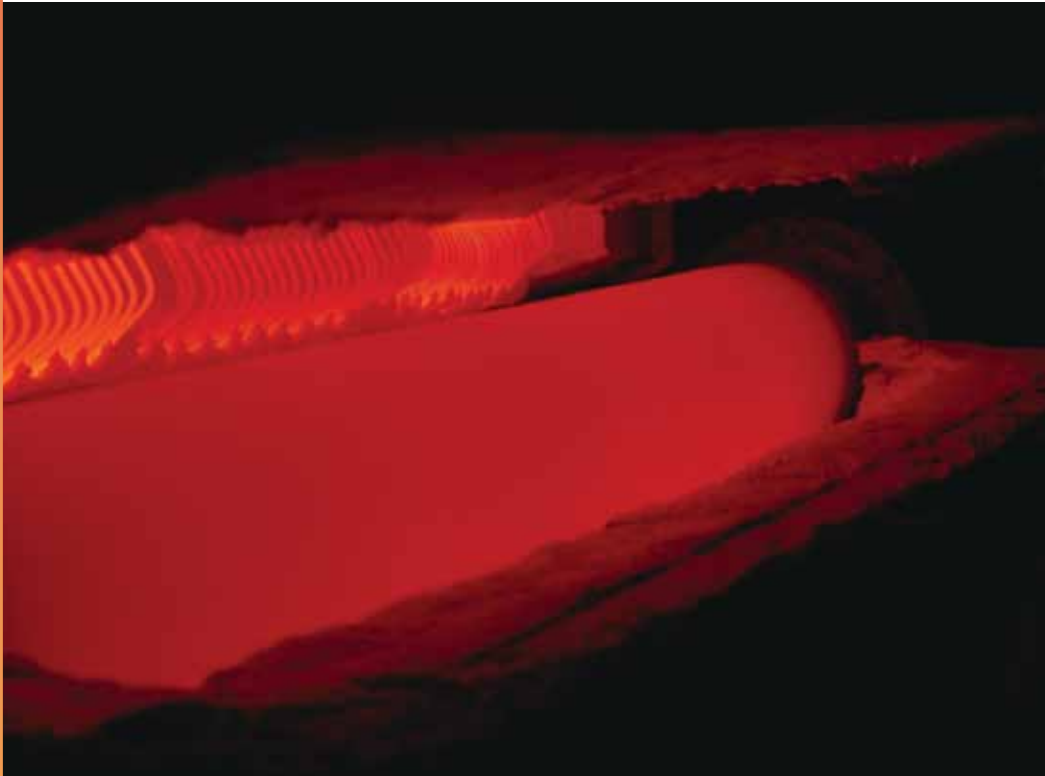




# CALCINERS



Calciner Shell at 2102° F (1150° C)

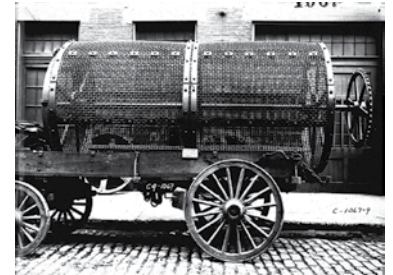
Calcination broadly refers to a process at elevated temperatures which effects a desired change in a given material. Calcining can include oxidation, reduction, removal of chemically bound water or other types of molecular change, crystal structural change or pyrolysis that converts a material's physical or chemical properties. Heyl & Patterson offers two types of Renneburg Calciners:

## Rotary Calciners

Calcining is typically used to process materials that are fine and dusty, sensitive to oxidation, combustible, explosive, potentially contaminating and thermally sensitive. The versatility of Heyl & Patterson's Renneburg Calciners makes them the ideal choice for a wide range of drying, calcining, chemical reactions and thermal desorption applications.

Renneburg Calciners continuously process bulk materials at medium to high temperatures, with an indirect heat source. Materials to be processed are introduced into a rotating shell, which is enclosed and heated from the exterior in a stationary furnace. This guarantees complete separation of heat source and product during processing. Separation is an important and valuable advantage in industrial operations such as catalyst manufacturing, hydrocarbon processing and chemical-making. The rotation and slope of the rotary shell motivates the material through the chamber from feed point to the discharge at the opposite end.

## Fluid Bed Calciners



Vintage Photo From Our Archive

## SPECIAL FEATURES

- Feed systems featuring closed hoppers or pressurized tanks
- Expandable and dust-tight seals for special atmospheres
- Custom internals for improved heat and mass transfer
- Plug flow operation for product uniformity
- Movement can be parallel flow or counter flow
- Dust collection systems
- Off-gas handling and collection systems
- Electric, fossil fuel or waste heat sources
- Heat zones to provide independent areas of control
- Integral coolers for product cooling prior to discharge

Each calciner is designed for your specific requirements and unique specifications.



Pilot Plant Lab Facility

### ADVANTAGES OF INDIRECT HEATING

- Efficient high-temperature processing
- Minimized equipment size and cost
- High-purity product with no contamination from heat source
- Fine materials easily processed without excessive product entrainment in gas stream
- Greatly reduced requirements for emission control or volatile recovery
- Maintain specific process atmospheres – inert, oxidizing, reducing, etc.
- Capability for temperature profiling of process
- No contamination from furnace exhaust to material being processed

### Specifications

- Operating temperatures up to 2200°F (1200°C)
- Specific process atmospheres – inert, oxidizing, reducing, dehumidified
- Co-current and counter-current material-to-gas flow designs
- Multiple heating zone configurations
- Designs from 4 inches to over 9 feet in diameter
- Units can be in excess of 75 feet in length

### Features

#### *Furnace Design:*

- Completely pre-piped and pre-wired NFPA-approved combustion systems or pre-wired electrical heating elements
- Split and flanged furnace casing for easy access to the furnace interior
- Multiple heating zones for uniform and tight temperature control

#### *Rotary Shell Design:*

- Full penetration shell welds, and thickened shell plate at tire and drive support locations
- Single-piece or split-flanged design for easy removal of furnace shell section
- Custom-designed internal shell components for maximum heat and mass transfer
- Shell material of construction selected to match process requirements

### Rotary Options

#### *Optimize the performance or service life of a rotary calciner with:*

- Various rotary seal designs for operation under positive or negative pressure
- Material feeding systems or equipment
- Internal bed temperature measurement systems
- Auxiliary/emergency drive systems
- Recuperative or regenerative burner systems
- Integral indirect water-spray cooler
- Lump-breakers, scrapers or anti-sticking devices
- Variable slope/speed capability
- Automatic lubrication systems
- Dust collection and emissions control equipment, including cyclones, baghouses, scrubbers, after-burners, etc.

## Unmatched Processing Advantages

Calciners represent a special approach to thermal processing. With indirect heat, these devices process powder and bulk materials at medium to high temperatures while maintaining complete separation from furnace flue gas.

The integrity of this separation imparts special, frequently unmatched processing advantages, which are valuable in catalyst manufacturing, waste recycling, hydrocarbon processing, torrefaction and chemical production.

Because the object of calcining is the processing of specialized materials, the applications tend to be highly specialized. Feeds can be designed to use hoppers or pressurized tanks. Seals can be added to develop positive flow control or maintain inert atmospheres. Pressurizing systems can be installed to produce atmosphere exchanges or controlled environments. Ducts or collection systems can be devised to capture gases or product.

Heyl & Patterson custom designs each Renneburg Calciner, incorporating the special requirements and features that are specific to each customer. Diameter, slope, rotational speed, capacity and volume are just a few of the complex variables that factor into the design of a calciner. Renneburg Calciners are designed for productivity, reliability and profitability.



Shipment of Renneburg Rotary Calciner

## ADVANTAGES OF FLUID BED CALCINING

- Fewer moving parts come in contact with product
- Process finer materials
- Extremely high surface area contact between fluid and solid per-unit bed volume
- High relative velocities between the fluid and the dispersed solid phase
- High levels of intermixing of the particulate phase
- Variable retention times by varying bed depth

## ALL HEYL & PATTERSON CALCINERS

### Materials of Construction

- Carbon steel
- Stainless steel
- Special alloys for corrosion resistance and/or high-temperature strength

### Heat Sources

- Natural gas, LPG or fuel oils
- Electric resistive heating elements
- Waste heat – furnace exhaust or boiler flue gas

	Agglomerator/Granulator	Calciner, Fluid Bed	Calciner, Rotary	Dryer, Flash	Dryer, Fluid Bed	Dryer, Rotary	Flail Mill	MultiDisc® Thermal Processor	Pug Mill	Screw Press
Agricultural			●		●	●		●		●
Alternative Fuels			●		●	●				
Biomass/Torrefaction			●	●	●	●				●
Ceramic		●	●		●	●		●		
Chemical	●	●	●	●	●	●		●		
Coal			●		●	●		●		
Environmental		●				●		●	●	
Fertilizers	●			●	●	●	●		●	
Food		●		●	●	●		●	●	●
Glass			●	●	●	●				
Metals			●		●	●		●		
Mining & Minerals	●	●	●	●	●	●	●	●	●	
Petroleum					●	●			●	
Plastics			●	●	●	●				
Pulp & Paper			●	●	●	●				●



## Safe and Secure

### *Minimizing Risks, Protecting Workers and Equipment*

We work diligently to ensure the utmost protection measures are incorporated into everything we do, and take advantage of a facility's available energy options for the utmost efficiency. The safety precautions built into our equipment collectively works against overall component failures, while shielding workers and equipment at optimum levels.

At Heyl & Patterson, we've been pioneering solutions for the chemical processing industry since 1887 – let our experience work for you. For further information, visit [www.heylpatterson.com](http://www.heylpatterson.com) or call today.



Renneburg Rotary Calciner