



## WEAR CERAMICS


CERAMIC SOLUTIONS THAT  
MAKE A DIFFERENCE




INDUSTRIAL  
CERAMICS

**PURPOSE** 

**Making a Material Difference**

**VISION** 

We will be a globally admired company driving innovations in Materials Science towards sustained value creation for people and our planet.

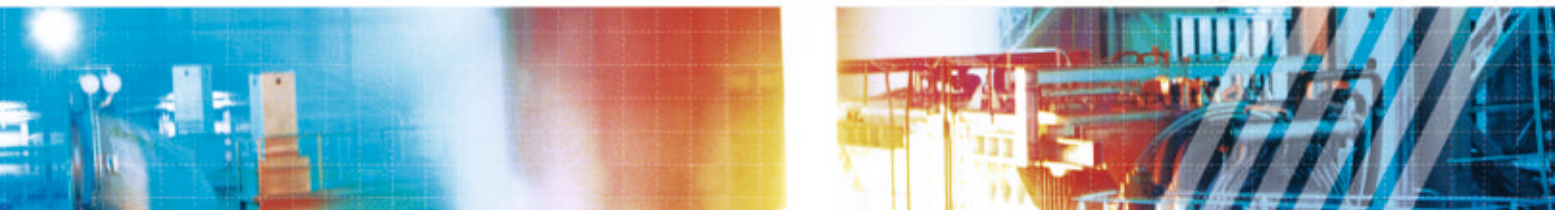
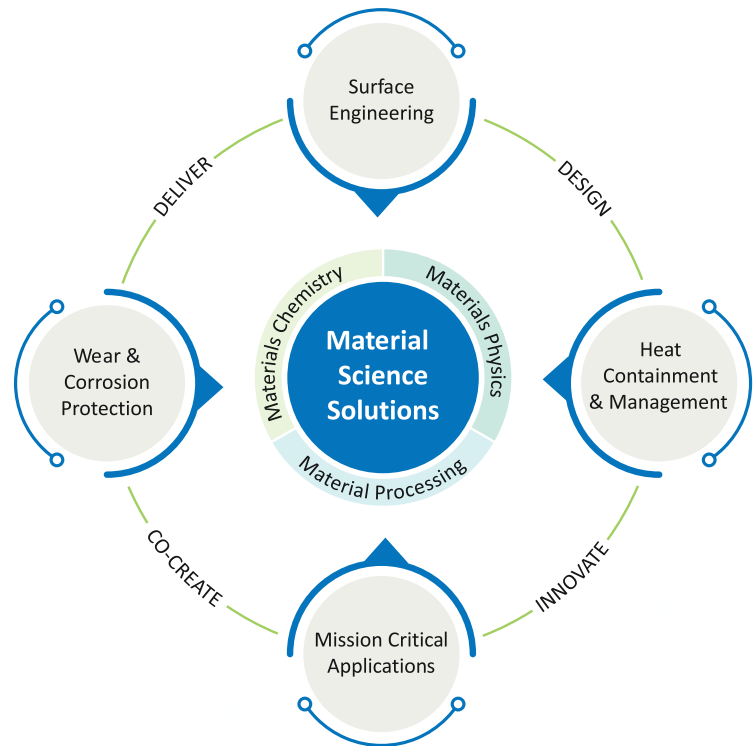
**MISSION** 

We design, co-create and deliver sustainable solutions to make a significant positive difference to all our stakeholders.

## HOW WE CREATE SOLUTIONS

### OUR RANGE OF SOLUTIONS

- WEAR
- CORROSION
- IMPACT
- READY TO FIT
- COATING



Welcome to the world of Cutting - Edge Industrial Ceramics...

At CUMI we offer ceramic solutions that will make a world of difference to your business. CUMI is part of the \$ 9.74 billion Murugappa Group and has emerged over the years as a leading player in the Material Science Industry, worldwide. Today, CUMI has a consolidated revenue of ₹46282 million (approx. US\$ 550 million) and over 29 manufacturing locations spanning 6 continents.

CUMI's Industrial Ceramics Division has carved a niche for itself in the business of high alumina ceramics. CUMI specializes in providing advanced ceramic solutions for Wear and Corrosion Protection, Ballistic Protection and Electrical Resistance. The division provides value-added products and turnkey project solutions. CUMI's design and application engineering capabilities rank amongst the best in the industry.

Talk to us to find out more on what CUMI-CERAMICS can do for you.



CUMI'S DEVELOPMENT AND PROGRESS OVER THE YEARS HAS BEEN BASED ON THE RELENTLESS PURSUIT OF A CLEAR VISION, STRONG ETHICAL VALUES, ITS COMMITMENT TO CUSTOMERS, GOOD GOVERNANCE, HIGH STANDARDS OF QUALITY, APPLICATION SERVICE, ADHERENCE TO SAFETY STANDARDS, ENVIRONMENTAL AND REGULATORY COMPLIANCE AND ABOVE ALL COMMITTED LEADERSHIP.

M. M. MURUGAPPAN  
CHAIRMAN



**M. M. Murugappan**  
Chairman  
CARBORUNDUM UNIVERSAL LIMITED

LEADERSHIP

GOOD  
GOVERNANCE

QUALITY

CLEAR VISION

COMMITMENT  
TO CUSTOMERS

ETHICAL VALUES





## MURUGAPPA GROUP

The Murugappa Group, headquartered in Chennai, India, is a US-\$9.74 billion conglomerate with interests in engineering, abrasives, finance, general insurance, fertilisers, farm inputs, sugar, bio-products, nutraceuticals, cycles and plantations. It has 29 limited companies under its umbrella with manufacturing facilities spread across the globe.

The Group, which has forged strong joint venture alliances with leading international companies like Mitsui Sumitomo, Cargill, Foskor, Morgan PLC and Groupe Chimique Tunisien has consolidated its status as one of the fastest growing diversified business houses in India.

*THE **MURUGAPPA GROUP**, HEADQUARTERED IN CHENNAI, INDIA, IS A US-\$ 9.74 BILLION CONGLOMERATE WITH INTERESTS IN ENGINEERING, ABRASIVES, FINANCE, GENERAL INSURANCE, FERTILISERS, FARM INPUTS, SUGAR, BIO-PRODUCTS, NUTRACEUTICALS, CYCLES AND PLANTATIONS.*



## CUMI

With customers in 43 countries across the globe, Carborundum Universal Limited (CUMI) is a one-point source for over 20,000 varieties of abrasives, electro minerals, ceramics and refractory materials, manufactured at 29 locations across Australia, China, India, Russia and South Africa.

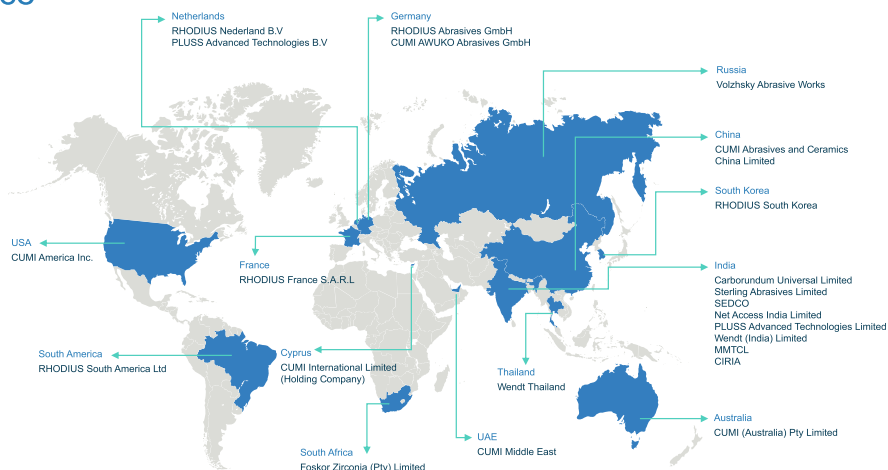
A US-\$9.74 billion company, CUMI was incorporated in 1954 as a tripartite collaboration between the Carborundum Inc, USA, the Universal Grinding Wheel Co Ltd, UK and the Murugappa Group, India. A pioneer in the manufacture of coated and bonded abrasives in India; CUMI has been an innovator in super refractory materials, electro minerals, industrial ceramics and ceramic fibers.

All of CUMI's manufacturing facilities are certified for international quality standards (ISO9001:2015), environment-friendly manufacturing practices (ISO 14001), welding management system (ISO3834-2) and ISO 45001:2018. State-of-the-art facilities and strategic alliances with global partners have earned CUMI a reputation for quality and innovation. It is one of the few manufacturers of abrasives and ceramics in the world with fully integrated operations, from mining, through fusion.

CUMI is equipped with a state-of-the-art Research and Development center which works aggressively on product development and efficiency enhancement. Its in-house R&D and collaboration with leading research institutions have ensured market leadership in India and abroad. CUMI has, in place, manufacturing practices like Lean and Six Sigma to improve its cost competitiveness.



## Global Presence





# INDUSTRIAL CERAMICS

*INDUSTRIAL CERAMICS IS DEDICATED TO MANUFACTURING HI-TECH CERAMICS FOR INDUSTRIAL APPLICATIONS. THE PRODUCTS CAN BE BROADLY CLASSIFIED INTO WEAR CERAMICS, ENGINEERED CERAMICS AND METALLISED CERAMICS.*

## PRODUCTS & SERVICES

The Industrial ceramics division specializes in the manufacture of wear limiting products, grinding media, liners and engineered ceramics catering to critical and demanding applications in the Armour, Ceramic Tile, Non-Ferrous, Steel, Power Generation, Power Distribution, Cement, and Mineral and Ore Processing industries. The division provides design and installation support in addition to product supply.

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### The wide array of products serves a range of industrial applications:

- Ceramic Tiles
  - Coal-based Power Generation
  - Coal Preparation Plants
  - Cement
  - Steel
  - Aluminium
  - Mineral Processing
  - Chemical and Fluid Handling Equipment
  - Defence (Personnel and Vehicle Armour)
  - Textile
  - Gas & Oil based Boilers
  - Non-Ferrous Molten Metal
  - Power Distribution
  - Pulp and Paper
-

CERAMIC LINERS  
LIMITING PRODUCTS  
COAL WASHERIES  
CERAMIC LINERS  
GRINDING MEDIA  
CEMENT INDUSTRY  
STEEL INDUSTRY  
LIMITING PRODUCTS  
STEEL INDUSTRY  
CERAMIC LINERS  
COAL WASHERIES  
POWER PLANTS  
STEEL INDUSTRY  
CEMENT INDUSTRY  
GRINDING MEDIA

# WEAR CERAMICS »»

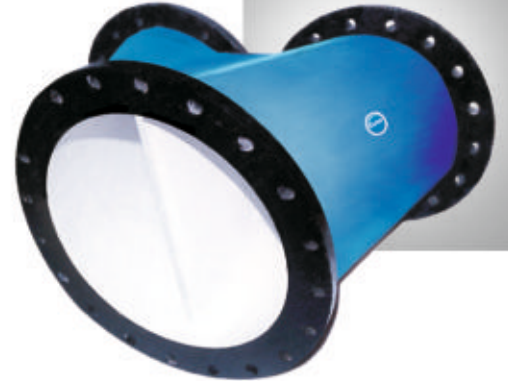
CUMI manufactures weldable and pastable alumina ceramic tiles that can be bonded onto the surface that is to be protected from wear.

We can supply the lining in the form of pre-engineered tiles and segments to match the profile of your equipment. These can be easily installed into your existing equipment and piping. We can also supply ready-to-fit ceramic lined equipment, such as pipes, bends, feed chutes, cones and other components.



# CUMITUFF®

## CERAMIC WEAR LIMITING PRODUCTS



Bulk material movement involving sliding often causes heavy wear to the equipment, resulting in damage of the equipment, lower reliability, production losses, and lower capacity utilisation. Installation of ceramic liners is a solution, and is a necessity in today's competitive world where equipment availability and low operating costs are essential.

- Based on your applications CUMI manufactures weldable, pastable, rubber backed and dovetail alumina ceramic tiles that can be bonded on to the surface that is to be protected from wear.
- Apart from standard sizes, we offer pre-engineered tiles to suit specific equipment. 3D modeling is used to ensure a good fit for the contours of the lining surface.
- CUMI can also offer a range of pre-fabricated Ceramic Lined Process Equipments in cases where drawing is provided.

### APPLICATIONS

#### Thermal Power Plant

- Inner Cone
- Ventury Vane
- Multiport Outlet
- Mill Discharge Valve
- Bends and Pipes
- Orifice
- Swing Panel
- Transition / Y-Piece
- Burner Assembly Pipe

#### Bulk Material Handling

- Chute / Transfer Points
- Pulley Lagging
- Slurry Pipes and Bends

#### Coal Washery

- Cyclones / Spigots
- Feed / Discharge Orifices
- Catch Pan

#### Cement Industry

- Coal / Raw / Cement Mills
- Toboggan Chute
- Fan Casing, Hoppers, Separators

#### Steel Industry

- Material Charging Hoppers
- Slag Granulation Systems

### THE CUMI ADVANTAGE - QUALITY AND CONSISTENCY

- Well qualified and experienced technical team to assist customers in the choice of right products.
- Dedicated installation crew for in-situ lining.
- Well established process as per international standards
- Precision controlled tailor-made products for thermal, corrosion and wear protection applications.

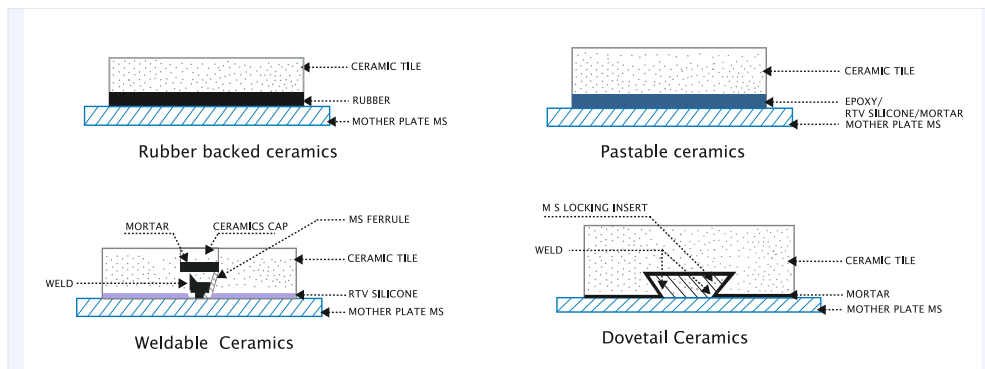




Should you have any wear problems, CUMI engineers will be glad to assist you. The following information will be helpful.

- Dimensional drawings or sketches of the part or equipment to be lined.
- Details of wear pattern and extent of wear.
- Operating conditions to which the equipment is subjected including temperature, material handled, the presence of acids etc.
- The life of existing lining.

CUMI PROVIDES THE FOLLOWING INSTALLATION SOLUTIONS

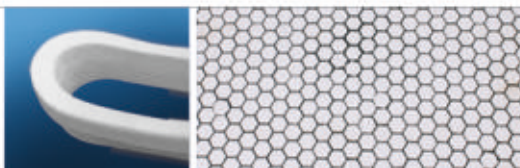


### CUMITUFF STANDARD TILES

LENGTH (mm)	WIDTH (mm)	THICKNESS (mm)
√ 150	100	6,8,10,13,15,20,25,50
* 150	100	13,15,25
√ 50	50	6
√ 50	25	6
√ 75	25	6

\* Weldable Tiles    √ Pastable Tiles

Other sizes also available.  
Equivalent sizes in inches also available.  
We also manufacture hexmats and mosaic mats.

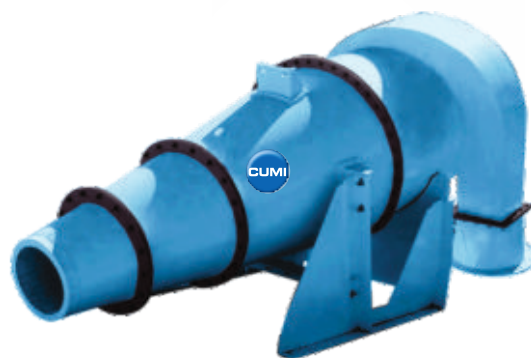






# CUMITUFF<sup>®</sup>

## CERAMICS FOR POWER PLANTS



### CERAMICS FOR POWER PLANTS ////

CUMI offers ceramic wear protection solutions for coal-based thermal power stations. Our expertise is in manufacturing and supplying pre-engineered wear resistant tiles and ready to fit pre-fabricated lined equipment.

Based on severity of application, CUMI offers wear limiting products in 85%, 90%, 92% and 95% alumina.

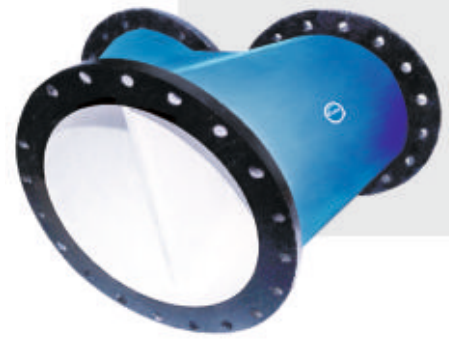
#### The CUMI Advantage

- Tailor-made solutions
- Dedicated installation crew for in-situ lining.



# CUMITUFF<sup>®</sup>

## CERAMICS FOR CEMENT INDUSTRY



### CERAMICS FOR CEMENT INDUSTRY /////

#### Vertical Roller Mill

Vertical Roller Mill Body ID Lining

- Grit Cone

#### Separator

- Raw Mill
- Coal Mill
- Cement Mill
- Feed Chutes

#### Raw Mill

- Inlet Bends + Discharge Bends

#### Coal Mill

- Blow Out Nozzle
- Bull Ring Segment
- Mill Body with 25mm Thick Tiles
- Bends and Pipes

#### Ceramic Rubber Composite Tiles

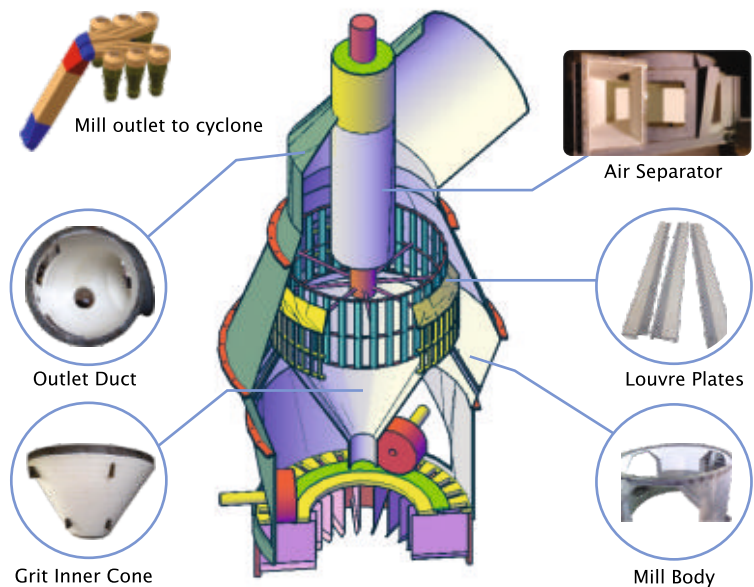
- Pulley Lagging
- Drive Pulley
- Stub Pulley

#### Ceramic Rubber Composite Impact Pads

- Chutes
- Hopper
- Transfer Points

#### Ceramic Rubber Composite for Packing Plants

- Toboggan Chutes



Based on severity of application, CUMI offers wear limiting products in 85%, 90% and 92% alumina.

CUMI also manufactures a wide range of monolithics in the form of conventional castables, low cement castables, insulating castables and no cement castables for applications in cyclone, pre-heater and smoke chamber, inlet cone, tip casting, burner pipe, bull nose and grate cooler.

**FLSMIDTH**

**fives**

**KHD** | HUMBOLDT WEDAG  
India Pvt. Ltd

**LOESCHE**  
INNOVATIVE ENGINEERING

**LNVTech**  
FORNITE TECHNOLOGY  
MEMBER OF  
**sinoma**



# CUMITUFF®

## GRINDING MEDIA & BALL MILL LINERS

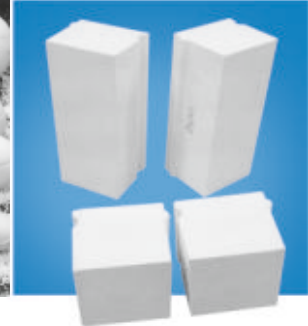
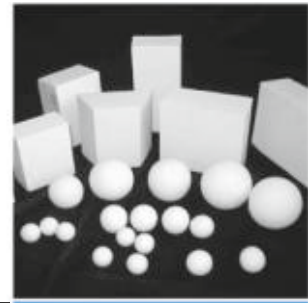
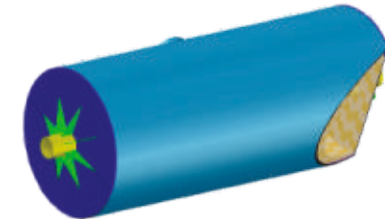
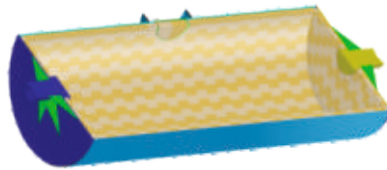
### GRINDING MEDIA AND BALL MILL LINERS /////

CUMI supplies ceramic grinding media and ball mill liners to the ceramic tile industry. Grinding media is used for particle size reduction which takes place when the material being ground is sandwiched between the media. Ball mill liners are supplied to protect the ball mill from wear and provide longer usable life.

Over the years, CUMI has developed the expertise in grinding operation and can provide guidance on media selection, both in terms and proportion. In addition to supplying ball mill liners, the experienced installation crew of CUMI can provide onsite assistance in terms of lining the ball mill.

#### APPLICATIONS

- Granito tiles
- Floor and wall tiles
- Ceramic glazes
- Frits and colours
- Paints
- Food industry
- Mineral processing



# CUMITUFF®

## CERAMICS FOR ALUMINIUM PLANTS

### CERAMICS FOR ALUMINIUM PLANTS /////

CUMI offers ceramic wear protection solutions for aluminium plants. Our expertise is in manufacturing and supplying pre-engineered wear resistant tiles and ready to fit pre-fabricated lined equipment.

Based on severity of application, CUMI offers wear limiting products in 90% and 92% alumina.

#### The CUMI Advantage

- Tailor-made solutions
- Dedicated installation crew for in-situ lining

#### APPLICATIONS

- Autogeneous Mill outlet vertical duct
- Pipes and bends for coke / Bath Plant
- Ship loading arm
- Serge Hopper
- Crusher bends Discharge Chutes
- Reciprocating feeder suction pipe.
- Dust collector pipes for crash bath
- Classifier for de-dusting system in BTP



# CUMITUFF<sup>®</sup>

## CERAMICS FOR COAL PREPARATION



### CERAMICS FOR COAL PREPARATION PLANTS /////

CUMI manufactures and supplies CUMITUFF ceramic liners and pre-fabricated ceramic lined equipment for various applications in Coal Washeries.

#### PRODUCTS

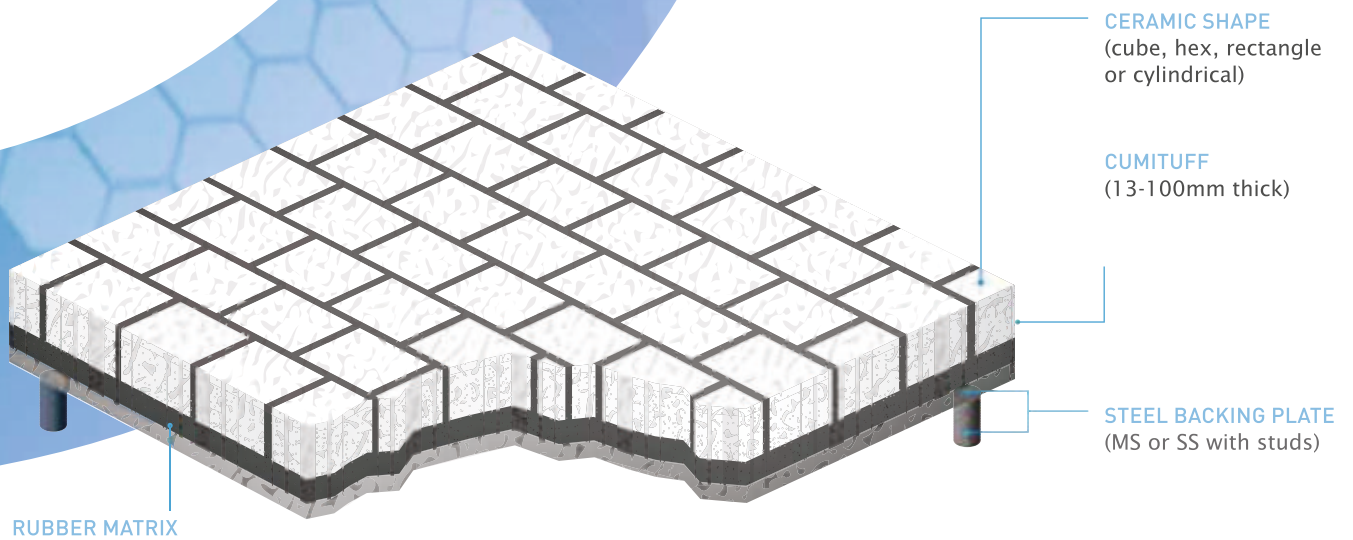
- Standard tiles
- Pre-engineered tiles
- Pre-fabricated ceramic lined equipment



Our comprehensive range of CUMITUFF ceramic liners will provide cost effective performance.

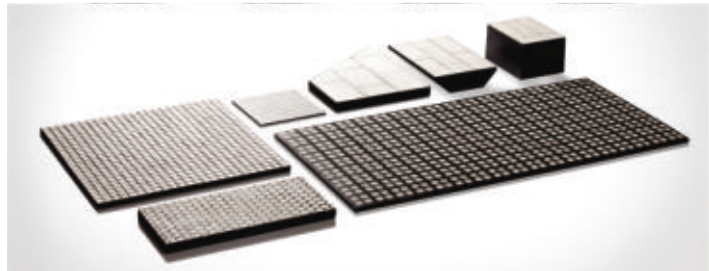
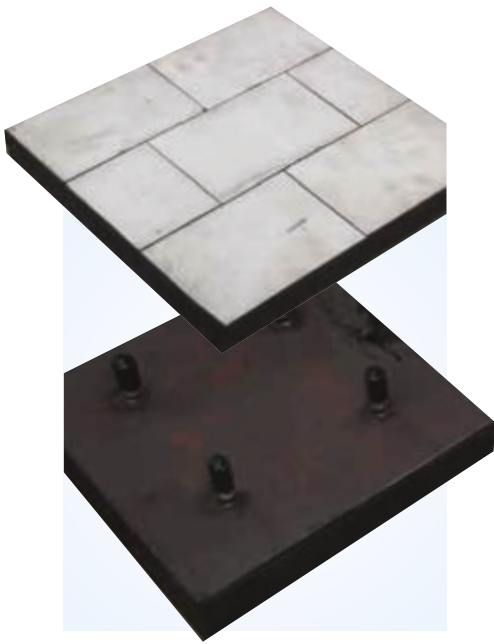
Based on severity of application, CUMI offers wear limiting products in 90% and 92% alumina.





## RUBBER BACKED CERAMIC WEAR SOLUTIONS

CUMI manufactures a **comprehensive range of tailored high performance engineered lining solutions** providing ultimate protection against the most extreme operating conditions. Our liners are manufactured from the highest quality materials in our state of the art facility following industry recognised and certified manufacturing process.



## HIGH WEAR PROTECTION

**CUMITUFF** liners provide superior wear life when compared to industry standard metallic wear plates. This leads to reduced frequency of change out, improving reliability of equipment and reducing operating costs.

CUMITUFF are superior materials with proprietary ceramic formulations high in strength and hardness for the toughest working conditions offering exceptional wear, corrosion, thermal shock and impact resistance. The ceramic provides extreme resistance to wear while the resilient properties of the rubber effectively dampen the impact. The resultant composite is ideal for impact and wear protection in bulk material handling.

# CUMITUFF<sup>®</sup>

## CERAMICS FOR STEEL INDUSTRY

### CERAMIC LINERS FOR STEEL INDUSTRY ////

#### APPLICATION AREAS

- Ceramic liners for
- Material Hoppers
  - Receiving Hoppers
  - Discharge Funnel
  - Charge End Socket
  - Rocker Arm
  - Lower Seal Valve
  - Upper Seal Valve

#### CERAMIC LINERS FOR SLAG GRANULATION PLANTS

#### APPLICATIONS

- Ceramic liners for
- Slow Down Box
  - Distribution Box
  - Blowing Box
  - Granulation Tank
  - Dehydrators
  - Raw Material Handling Plant Chutes
  - Coke Oven Plant
  - Sinter Plant

Based on severity of application, CUMI offers wear limiting products in 90% and 92% alumina.

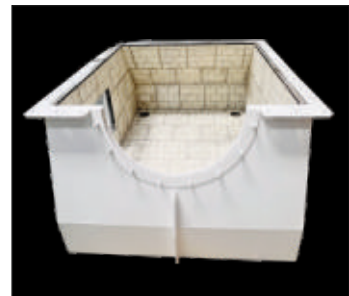
Major OEM's Served...

**SMS** group

**TATA STEEL**

**JSW** Steel

**DANIELI** CORUS



# MATERIAL DATA SHEET

PROPERTIES	UNITS	TEST	CUMITUFF 85	CUMITUFF 90	CUMITUFF 90S	CUMITUFF 92	CUMITUFF 92 CSP	CUMITUFF 96	CUMITUFF 96 Substrate	CUMIZIRTUUFF 10	CUMIZIRTUUFF 18.7	CUMICARB R WRL	CUMICARB-R
<b>CHEMICAL COMPOSITION</b>													
Density	gm/cc	ASTM C373-88 (2006)	3.35	3.55	3.55	3.65	3.65	3.72	3.78	4.0	4.12	2.95	3.05
Colour	-		White	White	White	Ivory	White	White	White	Ivory	Ivory	Black	Black
Water Absorption	%	ASTM C373-88 (2006)	0	0	0	0	0	0	0	0	0	0	0
Rockwell Hardness	R45N	ASTM E18-15	70	75	75	77	77	78	80	78	81	90 (HRA)	90 (HRA)
Vickers Hardness	GPa	ASTM C1327-03	9.5	11.8	11.8	12.5	12.5	13	13.5	12.5	13.0	20.0	22.0
Elastic Modulus	GPa	ASTM C1198-08	230	275	275	300	300	325	325	350	330	360	380
Poisson's Ratio	-	ASTM C1198-08	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.30	0.30	0.21	0.21
Flexural Strength	MPa	ASTM C1161-02c (2008)	240	270	270	320	330	360	375	380	400	300	350
Compressive Strength	MPa	ASTM C1424-04	1450	1750	1750	1950	2000	2300	2400	2700	2900	2200	2500
Fracture Toughness	MPa.m <sup>0.5</sup>	ASTM C1421-01b (2007)	(3-4)	(3-4)	(3-4)	(4-5)	(4-5)	(4-5)	(4-5)	(5.5-6.5)	(6.0-7.0)	(3-4)	(3-4)
Thermal Conductivity	W/m-k	ASTM C1470-06	16	16.7	16.7	20.2	20.2	24.7	25	25	20	120	130
Coefficient of Thermal Expansion @ 25-1000°C	10 <sup>-6</sup> /°C	ASTM C1470-06	7.4	8.1	8.0	8.1	8.1	8.2	8.2	8.3	8.4	4.0	4.0
Max Use Temperature	°C	No load condition	1450	1500	1500	1500	1600	1700	1700	1500	1500	1250	1250
Thermal Shock, Tc	°C	ASTM C1525-04	300	250	250	250	250	250	250	300	300	400	400
Dielectric Strength	ac-kV/mm (3.18mm)	ASTM D149-97a(2004)	9.0	8.3	8.3	8.3	8.3	8.3	10 (3.18 mm) 20 (0.25 mm)	N/A	N/A	N/A	--
Dielectric Loss	25°C @ 1MHZ	ASTM D2520-01	0.0009	0.0004	0.0004	0.0004	0.0004	0.0002	0.0002				
Volume Resistivity	25°C,ohm-cm	ASTM D1829	>10 <sup>13</sup>	>10 <sup>13</sup>	>10 <sup>13</sup>	>10 <sup>13</sup>	>10 <sup>13</sup>	>10 <sup>13</sup>	>10 <sup>13</sup>				
	500°C, ohm-cm		4x10 <sup>8</sup>	4x10 <sup>8</sup>	4x10 <sup>8</sup>	4x10 <sup>8</sup>	4x10 <sup>9</sup>	4x10 <sup>9</sup>	4x10 <sup>9</sup>				
	1000°C,ohm-cm		5x10 <sup>5</sup>	5x10 <sup>5</sup>	5x10 <sup>5</sup>	5x10 <sup>5</sup>	5x10 <sup>5</sup>	1.0x10 <sup>6</sup>					>10 <sup>5</sup>
<b>Prime Characteristics</b>													
			Wear Resistance	Good Wear Resistance	Good Wear Resistance	Excellent Wear Resistance	Excellent Wear & Corrosion Resistance	Excellent Wear Resistance & Thermal Application	Electrical & Electronic Application	Impact & Wear Application	Impact & Wear Application	Excellent Wear, Acid, Corrosion Resistant & Thermal Application	Excellent Wear, Acid, Corrosion Resistant & Ballistic Properties

**Notes:**

- DATA MEASUREMENTS-** All data measurements are typical and made at room temperature unless otherwise noted.
- COMPOSITION CONTROL-** All industrial ceramic compositions are controlled using modern chemical, spectrographic, and x-ray fluorescent methods.
- THERMAL SHOCK RESISTANCE-** Tests are done by quenching samples into water from various elevated temperatures. The change in temperature where a sharp decrease in flexural strength is observed is listed as +Tc.

**4. CHEMICAL RESISTANCE-** Although all Industrial ceramic products are highly resistant, specific application data has to be obtained prior to design finalisation to ensure optimum ceramic selection.

This chart is intended to illustrate typical properties of CUMITUFF / CUMITHERM ceramic materials. The designer should recognize that exact properties may vary according to product configuration and can sometimes be tailored to meet specific requirements. The information set forth herein should not be construed as absolute engineering data or constituting a warranty or representation for which we assume legal responsibility.

# MAKING A MATERIAL DIFFERENCE



## CONTACT DETAILS

### CUMI Worldwide

CUMI America Inc.  
CUMI Australia (Pty) Ltd.  
CUMI Middle East F.Z.E  
Foskor Zirconia (Pty) Ltd.  
Volzhsky Abrasive Works  
Wendt Grinding Technologies Ltd.

Oakdale, PA, USA  
Carrington, Australia  
Ras Al Khaimah, UAE  
Phalaborwa, South Africa  
Volograd, Russia  
Rayong, Thailand

+1 724 218 1603  
+61 24940 0035  
+971 7204 6181  
+271 5789 2233  
+7 495 645 6866  
+66 38 955490



WEBSITE



CUMI-Location

## CARBORUNDUM UNIVERSAL LIMITED INDUSTRIAL CERAMICS DIVISION

#47, SIPCOT INDUSTRIAL COMPLEX, HOSUR - 635126, TAMILNADU  
INDIA, TEL : +91 4344 61 4700 / 4718  
E-mail: [customercaireic@cumi.murugappa.com](mailto:customercaireic@cumi.murugappa.com) Fax: +91 4344 61 4809  
[www.cumiceramics.com](http://www.cumiceramics.com)