



# CERAMITE CSA AND CSR SERIES

## SILICON CARBIDE BASED CASTABLE REFRACTORY

Ceramite® CSA and CSR series are precast refractory materials based on silicon carbide. Used in areas of heavy wear in the aluminium industry, they have high abrasion resistance and high thermal conductivity.

Different aggregates in each formulation determine the properties for each product. Ceramite CSA and CSR series are high performance refractories for high temperature applications.

Refractories in the CSA family have a maximum service temperature of 1500°C (2732°F). They provide high wear resistance, alkali resistance, and good thermal shock resistance and include:

- CSA
- CSA-F (trowellable)
- CSA-B (contains non-wetting additives)
- CSA-SB (self-flowing during casting and contains non-wetting additives)

Refractories in the CSR family have a maximum service temperature of 1000°C (1832°F). They provide high abrasion resistance and high thermal conductivity and include:

- CSR
- CSR-F (trowellable)
- CSR-S (self-flowing, meaning it can be successfully cast in most instances without the use of vibration)
- CSR-B (contains non-wetting additives)
- CSR-SB (self-flowing with a non-wetting additive)

### COMPOSITION

Material	Approximate Percentage of Weight				
	CSA	CSA-F	CSR	CSR-F	CSR-S
SiC	74%	69%	69%	64%	64%
Al <sub>2</sub> O <sub>3</sub>	13%	15%	16%	18%	21%
SiO <sub>2</sub>	10%	12%	8%	10%	10%
CaO	2%	3%	6%	7%	4%
Fe <sub>2</sub> O <sub>3</sub>	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%



### BENEFITS

- Good strength
- Good wear resistance
- High thermal conductivity
- High thermal shock resistance
- Alkali resistance

### APPLICATIONS

Precast Shapes	Material
Bottom of Crucible Lining	CSR, CSR-S
Furnace Jambs and Lintels	CSA
Metal Inlet and Transfer Launderers	CSA
Furnace Sills and Ramps	CSA
Transfer Launderers	CSA-SB
Listed applications are suggested uses only.	

### STORAGE

- Ceramite mortar is to be stored in dry and frost-free conditions, off the ground in closed bags. With proper storage it will retain its properties for at least six months
- Ceramite mortar should be stored at room temperature 15–25°C (59–77°F) for at least two days before use
- Pre-fired, cast Ceramite parts for hot applications must not be exposed to water or moisture. If exposed a full sequence of preheating must be performed

Contact a Pyrotek representative for more detailed product information regarding Ceramite CSA and CSR.



## CERAMITE CSA AND CSR SERIES

Property	Temperature	Value				
		CSA	CSA-F	CSR	CSR-F	CSR-S
Density– kg/m <sup>3</sup> (lb/ft <sup>3</sup> )	20°C (68°F)	2700 (169)	2700 (169)	2700 (169)	2500 (156)	2800 (175)
	600°C (1112°F)	2700 @ 850°C (169 @ 1562°F)	2700 @ 850°C (169 @ 1562°F)	2600 (162)	2500 (156)	2600 (162)
Cold Modulus of Rupture– MPa (psi)	20°C (68°F)	8 (1160)	6 (870)	19 (2760)	17 (2470)	12 (1740)
	600°C (1112°F)	23 @ 850°C (3340 @ 1562°F)	–	14 (2030)	12 (1740)	18 (2610)
	850°C (1562°F)	27 @ 1000°C (3920 @ 1832°F)	23 (3340)	13 (1890)	13 (1890)	18 (2610)
	1000°C (1832°F)	26 @ 1200°C (3771 @ 2192°F)	27 (3920)	16 (2320)	15 (2180)	20 (2900)
Cold Compressive Strength– MPa (psi)	20°C (68°F)	84 (12,200)	48 (6970)	161 (23,400)	144 (20,900)	131 (19,000)
	600°C (1112°F)	161 @ 850°C (23,400 @ 1562°F)	–	181 (26,300)	160 (23,200)	205 (29,700)
	850°C (1562°F)	150 @ 1000°C (21,800 @ 1832°F)	145 (21,050)	112 (16,200)	106 (15,400)	120 (17,400)
	1000°C (1832°F)	135 @ 1200°C (19,580 @ 2192°F)	155 (22,500)	115 (16,700)	102 (14,800)	122 (17,700)
Hot Modulus of Rupture–MPa (psi)	1000°C (1832°F)	>28 (>4060)	–	25 (3630)	21 (3050)	28 (4060)
Abrasion*– cm <sup>3</sup> (in <sup>3</sup> )	20°C (68°F)	1.1 (0.07)	1.5 (0.09)	0.8 (0.05)	1.0 (0.06)	0.8 (0.05)
	600°C (1112°F)	–	–	0.8 (0.05)	1.1 (0.07)	0.9 (0.05)
	850°C (1562°F)	0.7 (0.04)	0.8 (0.05)	–	–	–
Thermal Conductivity– W/m-K (BTU-in/ft <sup>2</sup> -hr-°F)	300°C (572°F)	14.0 (97.2)	14.0 (97.2)	7.9 (54.8)	–	–
	600°C (1112°F)	12.0 (83.3)	12.0 (83.3)	6.6 (45.8)	–	–
	900°C (1652°F)	–	–	6.4 (44.4)	–	–
Linear Thermal Expansion, 20–850°C (68–1562°F)		0.4%	0.4%	0.4%	–	–
Permanent Linear Change, 20–850°C (68–1562°F)		–0.3%	–0.3%	–0.27%	–	–
Maximum Service Temperature		1500°C (2732°F)	1500°C (2732°F)	1000°C (1832°F)	1000°C (1832°F)	1000°C (1832°F)
Maximum Grain Size–mm (in)		3 (0.12)	–	3 (0.12)	3 (0.12)	3 (0.12)

\* The abrasion test was performed per the DIN 52108 standard and pre-fired at the indicated temperature.

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