

PLAINTIFF'S
EXHIBIT
AL-824

(Date)

(Company)

(Address)

Dear

We are in the process of upgrading our knowledge of the various chemical substances we handle within our facilities to meet the requirements of the new OSHA Hazard Communication Standard (29 CFR 1910.1200). Listed below are products for which you are an approved supplier. We need the following information from your company for each of these products:

1. The complete chemical composition by percentage. In addition, identify the "hazardous" ingredients as defined in the new Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (i.e., 29 CFR 1910.1200).
2. The Chemical Abstract Service (CAS) numbers for the chemical constituents.

Thank you for your prompt attention. Please respond to Mr. R. M. James, Manager Health Regulatory Affairs, by October 23, 1984, concerning these matters. If you have any questions, please call Bob James at (412) 553-2881.

Sincerely yours,

411073 0331

MEMO for Dale

Jim UHRIG

Harrison Walker

PHONE NO. 343-0050

☒ PHONED
☐ WANTS TO SEE YOU
☐ WAS IN TODAY
☒ PLEASE CALL
☐ WILL CALL AGAIN
☐ URGENT
☐ SEE BELOW
☐ RETURNED YOUR CALL

MESSAGE:

Talk with UHRIG
All the info considered proprietary

SIGNED
SF-3275

L | DATE 7/17 | TIME 103



JAMES R UHRIG
REGIONAL MANAGER
INDUSTRIAL MARKET

TELEPHONE 412-343-0050

July 3, 1985

Aluminum Company of America
1501 Alcoa Building
Pittsburgh, Pennsylvania 15219

Attention: Mr. Dale Huddleston
Senior Industrial Hygienist

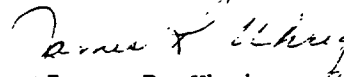
Subject: Data Sheets

Dear Mr. Huddleston:

Per your request in our meeting of June 20, 1985,
attached is Harbison-Walker's data sheets covering
materials purchased by Alcoa for your reference.

If we may be of any further assistance, please do
not hesitate to contact me promptly.

Yours truly,


James R. Uhrig
Regional Manager
Industrial Market

JRU/ga
Attachments

H & S
Industrial Hygiene
BDD
EER
TBB
RMJ
JES
MJV
JUL 10 1985
SC
DEH
CD
PW
LMN
EDS



HARBISON-WALKER REFRACTORIES

Division of Dresser Industries, Inc.

One Gateway Center, Pittsburgh, Pennsylvania 15222

THERMOLITH

Technical Data:

<u>Physical Properties: (Typical)</u>	<u>English Units</u>	<u>SI Units</u>
Approximate Amount Required per 1000 9" Equivalent:		
Brick Laid Dry then Grouted	500 to 600 Lbs.	227 to 272 Kg.
Brick Dipped or Thinly Trowelled Joints	700 to 800 Lbs.	318 to 363 Kg.
Approximate Amount of Water for Trowelling Consistency		
Per 100 Lbs.	2 to 2½ U.S. Gallons	
Per 45.36 Kg.		7.6 to 9.5 Liters
Modulus of Rupture	<u>lb/in²</u>	<u>kPa</u>
After Drying at 230°F (110°C)	500 to 700	3,400 to 4,800

Chemical Analysis: (Approximate) (Calcined Basis)

Silica	(SiO ₂)	11.4%
Alumina	(Al ₂ O ₃)	25.9
Iron Oxide	(Fe ₂ O ₃)	13.8
Lime	(CaO)	0.5
Magnesia	(MgO)	17.2
Chromic Oxide	(Cr ₂ O ₃)	29.7
Alkalies	(Na ₂ O+K ₂ O+Li ₂ O)	1.5

All data subject to reasonable deviations and therefore,
should not be used for specification purposes.

ASTM Test Methods, where applicable, used for determination
of data.



HARBISON-WALKER REFRACTORIES

Division of Dresser Industries, Inc.,

2 Gateway Center, Pittsburgh, Pennsylvania 15222

H-W SUPERDUTY MORTAR

Heat-setting mortar of superduty class.

Technical Data:

Physical Properties (Typical)

Approximate Amount of Water for
Trowelling Consistency (add
slightly more for dipping)

English Units
4 to 4½ U.S. Gal.
per 100#

Metric Units
15 to 17
Liters/45.36 kg.

Approximate Amount Required per 1000,
9" Equivalent:

Brick Laid Dry then Grouted
Brick Dipped or Thinly Trowelled
Joints

200 to 250 lbs. 91 to 113 kg.

300 to 400 lbs. 136 to 181 kg.

Refractoriness Test

Does not squeeze or flow from
joints when heated for 5 hours
at 2910°F. (1600°C.)

Typical Chemical Analysis (Calcined Basis) (Approximate)

Silica	(SiO ₂)	51.2%
Alumina	(Al ₂ O ₃)	42.0
Titania	(TiO ₂)	2.4
Iron Oxide	(Fe ₂ O ₃)	1.9
Lime	(CaO)	0.3
Magnesia	(MgO)	0.5
Alkalies	(Na ₂ O+K ₂ O+Li ₂ O)	1.7

NOTE: All data subject to reasonable deviation.

ASTM Test Methods, where applicable, used for determination of data.

Features: Combines excellent workability with high refractoriness.

Shipping Data: Shipped dry in multi-wall moisture-proof sacks of 100 lbs.
(45.36 kg.) net weight.



HARBISON-WALKER REFRACTORIES

Division of Dresser Industries, Inc.

One Gateway Center, Pittsburgh, Pennsylvania 15222

PHOXBOND

(Formerly H-W 14-81 Mortar)

Technical Data:

<u>Physical Properties: (Typical)</u>	<u>English Units</u>	<u>SI Units</u>
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Approximate Amount Required per 1000, 9" Equivalent for Trowelled Joints	400 to 600 Lbs.	180 to 272 Kg.
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Modulus of Rupture at Joints		
After Drying at 230°F (110°C)	600 to 1000 psi	4,100 to 6,900
After Heating at 1700°F (927°C)	250 to 600 psi	1,700 to 4,100

Refractoriness Test:

Mortar does not melt or flow out of joints when heated
for 5 hours at 3000°F (1650°C)

Chemical Analysis:

(Calcined Basis)

(Approximate)

Silica	(SiO ₂)	11.4%
Alumina	(Al ₂ O ₃)	76.3
Titania	(TiO ₂)	3.1
Iron Oxide	(Fe ₂ O ₃)	1.3
Lime	(CaO)	0.1
Magnesia	(MgO)	0.1
Alkalies	(Na ₂ O+K ₂ O+Li ₂ O)	0.1
Phosphoric Oxide	(P ₂ O ₅)	7.6

All data subject to reasonable deviation and should not
be used for specification purposes.

ASTM Test Methods, where applicable, used for determination
of data.

HE-1

== technical data ==

(Continued)

411073 0337

**DRESSER****HARBISON-WALKER REFRACTORIES**

Division of Dresser Industries, Inc.,

2 Gateway Center, Pittsburgh, Pennsylvania 15222

LOTHERMClassification: Insulating BrickPhysical Data: P.C.E. (Orton Cone)
(Typical)

29 - 31

	<u>English Units</u>	<u>SI Units</u>	
	<u>lb/ft³</u>	<u>kg/m³</u>	
Bulk Density	91 to 97	1,460 to 1,550	
	<u>lb/in²</u>	<u>kPa</u>	
Cold Crushing Strength	1,400 to 2,400	9,700 to 16,500	
Modulus of Rupture	700 to 1,000	4,800 to 6,900	
Reheat Test			
Permanent Linear Change %			
After Heating at 2550°F (1400°C)		+0.1 to +1.5	
<u>Temperature °F</u>	<u>BTU/Hr. Ft²°F/In.</u>	<u>Temperature °C</u>	<u>Kcal/Hr. m²°C/m</u>
200	4.28	100	0.531
600	4.39	300	0.544
1,200	4.70	600	0.573
1,800	5.20	900	0.626

Chemical Analysis:
(Approximate)

Silica	(SiO ₂)	57.2%
Alumina	(Al ₂ O ₃)	36.4
Titania	(TiO ₂)	1.9
Iron Oxide	(Fe ₂ O ₃)	1.6
Lime	(CaO)	0.3
Magnesia	(MgO)	0.3
Alkalies	(Na ₂ O+K ₂ O+Li ₂ O)	2.3

The above data are typical of the properties of rotary kiln arches and wedges. The data are subject to reasonable variations and therefore should not be used for specification purposes.

ASTM Test Methods, where applicable, used for determination of data.

HB-8

== technical data ==

411073 0339



HARBISON-WALKER REFRACTORIES

Dresser Industries, Inc.

2 Gateway Center, Pittsburgh, Pennsylvania 15222

- Limited Data -

KORUNDAL GUN MIX

Technical Data:

<u>Physical Properties: (Typical)</u>	<u>English Units</u>	<u>SI Units</u>
	<u>lb/ft³</u>	<u>kq/m³</u>
Gunning Mix Required	147	2,350
Bulk Density		
After Drying at 230°F (110°C)	150	2,400
	<u>lb/in²</u>	<u>kPa</u>
Modulus of Rupture		
After Drying at 230°F (110°C)	250 to 400	1,700 to 2,800
After Heating at 1500°F (816°C)	300 to 500	2,100 to 3,400
After Heating at 3000°F (1650°C)	1,500 to 3,000	10,300 to 20,700
Cold Crushing Strength		
After Drying at 230°F (110°C)	300 to 600	2,100 to 4,100
After Heating at 1500°F (816°C)	1,000 to 3,000	6,900 to 20,700
After Heating at 3000°F (1650°C)	4,000 to 8,000	27,600 to 55,200
Permanent Linear Change, %		
After Heating at 1500°F (816°C)	0.0 to -0.3	
After Heating at 3000°F (1650°C)	-1.8 to -3.5	
<u>Chemical Analysis:</u>		
(Approximate)		
(Calcined Basis)		
Silica (SiO ₂)	9.1%	
Alumina (Al ₂ O ₃)	88.1	
Titania (TiO ₂)	0.5	
Iron Oxide (Fe ₂ O ₃)	0.7	
Lime (CaO)	1.3	
Magnesia (MgO)	0.1	
Alkalies (Na ₂ O+K ₂ O+Li ₂ O)	0.2	

All data based on gunned specimens. ASTM procedures, where applicable, used for determination of data.

All data subject to reasonable deviation and therefore should not be used for specification purposes.

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== technical data ==

(Continued)

411073 0340



HARBISON-WALKER REFRACTORIES

Division of Dresser Industries, Inc.

One Gateway Center, Pittsburgh, Pennsylvania 15222

KALA

(Formerly H-W 1-77)

Classification: High Alumina Brick

Physical Data: (Typical)

English Units

SI Units

lb/ft³

kg/m³

Bulk Density

150 to 155

2,400 to 2,480

Apparent Porosity, %

13.0 to 15.0

13.0 to 15.0

lb/in²

kPa

Cold Crushing Strength, psi

6,000 to 9,000

41,400 to 62,100

Modulus of Rupture, psi

1,500 to 2,500

10,300 to 17,200

Reheat Test

Permanent Linear Change, %

After Heating at 2910°F (1600°C)

0.0 to +0.5

Load Test, 25 psi (172 kPa)

% Linear Subsidence

After Heating to 2640°F (1450°C)

0.0 to 0.5

Chemical Analysis:

(Approximate)

Silica

(SiO₂)

46.4%

Alumina

(Al₂O₃)

49.6

Titania

(TiO₂)

2.2

Iron Oxide

(Fe₂O₃)

1.4

Lime

(CaO)

0.1

Magnesia

(MgO)

0.1

Alkalies

(Na₂O+K₂O+Li₂O)

0.2

The above data are typical of properties of commercial 9" straight brick. The data are subject to reasonable variations and therefore, should not be used in specification purposes.

ASTM Test Methods, where applicable, used for determination of data.

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== technical data ==

411073 0342



HARBISON-WALKER REFRACTORIES

Division of Dresser Industries, Inc.

One Gateway Center, Pittsburgh, Pennsylvania 15222

CORAL PLASTIC

Technical Data:

<u>Physical Properties: (Typical)</u>	<u>English Units</u>	<u>SI Units</u>
Maximum Service Temperature	3,100°F	1,705°C
	<u>lb/ft³</u>	<u>kg/m³</u>
Approximate Amount Required		
As Rammed	177	2,840
Bulk Density		
After Drying at 230°F (110°C)	165	2,640
	<u>lb/in²</u>	<u>kPa</u>
Modulus of Rupture		
After Drying at 230°F (110°C)	600 to 1,000	4,100 to 6,900
After Heating at 1500°F (816°C)	800 to 1,200	5,500 to 8,300
After Heating at 2550°F (1400°C)	1,200 to 2,000	8,300 to 13,800
After Heating at 3000°F (1650°C)	1,500 to 2,200	10,300 to 15,200
Permanent Linear Change, %		
After Drying at 230°F (110°C)	-0.4 to -1.0	
After Heating at 1500°F (816°C)	-0.2 to -0.7	
After Heating at 2550°F (1400°C)	+0.2 to +1.0	
After Heating at 3000°F (1650°C)	-0.5 to -1.7	

Chemical Analysis: (Approximate) (Calcined Basis)

Silica	(SiO ₂)	12.8%
Alumina	(Al ₂ O ₃)	79.9
Titania	(TiO ₂)	1.7
Iron Oxide	(Fe ₂ O ₃)	1.1
Lime	(CaO)	0.1
Magnesia	(MgO)	0.1
Alkalies	(Na ₂ O+K ₂ O+Li ₂ O)	0.4
Phosphorous Pentoxide	(P ₂ O ₅)	3.9

All data subject to reasonable deviations and therefore should not be used for specification purposes.

ASTM Test Methods, where applicable, used for determination of data.

Protected by U.S. letters Patent No. 3,303,034.

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== technical data ==

(Continued)

411073 0343



HARBISON-WALKER REFRACTORIES

Division of Dresser Industries, Inc.

One Gateway Center, Pittsburgh, Pennsylvania 15222

H-W ES CASTABLE C

Technical Data:

Physical Properties: (Typical)	English Units	SI Units
Maximum Service Temperature	2,400°F	1,316°C
	lb/ft ³	kg/m ³
Dry Weight Required for Casting	130	2,080
Approximate Amount of Water Required		
Per 100 Lbs.	1½ to 1½ U.S. Gallons	
Per 45.36 Kg.		4.73 to 5.68 Liters
	lb/ft ³	kg/m ³
Bulk Density		
After Drying at 230°F (110°C)	137	2,195
	lb/in ²	kPa
Modulus of Rupture		
After Drying at 230°F (110°C)	800 to 1,200	5,500 to 8,300
After Heating at 1000°F (540°C)	400 to 800	2,800 to 5,500
After Heating at 1500°F (815°C)	400 to 800	2,800 to 5,500
After Heating at 2300°F (1260°C)	500 to 800	3,400 to 5,500
Cold Crushing Strength		
After Drying at 230°F (110°C)	6,000 to 9,000	41,400 to 62,100
After Heating at 1000°F (540°C)	4,000 to 6,000	27,600 to 41,400
After Heating at 1500°F (815°C)	4,000 to 6,000	27,600 to 41,400
After Heating at 2300°F (1260°C)	2,000 to 4,000	13,800 to 27,600
Permanent Linear Change, %		
After Drying at 230°F (110°C)		Negligible
After Heating at 1000°F (540°C)		Negligible
After Heating at 1500°F (815°C)		Negligible
After Heating at 2300°F (1260°C)		-1.0 to +2.0
Chemical Analysis		
(Approximate)		
(Calcined Basis)		
Silica	(SiO ₂)	35.9%
Alumina	(Al ₂ O ₃)	45.5
Titania	(TiO ₂)	2.4
Iron Oxide	(Fe ₂ O ₃)	3.8
Lime	(CaO)	11.3
Magnesia	(MgO)	0.6
Alkalies	(Na ₂ O+K ₂ O+Li ₂ O)	0.5

HJ-8

== technical data ==

(Continued)

411073 0345



HARBISON-WALKER REFRACTORIES

Dresser Industries, Inc.

2 Gateway Center, Pittsburgh, Pennsylvania 15222

CALAMO

Technical Data:

<u>Physical Properties: (Typical)</u>	<u>English Units</u>	<u>Metric Units</u>
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PCE, Equivalent Temperature CALAMO	3185°F	1750°C
Melting Temperature Pure Silica Sand	3133°F	1723°C
Bulk Specific Gravity:		2.47 gm/cc
Approximate Bulk Density	94 pcf.	1.50 gm/cc

The bulk density value is based on matching the grain size and distribution of quartz grains of 2.65 bulk specific gravity which will provide a bulk density of 100 pcf. (1.60 gm/cc)

Approximate Expansion through Temperature Rise:	70° to 1200°F	20° to 650°C
CALAMO	0.0037 in./in.	0.0037 cm/cm
Pure Silica Sand	0.018 in./in.	0.018 cm/cm

Typical Chemical Analysis (Calcined Basis)

Silica	(SiO ₂)	52.1%
Alumina	(Al ₂ O ₃)	43.4
Titania	(TiO ₂)	2.3
Iron Oxide	(Fe ₂ O ₃)	0.9
Lime	(CaO)	0.2
Magnesia	(MgO)	0.3
Alkalies		0.8

All data subject to reasonable deviation.

ASTM Test Methods, where applicable, used for determination of data.

HB-1

== technical data ==

(Continued)

411073 0347



HARBISON-WALKER REFRACTORIES

Division of Dresser Industries, Inc.

One Gateway Center, Pittsburgh, Pennsylvania 15222

BENEZET

Classification: High-Duty Fireclay Brick

Physical Data:
(Typical)

P.C.E (Orton Cone)

32½

English Units

SI Units

lb./ft³

kg/m³

Bulk Density

133 to 137

2,130 to 2,195

Apparent Porosity, %

13.5 to 16.5

13.5 to 16.5

lb/in²

kPa

Cold Crushing Strength

4,000 to 6,000

27,600 to 41,400

Modulus of Rupture

1,400 to 2,000

9,700 to 13,800

Reheat Test

Permanent Linear Change %

After Heating at 2550°F (1400°C)

0.0 to +0.5

Load Test, 25 psi (172 kPa)

% Linear Subsidence

After Heating at 2460°F (1350°C)

0.5 to 2.0

Chemical Analysis:
(Approximate)

Silica	(SiO ₂)	53.7%
Alumina	(Al ₂ O ₃)	39.7
Titania	(TiO ₂)	2.4
Iron Oxide	(Fe ₂ O ₃)	1.9
Lime	(CaO)	0.1
Magnesia	(MgO)	0.3
Alkalies	(Na ₂ O+K ₂ O+Li ₂ O)	1.9

The above data are typical of the properties of commercial 9" straight brick. The data are subject to reasonable variations and therefore, should not be used for specification purposes.

ASTM Test Methods, where applicable, used for determination of data.



HARBISON-WALKER REFRACTORIES

Division of Dresser Industries, Inc.,

2 Gateway Center, Pittsburgh, Pennsylvania 15222

HARCHROME G

Technical Data:

<u>Physical Properties: (Typical)</u>	<u>English Units</u>	<u>SI Units</u>
Maximum Service Temperature	2,700°F	1,480°C
Dry Weight Required for Casting	$\frac{1\text{b/ft}^3}{171}$	$\frac{\text{kg/m}^3}{2,740}$
Approximate Amount of Water Required		
Per 100 lbs.	3/4 to 1 U.S. Gal.	
Per 45.36 Kg.		2.84 to 3.78 Liters
Bulk Density	$\frac{1\text{b/ft}^3}{179}$	$\frac{\text{kg/m}^3}{2,865}$
After Drying at 230°F (110°C)		
Modulus of Rupture	$\frac{1\text{b/in}^2}{1,000 \text{ to } 1,400}$	$\frac{\text{kPa}}{6,900 \text{ to } 9,700}$
After Drying at 230°F (110°C)		
After Heating at 1000°F (540°C)	1,200 to 1,700	8,300 to 11,700
After Heating at 1500°F (815°C)	1,200 to 1,700	8,300 to 11,700
Cold Crushing Strength		
After Drying at 230°F (110°C)	6,500 to 8,500	44,800 to 58,600
After Heating at 1000°F (540°C)	7,000 to 9,000	48,300 to 62,100
After Heating at 1500°F (815°C)	7,000 to 9,000	48,300 to 62,100
Permanent Linear Change, %		
After Drying at 230°F (110°C)	Negligible	
After Heating at 1000°F (540°C)	Negligible	
After Heating at 1500°F (815°C)	Negligible	
After Heating at 2700°F (1480°C)	-1.0 to -2.3	

Chemical Analysis:

(Approximate)

(Calcined Basis)

Silica	(SiO ₂)	3.8%
Alumina	(Al ₂ O ₃)	41.1
Iron Oxide	(Fe ₂ O ₃)	11.1
Lime	(CaO)	4.8
Magnesia	(MgO)	14.1
Chromic Oxide	(Cr ₂ O ₃)	25.1

All data based on vibration cast specimens. ASTM procedures, where applicable, used for determination of data.

All data subject to reasonable deviations and therefore should not be used for specification purposes.

GI-8 (Rev.) **== technical data ==**

411073 0350

(Continued)



HARBISON-WALKER REFRACTORIES

Division of Dresser Industries, Inc.

One Gateway Center, Pittsburgh, Pennsylvania 15222

ALUSA

Classification: High-Alumina Brick

<u>Physical Data: (Typical)</u>	<u>English Units</u>	<u>SI Units</u>
	<u>lb/ft³</u>	<u>kg/m³</u>
Bulk Density	157 to 161	2,515 to 2,580
Apparent Porosity, %	15.0 to 18.0	15.0 to 18.0
	<u>lb/in²</u>	<u>kPa</u>
Cold Crushing Strength	6,000 to 9,000	41,400 to 62,100
Modulus of Rupture	1,800 to 2,600	12,400 to 17,900
Reheat Test		
Permanent Linear Change % After Heating at 2910°F (1600°C)	0.0 to -1.0	
Load Test, 25 psi (172 kPa)		
% Linear Subsidence After Heating at 2640°F (1450°C)	0.4 to 1.0	
Panel Spalling Test		
% Loss Preheat - 3000°F (1650°C)	0 to 3	
<u>Chemical Analysis:</u> (Approximate)		
Silica	(SiO ₂)	27.5%
Alumina	(Al ₂ O ₃)	68.2
Titania	(TiO ₂)	2.8
Iron Oxide	(Fe ₂ O ₃)	1.1
Lime	(CaO)	0.1
Magnesia	(MgO)	0.1
Alkalies	(Na ₂ O+K ₂ O+Li ₂ O)	0.2

The above data are typical of the properties of commercial 9" straight brick. The data are subject to reasonable variations and therefore should not be used for specification purposes.

ASTM Test Methods, where applicable, used for determination of data.



HARBISON-WALKER REFRACTORIES

Division of Dresser Industries, Inc.

One Gateway Center, Pittsburgh, Pennsylvania 15222

ALAMO S

Classification: Superduty Fireclay Brick

Physical Data: (Typical) P.C.E. (Orton Cone) 33 - 34

	<u>English Units</u>	<u>SI Units</u>
	$\frac{\text{lb}}{\text{ft}^3}$	$\frac{\text{kg}}{\text{m}^3}$
Bulk Density	144 to 148	2,305 to 2,370
Apparent Porosity, %	10.0 to 13.0	10.0 to 13.0
	$\frac{\text{lb}}{\text{in}^2}$	kPa
Cold Crushing Strength	2,500 to 4,000	17,200 to 27,600
Modulus of Rupture	1,000 to 1,500	6,900 to 10,300
Reheat Test		
Permanent Linear Change %		
After Heating at 2910°F (1600°C)	-0.5 to -1.5	
Load Test, 25 psi (172 kPa)		
% Linear Subsidence		
After Heating at 2640°F (1450°C)	1.0 to 2.5	
Panel Spalling Test		
% Loss		
Preheat - 3000°F (1650°C)	2.0 to 6.0	

Chemical Analysis:
(Approximate)

Silica	(SiO ₂)	52.9%
Alumina	(Al ₂ O ₃)	42.0
Titania	(TiO ₂)	2.4
Iron Oxide	(Fe ₂ O ₃)	1.0
Lime	(CaO)	0.2
Magnesia	(MgO)	0.3
Alkalies	(Na ₂ O+K ₂ O+Li ₂ O)	1.2

The above data are typical of the properties of commercial 9" straight brick. The data are subject to reasonable variations and therefore, should not be used for specification purposes.

ASTM Test Methods, where applicable, used for determination of data.



HARBISON-WALKER REFRACTORIES

Division of Dresser Industries, Inc.,

One Gateway Center, Pittsburgh, Pennsylvania 15222

H-W 3-83 UPPER SIDEWALL BLOCK

- LIMITED DATA -

Maximum Service Temperature: (°F)	3100	
True Deformation, 2640°F, % Subsidence	-6.18	
Bulk Density After Drying: (pcf)	150	
Porosity After 1500°F: (%)	18.30	
Modulus of Rupture: (psi)		
After Drying	1600 - 1800	
After 1500°F	1700 - 1900	
After 2500°F	1600 - 1800	
Cold Crushing Strength: (psi)		
After Drying	8460	
After 1500°F	8220	
After 2730°F	10,820	
Permanent Linear Change: (%)		
After 1500°F (1000°F)	-0.2	
After 2730°F	-0.2	
Chemical Analysis: (%)		
(Calcined Basis)		
Silica	(SiO ₂)	37.8
Alumina	(Al ₂ O ₃)	57.2
Titania	(TiO ₂)	2.3
Iron Oxide	(Fe ₂ O ₃)	1.0
Lime	(CaO)	1.5
Magnesia	(MgO)	0.1
Alkalies		0.2

All data based on vibration cast specimens. ASTM procedures were applicable used for determination of data. Data subject to reasonable deviations and, therefore, should not be used for specification purposes.

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