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ENGLISH

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# FORMULA 4-BF

Formerly Formula Five-Fine

*Thermbond Refractories use the patented Stellar Binder System™ for easy and accurate mixing, controlled setting, fast dry-out and heat up, thermal shock resistance and other unique properties. Thermbond chemically bonds to existing fired refractories. CHARACTERISTICS: - High Purity - High Alumina - Very Dense - Fine Grain - Abrasion Resistant - Non-Wetting - Fast Setting - Fast Curing -*

PACKAGING		
Unit Equivalent	Bags: 1	Jugs: 1
Bag Weight*	60 lbs	27.2 kg
Jug Weight*	8 lbs	3.6 kg
Drum Weight*	400 lbs	181.4 kg
Unit Weight*	68 lbs	30.7 kg
Yield / Unit*	0.38 ft <sup>3</sup>	0.011 m <sup>3</sup>
Units / Ton*	29.59 short	32.61 metric
Board Feet / Unit*	4.5 bd ft	
Wet to Dry Ratio*	12.7% - 13.9%	
Liquid Activator	FORMULA	
Bags Per Pallet	48	
Drums Per Dry Pallet	1	

APPLICATION	
Data based on	Casting

BULK DENSITY**		
As Placed	180 lbs/ft <sup>3</sup>	2883 kg/m <sup>3</sup>
After 1500F (816C)	170 lbs/ft <sup>3</sup>	2723 kg/m <sup>3</sup>

MAXIMUM RECOMMENDED SERVICE TEMP**		
Hot Face	3000 F	1649 C

ABRASION RESISTANCE** (ASTM C-704)	
After 1500F (816C)	<12 cc loss

MOLTEN METAL CONTACT	
- Aluminum - Zinc - Iron -	

COMPRESSIVE STRENGTH**			
1500F (816C)	6625 psi	466 kg/cm <sup>2</sup>	46 N/mm <sup>2</sup>
2500F (1371C)	14000 psi	984 kg/cm <sup>2</sup>	97 N/mm <sup>2</sup>
2800F (1538C)	19250 psi	1353 kg/cm <sup>2</sup>	133 N/mm <sup>2</sup>

PERMANENT LINEAR CHANGE**	
1500F (816C)	-0.25%
2500F (1371C)	-1.50%
2800F (1538C)	-1.90%

TYPICAL CHEMICAL ANALYSIS (After 1500F (816C))**	
Al <sub>2</sub> O <sub>3</sub>	85.42%
SiO <sub>2</sub>	2.54%
Fe <sub>2</sub> O <sub>3</sub>	0.91%
P <sub>2</sub> O <sub>5</sub>	5.21%
Other	5.92%
Total	100.00%

THERMAL CONDUCTIVITY**		
600F (316C)	16.9 Btu-in/hr-ft <sup>2</sup> -F	2.43 W/m K
1200F (649C)	14.3 Btu-in/hr-ft <sup>2</sup> -F	2.06 W/m K
1800F (982C)	13.5 Btu-in/hr-ft <sup>2</sup> -F	1.95 W/m K
2400F (1316C)	13.9 Btu-in/hr-ft <sup>2</sup> -F	2.00 W/m K

COLD MODULUS OF RUPTURE**			
1500F (816C)	1450 psi	102 kg/cm <sup>2</sup>	10 N/mm <sup>2</sup>
2500F (1371C)	3100 psi	218 kg/cm <sup>2</sup>	21 N/mm <sup>2</sup>
2800F (1538C)	4300 psi	302 kg/cm <sup>2</sup>	30 N/mm <sup>2</sup>

HOT MODULUS OF RUPTURE**			
1500F (816C)	2270 psi	160 kg/cm <sup>2</sup>	16 N/mm <sup>2</sup>

\*Measures are approximate and may vary. For mixing partial units, contact Stellar Materials for specific wet-to-dry ratios. See Installation Guide for more detailed information.

\*\*Test data shown are based on averages subject to normal variation on individual tests, and therefore should not be assumed to be maximum or minimum specifications.

Due to the unique nature of the Stellar binder system, test procedures vary slightly from ASTM. Documentation of these variations is available upon request.