ABOUT
Since 1951, FEECO has been designing and supplying custom rotary dryers and coolers for industries around the world. Whether you’re looking for a single piece of equipment, or a complete system including the necessary exhaust gas handling and material handling equipment, we can offer you a customized solution, tailored to your processing needs. Advantages of a FEECO system include:

RUGGED, YET REFINED
You can rest assured when you purchase FEECO equipment, you’re getting a system that was built with longevity in mind. Our engineers work closely with our in-house fabricators to ensure everything is crafted just right. The conservative, robust design of our dryers yields a lifetime of reliable performance.

CUSTOM SOLUTIONS
What sets FEECO equipment apart from our competitors is not just the quality of craftsmanship, but the level of customization we offer. We look at our customers’ unique needs, from facility layout, to material characteristics, and process goals, in order to design a system that operates at optimal efficiency, and accomplishes exactly what the customer is looking for. Our familiarity with hundreds of materials allows us to provide you with the best solution possible.

WHO WE WORK WITH
FEECO’s expertise has been sought by everyone from start-ups to Fortune 100 companies seeking innovative solutions in process design, engineering, and manufacturing for a variety of industries. Some of these companies include:

COMMON MATERIALS:
- Aggregates
- Agricultural By-Products
- Animal Feeds
- Biomass
- Biosolids
- Fertilizers
- Gypsum
- Inorganic Chemicals
- Limestone
- Manure
- Metal Chips & Shavings
- Mining Ores & Concentrates
- Municipal Waste & Sludge
- Organic Chemicals
- Paper Sludge
- Plastic Pellets & Grains
- Potash
- Reclaimed Dust
- Rubber Pellets
- Salts & Sugars
- Sand
- Steel Mill Waste Sludges
- Urea Prills & Crystals

Mosaic
PotashCorp
3M
ADM
Unimin
Flexible processing solutions

“FEECO offers a unique perspective in processing bulk solids, because we can not only design a custom drying or cooling solution as a single unit, but we can also look at how the entire process functions as a whole, in order to provide the most efficient solution.”

- Shane Le Capitaine
FEECO Process Sales Engineer
**DIRECT ROTARY DRYERS**

Direct rotary dryers are the most common choice of equipment for drying bulk solids. These robust industrial dryers offer heavy-duty construction, efficient processing, and uniform results, even when working with variance in feedstock. When used with agglomerates, rotary dryers have the added benefit of polishing—further rounding pellets and refining rough edges.

Direct dryers rely on direct contact between the material and drying air. This direct contact, combined with the use of lifting flights, maximizes the heat transfer between the material and drying air, offering a highly efficient processing solution.

While all FEECO dryers are custom engineered around the material to be processed and the unique processing goals, the design of a direct unit can be somewhat standard. The 3D illustration above shows the build of a basic rotary dryer. Indirect units are also available.

**CAPACITY | 1 TPH - 200 TPH+ (1 MTPH - 181 MTPH+)**

**DIAMETER | 3’ - 15’ (1 - 4.6 m)**

**FEATURES**
- Specially designed lifting flights
- Heavy-duty design and construction
- Process and mechanical warranties
- Co-current or counter current design

**OPTIONAL COMPONENTS**
- Various Seal Options
- Knocking Systems
- Trommel Screen
- Liners
- Machined Bases
- Screw Conveyor Feeder
- Automatic Gear Lubrication System
- Exhaust Handling Equipment
- Various Burner Configurations
- Ductwork

**MATERIAL OPTIONS**
- Carbon Steel
- Stainless Steel
- Specialty Alloys
- Explosion Bonded
- AR Steel

**DRIVE OPTIONS**
- Chain & Sprocket
- Girth & Pinion Gear
- Friction Drive
- Direct Drive at discharge end

**FEATURES**
- Specially designed lifting flights
- Heavy-duty design and construction
- Process and mechanical warranties
- Co-current or counter current design

**MATERIAL OPTIONS**
- Carbon Steel
- Stainless Steel
- Specialty Alloys
- Explosion Bonded
- AR Steel

**DRIVE OPTIONS**
- Chain & Sprocket
- Girth & Pinion Gear
- Friction Drive
- Direct Drive at discharge end
When direct drying is not an option, FEEDCO offers state-of-the-art indirect dryers to suit your drying needs. Indirect dryers are similar in design to direct dryers, but instead of using direct contact between the material and drying air to reduce moisture, the heating medium is kept separate from the material to avoid contact between the two.

The drum shell is heated externally and fitted within a heat shroud. The material is dried through contact with the shell of the drum.

Indirect dryers offer three major distinctions when compared to direct rotary dryers:

1. When processing fine materials, an indirect dryer avoids the risk of entrainment. When processing in a direct dryer, fine materials can become entrained in the drying air, and carried out to the baghouse. An indirect dryer avoids this issue because there is minimal drying air moving through the drum.

2. Less exhaust air treatment is required. Because no drying air is moving through the drum, and the furnace exhaust is kept separate, significantly less exhaust air treatment is required.

3. Processing in an indirect dryer allows temperatures to be adjusted along the length of the drum, providing precise process control.
**DIRECT ROTARY COOLERS**

Similar to direct dryers, direct rotary coolers are the most common choice of equipment for cooling bulk solids. Heavy-duty construction, efficient processing, and uniform results are all benefits of working with a direct cooler.

Direct coolers rely on direct contact between the material and cooling air. This direct contact, combined with the use of lifting flights, maximizes the heat transfer between the material and processing medium, offering a highly efficient cooling solution. The feed end can be lined in order to protect from incoming hot materials.

While all FEECO coolers are custom engineered around the material to be processed and the unique processing goals, the base of a direct unit can be somewhat standard. The 3D illustration above shows the build of a basic rotary cooler.

Indirect water deluge coolers are also available.

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**CAPACITY**

- 1 TPH - 200 TPH+  
  (1 MTPH - 181 MTPH+)

**DIAMETER**

- 3' - 15' (1 - 4.6 m)

**FEATURES**

- Specially designed lifting flights  
  - Maximize the air-to-material contact
- Heavy-duty design and construction
- Process and mechanical warranties
- Counter current design

**OPTIONAL COMPONENTS**

- Various Seal Options
- Trommel
- Liners
- Machined Bases
- Screw Conveyor Feeder
- Automatic Gear Lubrication System
- Exhaust Handling Equipment
- Ductwork

**MATERIAL OPTIONS**

- Carbon Steel
- Stainless Steel
- Specialty Alloys
- Explosion Bonded
- AR Steel

**DRIVE OPTIONS**

- Chain & Sprocket
- Girth & Pinion Gear
- Friction Drive
- Direct Drive at discharge end
Indirect coolers, or indirect water deluge coolers, are a specialized type of industrial cooler used in applications where the processing environment must be tightly controlled, or when the material to be processed risks entrainment in a direct processing configuration.

This is commonly seen with fine or lightweight materials that could be picked up and carried out in the presence of an air stream. Similarly, materials that may oxidize or burn in the presence of a cooling air must be carefully processed in a controlled environment in order to avoid such issues.

Unlike their direct counterparts, indirect water deluge coolers avoid contact between the cooling medium and the material being processed. Instead, material is tumbled through a sealed rotating drum, which is externally bathed in cool water. The water cools the exterior of the drum, which in turn cools the material within.

A water collection system collects the used water and passes it through a heat exchanger to re-cool it if needed. It is then recirculated to the trough above the drum for reuse in the bathing process.

Indirect water deluge coolers are typically constructed of stainless steel in order to protect the drum from the constant exposure to water, which can result in corrosion. Specialty alloys can be employed at the inlet of the drum to accommodate materials that are coming in at especially high temperatures.
TYPICAL ROTARY DRYER & COOLER DATA

The chart below illustrates common rotary dryer and cooler data points. Please note that all FEECO equipment is custom engineered around the project at hand, and this data is only a general representation.

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>METRIC</th>
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</thead>
<tbody>
<tr>
<td>DIAMETER (FT.) LENGTH (FT.) CAPACITY (STPH)* HP</td>
<td>DIAMETER (M) LENGTH (M) CAPACITY (MTPH)* KW HEAT SOURCE (Dryer only) DRIVE SPROCKET OR GEAR</td>
</tr>
<tr>
<td>3’ 20-30 8 7 1/2</td>
<td>.9 6-9 7 5.5 Gas or Oil Sprocket</td>
</tr>
<tr>
<td>4’ 20-30 20 10-15 1.2 6-9 18 7.5-11 Gas or Oil Sprocket</td>
<td></td>
</tr>
<tr>
<td>5’ 20-40 30 15-25 1.5 6-12 27 11.0-18.5 Gas or Oil Sprocket</td>
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</tr>
<tr>
<td>6’ 30-50 45 25-40 1.8 9-15 41 18.5-30 Gas or Oil Sprocket</td>
<td></td>
</tr>
<tr>
<td>7’ 40-60 60 50-60 2.1 12-18 55 37-45 Gas or Oil Sprocket</td>
<td></td>
</tr>
<tr>
<td>8’ 50-70 80 75-125 2.4 15-21 73 55-90 Gas or Oil Sprocket</td>
<td></td>
</tr>
<tr>
<td>9’ 50-80 100 100-125 2.7 15-24 91 75-90 Gas or Oil Sprocket</td>
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<tr>
<td>10’ 50-80 125 100-200 3.0 15-24 114 75-150 Gas or Oil Gear</td>
<td></td>
</tr>
<tr>
<td>11’ 60-90 150 150-250 3.4 18-27 136 110-150 Gas or Oil Gear</td>
<td></td>
</tr>
<tr>
<td>12’ 60-90 180 200-300 3.6 18-27 164 150-220 Gas or Oil Gear</td>
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</tr>
<tr>
<td>13’ 70-100 210 250-350 4.0 21-31 191 185-260 Gas or Oil Gear</td>
<td></td>
</tr>
<tr>
<td>14’ 70-100 250 300-400 4.3 21-31 227 225-300 Gas or Oil Gear</td>
<td></td>
</tr>
</tbody>
</table>

*Varies with materials to be dried. Capacity based on 60#/Cu. Ft. granular fertilizer materials having up to 10% moisture removal.
CHAIN & SPROCKET DRIVE
Chain and sprocket drive assemblies are reserved for smaller drums, running up to 75 horsepower (55kw). This type of arrangement is typically not suitable for larger drums running above 75 horsepower, but is ideal for smaller jobs, as it is cost effective, and easy to run.

GEAR & PINION DRIVE
The gear and pinion drive assembly is best for heavy-duty applications running above 75 horsepower (55kw). While this type is more costly, it operates better in demanding applications and requires less maintenance.

FRICTION DRIVE
Friction drive assemblies are reserved for small applications requiring low horsepower. This is commonly seen with drums around 6’ (1.8m) and under. With a friction drive, two of the four trunnion wheels are connected by one shaft and driven by a shaft-mounted reducer and motor arrangement.

Direct drive assemblies are also available.
The FEECO Innovation Center offers a variety of testing options to simulate the conditions in continuous, commercial size dryers. Testing in the FEECO Innovation Center offers a host of invaluable information, allowing you to gain critical data on your material, work out process variables, and develop a recipe for process scale-up.

The FEECO Innovation Center can run tests in the dryer alone, or test your material as part of a continuous process loop such as an agglomeration or granulation process.

Our process experts can work with you to develop a customized testing program around the answers you’re looking for. Depending on your needs, the testing process can vary. In general, however, testing is typically carried out in two phases:

1. **Proof of Process** - A continuous testing phase that aims to establish the equipment setup and parameters required for continuous production of your specific material.

2. **Process/Product Optimization** - An in-depth study to optimize your specific material’s characteristics and/or production parameters in an industrial setting.

**FLIGHT DESIGN & PATTERN**
Both flight design and pattern are commonly customized in order to maximize drying efficiency. For this reason, it is common to test a variety of flight designs and patterns when designing a rotary dryer. The Innovation Center offers a flight simulator that can be utilized to test various configurations, confirming the most ideal design and pattern combination for the material to be processed.

**PARTICLE CHARACTERISTICS**
There are a variety of particle characteristics that can be measured and adjusted during processing to produce a product with ideal characteristics. The following properties can be measured and fine-tuned:

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

Questions That Can Be Answered Through Testing:

- Can my product be improved?
- What type of drying method best suits my material?
- Can my material be dried and still maintain the desired characteristics?
- What equipment configuration will be required to produce the results I’m looking for?
- How can I optimize my existing process?

Fly ash pellets created in the FEECO Innovation Center
TESTING EQUIPMENT
Whether you need to test a single piece of equipment, or you’re looking to try various configurations of multiple pieces, the FEEO Innovation Center is well-equipped to suit small batch tests, as well as continuous process loops. The following equipment is available for testing in the Innovation Center:

AGGLOMERATION

BATCH EQUIPMENT
- Disc Pelletizer
- Pin Mixers (2)
- SC Roll Compactor / Briquetter

CONTINUOUS EQUIPMENT
- Disc Pelletizers (2)
- Rotary Granulator
- Paddle Mixer/Pug Mill
- Pin Mixer
- Hammer Mill
- Rod Mill
- Prater Mill
- Rotex Screen – 2 deck
- Circular Screen
- Pipe Reactor
- Littleford Day Mixer
- Coating Drum

MATERIAL HANDLING

(ALL CONTINUOUS)
- Baghouse
- Combustion Chamber
- Direct or Indirect
- Parallel (Co-Current) Flow
- Removable Flights, Dams, and Bed Disturbers
- Thermal Oxidizer
- Water Quench Tower
- Wet Scrubber

OPTIONAL TESTING CONDITIONS & EQUIPMENT

- Baghouse
- Combustion Chamber
- Direct or Indirect
- Parallel (Co-Current) Flow
- Removable Flights, Dams, and Bed Disturbers
- Thermal Oxidizer
- Water Quench Tower
- Wet Scrubber

SUPPORT

BATCH EQUIPMENT
- Muffle Furnace
- Fluid Bed Sample Dryer
- Tray Oven

CONTINUOUS EQUIPMENT
- Steam Generator with Steam Tanks

ON-SITE SUPPORT
In addition to the equipment listed here, we are capable of making on-site, large-scale modifications to our facility in order to accommodate your testing needs, without the hassle of bringing in external contractors.

THERMAL

BATCH EQUIPMENT
- Rotary Kiln
- Indirect Kiln
- Rotary Dryer
- Flight Simulator

CONTINUOUS EQUIPMENT
- Rotary Kiln
- Indirect Kiln
- Rotary Dryer
- Fluid Bed Dryer, Cooler

DATA GATHERED

- Samples: Feed, Product
- Burner Fuel Usage
- Drum Slope
- Emissions
- Fan Speed
- Feed Rate
- Gas Sampling & Analysis
- Particle Size Analysis of Feed & Product
- Residence Time
- Rotational Speed
- Temperature Profiles
AFTERMARKET

We are an extension of your maintenance department. From start-up and installation support, to emergency services and preventative maintenance, FEECO offers a variety of services to help keep your equipment running at its best for years to come, whether your equipment is FEECO brand or otherwise. We offer the following services:

- Installation & Start-up Support
- Spare Parts
- Field Services
  - Tire & Trunnion Wheel Grinding
  - Drum Trunnion Training
  - Alignments
  - Gear Replacement
  - Spare Parts Installation
  - Laser Alignment
  - Inspections
  - Equipment Audits
- Training Programs
- Process Optimization Engineering
- 24-Hour Emergency Service

AUTOMATION AT ITS BEST

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. The FEECO Innovation Center features a Rockwell Automation PLC/MCC system, which utilizes current technologies for optimizing testing operations.

DATA IN REAL-TIME

Our system allows you to monitor, trend, and adjust various data points in real-time, all from a single interface or mobile device. This includes:
- Current (Amps)
- Fan Speed
- Feed Rate
- Flow Rates/Product Flow
- Fuel Usage
- Gas Sampling & Analysis
- Horsepower
- Speed
- System Pressure
- Temperature

UNPARALLELED REPORTING CAPABILITIES

A control system from Rockwell Automation provides state-of-the-art data collection and reporting capabilities. Our system allows you to select only the variables you want to report on, from the exact time frame you’re looking for. This is especially beneficial in the Innovation Center, allowing returning customers to pick up exactly where they left off.

FEECO can integrate third party equipment into your control system, giving you complete process tracking and visualization.

Secure remote access to the system provides unparalleled troubleshooting capabilities.
THE FEECO COMMITMENT TO QUALITY

With 65+ years of experience, FEECO International has provided full-scale process solutions for thousands of satisfied customers (including some of the world’s largest corporations, engineering firms, and start-ups). Cited in over 250 US patents, the name FEECO has become synonymous with innovation and the reimagining of efficiency. 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 aftermarket services, we bring our passion for quality into everything we do. FEECO International is in the process of working towards ISO 9001:2015 quality management system compliance, with the goal of achieving ISO 9001:2015 Certification within the next calendar year.