

Typical Data		STANDARD ASTM C 155 GRADES								
Properties		BNZ-20	BNZ-23	BNZ-23 HS	BNZ-23A	BNZ-26	BNZ-26-60	BNZ-28	BNZ-3000	BNZ-32
ASTM Classification		20/23	23	23	23	26	26	28	30	32
Temperature Use Limit (Normal oxidizing atmosphere)	°F	2300	2300	2300	2300	2600	2600	2800	3000	3200
	°C	1260	1260	1260	1260	1427	1427	1538	1649	1760
Density, Avg. ASTM C 134	lb/ft <sup>3</sup>	36	37	42	33	48	50	55	65	75
	kg/m <sup>3</sup>	577	593	673	529	769	801	881	1041	1201
	lb/BEq	2.1	2.2	2.5	1.93	2.8	2.9	3.2	3.8	4.4
	kg/str.	0.9	1.0	1.1	0.86	1.3	1.3	1.5	1.7	2.0
Modulus of Rupture ASTM C 133	lb/in <sup>2</sup>	95	105	140	115	200	190	220	250	300
	MPa	0.7	0.7	1.0	0.79	1.4	1.3	1.5	1.7	2.1
	kg/cm <sup>2</sup>	6.7	7.4	9.9	8	14.1	13.4	15.5	17.6	21.1
Cold Crushing of Strength ASTM C 133	lb/in <sup>2</sup>	105	125	190	145	270	290	340	440	450
	MPa	0.7	0.9	1.3	1	1.9	2.0	2.3	3.0	3.1
	kg/cm <sup>2</sup>	7.4	8.8	13.4	10.2	19.0	20.4	23.9	31.0	31.7
Permanent Linear Change ASTM C 210	%									
24 hrs at soaking temp: °F (°C)										
2250 (1232)		0.0	0.0	0.0	0.0	-	-	-	-	-
2350 (1290)		-	-	-	-	-	-	-	-	-
2450 (1343)		-	-	-	-	-	-	-	-	-
2550 (1399)		-	-	-	-	-0.1	-0/2	-	-	-
2750 (1510)		-	-	-	-	-	-	-0.7	-	-
2800 (1538)		-	-	-	-	-	-	-	-	-
2950 (1621)		-	-	-	-	-	-	-	-0.7	-
3150 (1732)		-	-	-	-	-	-	-	-	-0.4
Reversible Linear Thermal Expansion	%									
at 2000°F (1093°C)										
		0.6	0.6	0.6	0.6	0.6	0.6	0.65	0.65	0.65
Hot Load Strength ASTM C 16	% deformation									
10 psi load for 11/2 hours: °F (°C)										
2000 (1093)		0	0	0	0	-	-	-	-	-
2200 (1204)		-	-	-	-	0.2	0.1	0.1	-	-
2400 (1316)		-	-	-	-	-	-	-	0.3	0.2
Thermal Conductivity ASTM C 182	Btu-in/ft <sup>2</sup> , hr, °F (W/mk)									
Mean temperature, °F (°C)										
500 (260)		0.9 0.13	1.0 0.14	1.2 0.17	.92 0.13	1.6 0.23	1.8 0.26	2.3 0.33	2.8 0.40	3.9 0.56
1000 (538)		1.2 0.17	1.3 0.19	1.5 0.22	1.14 0.16	1.9 0.27	2.0 0.29	2.4 0.35	2.9 0.42	4.1 0.59
1500 (816)		1.5 0.22	1.6 0.23	1.7 0.25	1.39 0.2	2.2 0.32	2.1 0.30	2.6 0.37	3.1 0.45	4.2 0.61
2000 (1093)		1.7 0.24	1.8 0.26	2.0 0.29	1.64 0.24	2.6 0.37	2.3 0.33	2.7 0.39	3.3 0.48	4.3 0.62
To convert Btu-in/ft <sup>2</sup> , hr, °F to Kcal-m <sup>2</sup> , hr, °C, multiply by 0.124.										
Chemical Analysis										
Alumina – Al <sub>2</sub> O <sub>3</sub>		35	35	35	38	47.0	60.4	67.0	69.9	78.3
Silica – SiO <sub>2</sub>		60.3	60.3	60.3	45	48.6	36.1	30.5	28.1	20.7
Ferric Oxide – Fe <sub>2</sub> O <sub>3</sub>		0.9	.9	0.9	0.3	0.7	0.4	0.3	0.3	0.2
Titanium Oxide – Ti <sub>2</sub> O <sub>3</sub>		1.3	1.3	1.3	1.6	1.3	1.0	0.9	1.2	0.5
Calcium Oxide – CaO		2.1	2.1	2.1	15	0.3	0.1	0.3	0.2	0.1
Magnesium Oxide – MgO		0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.1	0.1
Alkalies, as Na <sub>2</sub> O & K <sub>2</sub> O		0.4	0.4	0.4	0.5	2.0	1.8	1.0	0.2	0.1