Dryers, Coolers and Calciners

Custom Engineered Products and Services
**Ultra Efficient**—Heyl & Patterson fluid bed dryers are among the most efficient and cost-effective dryers on the market. We have conventional designs available for powders and granular materials, as well as unique designs for materials which exhibit characteristics not normally conducive to fluid bed processing, such as sludges, filter cakes, agglomerates, etc. Factors such as particle size distribution and weight, starting and final moisture content, product temperature, drying air temperature, air velocity and retention time of the material in the dryer are considered in the specification of the dryer. Applications and designs can be tested in our testing facility.

**SPECIFICATIONS**

The specifications of your dryer will be customized to your particular application. Specifications include:

- Cylindrical design for back-mix flow, or rectangular design for plug flow
- Fluidized-media design for sticky, lumpy or otherwise hard-to-handle materials
- Sizes up to 18 ft. in diameter, or equivalent rectangular configuration
- Inlet gas temperatures up to 2200°F (1200°C)
- Stainless steel or high-temperature alloy bedplate, or refractory brick dome designs
- Variety of control systems available, from burner management only to complete PLC-based process control

**FEATURES**

Heyl & Patterson fluid bed dryers have several distinct features and benefits which make them particularly desirable for applicable processes, including:

- High thermal efficiency—maximum heat utilization of drying gas stream
- Completely pneumatic fluidization—no moving parts results in a very low-maintenance design
- Pilot plant testing available
- Relatively small equipment footprint
- Low initial capital cost
- Completely pre-piped and pre-wired NFPA-approved burner valve trains
- Uniform product quality
MATERIALS OF CONSTRUCTION

Based on the application, Heyl & Patterson will select the most appropriate materials for construction of the dryer. These materials include:

- Carbon steel
- Stainless steel
- Special alloys for corrosion or abrasion resistance

HEAT SOURCES

Heyl & Patterson will design and construct your equipment to utilize the heat source which best meets your requirements. Dryers can be:

- Direct-fired using natural gas, LPG, fuel oils, coal
- Indirectly heated using steam
- Heated by waste heat sources such as furnace exhaust or boiler flue gas

FLUID BED COOLERS

Fluid bed coolers are designed as stand-alone units or in combination with dryers including:

- Trough air swept design
- In-bedplate or pipe coils
- Evaporative water spray design

AVAILABLE OPTIONS

Features can be chosen which will optimize the performance or service life of your fluid bed dryer, including:

- Combined drying/cooling configurations
- In-bed heating or cooling coils for additional heat transfer capability
- Special abrasion- and corrosion-resistant designs
- Dust collection and emissions control equipment, including cyclones, baghouses, scrubbers, etc.

ABOUT FLUID BED DRYERS

In a fluid bed, the material being processed is suspended and completely surrounded by a rising gas stream causing the material to act like a fluid. Besides keeping the material fluidized, the gas stream is the media for heat and mass exchange. As a result of the intimate gas-solids contact, very high rates of heat transfer are accomplished while gently handling the solids. The bedplate or grid provides for the uniform distribution of the gas stream during operation and supports the bed of material during shutdown. The final product moisture is a function of retention time and product temperature.
Highly Versatile—Heyl & Patterson rotary dryers are among the most versatile dryers available, capable of handling almost any bulk solid material regardless of its conveyance and handling characteristics. Our rotary dryers can be configured to meet a wide range of needs and applications. Factors such as starting and final moisture content, product temperature, drying air temperature, air velocity and retention time of the material in the dryer are considered in the specification of the dryer. Applications and designs can be investigated in our testing facility. Whatever the properties of the material you need to dry, H&P will design and manufacture a rotary dryer that will meet all your application objectives.

SPECIFICATIONS
The specifications of your dryer will be customized to your particular application. Specifications include:
• Sizes up to 16 ft. in diameter and in excess of 100 ft. in length
• Inlet gas temperatures up to 2200°F (1200°C)
• Co-current and counter-current material/gas flow designs
• Induced-draft, forced-draft, and combination air flow systems
• Variety of control systems available, from burner management only to complete PLC-based process control

FEATURES
Heyl & Patterson rotary dryers have several distinct features which set them apart from those of other manufacturers, including:
• Full penetration shell welds
• Fully welded internal flights
• Thickened shell plate at tire and drive support locations
• Solid-forged steel tires and trunnion rollers
• Various shell drive systems including chain and sprocket, gear and pinion, hydraulic, and friction designs
• Separate combustion chamber which fully houses burner flame
• Completely pre-piped and pre-wired NFPA-approved burner valve trains
• OSHA-compliant personnel protection

ROTARY COOLERS
Several designs are available including:
• Counter-current air swept
• Internal/external water-cooled
• Combination air/water-cooled
MATERIALS OF CONSTRUCTION
Depending on the application, material options include:
• Carbon steel
• Stainless steel
• Special alloys for corrosion or abrasion resistance

HEAT SOURCES
We will design and construct your equipment to utilize the heat source which best meets your requirements. Dryers can be:
• Direct-fired using natural gas, LPG, fuel oils, coal
• Indirectly heated using steam
• Heated by waste heat sources, such as furnace exhaust or boiler flue gas

AVAILABLE OPTIONS
Features can be chosen which will optimize the performance or service life of your rotary dryer, including:
• Refractoryless furnace designs
• Various rotary seal designs
• Variable slope/speed capability
• Automatic lubrication systems
• Special abrasion- and corrosion-resistant designs
• Trommel screen shell extension
• Dust collection and emissions control equipment, including cyclones, baghouses, scrubbers, etc.

ABOUT ROTARY DRYERS
From dusty powder to sticky, near-liquid sludges, rotary dryers succeed where other dryers may fail. This is due primarily to the relatively simple method of operation. The rotary dryer consists of a rotating cylindrical shell, slightly inclined from the horizontal, equipped with lifting flights on the interior. The wet material is fed into one end of the rotating shell, is conveyed along the length of the shell as it dries, and is discharged from the other end. As the material passes through the rotary shell, it is lifted by the flights and showered through and dried in the hot gas stream flowing through the shell.
Rotary Calciners

A Wide Range of Solutions—
Heyl & Patterson’s rotary calciners are on the leading edge of thermal processing equipment and technology for bulk solid materials. Their versatility makes them an ideal choice for a wide range of specialty applications including drying, calcining, chemical reactions, and thermal desorptions. Our rotary calciners can be configured to meet a wide range of needs and applications. Our experienced technical staff will help you assess your process and product objectives to determine if a rotary calciner is right for your application.

ADVANTAGES OF INDIRECT HEATING
The separation of the heat source from the process environment confers several distinct advantages, including:
- Maintenance of high-purity product with no contamination from heat source
- Fine materials easily processed without excessive product entrainment in heating gas stream
- Greatly reduced requirements for emission control or volatile recovery
- Maintenance of specific process atmospheres—inert, oxidizing, reducing, etc.
- Capability for temperature profiling of process
- No contamination of furnace exhaust by potential pollutants from the process

SPECIFICATIONS
The specifications of your rotary calciner will be customized to your particular application. Specifications include:
- Sizes up to 9 ft. in diameter and in excess of 75 ft. in length
- Shell operating temperatures up to 2200°F (1200°C)
- Specific process atmospheres—inert, oxidizing, reducing, dehumidified
- Co-current and counter-current material/gas flow designs
- Multiple heating zone configurations
- Special materials of construction for high-temperature and/or corrosive service

MATERIALS OF CONSTRUCTION
Based on the application, we will select the most appropriate materials for construction of the calciner. These materials include:
- Stainless steel
- Special alloys for corrosion resistance
- Special alloys for high-temperature strength

HEAT SOURCES
Heyl & Patterson will design and construct your equipment to utilize the heat source which best meets your requirements. Calciners can be heated with:
- Fuels such as natural gas, LPG or fuel oils
- Electric resistive heating elements
- Waste heat sources such as furnace exhaust or boiler flue gas
FEATURES
Heyl & Patterson rotary calciners are of robust design and manufacture, rigorously engineered for efficient and effective performance in the most demanding processes and environments:

FURNACE DESIGN
- Completely pre-piped and pre-wired NFPA-approved combustion systems or pre-wired electrical heating elements
- Horizontally split and flanged with sectional lid for easy access to furnace interior
- Multiple heating zones for the most 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 appurtenances for maximum heat and mass transfer

AVAILABLE OPTIONS
Features can be chosen which will optimize the performance or service life of your rotary calciner, including:
- 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.

ABOUT ROTARY CALCINERS
The indirect-heated rotary calciner is a continuous-process device for medium- to high-temperature applications. Simply designed, the material processed is heated indirectly in a rotating shell. The rotary shell is enclosed and heated from the exterior in a stationary furnace. The heated shell provides the hot surface for heat transfer to the material stream on the shell interior through a combined radiative and through-wall conductive/convective mode of heat transfer. The rotation and slope of the shell motivate the flow of material through the shell from feed to discharge points, which are located at stationary breechings which enclose the ends of the rotary shell.
THE H&P ADVANTAGE
Heyl & Patterson, Inc. is one of the world’s leading manufacturers of chemical and bulk processing equipment. Since 1887, the processing industry has trusted Heyl & Patterson for our innovative designs and our durable, reliable equipment. In addition to our extensive lines of thermal and bulk processing equipment, we offer the benefits of a testing facility to achieve superior designs and configurations for our products, as well as reliable, authoritative aftermarket service.

PILOT PLANT TESTING LAB
Working directly with your material, Heyl & Patterson’s testing laboratory can perform the necessary testing to determine the appropriate processing conditions to achieve the desired end results. Our technicians will test the available features and options to find the optimal configuration and specifications for the equipment. The end result is the most effective and efficient equipment for your process, and peace of mind that you are getting the right equipment for the job—and no surprises.

AFTERMARKET
Heyl & Patterson’s commitment to excellence continues after your equipment leaves our plant. Through our affiliated company, HeyIPat Technologies, we are able to offer the best aftermarket support in the industry, regardless of equipment age or manufacturer. The results are peak performance, maximum equipment life, no headaches or hassles, and years of trouble-free, reliable service—all for you, our valued customer.

www.heylpatterson.com
www.calciners.com
www.fluidbeddryer.com
www.rotarydryer.com