

BLAST FURNACE TROUGH MATERIALS (TROUGH MIX)

The flow rate of molten metal and slag through the trough system increase many times in case of larger blast furnaces. To get good campaign life special attention must be given to both refractory lining and design i.e. trough geometry and cooling system. The trough design is based on fluid flow characteristics along with thermo-chemical reactions. The important parameters of the geometry would be - length, width, depth at drainage point, distance between iron and slag over-flow, skimmer opening dimensions, and side-wall angle. Each of the above parameters affects the campaign life of the furnace trough if not designed properly. Cooling helps to bring down the hot face temperature, and thus the wear by way of chemical attack, infiltration and thermal stresses.

Development of sophisticated materials and innovative installation and repair techniques now make it possible to hold hot metal in today's deep pooling type iron troughs for a week or more without draining for

maintenance. In this area the traditional graphitic high alumina ramming masses used in the past have been replaced by high quality, low moisture, metal or organic fiber containing castables with Al_2O_3 - SiC - C as the standard refractory base material (dry ramming masses / gunning compound / ULCC) for troughs. The important physical properties for this material are - thermal expansion, hot strength and thermal conductivity. The following shows the role of different constituents of trough mix (material).

**Table: Role of different components in the
Blast Furnace Trough Mix (Refractory)**

Material	Role
Alumina components	<ul style="list-style-type: none"> > Volume stability > Wear resistance
Silicon Carbide (SiC)	<ul style="list-style-type: none"> > Wear resistance > Oxidation

	<ul style="list-style-type: none"> resistance > Slag penetration resistance
Carbon	<ul style="list-style-type: none"> > Spalling resistance > Slag penetration resistance
Anti-oxidants	<ul style="list-style-type: none"> > Oxidation resistance > Hot MOR
Resin	<ul style="list-style-type: none"> > Hot MOR > Binding strength

Source: <http://viewforyou.blogspot.in/2009/08/blast-furnace-trough-materials-trough.html>