New Product

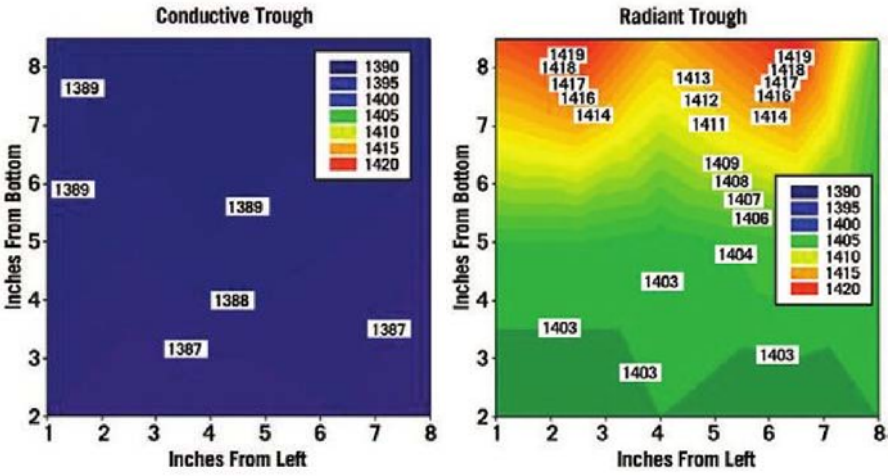
# Conductive Troughs Improve Melt Transfer Efficiency

Trough/launder systems are commonly used in aluminum metalcasting facilities to transfer molten metal between furnaces and pouring stations. Open troughs result in temperature losses. Trough covers and heated trough covers reduce these losses. Radiant heat transfer, which is typical in traditional heated covers, increases oxidation losses, requires frequent skimming and cleaning, and results in substantial thermal stratification, where a warm, less dense layer of molten metal overlies a cooler, denser layer.

In a new concept from Apogee Technology Inc., Verona, Pa., conductive troughs (CTs) are heated using high intensity resistance elements embedded in baffle and side pocket panels (BSPP) integrated into the sidewalls of the trough. This concept relies on thermally conductive BSPP sections impervious to metal attack through which heat transfer occurs by subsurface conduction and convection (Figs. 1a and 1b). The CT eliminates thermal stratification (Figs. 2a and 2b), and melt loss is negligible. Skimming is optional.

Figs. 1a and 1b. Metalcasting facilities can utilize a combination conductive trough with an integral baffle side pocket panel-heated dip-out well in their melt department.

The use of CTs has demonstrated energy requirements lower than 0.5 kW-H/ft. and precise temperature maintenance or increasing temperatures during transfer at the rate of 1.3F/ft. at a flow rate of 19,000 lbs. per hour. A radiantly heated trough cannot effectively raise temperature and requires more than twice the energy. Expected CT refractory life is greater than traditional radiantly heated troughs because excessive temperatures at and above the metal line are avoided. Heating element life is greater than two years and replaced without affecting production.




Figs. 2a and 2b. Thermal stratification present in radiant troughs (right) is avoided with conductive troughs.

The receiving end of in-plant trough transfer is either a holding furnace or basin from which metal is drawn for pouring. BSPP-heated basins and furnaces of 1,000- to 9,000-lb. capacity offer up to a 12:1 advantage in energy efficiency over natural gas fired units, unstratified temperature control and minimal melt loss. The impact of reduced temperature variability at the point metal is cast can be measured in improved recovery and product/process reproducibility. A combination CT with an integral BSPP-heated pouring basin has been proven in production.

CT and BSPP holding, which benefit from the availability, versatility and projected stability of electric power compared to natural gas, have the potential to increase energy efficiency, reduce melt loss, reduce refractory repairs and lower manufacturing costs, while improving the workplace environment. ***MC***

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