# HOTLINK<sup>®</sup> SYSTEM BENEFITS OF CHARGING HOT DRI (HDRI)



### THE MIDREX SHAFT FURNACE DISCHARGES DRI HOTTER THAN COMPETING TECHNOLOGIES, ENABLING HIGHER TEMPERATURE PRODUCT TO BE DELIVERED TO THE MELTSHOP.

There are two main benefits of charging hot DRI (HDRI) to the EAF: lower specific electricity consumption and increased productivity. The energy savings occur because less energy is required in the EAF to heat the DRI to melting temperature, resulting in a shorter overall melting cycle.

The rule-of-thumb is that electricity consumption can be reduced about 20 kWh/t liquid steel for each 100° C increase in DRI charging temperature. Thus, the savings when charging at more than 600° C can be 120 kWh/t or more. An additional benefit of electricity savings is a reduction in electrode consumption. The increased productivity from HDRI charging is significant. Use of HDRI reduces the tap-to-tap time, resulting in a productivity increase of up to 20% versus charging DRI at ambient temperature.

There are environmental benefits of HDRI charging as well. Retaining the sensible heat in the DRI rather than cooling prior to furnace discharge lowers overall emissions in two ways. First, lower electricity demand reduces power plant emissions per ton of steel produced. Second, in mills depending on charge carbon, reduced energy requirements in the EAF result in less CO<sub>2</sub> emissions.

## HOTLINK<sup>®</sup> SYSTEM

#### HOTLINK<sup>®</sup> SYSTEM FOR HOT CHARGING DRI

The **HOTLINK**<sup>®</sup> System delivers HDRI to an adjacent EAF at up to 700° C by positioning the **MIDREX**<sup>®</sup> **Shaft Furnace** just outside and above the exterior wall of the meltshop. DRI is discharged hot into a surge bin and then fed directly to the EAF with minimal heat loss.

Low velocity gravity transfer keeps physical degradation of HDRI to a minimum, and there is no re-oxidation of the HDRI due to the sealed design of the HOTLINK<sup>®</sup> System.

The HOTLINK<sup>®</sup> System is designed with options to produce hot briquetted iron (HBI) or cold DRI (CDRI) without stopping production when the EAF is offline.



# HOTLINK<sup>®</sup> SYSTEM BENEFITS OF CHARGING HOT DRI (HDRI)



### **JINDAL SHADEED**

The first **MIDREX**<sup>®</sup> **Direct Reduction Plant** featuring the **HOTLINK**<sup>®</sup> **System** for hot charging DRI directly from the reduction furnace into an electric arc furnace (EAF) is part of the Jindal Shadeed steelworks in Sohar, Oman. The 1.5 million metric ton per year plant is designed to transfer and charge hot DRI (HDRI) by gravity flow and is equipped to produce hot briquetted iron (HBI) when the HDRI is not required by the meltshop.

#### **PROJECT DETAILS**

The DRI plant at Jindal Shadeed utilizes the **MIDREX**° **Direct Reduction Process** to produce and discharge HDRI using the **MIDREX HOTLINK**° System to charge HDRI directly into its EAF.

The **HOTLINK**<sup>°</sup> System enables a 25% reduction of the electricity consumed by the EAF meltshop. Electrode and refractory consumption is also minimized.

The **MIDREX**° **Plant** started commercial production four months ahead of schedule in December 2010 and produced HBI while the EAF meltshop was under construction. HBI production remains an option while the **HOTLINK**° System is in operation.

Jindal Steel & Power Limited (JSPL) plans to expand the Jindal Shadeed iron and steel works over the next few years, with goals of producing 2 million metric tons per year of finished steel in the second stage and 4-5 million metric tons per year in the third stage.



Jindal Shadeed in Sohar, Oman

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