



**BMW**  
**Steels Ltd**

Alumina Ceramic Division

Alumina92™



An ISO 9001-2008 Company



# About US

Fiction, wear, and erosion are major issues, resulting in major costs to businesses operating in the Power Generation, Cement Plants, Mineral Processing and other engineering industries. BMW uses its core strengths of custom engineering, materials expertise, operational excellence, and rapid execution, to help customers develop amazing solution to their toughest technical challenges.

With the support of excellent manufacturing infrastructure, experienced engineers, technicians and staff, BMW has to its credit developed many proprietary equipments like

Variable Orifices, coal Rope Breaker system for coal piping and any more.

Effectiveness of our material for wear resistance has been tested in actual use, at various power plants and other industries including NTPC, BHEL, Alstom, Doosan, Veanta, Tata Power and many more. Our wear protection capabilities have been evaluated and successfully established for wear and erosion resistance in laboratories like CSIR, Labs too.

BMW products have been proved second to none in the industry.

## Our Product Range

### • Wear Resistant Lining

- Alumina Ceramic Liner and Grinding Media (ALUMINA92™)
- Cast Basalt Cylinders and Tiles (BASALT450™)
- Chemically Bonded Lining (Wear Seal CBC™)
- Alumina Based Wear Seal™ Series of Mortar, Putty & Liners
  - Wear Seal™ Diamond
  - Wear Seal™ CBC
  - Wear Seal™ Mortar
- Fabrication for Lined equipment

### • Wear Resistant Iron Casting

- Ni-Hard
- Hi-Chrome
- Manganese Steel

### • Pipe Connection Coupling System

- Grooved Coupling
- Slip on Type Coupling
- Quick Release Coupling
- Flexible Coupling



### Production Capacity ...

BMW Steels Ltd. has a daily capacity to produce 7 MT Alumina ceramic, 25 MT Cast Basalt, 10 MT CBC Linings & 10 MT Castings. Lining/Coating can be in any quantity/shape for wear resistance.

### Industries we serve...

- Power Plants
- Cement Plants
- Mining Industry
- Paper Pulp Industry
- Ceramic Industry
- Fertilizer Industry
- Mineral Processing Units
- Construction Industry

# Product Range

## Alumina Ceramic - Alumina92™ Coal Pipeline Products



Coal Pipe Bends and Straight Pipes



Coal Pipe  
Line Nozzle



## Variable Orifice



Fixed Orifices





# Product Range

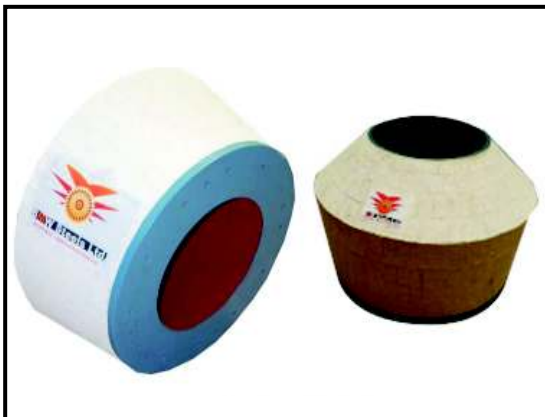
## Alumina Ceramic - Alumina92™ Coal Mill Equipment



Inner Cone



Classifier Assembly



Ventury Outlet



Mill Discharge Valve



Transition Piece



Multiple Port Outlet



Multiple Port  
Outlet Assembly

# Product<sup>®</sup> Range

## Alumina Ceramic - Alumina92™ Liners and Grinding Media

Wedge shaped liners



Wedge Type Liner Fitment  
(Alumina Bend)



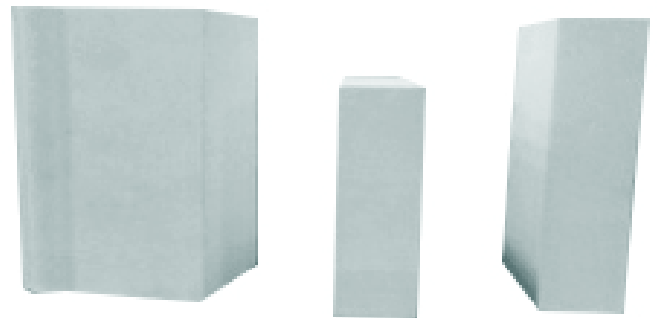
Pastable Liner (Hexagonal Liner)



Weldable Liners



Ball Mill Liners



# Product Range

## Alumina Ceramic - Alumina92™ Liners and Grinding Media (...continued)



Grinding Media Balls and Cylpebs



Cylinder Liners



Orifice Liners



# Product Range

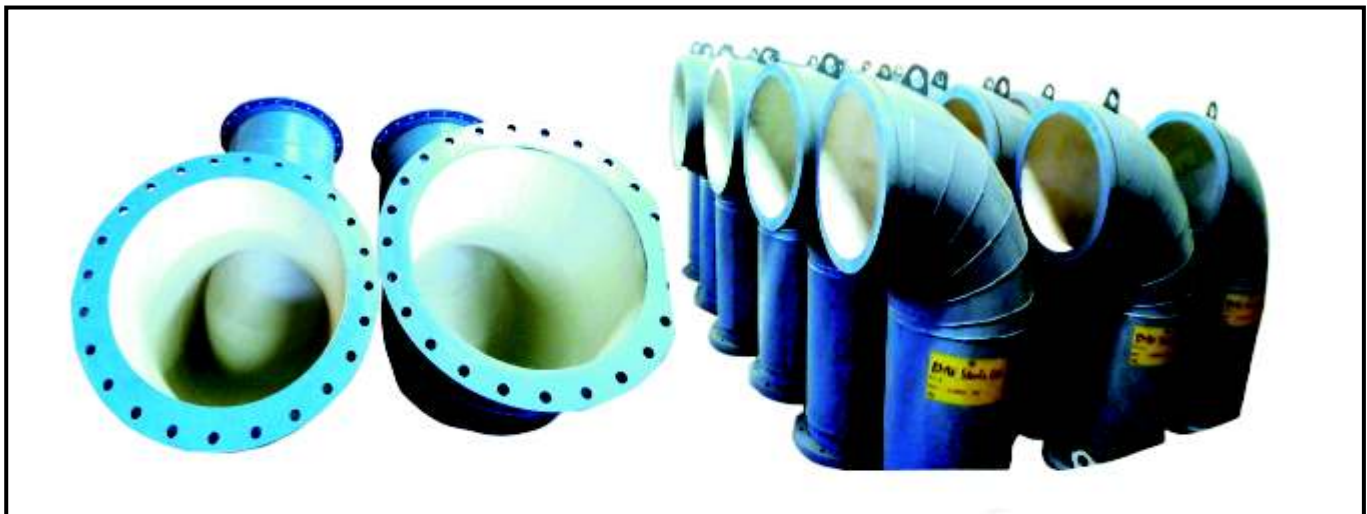
## Coal & Ash Handling Equipment



Coal Bunkers and Chutes



Ash Pump Volute Casings



Bends

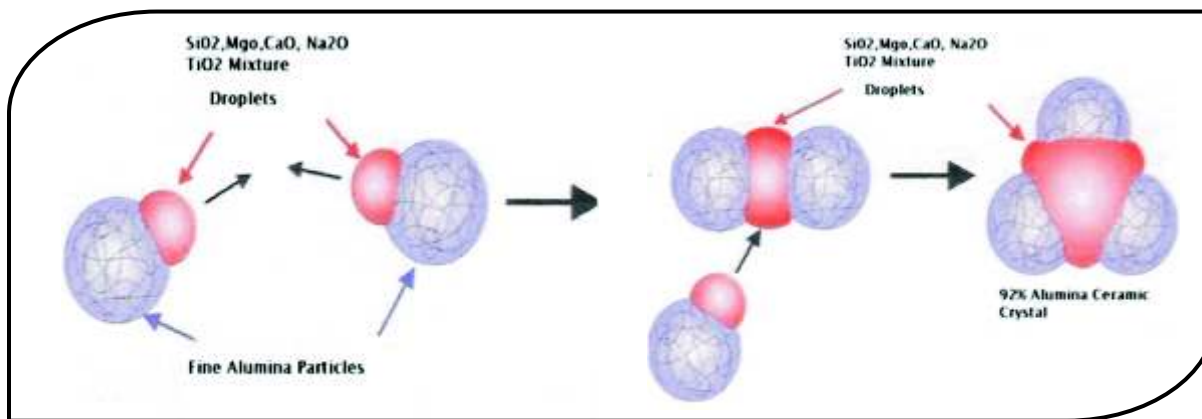


Dense medium Cyclones



Rubber Backed Impact Pads

# Process of Alumina Liner Fusion at 1520 deg. Sintering

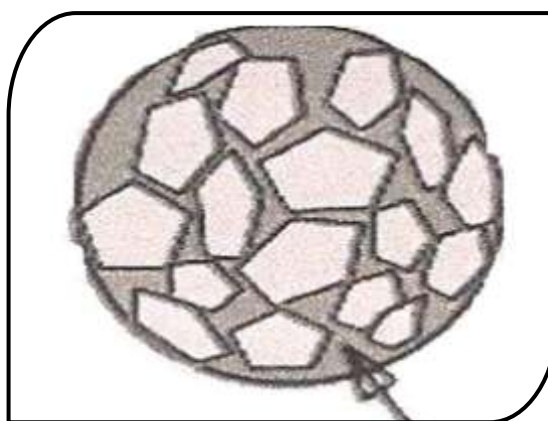


Microstructure of 90-92%  
Alumina Liner (White)

Microstructure of 80-87%  
Alumina Liner (Brown)



With low SiO<sub>2</sub> and MgO, White colour  
(Chemical Grade Alumina)  
Sintering Temp. 1520 Deg.



VOIDS AND IMPURITIES  
With high SiO<sub>2</sub> and MgO Brown Colour  
(Bauxite base)  
Sintering Temp. 1380 Deg.

## Alumina Ceramic Physical Indicators (%)

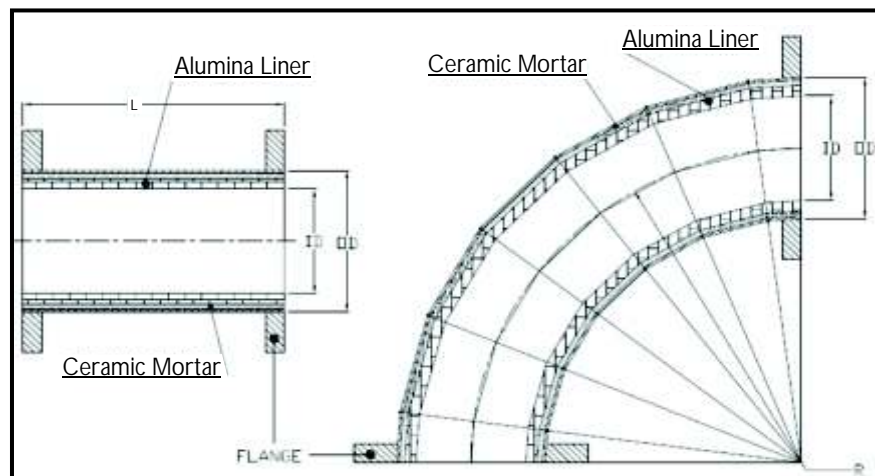
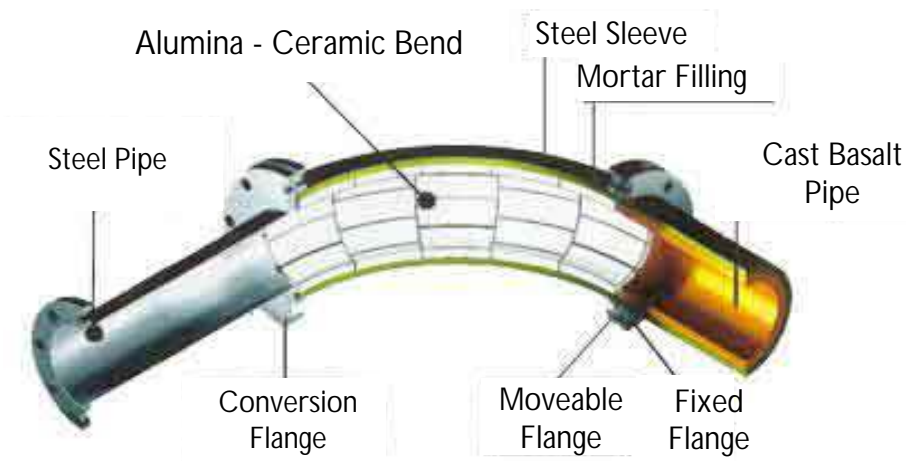
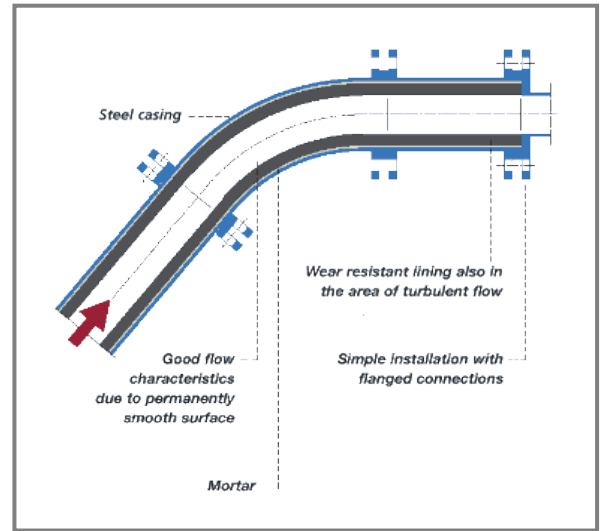
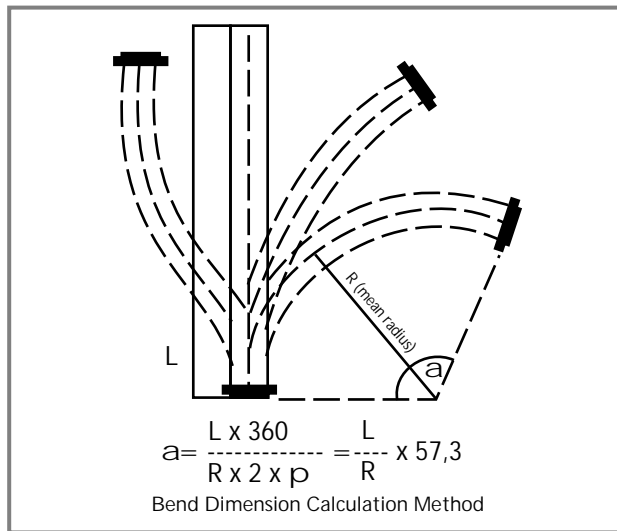
Alumina (%)	Hard ness (Moh's)	Compressive strength (kg/cm <sup>2</sup> )	Weight Loss (% 24 hrs)	Water-absorption (%)
95	9	≥ 10000	0.100	< 0.005
90	9	≥ 7000	0.100	< 0.010
80	9	≥ 5000	0.150	< 0.010
70	8	≥ 4000	0.150	< 0.050
65	7	≥ 3500	0.250	< 0.015

## Alumina Ceramic Chemical Indicators (%)

Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CaO	MgO	Fe <sub>2</sub> O <sub>3</sub>	Other
65-95	22-5	10-0.5	2-0.5	0.5-0.01	Micro



# Composition of Ceramic Lined Bends














Pipes and Bends

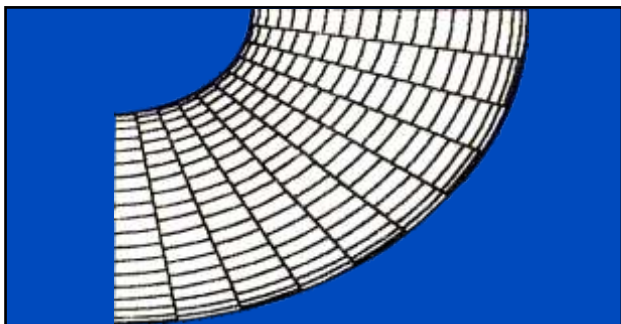
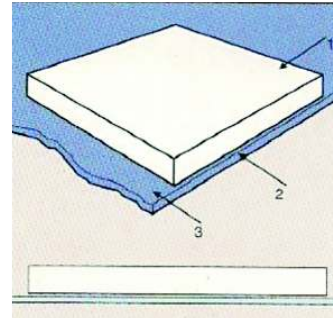
## Desirable Alumina Ceramic Properties for achieving optimum wear life

Properties	Units	Properties of our Alumina Liners
Alumina Content	%	90-92%
Density	gm/cc	3.6-3.7
Crystal Size Average	Microns	4
Water Absorption	-	0.005 (Max)
Gas Permeability	-	0
Color	-	White
Flexural Strength (MOR) 20°C	MPa	220-275
Compressive Strength 20°C	MPa	700
Hardness	Moh's	9
	R45N	75
Coefficient of Thermal Expansion	1x10 <sup>-6</sup> /°C	7.0-9.0
Maximum Use temperature	°C	1500
Abrasion by Jet Erosion	-	max 0.05 gm/ 30 Seconds
Abrasion by Rubbing	-	max 0.01 gm/ 30 Seconds
Thermal Shock	°C/min	250

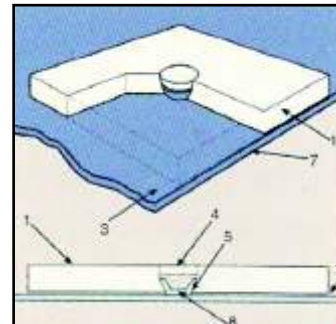
### Hardness Comparison Chart

<u>Material</u>		<u>Moh Hardness</u>
Diamond		10
Sapphire		9
Alumina Ceramic		9
Topaz		8
Cast Basalt		7+
Quartz		7
Tool steel		6+
Silica		6.0
Glass		5+
Carbon steel		5+
Limestone		3+

# Alumina Ceramic Liner Fixing Arrangement



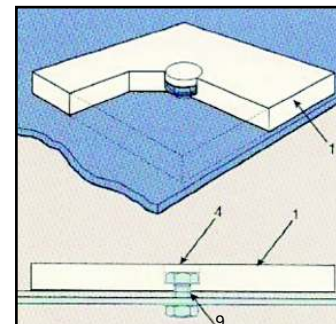
Fixing Pattern of Liners in Bend



*Metal Stud weldable*

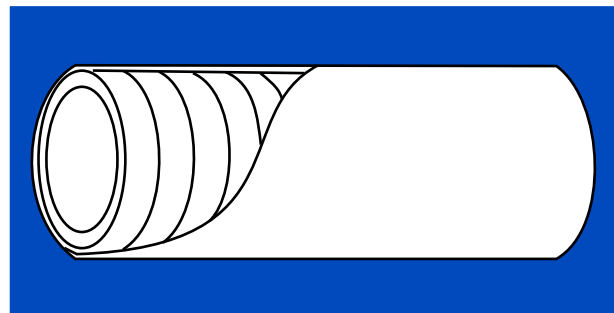
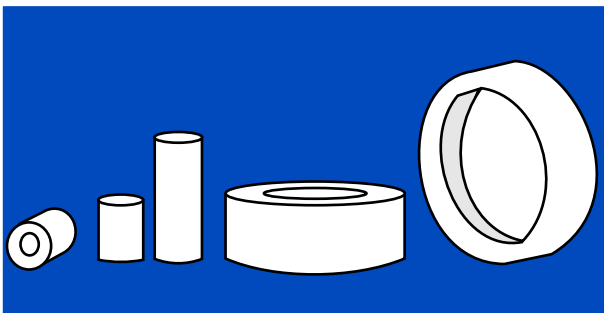


Rectangular Liner



*Bolttable*

## Pipe Ceramic Liner Fixing



Fixing Pattern of Liners in small I.D Pipe



# Manufacturing Capabilities

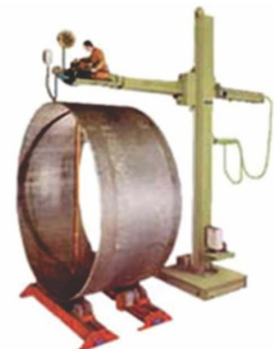
## Unit-I: Fabrication and Assembly Unit - Hathras (U.P.) Production Capacity 300 Tons/month



CNC Miter Bend  
Welding Machine



CNC pipe profile  
cutting machine



Column & Boom  
Manipulator



NC Four roll Pipe  
Bending machine



NC Vertical Rotary  
Table Welding



Paint booth



Diamond Abrasive cutter



Shot Blasting Chamber

# Manufacturing Capabilities

## Unit-II: Alumina Ceramic Division- Khurja (U.P.)

Production Capacity 7 Tons/day



Hydraulic Press - 1 (300MT)



CNC Hydraulic Press - 2 (500MT)



Spray Drier



Cylpebs Making Presses



Pot Mill



Ceramic Lined Ball Mill



Tunnel Furnace (1550°C)



Lab Muffle Furnace (1700°C)

# Testing Facilities



Magnetic Particle Testing Machine



Ultrasonic Hardness Tester



Ultrasonic Thickness Gauge



Density Testing Apparatus



Hardness Testing Machine



Hydraulic Test Pump



# Testing Facilities



Water Absorption Test



Deep Abrasion Test



Compressive Strength Test



Flexural Strength Test

# Out Prestigious Clients

## Power Plants



## Steel Plants



## EPC



## Cement Plants



## Mineral Processing Units



## Fertilizers



## Aluminum Plants



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