

# ELECTRICALLY HEATED IMMERSION ELEMENT HOLDING FURNACES



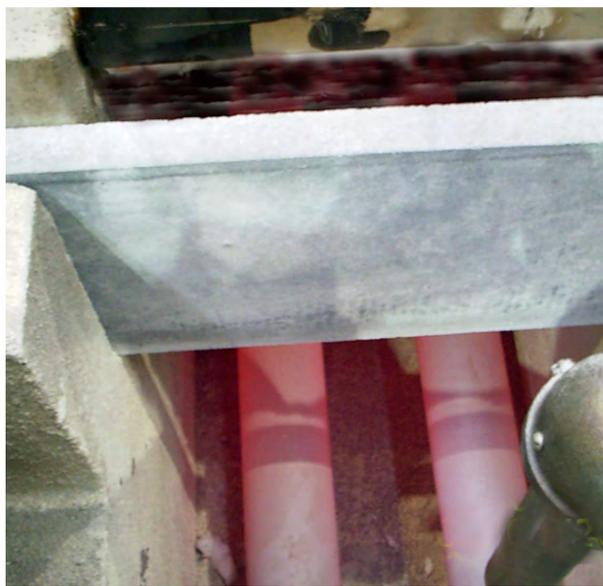
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## Article Takeaways:

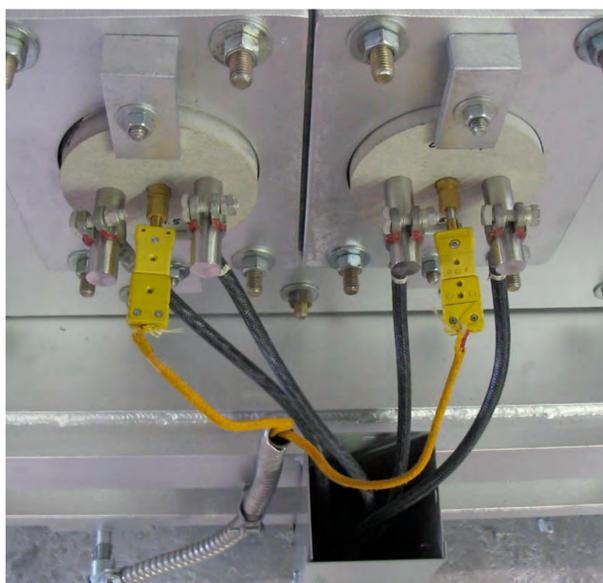
1. Less maintenance
2. Less energy usage
3. Very clean metal

Immersion element aluminum holding furnaces available for over 10 years and are finally gaining in popularity with North American manufacturers. Asian companies were the first to use them in the US and now they have really taken off in the die cast and foundry world for important energy efficient, clean metal producing, and low maintenance reasons.



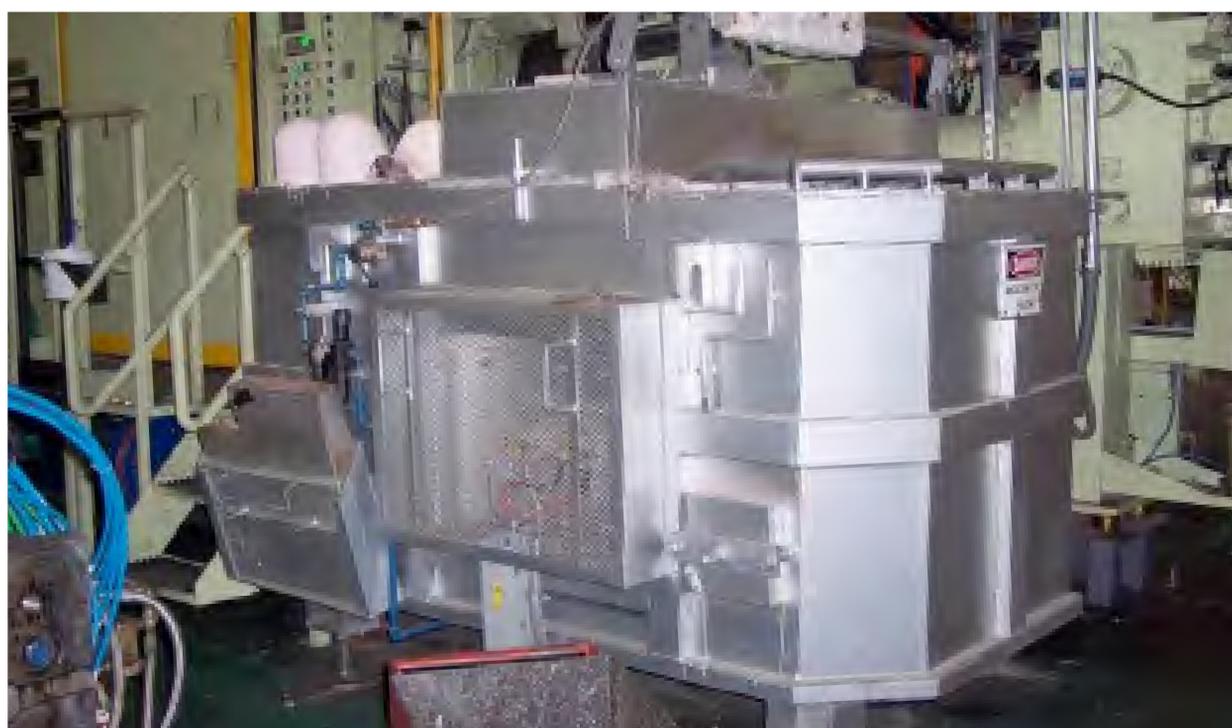
Electric immersion elements used in aluminum furnaces are normally in either vertical or horizontal positions in the molten metal bath. These heating methods allow the holding furnace to be:

- More compact – since the heat necessary to hold the metal at temperature is introduced directly into the molten metal without having to deal with a radiant heat enclosure “thermal head chamber” mounted over the metal and external to the dip well.
- Lower maintenance – due to the entire furnace acting like an exterior dip well; the advantage of this is a result of having no thermal head chamber and the refractory wear and tear that occurs at the molten metal contact line. The need for furnace cleaning is greatly reduced as well, to once every 3-4 days!



- Extremely efficient – the electric elements are housed in top-quality sialon high heat transfer protection tubes (4-to-6 year’s life). It is typical to hold the molten aluminum at production temperature for 18-to-19 BTU/lb of metal held in the furnace. (0.0052-to-0.0053 kWh/lb). The low heat loss thermally stingy linings used in SGI furnaces combine with the immersion element advantages in providing the most energy efficient holding furnaces in the industry.
- The simplest and cleanest main bath top available – the way to achieve this objective is to horizontally mount the immersion tubes and the electric element terminal connections low in the furnace wall (near the floor of the furnace). There are no impediments of terminal boxes and electrical connections on the top of the furnace, which is the case when vertical immersion tubes are used. This leaves a clean, unencumbered and business-like top to the main bath. Here again, this leads to a more compact and efficient furnace that holds simply the amount of molten metal you

- want. The rule of hold capacity is 3 times what you cast through the machine per hour. This provides the greatest flexibility in delivering metal to the holder. It means you can deliver metal to this holder only once every half hour. As opposed to radiant furnaces that have to have the metal close to the heat source or they will lose temperature.
- The most comfortable furnace to work around – it is electric and makes no noise, nor does it have to flue and products of combustion as in a gas-fired holding furnace. The cooler exterior of this more compact furnace leads to less worker fatigue and thus more productivity.
- The most accurate in close tolerance temperature control – when the furnace is designed to provide the most compact package (less wall and floor area for heat losses) the in-the-bath immersion elements allow for the closest process temperature control achievable. SGI further enhances this advantage by using full proportioning SCR power controls to meter in only the exact amount of energy required at any given moment.



## THE VERTICAL HEATING ELEMENT FURNACES

The vertical heating element furnaces give you the flexibility of changing tubes without draining the furnace like the horizontal ones. This is strategically important in tight areas such as die cast cells or permanent mold cells. This allows the end user to remove tubes and elements from the top of the unit as opposed to the side of the furnace. These tubes and elements are generally much larger in diameter than their horizontal counterparts because there is less space to deliver the energy in the depth of most furnaces than in the width. The example below shows a 10,000# vertical immersion element furnace

These units can range in sizes from 8,000# to 20,000# of hold capacity. The added benefit of all immersion furnaces is that if you clean up your aluminum in the melter and launder into the holding furnace there is no further contamination of the aluminum (no hydrogen pick up and no inclusions).

Although there are some limitations with respect to size configurations as a custom designed furnace company we can usually make them fit in most location.

### CONCLUSION

1. Less maintenance because you only clean them once every 3-4 days.
2. Less energy usage 18 BTU's/# equivalent compared to

35BTU's/# on most electric or gas radiant roof fired holders.

3. Element life 2-3 years and tube life 4-6 years.
4. Easily changed elements.
5. Very clean metal.
6. Casing temperatures of 105 ° F or less.
7. Premium linings that last 7 years or more.

These outstanding holding furnace performance characteristics can be very profitably installed in your aluminum casting foundry. They will provide year-after-year of the most reliable, cost-effective production.



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