

Use of Direct Reduced Iron (DRI) in the Electric Arc Furnace (EAF) for Steelmaking

- Steel production in the EAF continues to grow both in North America and worldwide. The past 5 years have seen increases in the supply and use of Pig Iron, Direct Reduced Iron (DRI), and Hot Briquetted Iron (HBI) in the EAF.
- DRI should not be considered as a scrap substitute but rather as a source of clean iron units that can be used to supplement and enhance the scrap charge
- DRI is a high Fe, low residual metallic material for producing high quality iron and steel products in a wide variety of furnaces
- DRI is shipped as Cold DRI, but in integrated DRI/EAF mills can be charged hot directly to the EAF (furnace discharge temperature is 650-700°C)

The value-in-use of DRI is different for each melt shop and will depend on local scrap supply, production facilities, metallurgical practice and steel product mix.

Cold DRI



Benefits of Using DRI in the EAF

- Very low residual element content
- Predictable, uniform & certified chemical analysis
- Predictable mass and heat balances
- Carbon content can be tailored to EAF requirements
- Easier to handle than scrap
- Can be continuously fed to the furnace
- Can be hot-charged in integrated plants
- Better slag foaming
- Control of nitrogen in steel
- Melt consistency

Hot DRI



General Specifications for DRI (Ranges % by Weight)

Based on 65.5 — 68% Fe Iron Ore

Metallization	92.0 - 96.0%
Fe (Total)	86.1 - 93.5%
Fe (Metallic)	81.0 - 87.9%
C	1.0 - 4.5%
S	0.001 - 0.03%
P₂O₅	0.005 - 0.09%
Gangue*	3.9 - 8.4%
Size (typical)	4 - 20 mm
Apparent Density	3.4 - 3.6 t/m ³
Bulk Density	1.6 - 1.9 t/m ³
* residual unreduced oxides, mainly SiO ₂ and Al ₂ O ₃ , but also CaO, MgO, MnO, etc.	

Typical levels of residual elements in scrap and DRI/HBI

	%Cu	%Sn	%Ni	%Cr	%Mo	%Mn	%S	%P	%Si
No. 1 Bundles	0.07	0.008	0.03	0.04	0.008	0.03	0.02	0.01	0.005
Shredded	0.22	0.03	0.11	0.18	0.02	0.4	0.04	0.025	0.01
No.1 HMS	0.25	0.025	0.09	0.1	0.03	0.3	0.4	0.02	0.01
No.2 Bundles	0.5	0.1	0.1	0.18	0.03	0.3	0.09	0.03	0.01
No.2 HMS	0.55	0.04	0.2	0.18	0.04	0.3	0.07	0.03	0.01
DRI/HBI	0.002	trace	0.009	0.003	trace	0.06-0.10	0.002-0.007	0.03-0.07*	*

NB: residual element content of DRI is dependent on the source iron ore

