

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	<b>2600</b>	2600	2800	3000	3200
	°C	1260	1260	1260	1260	<b>1427</b>	1427	1538	1649	1760
Density, Avg. ASTM C 134	lb/ft <sup>3</sup>	36	37	42	33	<b>48</b>	50	55	65	75
	kg/m <sup>3</sup>	577	593	673	529	<b>769</b>	801	881	1041	1201
	lb/BEq	2.1	2.2	2.5	1.93	<b>2.8</b>	2.9	3.2	3.8	4.4
	kg/str.	0.9	1.0	1.1	0.86	<b>1.3</b>	1.3	1.5	1.7	2.0
Modulus of Rupture ASTM C 133	lb/in <sup>2</sup>	95	105	140	115	<b>200</b>	190	220	250	300
	MPa	0.7	0.7	1.0	0.79	<b>1.4</b>	1.3	1.5	1.7	2.1
	kg/cm <sup>2</sup>	6.7	7.4	9.9	8	<b>14.1</b>	13.4	15.5	17.6	21.1
Cold Crushing of Strength ASTM C 133	lb/in <sup>2</sup>	105	125	190	145	<b>270</b>	290	340	440	450
	MPa	0.7	0.9	1.3	1	<b>1.9</b>	2.0	2.3	3.0	3.1
	kg/cm <sup>2</sup>	7.4	8.8	13.4	10.2	<b>19.0</b>	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)		-	-	-	-	<b>-0.1</b>	-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	<b>0.6</b>	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)		-	-	-	-	<b>0.2</b>	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	<b>1.6</b> <b>0.23</b>	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	<b>1.9</b> <b>0.27</b>	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	<b>2.2</b> <b>0.32</b>	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	<b>2.6</b> <b>0.37</b>	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	<b>47.0</b>	60.4	67.0	69.9	78.3
Silica – SiO <sub>2</sub>		60.3	60.3	60.3	45	<b>48.6</b>	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	<b>0.7</b>	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	<b>1.3</b>	1.0	0.9	1.2	0.5
Calcium Oxide – CaO		2.1	2.1	2.1	15	<b>0.3</b>	0.1	0.3	0.2	0.1
Magnesium Oxide – MgO		0.0	0.0	0.0	0.1	<b>0.1</b>	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	<b>2.0</b>	1.8	1.0	0.2	0.1