

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	°F	2300	2300	2300	2300	2600	2600	2800	3000	3200
(Normal oxidizing atmosphere)	°C	1260	1260	1260	1260	1427	1427	1538	1649	1760
Density, Avg.	lb/ft ³	36	37	42	33	48	50	55	65	75
ASTM C 134	kg/m ³	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	lb/in ²	95	105	140	115	200	190	220	250	300
ASTM C 133	MPa	0.7	0.7	1.0	0.79	1.4	1.3	1.5	1.7	2.1
	kg/cm ²	6.7	7.4	9.9	8	14.1	13.4	15.5	17.6	21.1
Cold Crushing of Strength	lb/in ²	105	125	190	145	270	290	340	440	450
ASTM C 133	MPa	0.7	0.9	1.3	1	1.9	2.0	2.3	3.0	3.1
	kg/cm ²	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	Btu-in/ft ² , hr, °F									
ASTM C 182	(W/mk)									
Mean temperature, °F (°C)										
500		0.9	1.0	1.2	.92	1.6	1.8	2.3	2.8	3.9
(260)		0.13	0.14	0.17	0.13	0.23	0.26	0.33	0.40	0.56
1000		1.2	1.3	1.5	1.14	1.9	2.0	2.4	2.9	4.1
(538)		0.17	0.19	0.22	0.16	0.27	0.29	0.35	0.42	0.59
1500		1.5	1.6	1.7	1.39	2.2	2.1	2.6	3.1	4.2
(816)		0.22	0.23	0.25	0.2	0.32	0.30	0.37	0.45	0.61
2000		1.7	1.8	2.0	1.64	2.6	2.3	2.7	3.3	4.3
(1093)		0.24	0.26	0.29	0.24	0.37	0.33	0.39	0.48	0.62
To convert Btu-in/ft ² , hr, °F to Kcal-m ² , hr, °C, multiply by 0.124.										
Chemical Analysis										
Alumina – Al ₂ O ₃		35	35	35	38.0	47.0	60.4	67.0	69.9	78.3
Silica – SiO ₂		60.3	60.3	60.3	45	48.6	36.1	30.5	28.1	20.7
Ferric Oxide – Fe ₂ O ₃		0.9	.9	0.9	0.3	0.7	0.4	0.3	0.3	0.2
Titanium Oxide – Ti ₂ O ₂		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 ₂ O & K ₂ O		0.4	0.4	0.4	0.5	2.0	1.8	1.0	0.2	0.1