

A. P. GREEN REFRACTORIES CO.

MEXICO, MISSOURI 65265 U.S.A.

Subsidiary of United States Gypsum Company

PRELIMINARY TECHNICAL DATA

MIZZOU CASTABLE Plus

60% Alumina Castable

Manufactured at Mexico, Missouri; Oak Hill, Ohio;
Philadelphia, Pennsylvania; and Sulphur Springs, Texas

MAXIMUM RECOMMENDED TEMPERATURE -----	3000°F	1650°C
QUANTITY REQUIRED - Net -----	132 lb/ft ³	2.12 g/cc
QUANTITY IN PLACE -----	lb/ft ³	g/cc
Cured and Then Dried at 220°F (105°C) -----	138	2.21
Heated at 1500°F (815°C) and Then Cooled -----	132	2.12
WATER REQUIRED FOR MIXING -----	Approximately	
Per 100 Pounds (45.4 kg) -----	1 gal (US)	3.8 liters
MAXIMUM TIME FROM ADDING WATER TO PLACING MATERIAL Minutes -----	20	
PERMANENT LINEAR CHANGE - ASTM C113 Expansion or Shrinkage		
Cured and Then Dried at 220°F (105°C) -----	Nil	
Heated at 1500°F (815°C) and Then Cooled ----	0.1% Shr	
Heated at 2000°F (1095°C) and Then Cooled ---	0.2% Shr	
Heated at 2500°F (1370°C) and Then Cooled ---	1.0% Exp	
Heated at 2900°F (1595°C) and Then Cooled ---	2.0% Exp	
MODULUS OF RUPTURE - ASTM C133 -----	lb/in ²	kg/cm ²
Cured and Then Dried at 200°F (105°C) -----	750	53
Heated at 1500°F (815°C) and Then Cooled -----	340	24
Heated at 2000°F (1095°C) and Then Cooled -----	370	26
Heated at 2500°F (1370°C) and Then Cooled -----	600	42
COLD CRUSHING STRENGTH - ASTM C133 -----		
Cured and Then Dried at 200°F (105°C) -----	2800	195
Heated at 1500°F (815°C) and Then Cooled -----	1500	105
Heated at 2000°F (1095°C) and Then Cooled -----	1500	105
Heated at 2500°F (1370°C) and Then Cooled -----	2100	150
PARTICLE SIZE - ASTM C92 Retained on 4 Mesh Tyler Screen (4.70 mm opening) Wet Analysis -----	Less Than 5%	

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(Continued)

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"HEAT-UP" SCHEDULE TO 2500° F.

MIZZOU CASTABLE VERSUS MIZZOU CASTABLE PLUS

- CONDITIONS -

1. BOTH TAKE 24-HOUR MINIMUM HYDRAULIC CURE
2. START AT AMBIENT AIR TEMPERATURE OF 50° F. FOR HEAT-UP
3. 9" LINING

MIZZOU CASTABLE

AT SCHEDULE B (75° F./HR.)

50° F. TO 250° F.	-	2.7 HOURS
HOLD AT 250° F.	-	4.5 HOURS
250° F. TO 500° F.	-	3.3 HOURS
HOLD AT 500° F.	-	4.5 HOURS
500° F. TO 1000° F.	-	6.7 HOURS
HOLD AT 1000° F.	-	4.5 HOURS
1000° F. TO 2500° F.	-	20.0 HOURS
HOLD AT 2500° F.	-	<u>1.0</u> HOUR

TOTAL 47.2 HOURS

MIZZOU CASTABLE PLUS

AT 300° F./HR.

FROM 50° F. TO 2500° F.	-	8.2 HOURS
HOLD AT 2500° F.		<u>1.0</u> HOUR
TOTAL		9.2 HOURS

NOTE: IF LOST PRODUCTION WAS WORTH \$1,000/HOUR FOR THIS EXAMPLE, SAVINGS WOULD AMOUNT TO \$38,000. ALSO, FUEL AND "HEAT-UP" MONITORING COSTS WOULD BE SUBSTANTIALLY REDUCED.

MIZZOU CASTABLE Plus

THERMAL CONDUCTIVITY		Btu-in	kcal-m
At a Mean Temperature of		ft ² hr°F	m hr°C
400°F (205°C)	-----	4.46	0.55
800°F (425°C)	-----	4.67	0.58
1200°F (650°C)	-----	4.88	0.61
1600°F (870°C)	-----	5.10	0.63
2000°F (1095°C)	-----	5.32	0.66
2400°F (1315°C)	-----	5.54	0.69

CHEMICAL ANALYSIS

Calcined Basis

Silica - SiO ₂	-----	31.5 - 34.5%
Alumina - Al ₂ O ₃	-----	58.5 - 61.5%
Iron Oxide - Fe ₂ O ₃	-----	1.0 - 2.0%
Lime - CaO	-----	2.5 - 3.5%
Magnesia - MgO	-----	0.1 - 0.6%
Titania - TiO ₂	-----	1.0 - 2.0%
Alkalies - Na ₂ O + K ₂ O	-----	0.3 - 0.8%

These results cannot be taken as maximum or minimum requirements for specification purposes.

May 2, 1983

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