



INFORMATION SHEET  
**HIGH ALUMINA CERAMICS**

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**WHAT IS ALUMINA CERAMIC?**

- It is a ceramic material with aluminum oxide ( $Al_2O_3$ ) contents exceeding 87 %.
- Sintered dense alumina possesses a high consistency, hardness and temperature and corrosion resistance.

**MANUFACTURE**

- Raw material is a highly pure, alpha aluminium oxide powder.
- It is shaped by a casting or pressing process and thereafter dried and sintered at approx. 1500 Deg. C.

**APPLICATIONS**

- Protection of industrial components against abrasion and impact wear and for high temperatures of above 1000 Deg. C.
- Very specific use in the manufacture of ceramic lined bends and pipes used in the transportation of Pulverised coal in power plants.
- Commonly used in multiple port outlet, PF nozzle, Mill Discharge Valve , Dampers etc.

**SHAPES AND SIZES**

- Standard tiles, square/rectangular, thickness 6 to 50 mm, with or without central holes, also with threaded bolt. Side lengths as per requirement.
- Curved tiles of thickness 20 to 25 mm, used in assembly of MS bends lined with ceramic tiles for PF application.
- Dimensions of tiles dependent upon dimensions of bends.

**METHODS OF ATTACHMENT**

Laying/installation using different kinds of mortar. Laying/bonding with special two components epoxy Screwing/bolting

**PROPERTIES**

Physical properties

Density	<b>3.3 - 3.6 g/cm<sup>3</sup></b>
Compressive Strength	<b>&gt; 3200 Kg/Cm<sup>2</sup></b>
Hardness	<b>&gt; 8 Moh's Scale</b>
Alumina Content	<b>Aluminium Oxide <math>Al_2O_3</math> 85-90 %</b>
Max. Opr. temp	<b>1000 ° C</b>
Water Absorption	<b>0.5 %</b>



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**BENDS AND PIPES FOR TRANSPORTATION OF PULVERISED COAL**

In India the coal used in Thermal Power Plants is highly abrasive and contributes significantly to wear and erosion of plant and equipment. In particular, coal bends and which convey Pulverised coal are highly vulnerable due to high velocity of coal particles and their severe impingement especially at the elbows.

Over the past two decades considerable study and progress has taken place in the development of materials resistant to wear and erosion especially in PF bends. As a result several new wear resistant liners have emerged which can outperform the life of conventional liners by several times.

In general the following alternatives are available for PF bends:

- Alloy Cast Iron Bends
- Special Steel Bends
- Bends fully lined with Cast Basalt
- Bends fully lined with Ceramic Tiles
- Bends partially lined with Cast Basalt and Ceramic Tiles (Composite Bends).

It is found that composite/ceramic bends are far superior to alloy cast iron, or special steel bends from life angle. However it is interesting to note that in case of long radius bends the life of a fully lined cast basalt bend and that of fully ceramic lined bend is the same. Conclusion therefore is:

For short radius PF bends, use composite bends and save up to 25% on costs as compared to ceramic lined bend. In a composite bend the portion where impact of coal particles is high is lined with ceramic tiles and the rest with cast basalt. There is thus a cost saving without compromising on performance.

For long radius PF bends use Cast Basalt Bends, the life of cast basalt lined bends is the same as ceramic lined bends in this application and the cost is about 3 times less.

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***For Further Details Please Contact :***

**DECCAN MECHANICAL & CHEMICAL INDUSTRIES LIMITED**

*Regd. Office & Factory:*

78, Bhosari Industrial Estate,  
Bhosari, Pune-411 026 INDIA

**Phone: 0091 20 2712 6535, 2712 0994, 2712 0020, 2712 2696**

**Fax: 0091 20 2712 0774, 2712 0485**

**Grams: "DEMECH". Email: [dmciho@vsnl.com](mailto:dmciho@vsnl.com)**