air stream. Other drying and cooling equipment options include fluid bed dryers and fluid bed coolers.

FEECO PIN MIXERS AT A GLANCE

SIZE	15" - 50" (380 - 1,270mm)
CAPACITY	500 lb/hr - 70 TPH
CUSTOMIZABLE?	Yes



FEECO Disc Pelletizer

FEECO DISC PELLETIZERS AT A GLANCE

SIZE	6' - 25' (1.8 - 7.5m)
CAPACITY	1 TPH - 100 TPH
CUSTOMIZABLE?	Yes

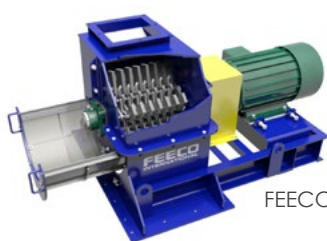


FEECO Rotary Dryer

FEECO ROTARY DRYERS AT A GLANCE

DIAMETER	3' - 15' (1 - 4.6m)
CAPACITY	1 TPH - 200 TPH+ (1 MTPH - 181 MTPH)
CUSTOMIZABLE?	Yes

Once the material is dried and/or cooled, the limestone pellets are screened by size. Under-size pellets go back into the process as feedstock, while over-size pellets are crushed and added back into the process as recycle. Optimally sized limestone pellets move on to bagging, storage, or transport. A [hammer mill](#)—a size reduction device—is frequently used for crushing over-size granules so they can be worked back into the process as recycle.



FEECO Hammer Mill

IMPORTANT LIMESTONE PELLETIZING ELEMENTS

While there are a number of factors that can have an effect on the success of a limestone pelletizing operation, the two most influential factors are typically binder and equipment.

BINDER

Limestone pelletizing requires a binder in order to achieve proper pellet strength. A binder assists in pellet formation, and also helps to create an end product with the desired crush strength. When it comes to pelletizing limestone, lignosulfonate is the most commonly used binding agent. If only water were to be used as a binder, the resulting limestone pellets would be weak. Both calcium-based and ammonium-based lignins are commonly used; the calcium-based lignin adds extra nutrients, while the ammonium-based lignin is a more economical choice.

EQUIPMENT

Quality equipment is a must in order to produce the best pelletized limestone product. Equipment designed around the unique processing requirements of limestone, instead of a one-size-fits-all approach, will produce the best results. Additionally, modifications to accommodate the rigors of limestone processing are often necessary, such as abrasion-resistant pins to prevent accelerated wear on the pin mixer. Choosing quality equipment will not only aid in process efficiency, but will also result in less maintenance and downtime, as well as prolonged equipment life.

THE BENEFITS OF ADDING A PIN MIXER TO A LIMESTONE PELLETIZING SYSTEM

As mentioned, the use of a pin mixer in a limestone pelletizing process is not required, but the addition of a [pin mixer](#) to the process does offer a wealth of benefits. The major advantages that this approach yields are summarized here.

DE-DUSTING

Disc pelletizers are referred to as an “open system,” meaning the material is not contained, and therefore is free to escape into the air. As a dusty material, pelletizing limestone in an open system creates a messy, dusty, and potentially hazardous environment. The introduction of a pin mixer allows the fine powder to be de-dusted prior to entering the pelletizer. This is done by pre-blending the material with a majority of the required moisture before it hits the pelletizer. The material is then virtually dust-free before entering the disc pelletizer, so there is no dust to escape into the air during pelletizer processing.

INCREASED PRODUCTION

Adding a pin mixer to the pelletizing process also allows for increased production. Because moisture must be gradually added on a pan pelletizer, reaching the desired moisture level on this piece of equipment can take a fair amount of time. With a pin mixer, however, the majority of the moisture can be added to the process and uniformly blended, before it even enters the pelletizer. This means the limestone can spend significantly less time on the pelletizer, and the rate of production is then considerably increased.

DENSIFICATION / REDUCED BINDER USAGE

The mechanical energy of the pins rotating in a pin mixer naturally creates an increase in product density, yielding a stronger product. Because this densification is created through energy and not through the binder, less binder is required to reach the same density result. This translates into reduced binder costs.

IMPROVED BLENDING

Because a disc pelletizer is not intended to mix materials on the pan, often the distribution of binder throughout the material can be uneven. Adding a pin mixer prior to the pelletizer allows for thorough mixing of the binder with the material, resulting in more uniform pellets. This is particularly noted in final crush strength; relying on the pan pelletizer to mix the binder can yield varying crush strengths due to uneven distribution of binder. When material and binder are pre-blended in a pin mixer, end crush strength is much more uniform.

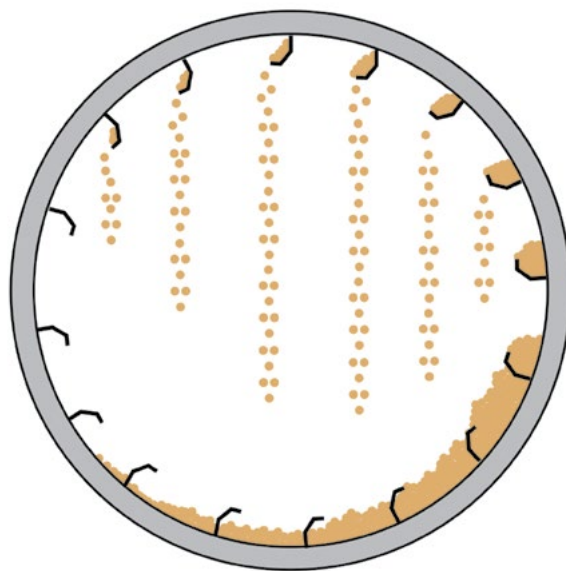


Diagram: The diagram above illustrates how flights create the curtain in a rotary dryer to maximize heat transfer.

DRYING LIMESTONE

Drying is an important step in limestone processing, both at the beginning, and the end. Limestone is dried when subsequent manufacturing steps require a reduction in moisture in order to pre-condition the material properly.



The most commonly used equipment for limestone drying is a rotary dryer. It can be used to dry both limestone ore and pelletized limestone. Also referred to as a limestone dryer, this piece of equipment is popular for use in many processing stages, because it is a reliable drying solution. The high volume functionality and robust build of a rotary dryer can easily withstand limestone processing demands. Additionally, the rotating motion and lifting flights within a rotary dryer not only ensure that the material is properly and evenly dried, but also offer the benefit of “polishing” the pellets—further rounding them as they tumble through the rotating drum. FEECO offers a variety of customizations for rotary dryers, including:

- Customized flight design and pattern
- Customized linings
- Thicker shells for abrasion resistance
- Special burner options that limit emissions such as NO_x and CO

An alternative to the rotary dryer is the fluid bed dryer, which uses pneumatic conveying to suspend limestone in a fluidized state. This exposes the entire

material surface and efficiently dries it. An advantage to using fluid bed dryers is that they are modular and smaller than rotary dryers. However, they are unable to polish granules and cannot accept variability in feedstock, making them incompatible with many applications.

LIMESTONE DRYING BENEFITS

The drying process accomplishes many benefits for limestone, such as:

ENHANCED PRODUCT QUALITY: Preconditioning a material for subsequent manufacturing stages creates a better final product. By correctly preparing the material at the very beginning, manufacturers ensure better limestone processing and improved production at every stage.

IMPROVED PRODUCT HANDLING: Drying limestone ore removes moisture from the surface by hardening the material and avoiding equipment congestion in future steps. For powdered limestone, limestone dryers prevent issues such as clumping, making it easier to store and handle.

A LOOK AT LIMESTONE HANDLING SYSTEMS

While most focus is given to the main pieces of equipment in a limestone processing operation, the handling system also plays an important role in assuring that the process runs smoothly from one step to the next. As a heavy, abrasive mineral, limestone requires a material handling solution that offers flexibility, automation, and robust construction.

Limestone is not unlike other minerals that require an engineered handling solution. In particular, its varying composition can present challenges, making a one-size-fits-all handling system inadequate when it comes to the demands of limestone. Systems designed around limestone's challenging characteristics, as well as the unique characteristics of the particular limestone source being processed, will produce the most reliable and efficient results. Common pieces of limestone handling equipment include:

BUCKET ELEVATORS

[Bucket elevators](#) are commonly used in limestone processing to transport limestone vertically. Bucket elevators are robust, and able to handle high capacities, making them ideal in a limestone processing setting. Various types of bucket elevators are available, including slow speed, continuous style in either single or double chain type, and higher speed centrifugal chain style.

BELT CONVEYORS

[Belt conveyors](#) are the backbone of a limestone handling operation, filling in the gaps and transporting material from one stop to the next, as well as to



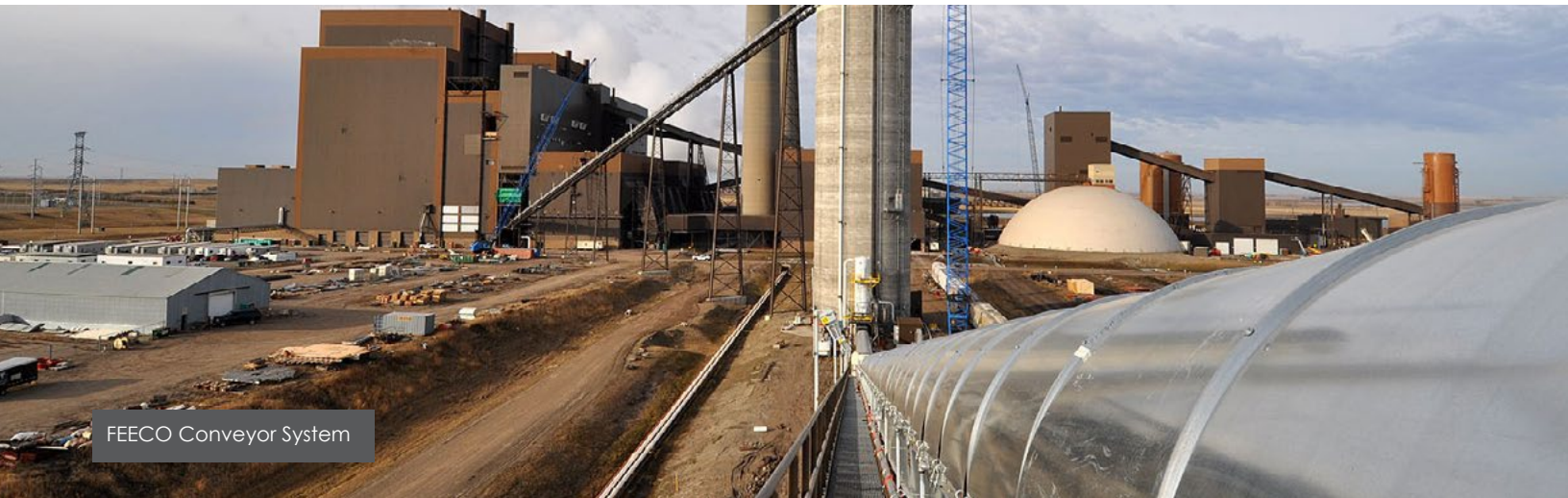
storage, transport, and shipping. Various options are available for customizing belt conveyor systems, including belt trippers, belt cleaner systems, and loading skirtboards.

BELT TRIPPERS

[Belt trippers](#), or tripper conveyors, increase flexibility in a limestone processing operation. While a conveyor alone transports limestone from one end of the conveyor to the other, a tripper allows limestone to be discharged at any point, or at multiple points, along the conveyor. This is particularly valuable for creating long, continuous piles of limestone in either “inside” or “outside” storage settings.

BELT FEEDERS

[Belt feeders](#) consist of a slow speed conveyor belt on rollers, and allow limestone to be discharged at a controlled rate, from a hopper or bin, into the process. Belt feeders can accommodate a wide range of capacities, and are available in many different belt widths.



FEECO Conveyor System

While it varies per manufacturer, there are a variety of options available for customizing material handling equipment to suit the challenging needs of limestone. This might include specialty alloys for construction, or reinforcing areas of equipment that are particularly susceptible to abrasion, among others.

When looking at a handling system for a limestone processing facility, planning for the challenges that limestone presents will go a long way in designing a reliable limestone handling system.



FEECO Bucket Elevator

CONSIDERATIONS

CHALLENGES | PROCESS & PRODUCT DEVELOPMENT



Limestone pellets created in
the FEECO Innovation Center



The image above illustrates limestone's ability to clump during processing. It is also a prime example of what are often called "raspberries" in the agglomeration world; raspberry agglomerates are undesirable and are produced as a result of the gathering of smaller agglomerates into one large, weak agglomerate. This is often the result of a material being too sticky.

CHALLENGES IN LIMESTONE PROCESSING

Limestone processing problems are not unlike the challenges faced with other naturally occurring materials. In addition to abrasion and buildup, issues such as clumping problems and varying composition can cause challenges during processing.

BUILDUP

Limestone does not always build up, but depending on the structure of the limestone being processed, and the various elements that accompany it, it can pose a problem. When buildup does occur, it is commonly seen in places such as disc plow blades, the pin mixer discharge, and the flights at the front end of the rotary dryer. When buildup occurs, it's important to address it as soon as possible. Limestone buildup has the ability to wear down equipment parts if left untreated. In order to prevent limestone maintenance issues, consistent material buildup removal as part of an equipment's regularly scheduled maintenance plan is essential.

CLUMPING

As mentioned, limestone can tend to clump together. Fortunately, in addition to including a drying process to reduce clumping, there are additional solutions available to combat limestone clumping issues:

- **Material handling equipment** can also be used to correct material clumps. Screw conveyors, for example, use a flinging motion in their feed trajectory that naturally breaks apart material as it moves between equipment.
- **Anti-caking additives** are available in a variety of forms based on material characteristics and desired product results. A pug mill or rotary coating drum is used to apply the additive to the limestone mixture/pellets.

VARYING COMPOSITION

In addition to potentially causing buildup, the composition of limestone can have a direct effect on process variables, such as how well a material will agglomerate, or how much binder will be needed

Pellets under a microscope in the FEECO Innovation Center

to create desired product characteristics. And while varying composition in limestone sources cannot be prevented, there are ways to work around it; testing limestone in a facility such as the [FEECO Innovation Center](#) will help to predict the material's behavior in a process setting, as well as define process variables, confirm process success, and leave less chance for unforeseen issues after scale-up.

LIMESTONE PROCESS AND PRODUCT DEVELOPMENT

Limestone testing is frequently carried out in the FEECO Innovation Center for a variety of reasons. This may be to confirm the viability of an intended process, troubleshoot an existing one, develop a new product, or enhance the characteristics of an existing product.

No matter what the goal of testing, the Innovation Center offers customized testing solutions around the unique project objectives to give you the answers you're looking for.

For all types of testing, depending on the known information and what information the customer is looking to gather, the testing process typically starts at batch

scale, where small samples of material are tested to gather initial data and determine feasibility of the intended goal. Once batch testing has been successful, continuous pilot-scale testing can be conducted. This is a much larger scale test, where the process is tested as a continuous process loop.

As often limestone producers are looking to target a specific set of parameters, the Innovation Center can measure and adjust a variety of particle characteristics during the testing process. This includes:

- Attrition
- Bulk Density
- Compression
- Crush Strength
- Flowability
- Green/Wet Strength
- Moisture Content
- Particle Size Analysis
- Physical Characteristics
- Solubility
- Temperature



Limestone pellets created in
the FEECO Innovation Center

AUTOMATION

FEECO is a Rockwell Automation partner, providing integrated process control solutions, both as a service in the Innovation Center, and as part of a system purchase.

FEECO and Rockwell Automation process control solutions are provided with current technology, motor control centers, programmable logic controllers, and data collection systems with advanced technologies for reporting.

ADDITIONAL RESOURCES

For further information or reading on limestone, we have provided some additional resources below. Please note that the inclusion of any resource or company is not an endorsement and the views of that resource do not reflect those of FEECO International.

ASSOCIATIONS & PUBLICATIONS

The Agricultural Lime Association (ALA)

www.aglime.org.uk

International Plant Nutrition Institute: Nutrient Source Specifics

[http://www.ipni.net/publication/nss.nsf/0/38667381F317E4A2852579AF00767382/\\$FILE/NSS-18%20Lime.pdf](http://www.ipni.net/publication/nss.nsf/0/38667381F317E4A2852579AF00767382/$FILE/NSS-18%20Lime.pdf)

BOOKS

Lime and Limestone: Chemistry and Technology, Production and Uses

by J. A. H. Oates

ISBN-13: 978-3527295272

ABOUT FEECO

FEECO International, Inc. was founded in 1951 as an engineering and equipment manufacturer. We are recognized globally as an expert in industry-leading process design, engineering capabilities (including everything from process development and sample generation, to feasibility studies and detailed plant engineering), custom equipment manufacturing, and parts and service. We serve a range of industries, including fertilizer and agriculture, mining and minerals, power/utility, paper, chemical processing, forest products, and more. As the leading manufacturer of processing and handling equipment in North America, no company in the world can move or enhance a concept from process development to production like FEECO International, Inc.

The choice to work with FEECO means a well-rounded commitment to quality. From initial feasibility testing, to engineering, manufacturing, and parts and service, we bring our passion for quality into everything we do.





For more information on processing limestone, material testing,
or custom equipment, contact FEECO International today!

US Headquarters

3913 Algoma Road | Green Bay, WI 54311 USA

Phone: 920-468-1000

[FEECO.com/contact](https://www.feeeco.com/contact)