400 SERIES

# HIGH TEMPERATURE, REDUCING ATMOSPHERE, CONTINUOUS FURNACES TO 2200°C (3990°F)

The CM 400 Series furnaces are available in a variety of configurations from manually loaded lab-scale units to fully automated production systems. Two basic systems are available. The 400A Series utilize exposed molybdenum grid elements and high alumina insulating brick for temperatures up to 1880°C (3415°F). The 400Z Series employ exposed tungsten rod elements and zirconia insulating brick for temperatures to 2200°C (3990°F).

The base model includes inclined doors with protective atmosphere flushes, high heat section, and a cooling section. Depending on application requirements other features are added such as preheat sections, wax or binder removal sections, multiple zone controls, low or high dewpoint features, and turn-key automated pusher systems.

The furnaces are constructed of heavy gauge steel that is welded and reinforced. All power components and controls are located on the main frame assembly. Block graded brick insulation packages are used for high efficiency. The open hearth and exposed element design allows for large tunnel cross-sections and the capability to process extremely heavy loads. When automated the pusher plates (carrier trays) form a train and are pushed through the furnace by an external stoker device. All automation is located outside the heat envelope for ease of maintenance and long life.

Hydrogen, dissociated ammonia, forming gas or any other reducing atmosphere compatible with refractory metal heating elements can be employed. The standard gas panel includes all necessary pressure regulators, flow meters, solenoids and pressure switches for both primary processing atmosphere and standby safety nitrogen. All furnaces come complete with the CM combustion atmosphere safety system. Full details are available on request.

Temperature control is by microprocessor based setpoint controllers operating in conjunction with phase angle-fire SCR power controllers and type "C" thermocouples. Independent overtemperature instrumentation is standard.

Model 4612-3Z Automated

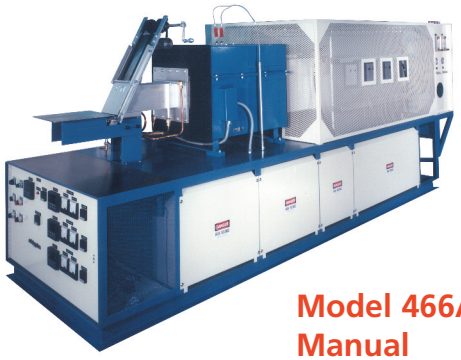
## USED FOR THESE AND OTHER APPLICATIONS:

- Refractory Metals
- Powder Metals
- Ceramics
- Nuclear Fuel
- Sintering
- Metallizing
- Firing
- Co-Firing
- Annealing
- Brazing
- Reducing

# SPECIFICATIONS

## STANDARD SYSTEM INCLUDES:

- Total system packaged in common frame including power and control components
- Heavy Gauge Welded and Reinforced Steel Frame
- Atmosphere Containment Doors with Protective Atmosphere Flushes
- Molybdenum Rod Grid Elements (400A), Tungsten Rod Elements (400Z)
- Block Graded Brick Insulation Package
- Water-Jacketed Cooling Section
- Microprocessor Based Set Point Temperature Controller
- Phase Angle-Fire SCR Power Controller
- Independent Overtemperature Instrumentation
- Type "C" Thermocouples
- Manual Operation



Model 466A-48-3Z
Manual

## OPTIONAL FEATURES INCLUDE:

- Preheat Sections
- Wax and Binder Removal Sections
- Multiple Zone Control
- Low or High Dewpoint Features
- Dewpoint and Oxygen Monitors
- Turn-Key Automation with External Stoker
- Data Recording Equipment

Model 4912A-96-4Z Automated

*TYPICAL SIZES (FOR REFERENCE ONLY, ADDITIONAL SIZES AVAILABLE)*

| MODEL NUMBER | TUNNEL OPENING H x W (in) | TUNNEL OPENING H x W (mm) | HEATED LENGTH (in) | HEATED LENGTH (mm) | NUMBER OF ZONES | OPERATING TEMPERATURE | MAXIMUM TEMPERATURE | ATMOSPHERES |
|---|---|---|---|---|---|---|---|---|
| 444A-36-1Z | 4 x 4 | 101 x 101 | 36 | 914 | 1 | 1700°C (3100°F) | 1880°C (3415°F) | Reducing Inert |
| 466A-48-1Z | 6 x 6 | 152 x 152 | 48 | 1219 | 1 | 1700°C (3100°F) | 1880°C (3415°F) | Reducing Inert |
| 488A-60-3Z | 8 x 8 | 203 x 203 | 60 | 1524 | 3 | 1700°C (3100°F) | 1880°C (3415°F) | Reducing Inert |
| 4612A-72-3Z | 6 x 12 | 152 x 305 | 72 | 1829 | 3 | 1700°C (3100°F) | 1880°C (3415°F) | Reducing Inert |
| 4912A-96-4Z | 9 x 12 | 228 x 305 | 96 | 2438 | 4 | 1700°C (3100°F) | 1880°C (3415°F) | Reducing Inert |
| 41616A-144-4Z | 16 x 16 | 406 x 406 | 144 | 3658 | 4 | 1700°C (3100°F) | 1880°C (3415°F) | Reducing Inert |
| 42424A-180-6Z | 24 x 24 | 607 x 607 | 180 | 4572 | 6 | 1700°C (3100°F) | 1880°C (3415°F) | Reducing Inert |
| 488Z-60-3Z | 8 x 8 | 203 x 203 | 60 | 1524 | 3 | 2100°C (3812°F) | 2200°C (3990°F) | Reducing Inert |
| 488Z-96-4Z | 8 x 8 | 203 x 203 | 96 | 2438 | 4 | 2100°C (3812°F) | 2200°C (3990°F) | Reducing Inert |

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