



Furnace Control System:

Surface offers a full line of process control systems from basic single loop controls to advanced Supervisory Control And Data Acquisition (SCADA) systems. The control systems are fully integrated with equipment safety hardware and PLC systems as required by each project.

The control system is the key to managing your furnace line for efficient production of quality product. These systems control temperature, atmosphere, motor speeds and mechanical motions.

The advanced SCADA systems offer additional functionality in:

- Recipe database
- Alarm database
- Historical trending of all key process parameters
- Part lot tracking
- Real time part tracking through the entire process line
- Historical retrieval of part lot processing parameters including temperature, atmosphere, process times, feed rates and any alarm conditions that occurred while processing
- Predictive maintenance reminders for components like furnace alloy, oxygen probes, thermocouples and bearings.







Illustrations for muffle and non muffle designs (Retort and Non-Retort)



Get started with Surface!

Call Surface with the following information to get your furnace solution underway.

Work Description and your Process needed:

-  cycle
-  operation
-  hours per year
-  available space
-  operating temperature range
-  heat source

We will work with you to develop the best processing solution for your heat treating requirements. This starts with developing a complete process solution and continues through shipment, installation and equipment commissioning.

Once your furnace is in place we continue working with you for the life of the equipment through our industry leading aftermarket services including customer service, Aftermarket Parts, Rebuild and Upgrade Service. We look forward to working with you.



1700 Indian Wood Circle
Maumee, OH 43537 USA

info@surfacecombustion.com
1-800-537-8980

surfacecombustion.com

Pit Furnace Systems

Diverse Applications Call for Customized
Furnace Capacity



The Surface Combustion Pit Furnace is used in a wide range of industries.

This style of furnace and its versatility in furnace volume, load weights, operation temperature and heat treating process capabilities allow the pit furnace design to be used for a wide array of applications.

Large Parts, Reliable Performance

Surface Pit Furnaces can use a variety of processes to treat work loads in excess of 50,000 lbs (26.5 kg)

Surface Solutions:

Pit furnaces are used to process numerous load configurations ranging from small bearing components and fasteners, to large gear and pinion products which can exceed 50000 pounds (22,680 kg) each. These components are readily processed in standard furnace sizes with effective work zones ranging from 24" (610 mm) diameter by 36" (915 mm) deep to larger sizes of 120" (3048 mm) diameter by 120 " (3048 mm) deep.



Processes performed in pit furnaces can vary from short cycle quench and temper, to deep case carburizing cycles exceeding 2-3 weeks in duration.

Furnaces can be provided to use specific atmospheres including air, inert atmospheres such as nitrogen, endothermic gas, exothermic gas, nitrogen/methanol, or other special gas mixtures. Standard furnace operating temperatures are available up to 1800 °F (982 °C). Custom furnace designs have been provided with operation temperature exceeding 2100 °F (1149 °C).

Furnaces can be provided as stand-alone units, or can be provided with a complete pit furnace line which includes companion pit temper furnaces, quench tanks and washer equipment. Other equipment such as atmosphere generators and automatic controls can also be provided.

Application Requirement:

- Large capacity heat treating
- Wide range of heat treating options

Furnace Parameters:

- Typical workspace diameters between 24 in. and 120 in. (60 cm and 304 cm)
- Typical loading heights between 36 in. and 144 in. (94 cm and 365 cm)
- Typical loading weight up to 30,000 lbs.(13,607 kg)
- Work supports: 50 Tons (45.5 Metric Ton)
- Maximum operating temperatures of 2400°F

Quench Tank

- Optimal oil volume
- High capacity and high surface area loads
- Designed for cold oil or hot oil
- Double deck elevator

FPO



Surface Processes:

The Pit Furnaces are typically used for the following heat treating processes:

- Annealing
- Carbonitriding
- Carbonizing
- Hardening

Ideal For:

Bearings, Fasteners, Gears, Shafts



Most Effective Material: Alloy Steel, Carbon Steel, Stainless Steel, Steel



Surface Results:

Flexible

The Surface Pit Furnace is built to spec, every time. These furnaces tend to be built for specific product lines and as a result, the flexible design is adapted to the environment they will be placed in.

Rugged

Pit furnaces treat some of the largest pieces of equipment we use on earth. The rugged design ensures consistency of the heat treatment to the part while maintaining the critical integrity of the manufacturing facility. Surface provides direct-fired solutions that have a high convective flow to provide fast heating and uniform soak temperatures.

Consistent and Long Lasting

Surface has a well-known reputation for providing solutions that are rugged and built to last. We design our casings with a heavy plate that is supported by large sectioned structural shapes. Surface pit furnaces can be direct-fired with high velocity burners if the products of combustion provide a suitable atmosphere for the product.

Efficient

Our pit furnace lids use our proprietary heat and atmosphere tight door design are hydraulically lifted and rotated to allow top loading by an overhead crane. Furnace casings are welded gas tight or are properly gasketed to prevent atmosphere contamination and excess heat loss. Surface understands how casings grow and shrink during the furnace cycles and engineers the right thermal expansion joints into our designs.

Standard Feature Options

Furnace Fans: Recirculating with Vibration Dampening Fans

Heating Equipment: Fuel Fired with direct or indirect heat. Options include: plug and rod type elements, Prolectric®, and ERT® (Electrified Radiant Tubes).

Furnace Insulation: Fire Brick Lining or Ceramic Fiber Insulation

Muffle and Non-Muffle Designs: The muffle improves temperature and atmosphere uniformity, however, it is less effective at higher operating temperatures. Using the non-muffle or non-retort design is most effective if there is enough tolerance in the temperature variation.

Furnace Cover: Lined with Ceramic Fire Modules, Moved with Hydraulic or Electromechanical Systems

Companion Products:

- Pit Temper Furnace
- Quench Tank
- Washer Equipment
- Atmosphere Generators
- Automatic Controls