



## *Ingot Preheating and Homogenizing*



*Single or double row design pusher furnace*

SECO/WARWICK provides custom engineered aluminum ingot preheating and homogenizing furnaces, including pusher, soaking pit and car bottom designs. SECO/WARWICK's long experience with ingot preheat furnaces assures the optimal heat input, air recirculation and furnace efficiency to meet the most demanding specifications. Fast heat-up rates have been obtained without compromising load uniformity or thermal efficiency.

### ***Furnace Temperature Control System and Airflow Design***

Whether ingot furnaces are designed with reversing cross flow or vertical upflow, SECO/WARWICK's furnace temperature control system using heat head and air-to-work ratio with probe thermocouples, prevents overheating the load. This control system can be used with all ingot furnace configurations. Temperature monitoring and heat input can be accomplished through conventional instrumentation, microprocessor-based instruments or programmable logic controllers.

### ***Insulation System***

To maximize efficiency and reduce overall Btu per pound requirements for ingot preheating, SECO/WARWICK uses an insulation system that has improved thermal characteristics, lower initial cost and reduced maintenance time. Our proprietary lining system starts with several inches of board-type insulation covered by a ceramic fiber blanket. A stainless steel wire mesh covers the entire insulating surface and is coated with a high-temperature mortar, which provides a rigid surface. If insulation damage does occur, it is much easier to repair than stainless steel liner sheets.

### ***Combustion Efficiency***

With the addition of burner recuperators, combustion efficiency can be improved to provide maximum fuel utilization.



*Discharge end with ingot down-ender and mill roll table*



*Ingot shoe assembly and positioner*



*Car bottom ingot soaking for billet heating*



## ***Material Handling Systems***

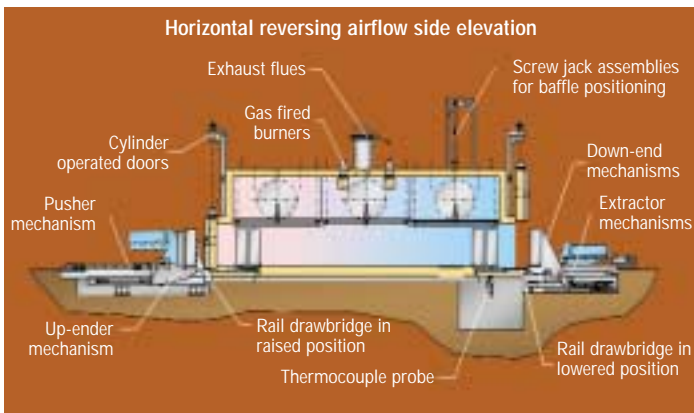
An integral part of any type of ingot preheating operation is the ingot material handling system that brings the ingot to the furnace and delivers it from the furnace to the rolling mill. SECO/WARWICK has designed, built and installed pusher-type ingot furnaces that operate with either a single or double row of ingots. The ingots stand on edge in "shoes" as they move through the furnace. Hydraulic cylinder-operated pusher heads advance the shoes. At the charge end, an up-ender rotates the ingots 90° from a flat to an edgewise position. At the discharge end, an extractor removes the ingot from the furnace by pulling on the shoes. A down-ender then rotates the ingots 90° into position on the mill table. Roller conveyors or monorail systems return the shoes to the charge end of the furnace for reloading.

Other types of ingot material handling systems make use of cranes or manipulators. Whatever the choice, SECO/WARWICK has the engineering capability to design the material handling system that meets the customer's facility limitations and process requirements. SECO/WARWICK soaking pit and car-type ingot furnaces can operate separately or with material handling systems built by SECO/WARWICK or other manufacturers.

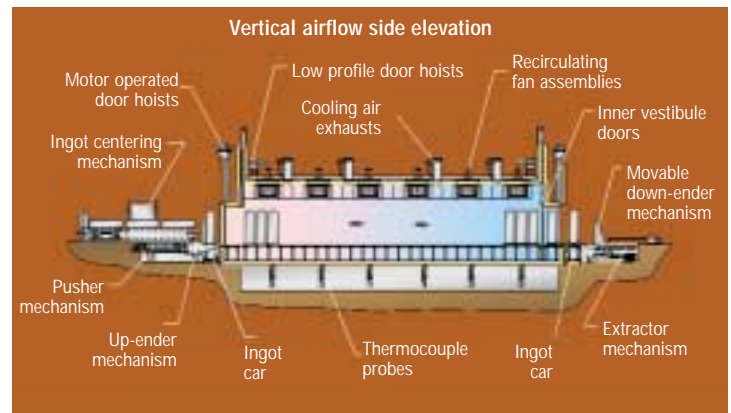
## ***Our Commitment***

As specifications continue to tighten on aluminum end products, so do the requirements for the performance of ingot heating furnaces. Through our many years of experience and commitment to ongoing research, SECO/WARWICK will continue to be a leading and innovative manufacturer of ingot furnaces.

The latest design, materials and equipment specifications should be obtained from the company before any reliance is placed on the enclosed since changes may occur due to product improvement.  
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***Vertical and horizontal airflow designs are available***



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