



Powder Processing & Technology Equipment List

PPT provides processing development and custom powder processing services for the leaders in ceramics and inorganic materials technology. For more information or if you have any questions, please contact us at the phone number or email listed above.

TABLE OF CONTENTS

Thermal Processing

Rotary Calciners	2, 3
Tunnel Kilns	3, 4
Spray Drying	4, 5
Batching / Blending	5
Grinding	5, 6
Classification	6
Innovative Materials Center	7

Thermal Processing Equipment

Emission Control System for Thermal Processing

Responding to demand from various industries for processing materials that emit nitrogen oxide (NOx), Powder Processing & Technology (PPT) has added advanced emission control capability to support its growing client base. The Tri-Mer emissions control unit, based on catalytic ceramic filters, is the state-of-the-art technology for processes that emit NOx. The unit has been fully commissioned and has demonstrated the ability to handle NOx emissions in the range of two to fifty pounds per hour with NOx destruction efficiency adjustable up to 95%. The Tri-Mer unit also captures particulate – PM10, PM2.5, and submicron PM – to over 99% efficiency. The system can be modified to handle SOx, HCl and VOC's and PPT will add those capabilities as clients' requirements dictate. Thermal processing equipment with emission control noted with **ECS** on #6, #7, #10, #11 and #12 Calciners.

Rotary Calciners:

Indirect Fired Calciner #12 (Gas Fired) (NEW)

- Temperature capability of 1093°C (2000°F)
- Inconel 600 Tube; 1.2 m (48") Ø x 8.8 m (29') (L) with 6 m (20.5') heating zone
- Tube RPM of 0.75 ~ 6
- 4 individually controlled temperature zones
- Powder or formed material feed capability
- Maximum throughput ~ 550 Kg/hr (~ 1,200 lbs/hr)
- Continuous monitoring capability of 3 zones internal bed temperature
- Manufactured by Bartlett-Snow-Pacific
- **ECS** capability

Indirect Fired Calciner #11 (Gas Fired) (NEW)

- Temperature capability of 1000°C (1830°F)
- HT Alloy Tube; 1.1 m (42") Ø x 8.2 m (27') heating zone
- Tube RPM of 0.75 ~ 6
- 3 individually controlled temperature zones
- Powder or formed material feed capability
- Maximum throughput ~ 550 Kg/hr (~ 1,200 lbs/hr)
- Continuous monitoring capability of 4 zones internal bed temperature
- Staggered flights and removable dam at the exit end
- Manufactured by Bartlett-Snow-Pacific
- **ECS** capability

Indirect Fired Calciners #2 & #6 (Gas Fired)

- Temperature capability of 1110°C (2025°F)
- Inconel 601 Tube; 1 m (39") Ø x 10 m (33') (L) with 7 m (23') heating zone
- Tube RPM of 0.75 ~ 6
- 3 individually controlled temperature zones
- Powder or formed material feed capability
- Maximum throughput ~ 550 Kg/hr (~ 1,200 lbs/hr)
- Can be retrofitted to run nitrogen atmosphere
- Manufactured by Riedhammer
- #6 Calciner is **ECS** capable

Direct Fired Calciner #5 (Gas Fired)

- Temperature capability of 1260°C (2300°F)
- **Newly Relined** Refractory brick lined tube; 1.2 m (48") Ø x 12 m (40') (L)
- Tube RPM of 0.50 ~ 3
- Slurry or formed material feed capability
- ~ 680 Kg/hr (~ 1,500 lbs/hr) throughput
- Manufactured by Bartlett-Snow

Indirect Fired Calciner #7 (Electric Fired)

- Temperature capability of 1110°C (2025°F)
- Inconel 601 Tube; 36 cm (14") Ø x 8 m (26') (L) with 4.5 m (15') heating zone
- Tube RPM of 0.75 ~ 6
- 4 individually controlled temperature zones
- Powder or formed material feed capability
- ~ 70 Kg/hr (~ 150 lbs/hr) throughput
- Manufactured by Riedhammer
- Nitrogen Atmospheric Control Capability
- **ECS** capability

Indirect Fired Calciner #8 (Gas Fired)

- Temperature capability of 1100°C (2010°F)
- HT Alloy Tube; 0.6 m (24") Ø x 7.3 m (24') (L) with 5.5 m (18') heating zone
- Tube RPM of 0.75 ~ 6
- 3 individually controlled temperature zones
- Powder feed capability
- ~ 250 Kg/hr (~ 550 lbs/hr) throughput

Indirect Fired Calciner #10 (Electric Fired)

- Inconel 601 Tube; Temperature capability of 1110°C (2025°F)
- Tube; 0.6 m (24") Ø x 10 m (33') (L) with 7.3 m (24') heating zone
- Tube RPM of 0.75 ~ 6
- 3 individually controlled temperature zones
- Powder feed capability
- Maximum throughput ~ 250 Kg/hr (~ 550 lbs/hr)
- Nitrogen and Steam Atmosphere Control Capability (#10)
- **ECS** capability

Tunnel Kilns

Calcining / Sintering Tunnel Kilns (Electric)

- Temperature capability of 1480°C (2700°F)
- Powder, formed material and pressed compact materials
- Material loaded into refractory saggars on kiln cars
- Load capacity: 3-liter (9" x 8.5" x 2.75")/sagger x 40, 48 or 56 saggars/car (37 cars in kiln)
- Push intervals of 45 minute to 3 hours
- 3 units available and 2 units have nitrogen atmosphere capability
- Manufactured by Harper

Calcining / Sintering Shuttle Kiln (Electric)

- Temperature capability of 1340°C (2445°F)
- Powder, formed material and pressed compact materials
- Material loaded into refractory saggars or on refractory shelves
- Load capacity: 3-liter (9" x 8.5" x 2.75")/sagger, ~ 546 saggars/load
- Working dimensions: 38" (W) x 144" (L) x 56" (H) with 2 cars
- Nitrogen atmosphere capability
- Manufactured by Nabertherm

Spray Drying Equipment:

20' Niro Spray Dryer

- Slurry feed to nozzles or wheel atomizer
- 1 ~ 5 nozzles capability of maximum 1,000 psi pump pressure
 - ~ 680 Kg/hr (~ 1,500 lbs/hr) throughput
 - Median granule size of 80 ~ 140 microns
- Wheel atomization capability of maximum 12,500 wheel RPM
 - ~ 1,350 Kg/hr (~ 3,000 lbs/hr) throughput
 - Median granule size of 60 ~ 120 microns

18' Niro Spray Dryer

- Slurry feed to nozzles or wheel atomizer
- 1 ~ 5 nozzles capability of maximum 1,000 psi pump pressure
 - ~ 630 Kg/hr (~ 1,400 lbs/hr) throughput
 - Median granule size of 80 ~ 150 microns
- Wheel atomization capability of maximum 12,500 wheel RPM
 - ~ 900 Kg/hr (~ 2,000 lbs/hr) throughput
 - Median granule size of 60 ~ 120 microns

16' Niro Spray Dryer

- Slurry feed to wheel atomizer
- Wheel atomization capability of maximum 14,000 wheel RPM
 - ~ 900 Kg/hr (~ 2,000 lbs/hr) throughput
 - Median granule size of 60 ~ 120 microns.

13' 6" Anhydro Spray Dryer

- Wheel atomization capability of maximum 18,000 wheel RPM
 - ~ 200 Kg/hr (~ 440 lbs/hr) throughput
 - Median granule size of 30 ~ 80 microns

11' Anhydro Spray Dryer

- Wheel atomization capability of maximum 20,000 wheel RPM
 - ~ 150 Kg/hr (~ 330 lbs/hr) throughput
 - Median granule size of 30 ~ 80 microns

9' 6" Anhydro Spray Dryer

- Slurry feed to nozzle
- 1 nozzle capability of maximum 700 psi pump pressure
 - ~ 230 Kg/hr (~ 500 lbs/hr) throughput
 - Median granule size of 80 ~ 150 microns.

Batching / Blending Equipment:

Dry Mixer / Pelletizer - Eirich R-12 Automated Batching System

- Up to 4 components dry weighing system
- Dry mixing and pelletizing capabilities
- 250-liter load capacity
- Calcination option of pellets/powder through Indirect Calciner
- Packaging capabilities to barrels or bulk bags
- **Eirich R-15 Pelletizer is also available**; 500-liter loading capacity

Double Cone Blender (2 units)

- 4.4 m³ (155 ft³) load capacity
- 1 MT (2,200 lbs) super sacks packaging capability

Nauta Blender

- 3.2 m³ (113 ft³) load capacity

V-Blender (2 units)

- 1.4 m³ (50 ft³) load capacity
- 0.6 m³ (20 ft³) load capacity; intensive bar; impregnation capable

Rotary Batch Mixer (Munson)

- 1.13 m³ (40 ft³) load capacity; impregnation capable

Ribbon Blender

- 3.6 m³ (127 ft³) load capacity

Intensive Mixer - Henschel Mixer, 250-liter (60 gallons) load capacity

Sheer Mixer - Various sized Cowles Mixers and Rotosolver[®] with variable speed

Grinding Equipment:

Ceramic Ball Mills

- High Alumina spherical grinding media
- 5' x 6' Ceramic Mills

Steel Ball Mills

- Hardened C-Steel spherical grinding media
- 3' x 3', 3½' x 4', 4' x 5' and 5' x 6' Steel Mills

Attrition Mills (Union Process Q-50)

- Recirculating batch attrition
- Use for fine grinding
- Chrome Steel spherical grinding media
- Load capacity of 1,000 ~ 3,000 Kg (2,000 ~ 7,000 lbs) solids
- 2,000 liter (500 gallon) Holding Tank for continuous attrition
- 2 Attritors are available

Dry Grinding Mill (Palla Mill)

- Particle size reduction capability down to 1 micron
- ~ 1,000 Kg/hr (~ 2,000 lbs/hr) throughput

Hammer Mill (Prater Mill)

- De-agglomeration
- ~ 500 Kg/hr (~ 1,000 lbs/hr) throughput

Hammer Mill (Jacobson Mill)

- De-agglomeration to finer particles used after Prater milling
- ~ 500 Kg/hr (~ 1,000 lbs/hr) throughput

Vibratory Mills (Sweco Vibratory Mills)

- Poly-Urethane Elastomer lined
- Steel or Alumina grinding media
- 20 ft³ Chamber capacity

Powder Classification:

Sweco Screeners

- 48" Single and Double Deck; 150 ~ 700 Kg/hr (300 ~ 1,500 lbs/hr) throughput
- 30" Single Deck; 50 ~ 700 Kg/hr (100 ~ 1,500 lbs/hr) throughput
- 4 US Mesh through 325 US Mesh screening capability

Magnetic Separator

- Magnetic separation of powders or slurry
- ~ 450 Kg/hr (~ 1,000 lbs/hr) throughput

Alternative Drying Equipment:

Pan Drying Ovens; Various sized Drying Ovens

INNOVATIVE MATERIALS CENTER EQUIPMENT

Batching and Blending Equipment

- Mixer / Pelletizer (Eirich R-7); 50-liter load capacity
- Intensive Mixer (Papenmeier); 5-liter load capacity
- Intensive Mixer (Henschel); 250-liter (60 gallons) load capacity
- V-Blender, Ribbon Blender, Drum Blender, 5 ft³ Double-Cone Blender
- Shear Mixer, Cowles Mixer and Rotosolver[®]

Calcining and Sintering Equipment

- Electric Fired Rotary Calciner (Bartlett-Snow) capable to 1110°C
 - Inconel 601 Tube; 20 cm Ø x 2.7 m (L)
 - 3 individually controlled temperature zones; atmosphere control capable
 - 3 ~ 6 Kg/hr throughput
- Electric Fired Rotary Calciner (Riedhammer) capable to 1110°C
 - Inconel 601 Tube; 36 cm Ø x 8 m (L) with 4.5 m heat zone
 - 4 individually controlled temperature zone; atmosphere control capable
 - **ECS** capability; NOx removal capable
 - 30 ~ 70 Kg/hr throughput
- Electric Elevator Kilns (Harper) capable to 1450°C
 - Atmosphere control capable; 2 units are available
 - Maximum load 48 of 3-liter saggars
- Electric Shuttle Kiln (Nabertherm) capable to 1340°C
 - 38" (W) x 144" (L) x 56" (H) working dimension;
 - Maximum load 546 of 3-liter saggars
- Temperature Gradient Furnaces; 2 units are available

Grinding Equipment

- Attrition Mills with YTZ balls
- Jar Mills with Roller
- Steel Ball Mills with Hardened C-Steel grinding media
- Ceramic Ball Mill (1,000 liter) with high Alumina grinding media
- Dry Mills - Hammer Mill, Prater Mill, and Sweco Vibratory Mill (3 ft³ chamber cap.)

Spray Drying Equipment

- Bowen Nozzle Tower™ Dryer; ~ 5 Kg/hr throughput
- 8' Niro Wheel Atomizer with an option of slurry feeding through a Nozzle; ~ 70 Kg/hr throughput

Complement Equipment

- Blue M Ovens
- De-lumper for breaking up agglomerates
- 24", 30", and 48" Sweco multiple deck Screeners
- Magnetic Separator