

ask the expert...

EMP™ AUTOMATED TAPPING MECHANISM IMPROVES PERFORMANCE IN METAL TRANSFER



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The traditional method of transferring molten metal from a furnace is through the combination of transfer height and gravity. Here, Jason Midgley* responds to a range of customer questions about the function of the metal transfer system from EMP™ Technologies, Pyrotek MCR (Melt Circulation & Recovery) Group. It is explained that this system provides an ideal and efficient solution for installations where there is a restriction in transfer height or space due to the plant layout.

Q: When is this automated tapping mechanism required?

A: The EMP™ transfer function can be used to assist transfer of metal into a crucible, holding furnace or casting operation, where height restrictions prevent the natural, gravity free-flow of metal. In this application the EMP system is used to raise the level within the EMP chargewell and discharge molten metal at an elevated height to overcome these limitations.

Q: How does this system differ from traditional equipment?

A: The initial concept was to use the EMP system as a transfer device in addition to its normal function of circulating the furnace, charging light-gauge scrap and achieving excellent thermal and chemical homogeneity. The

resultant effect of pumping metal into the chargewell is that a molten metal pressure head is formed. The level of pressure head is a function of the depth of metal in the furnace and the rate of flow of the metal into the chargewell.

By controlling the speed of flow into the chargewell, the pressure head can be adjusted using the EMP pump, to raise and lower the level of aluminium in the EMP chargewell. This change in pressure head can be used to allow the flow of aluminium in conjunction with a pneumatically-operated tapping plug and precast tapping hole located in the rear of the EMP chargewell. The rate of transfer is achieved through a combination of metal level and the size of the tapping hole in the EMP chargewell.

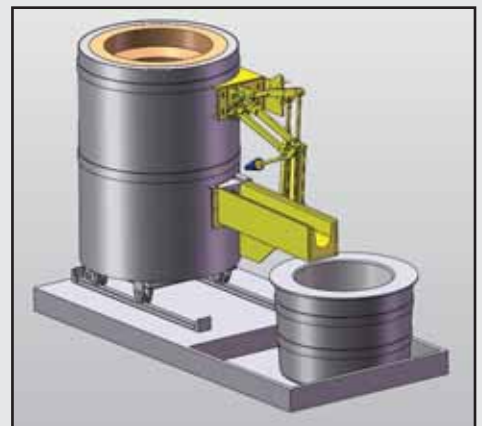
Q: What is the main purpose of the transfer mechanism?

A: The transfer mechanism enables the safe transfer of metal with finite control of the flow rate, so that the only operator interface required is to start the transfer process and replace the ceramic cone on the transfer plug.

When the transfer process is complete, the EMP can be placed in the reverse direction, causing the EMP chargewell to empty, and allowing the transfer mechanism to be positioned without a molten metal pressure head present, thus making the process much safer.

Q: What are the materials and designs used in the equipment?

A: The transfer mechanism can be installed on a new EMP system or retrofitted to an existing EMP equipment installation. The overall supply of equipment from EMP includes



EMP automated tapping system schematic, showing mechanism, chargewell and crucible



Recently installed EMP system operating in customer's plant

ask the expert... (continued) by Jason Midgely**EMP™ AUTOMATED TAPPING MECHANISM IMPROVES PERFORMANCE IN METAL TRANSFER**

a pneumatic transfer mechanism, installation of a tapping block in the EMP chawell and modifications to the EMP PLC and HMI control software, as required.

Q: What are the special features and the process benefits achieved using this Pyrotek product?

A: Features of the Pyrotek EMP system bring a range of benefits to customer process operations, including the following.

- The operator can be at a safe distance from the tap-out while metal is transferred
- Metal flow can be turned on and off efficiently
- Metal flow rate is easily controlled
- Minimal operator interface
- Instantaneous and quiescent metal flow
- High flow capability
- Pressure head can remove height restrictions
- Long distance transfers possible

Q: What are the additional advantages for the customer?

A: The rates of transfer experienced have been between 2 and 4 tonnes per minute, while still achieving circulation within the furnace and maintaining good levels of thermal and chemical homogeneity during the transfer process.

Pyrotek now has installed over 20 systems in melting operations globally, employing the EMP transfer function with different variants, all delivering the benefits to customers as described here.

www.pyrotek.info/emp

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