

Handling and **U**se of **DRI** in the **EAF**

Basic facts on DRI.

- **P**orosity : DRI porosity (single pellet) is very high; the internal surface area of a DRI pellet is about 3,000 to 4000 times larger than its external surface.
- **B**ulk thermal Conductivity : DRI pellets Bulk thermal conductivity is very low; contact surface between individual pellets is small and heat transfer is poor.
- **R**eactivity : DRI reactivity is influenced by: Iron ore origin, reduction and ambient temperature and age.
- **R**eoxidation : A stack of DRI can conserve its metallization after a long storage time. The outside surface of the stack will lose metallization, but not the inside. Reoxidation is a slow reaction, if detected on time, it can be easily controlled.

Basic Rules for Storage....

- **T**emperatures : Product shall be send to any storage system at temperatures lower than 60 °C.

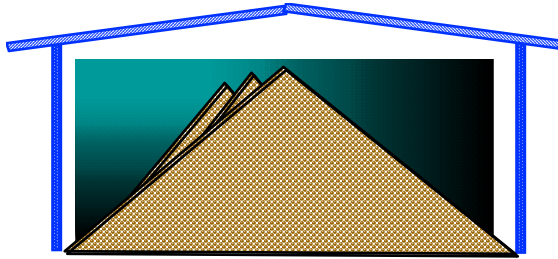
Storage systems must be designed to avoid temperatures higher than 110 °C.

- **W**ater **C**ontact : Decrease of metallization by water contact can be small. However, direct contact with water should be avoided due to risk in the EAF.

- **F**ire **S**ources : Flammable materials, heat or spark sources should be avoided in the near vicinity.

- **P**rovision for **I**solation : Storage systems must allow separation of the product in isolated lots in the eventual case of reoxidation of any portion.

Storage Systems....



- Piles can be up to 6 mts. high with a $< 45^\circ$ slope.
- Separation in lots of 4,000 to 6,000 tons.
- In rainy regions covered building is recommended.
- Side walls only at the upper part of the building.
- Base level of pile slightly above ground level and with a minimum slope.
- Area around shall be leveled for moving equipment.

Huge closed silos are not recommended



- Furnaces bins capacity for one shift operation.
- Bin design should be such to allow a free flow of material.
- Complete closure to avoid draft through the bed.
- Bins shall be equipped with temperature monitoring and emergency discharge.
- Inert gas injection is highly recommended.

Handling....

- **Sizing** : DRI can be used “all in one” in the Meltshop or it can be screen. The % of fines can have an important effect on yield. More than 6 to 8% fines (<1/8 “) can decrease yield in the EAF.
- **In Plant Handling** : Pay loader when DRI is send to stockyard. Flat, bucket and pipe conveyors for sending to the meltshop´s continuous feeding system.
- **Bucket Charge** : Grabber or magnet are used to charge DRI after the first layer of scrap.
- **Continuous** : Computer controlled automatic feeding based on metallurgical Charge parameters, energy and material balance.

Batch Charge vs Continuous Feeding In the EAF

**Bulk Density
(tons/m³)**

HM#1	0.70-1.20	DRI	1.60-1.80
HM#2	0.56-0.80	HBI	2.40-2.80
Bundles	0.85-1.10		
Shredded	1.00-1.10		
Turnings	0.50-0.70		
Reverts	0.75-1.60		

Recommended Charging Procedure of DRI in the EAF

