The Use of Hot Briquetted Iron (HBI) in the Blast Furnace (BF) for Hot Metal Production

HBI can be used as blast furnace burden material with the following environmental, productivity and cost benefits:

- lower carbon dioxide emissions
- increased blast furnace productivity (increase of about 8% for each 10% increase in burden metallisation)
- reduced coke rate (decrease of about 7% for each 10% increase in burden metallisation)


Hot Briquetted Iron

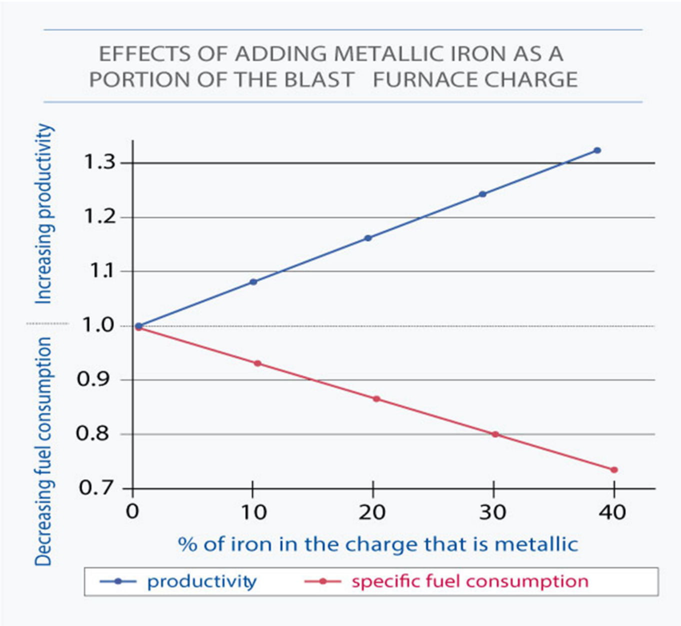
Reasons for HBI Charging into the Blast Furnace

Various circumstances under which including HBI in the BF burden could have a positive economic effect:

- Output limit of a BF based on pellets and sinter has been reached and the downstream steel mill has excess capability. Increase of hot metal production can be achieved without additional investment.
- Coke production capacity is limited and capital expenditure on coke ovens is not viable. Therefore, the plant needs to reduce specific coke consumption.
- Purchased coke is used, but the price is sufficiently high to enable a reduced coke consumption to offset higher cost when adding HBI to the BF burden.
- Out of several BF's, one BF must be relined, so increased hot metal production is required from the remaining BF's to minimize downstream production losses.
- There is an imbalance between the required tonnage of hot metal and BF capacity: the plant operates three BF's when the hot metal output of somewhere between two and three BF's would be sufficient. Therefore, it can be economical to operate two BF's at slightly higher hot metal cost in order to optimize production of downstream facilities.

Under these circumstances, some increase in hot metal feedstock cost due to addition of HBI to the BF burden can be justified on the basis of increased steel production, higher BF productivity, reduced coke consumption, etc. HBI specifications for BF use can be less stringent than for EAF steelmaking since higher levels of silica, iron oxides and sulphur and lower metallization can be tolerated in the BF.

General Specifications for HBI (Ranges % by Weight) (based on 65.5 - 68.0% Fe Iron Ore)	
Metallization	94.0%
Fe (Total)	88.3 - 94.0%
Fe (Metallic)	83.0 - 88.4%
C	0.5 - 1.6
S	0.001 - 0.03%
P_2O_5	0.005 - 0.09%
Gangue*	3.9 - 8.6%
Mn, Cu, Ni, Cr, Mo, Sn, Pb, Zn, V	Traces
Size (typical)	(90 - 140) x (48 - 58) x (32 - 34) mm
Fines and chips	≤ 5.0%
Apparent Density	> 5.0 t/m^3
Bulk Density	2.5 - 3.3 t/m^3
* residual unreduced oxides, mainly SiO_2 and Al_2O_3,, but also CaO, MgO, MnO, etc.	



Source: Midrex Technologies