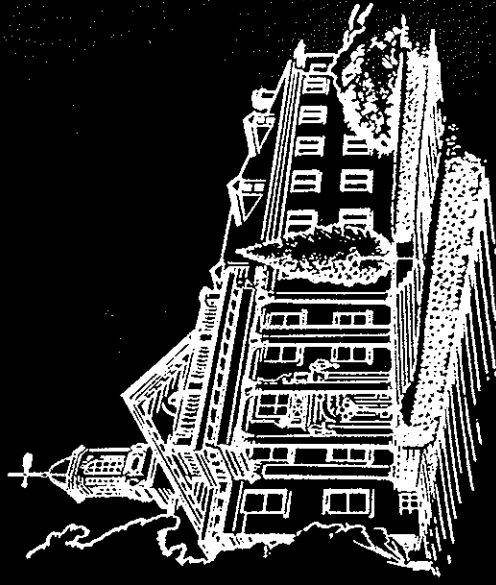


*A. P. Green*

**REFRACTORY  
POCKET CATALOG**



**MEXICO, MISSOURI, U.S.A.**

The

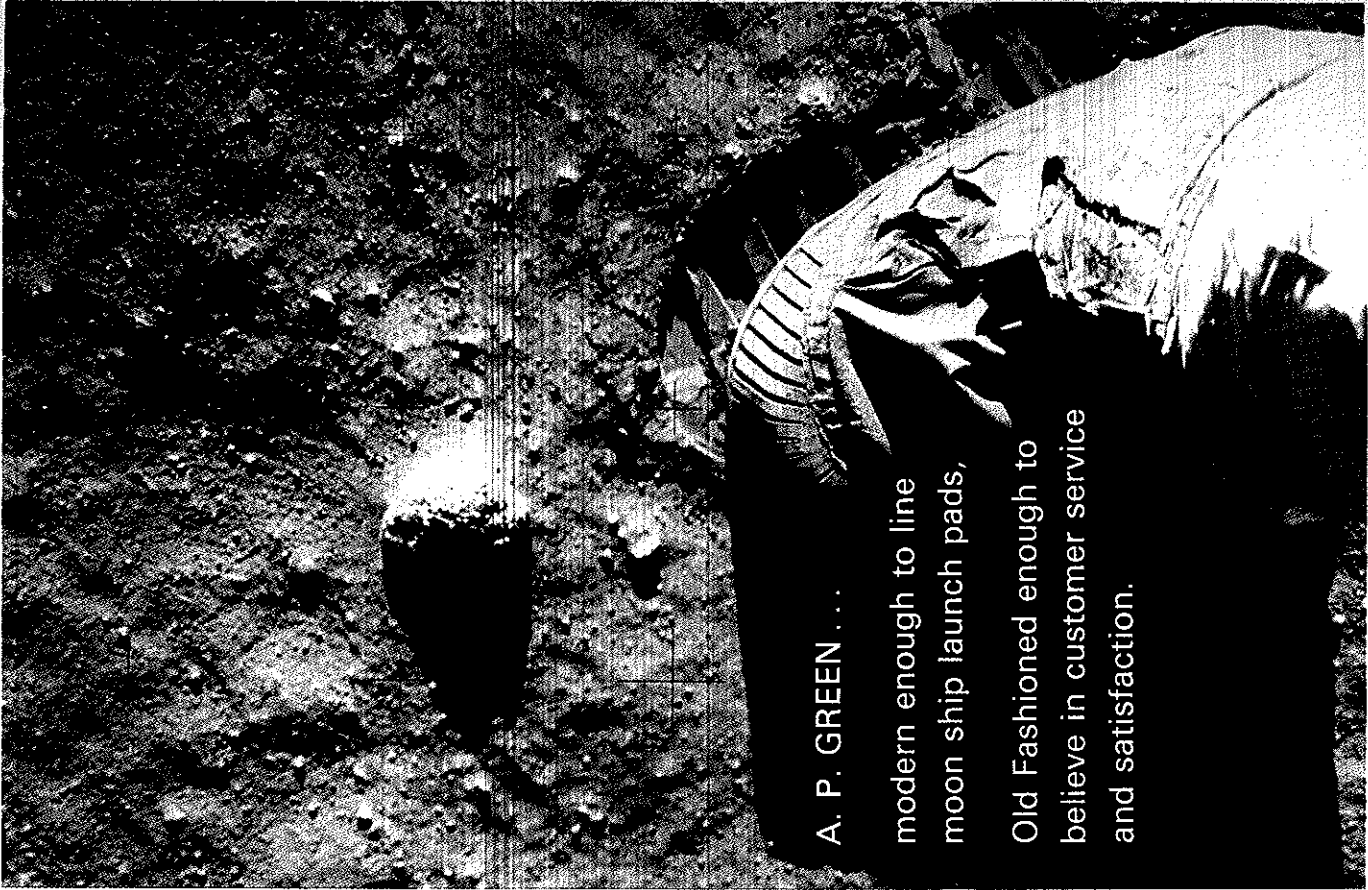
**A. P. GREEN**

**REFRACTORIES CO.**

Presents



**The Complete Green Line  
of Refractory Products**



A. P. GREEN . . .  
modern enough to line  
moon ship launch pads,  
Old Fashioned enough to  
believe in customer service  
and satisfaction.

It was no accident that the A. P. Green Refractories Co. was selected to provide the refractory materials . . . and their installation . . . for all of the Mercury, Gemini, and Apollo rocket launch pads at Cape Kennedy. Such giant steps for mankind had to have the best.

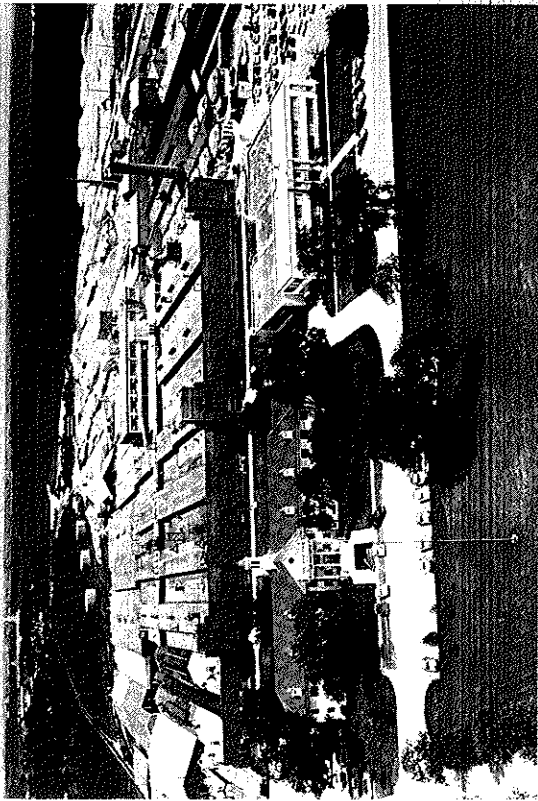
The same research and manufacturing team that provided America with the best in space age refractories combines to provide America's best in quality refractories for every industrial requirement. There is an A. P. Green product specifically designed to give you longer, better, more economical service.

In addition to an unbeatable line-up of products, the A. P. Green distribution system composes a vast network of sales offices, distributors, and dealers strategically located to provide prompt delivery on every order.

Large warehouse stocks, plus the assistance of an engineering group experienced in the latest recommendations and installation techniques of refractories, are your assurance of the most advanced products and service.

There is an A. P. Green representative near you. He is listed in the yellow pages of your telephone directory . . . or write direct.

We're not too far out in space to want to help!



A. P. Green Refractories Co.—  
Mexico, Missouri plant and  
executive offices.

The A. P. Green Refractories Co. makes available to industry a complete line of refractory products and services. There is an A. P. Green product specifically designed to fulfill more efficiently every industrial refractory requirement. These products include firebrick of all qualities—low duty, medium duty, high duty and super duty; 50% to 99% alumina; semi-silica; silica; mullite; silicon carbide; zircon; and, a full line of basic brick including chrome, chrome-magnesite, magnesite-chrome, magnesite, and metal encased. In addition, the Green Company manufactures insulating firebrick, industrial insulations, and all types of mortars, plastics, castables, ramming mixes, gunning materials, and special refractory mixes.

The Green Company distribution system composes a vast network of sales offices, distributors, and dealers strategically located to provide prompt delivery of every order.

Manufacturing plants are located in Mexico and Fulton, Missouri—Woodbridge, New Jersey—Sulphur Springs, Texas—Jackson, Massillon, and Oak Hill, Ohio—Climax, Tarentum, and Philadelphia, Pennsylvania—Troy, Idaho—Pueblo, Colorado—Macon, Georgia—Birmingham and Bessemer, Alabama—Morris, Illinois—Taylor, Michigan—Weston and Acton, Ontario—and in Claybank, Saskatchewan. Producing plants are also located in Argentina, Chile, France, Germany, India, Italy, Mexico, New Zealand, Norway, South Africa, Spain, and the United Kingdom.

## A. P. GREEN

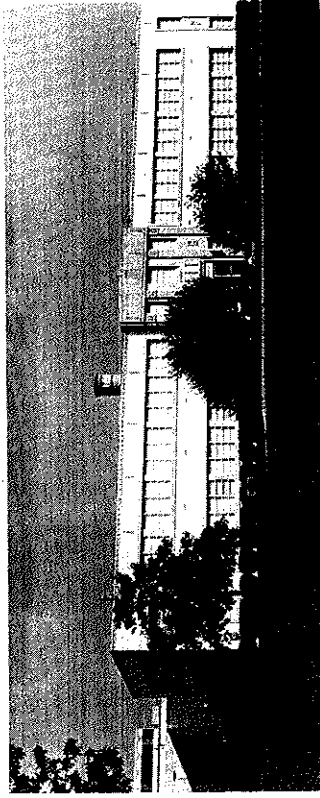
RESEARCH  
PRODUCT DEVELOPMENT  
QUALITY CONTROL

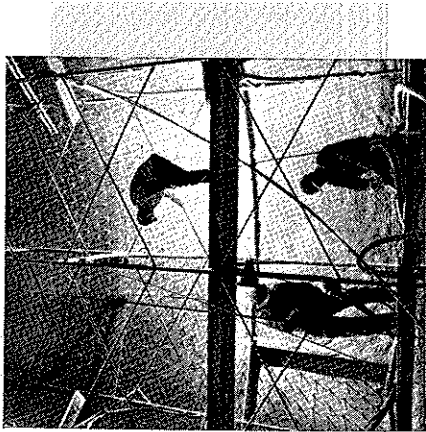
The refractories industry is now involved in the most extensive research and development expansion that it has ever known. Anticipating the future requirements of our customers and fulfilling present demands—resulting from modern technological advances in a multitude of industries—calls for intense concentration of effort in both basic and applied research.

Every day of every year A. P. Green research specialists are constantly striving toward the development of better products and better techniques of refractory production to serve the ever-increasing needs of modern industry. These ceramists, engineers, and laboratory technicians have established quality control procedures for use in each of the A. P. Green plants throughout the world. These control measures are applied from clay selection, through manufacture, to final packaging and shipping to your job site.

This constant vigilance toward assuring the ultimate in quality control is your guarantee of the best possible product for your specific needs. Quality is a byword at the Green Company . . . in raw materials . . . in manufacture . . . in the finished product . . . in personnel . . . and in customer service. Call on us to assist in solving refractory problems. Our facilities and staff of experienced personnel are available to serve you.

New Green Research Center at Mexico, Missouri





## ... A COMPLETE REFRACTORY PACKAGE

Specific refractory requirements naturally vary with each individual industrial application, and numerous factors influence the selection of the proper refractory for a given job.

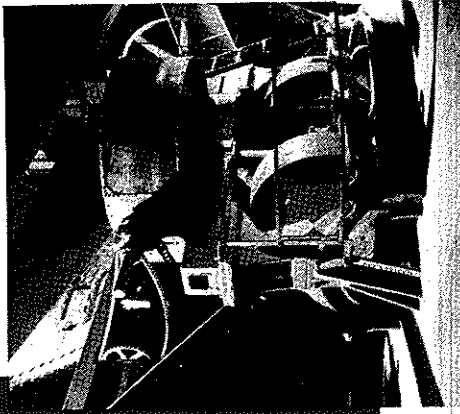
For over half a century, the A. P. Green Company has been a leader in developing refractories to meet the exacting requirements of modern industry. Our engineering service begins with a survey of all conditions pertaining to your project. Properly selected materials are installed, and all this highly specialized work is performed under the supervision of engineers experienced in this type of construction.

To perform satisfactorily in service, it is a proven fact that quality materials must be properly engineered and constructed into the furnace lining by the latest, most advanced installation methods and application techniques. For there is a vital connecting link between the refractories used and the manner in which they are installed. The service we provide affords the customer **undivided responsibility** and maximum efficiency and economy. Therefore, we now offer world-wide installation service with the largest refractory construction organization in the world.

A follow-up on the performance of the completed job is provided to assure long, efficient service.

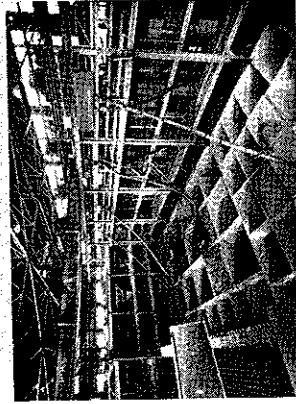
Don't rely on guesswork. Contact your local A. P. Green representative for information concerning your refractory problems and take advantage of the experienced engineering service of the Green Company.

## ADVANCED MANUFACTURING FACILITIES



This large grinder is used to reduce the clays to the proper grain-size for maximum density and bond.

Battery after battery of driers and kilns automatically control the drying and burning processes. Humidity drying and tunnel kiln burning of refractory shapes contribute to the high quality and uniformity of A. P. Green Refractories.



Over 6,000 tons of processed clay, tested by laboratory control methods, are always in storage in huge bins.

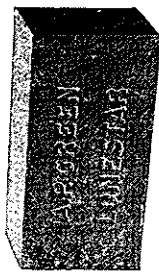
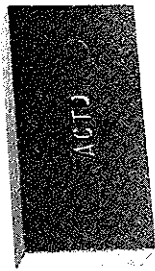
Kiln car loaded with refractory shapes.

The physical properties of A. P. Green medium and low duty brick are such that they give long and dependable service in many industrial applications where operating conditions and temperatures are moderate. In many instances medium duty, and sometimes low duty, brick will prove stronger and more abrasion resistant than high duty brick at the moderate temperature ranges.

The Green Company manufactures low and medium duty fireclay brick by both the dry press and the stiff mud processes, exercising the same quality control and pride of workmanship that goes into all products carrying the Green name.

The Green Company is well known for its line of "white" fireplace brick. These attractive uniform brick are economical for laying fireplaces and barbecue grills and are ideal for use in the building industry.

Recommended applications include moderate duty boiler service, waste heat installations, stack and flue linings, annealing furnaces, and as backing-up brick in heavy duty boiler furnaces.



**LOW DUTY FIRECLAY BRICK**

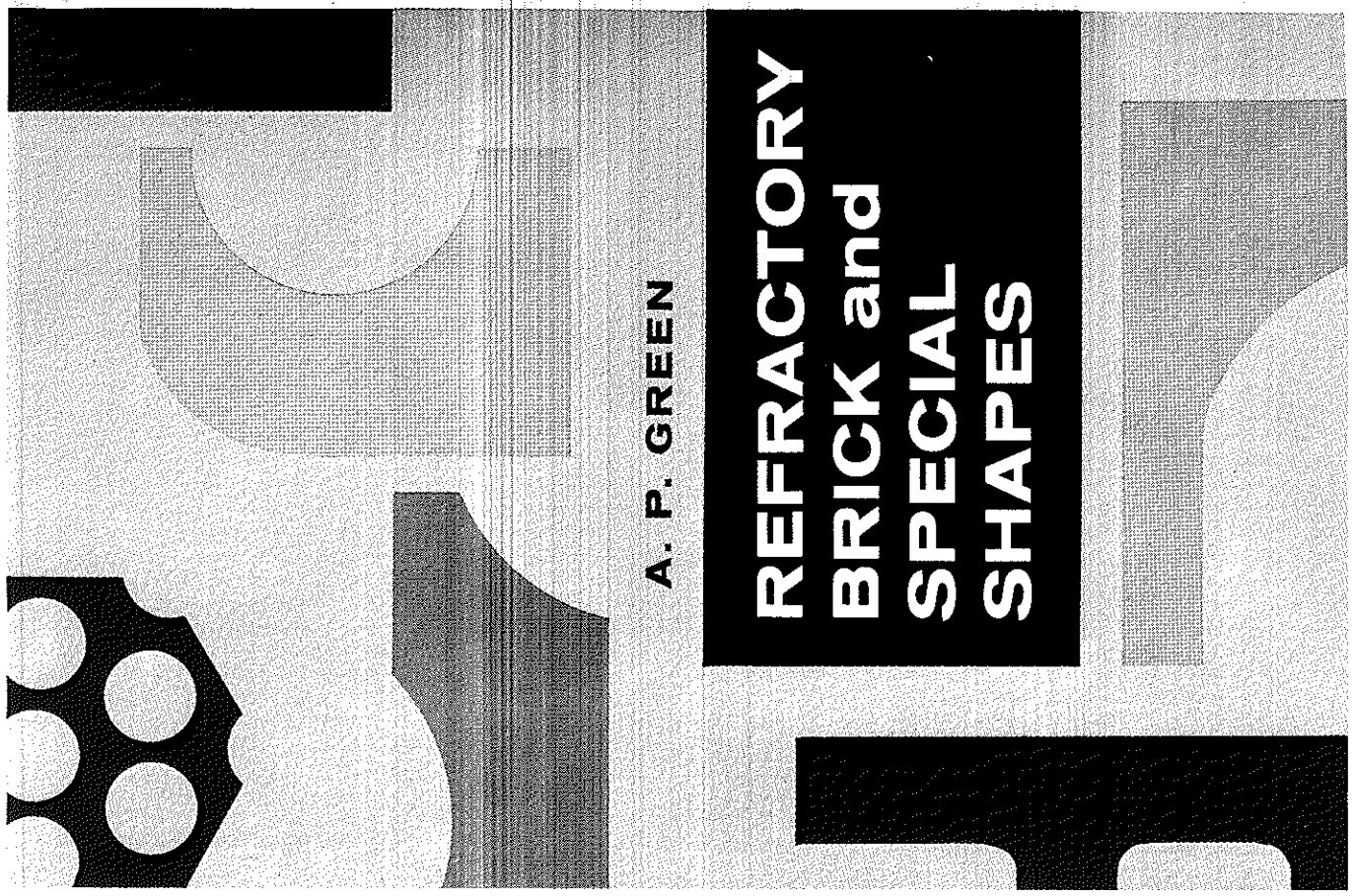
Brand Name	Process	Manufacturing Plant
ACTO	DP	Climax, Pennsylvania
KIMBERLY	DP, SM	Birmingham, Alabama

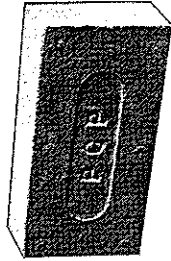
**MEDIUM DUTY FIRECLAY BRICK**

DIXIE	SM	Birmingham, Alabama
D-SAVAGE	DP	Climax, Pennsylvania
LONE STAR	DP	Sulphur Springs, Texas
MORRIS	DP	Morris, Illinois
PAR	DP	Climax, Pennsylvania

**A. P. GREEN**

**REFRACTORY  
BRICK and  
SPECIAL  
SHAPES**





High duty fireclay brick have long been the "work horse" refractory of the world . . . serving all types of industries economically and efficiently. And, A. P. Green high duty brick, notably EMPIRE, have long been the standard by which all high duty fireclay brick are judged.

A careful and scientific blending of the highest quality raw materials, combined with variations in processing methods, give A. P. Green high duty brick a wide range of properties that assure reliable service in all applications where temperature or chemical attack is not beyond their range.

All brands of A. P. Green high duty fireclay brick, regardless of the area in which they are manufactured, are subjected to rigid quality control procedures to assure uniformity in quality, texture, and shape.

**WHY A. P. GREEN HIGH DUTY BRICK GIVE LONG SERVICE**

**Laboratory Controlled** — Rigidly tested at every stage. Produced from the finest raw materials available. Uniform in properties — uniform in dimensions.

**Permanent Volume** — Will not shrink at high temperatures. Joints stay closed under severe operating conditions, thus preventing attack by flame, furnace gases, and slags.

**Good Load Bearing Ability** — Because of their high refractoriness and dense texture A. P. Green high duty brick have exceptional hot load bearing properties. Will withstand heavy loads when completely surrounded by heat.

**Slag Resistance** — High duty stiff mud brick are very dense and highly resistant to the corrosive or washing action of fluid slags, penetration of molten metals, and mechanical abrasion.

**Excellent Spalling Resistance** — High duty dry press brick are recommended where spalling conditions are particularly severe. Many years of outstanding performance have proved them exceptional in this respect.

Strategic plant locations make A. P. Green high duty brick available for fast delivery at a saving in transportation costs to all areas of the United States. They are available in all standard shapes and most special shapes.

**A. P. GREEN HIGH DUTY FIRECLAY BRICK**

Brand	Process	Manufacturing Plant
ATLANTIC FIRST	SM	Macon, Georgia
CHAMPION	SM	Birmingham, Alabama
CLIMAX	SM	Climax, Pennsylvania
EMPIRE	DP, SM	Mexico, Missouri
EMPIRE BF	DP	Mexico, Missouri
EMPIRE STOVE	DP	Mexico, Missouri
EMPIRE S	DP	Sulphur Springs, Texas
EMPIRE W	DP	Woodbridge, New Jersey
HOT ZONE	DP	Mexico, Missouri
IDAHO	DP	Troy, Idaho
MONARC DP	DP	Climax, Pennsylvania
MONARC STOVE	DP	Climax, Pennsylvania
MONARC SM	SM	Climax, Pennsylvania
PCP	DP	Oak Hill, Ohio
PYRO STEEL	SM	Oak Hill, Ohio
S-1	DP, SM	Pueblo, Colorado

**EMPIRE**

**The Standard For High Duty Brick**

The exceptional performance of EMPIRE in a wide range of applications makes them the outstanding choice for general boiler or furnace work throughout the world.

EMPIRE are amazingly resistant to destructive spalling and chemical attack. They are dense and well adapted to slagging and abrasive conditions. They are permanent in volume . . . no shrinkage at high temperatures.



**YOUR ASSURANCE OF LONG, LOW-COST SERVICE**

**UNIFORMITY** — uniformity in quality, texture, and shape permits tighter joints and easier installation.

**HOT LOAD STRENGTH** — will withstand heavy loads when completely surrounded by heat.

**PERMANENT VOLUME** — will not shrink at high temperatures. Joints stay closed preventing attack by flame, gases, and slags.

**EXCELLENT SPALLING RESISTANCE** — EMPIRE D.P. have proved in service their amazing ability to withstand destructive spalling.

**GOOD SLAGGING RESISTANCE** — EMPIRE S.M. are dense and highly resistant to corrosive action of fluid slags, penetration of molten metals and mechanical abuse.



For exceptional performance under extreme operating conditions . . . for the tough spots where maintenance costs are high . . . A. P. Green super duty fireclay brick have been proved in thousands of installations to provide long, low-cost service. They are dense, strong, and tough. A perfect balance of physical and chemical properties, enhanced by strict laboratory control and rigid tests at every stage of the manufacturing process, make them the outstanding choice for a wide range of applications.

Their excellent properties are high refractoriness, permanency of volume even at extreme temperatures, amazing resistance to destructive spalling, great load bearing strength with considerably less deformation under load at high temperatures than high duty brick, and a dense structure which resists corrosive slags, fumes, dust, and penetration of molten metal.

A. P. Green super duty fireclay brick are manufactured in all standard shapes and series, plus a wide variety of special shapes.

A. P. Green's KX-99 are super duty firebrick fired to unusually high temperatures. They have a stable mineral structure developed by this high temperature burning process which gives them exceptional strength, low porosity, resistance to slag attack, and greater hot load bearing strength.

KX-99 are specially recommended for applications with severe reducing atmospheres.

**SUPER DUTY FIRECLAY BRICK**

Brand	Process	Manufacturing Plant
CLIPPER	DP, SM	Mexico, Missouri
KX-99	DP	Mexico, Missouri
KX-99-BF	DP	Mexico, Missouri
MEX-KO	DP	Mexico, Missouri
SDS	SM	Mexico, Missouri
YUKON	DP	Troy, Idaho

**CLIPPER**

CLIPPER are made from highest quality flint and plastic fire clays. Careful grain sizing and processing of the raw materials—de-airing and forming under tremendous pressure—all contribute to their excellent qualities.



**CHECK THESE PROPERTIES:**

**HIGH REFRACTORINESS**—P.C.E. Cone 33-34.

**DENSE STRUCTURE**—Resistant to corrosive slags, fumes or dust, and to the penetration of molten metal.

**EXCELLENT STRENGTH**—Modulus of Rupture 1000-1600 p.s.i.

**PERMANENT IN VOLUME**—No shrinkage — no open joints — under most severe operating conditions.

CLIPPER are recommended for applications where a strong, dense brick of high refractoriness is required.

Their resistance to iron oxide slags makes CLIPPER an excellent checker brick for open hearth furnaces, and for malleable air furnace bottoms.

**YUKON**

YUKON are extremely resistant to spalling and vitrification . . . they are permanent in volume, have exceptional load bearing strength, and high refractoriness (P.C.E. Cone 33-34). Made from the finest quality fire clays under the most rigid quality control system, YUKON'S unusually well balanced properties meet or exceed the A.S.T.M. requirements of a super duty fireclay brick.

**MEX-KO**

MEX-KO more than meet the requirements of a super duty fireclay brick. Compared with high duty brick, they are more refractory (P.C.E. Cone 33-34), more resistant to spalling and vitrification, and have better load bearing properties under soaking heat. They are permanent in volume—no open joints due to shrinkage at high temperatures.



# KX-99

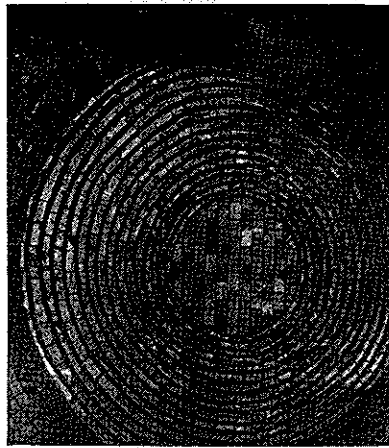
## HIGH-FIRED SUPER DUTY FIREBRICK

KX-99 are another "first" for the A. P. Green Refractories Co. Their principal physical characteristics are low porosity, resistance to slag attack, load bearing strength, and high refractoriness (P. C. E. Cone 33-34). KX-99 are super duty fireclay brick fired to unusually high temperatures. They are companion brick to MEX-KO with many of the same properties but with increased resistance to load, abrasion, and slag action.



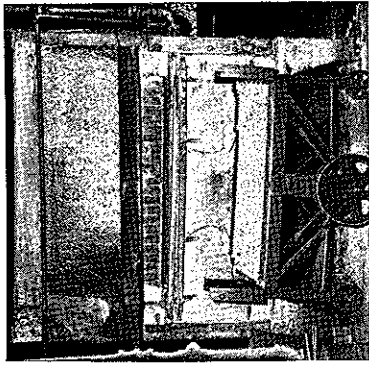
KX-99 are giving excellent service for complete blast furnace linings—ladles of all sizes, from one-ton foundry ladles to 1500-ton hot metal mixers—forge furnaces—billet and slab heating furnaces—glass tank checkers—boiler grate lines—aluminum, zinc, tin and other non-ferrous furnaces—sprung arches and piers subjected to high temperatures and heavy loads. There are all kinds of trouble-spots where KX-99 will lower your maintenance cost, and increase the life of your refractory linings.

This long service life is the result of many unusual properties. KX-99 are highly resistant to abrasion—to washing action or penetration of fluid slags or molten metal—to shrinkage or deformation due to load under soaking heat—to vitrification and spalling. They're hard and tough, and fulfill every meaning of the word "refractory."



KX-99 lining in hot metal car used to transport molten iron from the blast furnace.

The A. P. Green Refractories Co. manufactures high alumina brick ranging from 50% to 80% alumina content and with corresponding P. C. E. ranges from Cone 34-35 to Cone 38-39. These brick are service proved to provide outstanding refractory life in a multitude of installations. Each brand is the result of detailed research, highest quality raw materials, modern manufacturing principles, and strict laboratory control.



A. P. Green high alumina brick are manufactured in more than one location to provide the fastest possible service to your job site at the lowest freight costs. Below is a chart showing A. P. Green brands of high alumina brick and their general characteristics. See pages 16 through 18 for detailed information regarding each brand.

MIZZOU brick saved \$17,000 in one year for a company operating five of these slot type forge furnaces . . . increased service life five times . . . decreased labor and cost of refractory replacement . . . reduced down time of the production line dependent on uninterrupted furnace operation.

### A. P. GREEN HIGH ALUMINA BRICK — 50% to 80% ALUMINA

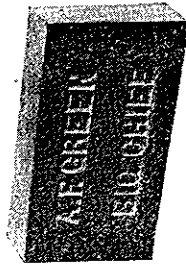
Brand	Al <sub>2</sub> O <sub>3</sub> Content	Process	P.C.E.	Where Manufactured
BIG CHIEF	50%	DP	Cone 34-35 (3205-3245° F.)	Mexico, Mo. Philadelphia
MIZZOU	60%	DP	Cone 36-37 (3279-3308° F.)	Bessemer, Ala. Mexico & Fulton, Mo. Philadelphia
KRUZITE D	70%	DP	Cone 37-38 (3308-3335° F.)	Mexico & Fulton, Mo. Philadelphia Bessemer, Ala.
KRUZITE R	70%	DP	Cone 37-38 (3308-3335° F.)	Mexico & Fulton, Mo. Philadelphia Bessemer, Ala.
DV-75-P	75%	DP	Cone 37-38 (3308-3335° F.)	Mexico, Mo. Fulton, Mo.
80 ALUMINA	80%	DP	Cone 38-39 (3335-3389° F.)	Mexico, Mo. Fulton, Mo.

A. P. Green also manufactures a full line of extra high alumina brick of 85%, 90%, 94%, and 99% alumina content. See pages 19 through 23 for details.

**BIG CHIEF**  
50% Alumina Brick

BIG CHIEF alumina brick were specifically designed for those applications requiring heat resistance superior to super duty brick. The spalling resistance of these brick is exceptionally good and when combined with a high P.C.E. (34-35) and relatively low porosity provides a broad range of usefulness.

Among the many services for which these brick can be used with economy are: rotary cement and lime kilns, forge furnaces, heavy duty boilers, and heating furnace roofs.

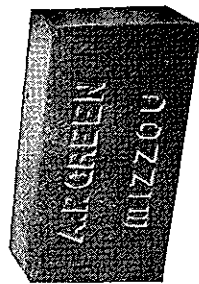


**MIZZOU**  
60% Alumina Brick

A. P. Green MIZZOU are 60% alumina content brick for use in applications requiring heat resistance superior to high or super duty brick, and the ability to effectively withstand destructive chemical attack.

MIZZOU have a Pyrometric Cone Equivalent of 36-37 (3279-3308° F.). Their high alumina content (60%) and a low impurity ratio give them a wide working range . . . resulting in longer life in furnaces operated at extreme temperatures.

The high refractoriness and permanent volume characteristics of these brick make them highly resistant to spalling. Shrinkage, the cause of many firebrick failures, is eliminated by special processing during manufacture. Also, due to their relative freedom from impurities, there is no formation of brittle glass within the brick at high temperatures. This resistance to vitrification means less spalling, softening, shrinkage, or deformation under load.



**KRUZITE D**  
High Density 70% Alumina

KRUZITE D are firebrick especially developed for use in metallurgical furnaces where operating conditions require an extra dense, low porosity 70% alumina refractory. KRUZITE D have an excellent balance of chemical and physical properties which results in longer life where furnaces are operated under severe service conditions.

**SPALLING RESISTANCE**

KRUZITE D demonstrate outstanding resistance to structural and thermal spalling. Their high refractoriness, resistance to vitrification, and lack of shrinkage at extreme temperatures assure longer life in applications where spalling is a problem — such as cement and lime kilns.

**HIGH DENSITY—LOW POROSITY**

The extra density and low porosity of KRUZITE D enable them to withstand attack by corrosive slags and molten metals and the penetration of volatile gases or dusts in the furnace atmosphere.

**HIGH REFRACTORINESS**

The 70% alumina content of KRUZITE D accounts for their high refractoriness and resistance to vitrification and spalling . . . giving them the ability to maintain their effectiveness at extremely high temperatures.

**PERMANENT VOLUME**

KRUZITE D display excellent permanent volume characteristics : : an extremely important property as metal and slag penetration at the joints make short work of brick linings. The uniform dimensions and lack of shrinkage in service of KRUZITE D are essential to tight joints.

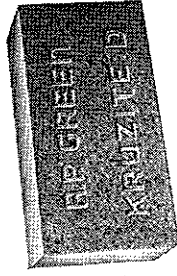
**HOT LOAD STRENGTH**

High initial strength, careful grain sizing for maximum density, and a high fusion point make KRUZITE D especially resistant to deformation under conditions of heavy load and soaking heat.

**KRUZITE R**  
70% Alumina Electric Furnace Roof Brick

KRUZITE R possess the characteristics which are essential to withstand the severe service conditions in today's high performance electric furnaces. High purity, Alabama bauxite, high mulite development, and low manufacturing shrinkage are features of KRUZITE R which translate into outstanding properties and benefits.

**LOW REHEAT EXPANSION • EXCELLENT HOT LOAD STRENGTH •  
LOW POROSITY • EXCELLENT SPALLING RESISTANCE • HIGH  
STRENGTH • UNIFORM DIMENSIONS**



High Alumina Brick — 50% to 80%

## 80 ALUMINA



### RECOMMENDED USES:

- Malleable Air Furnaces (Bottoms)
- Lead Melting Furnaces
- Soaking Pits (Sidewalls)
- Nickel Reverberatory Smelting Furnaces
- High Temperature Kilns

80 ALUMINA are 80% alumina brick made of the finest quality materials . . . free from low melting impurities. They have an extremely high fusion point . . . P.C.E. 38-39 (3335° — 3389°F). Outstanding characteristics include high refractoriness, exceptional resistance to the fluxing action of basic slags, superior load bearing ability, and excellent strength. 80 ALUMINA are recommended for use where highly basic slags at high temperatures must be contained and in installations requiring extreme refractoriness or resistance to chemical attack. They are available in all standard sizes and shapes.

### CHECK THESE SUPERIOR PROPERTIES

- ✓ REFRACTORINESS . . . Pyrometric Cone Equivalent 38-39 (3335° F.—3389° F.)
- ✓ HIGH ALUMINA CONTENT . . . A high alumina content of 80% . . . plus freedom from low melting impurities . . . gives 80 ALUMINA a very high working range.
- ✓ SPALLING RESISTANCE . . . 80 ALUMINA show a loss of only 0 — 3% in A.S.T.M. Panel Spalling Tests.
- ✓ SLAG RESISTANT . . . Good refractoriness and a high alumina content make 80 ALUMINA exceptionally resistant to slagging.

## DV-75-P

### 75% Alumina, Chemically Bonded

DV-75-P are chemically bonded, unburned, 75% alumina brick. They will give excellent and economical service in those applications where the extra refractoriness and strength of a higher alumina product is not required.

Extra High Alumina Brick — 85% to 99%

## 85% to 99% Alumina Content

The Green Company manufactures a full line of extra high alumina content refractories, ranging in P.C.E. from Cone 39-40 to Cone 42 and in alumina content from 85% to 99%.

These brick are recommended for those applications having operating conditions too severe for conventional fireclay and high alumina refractories.

Compared with lower alumina content refractories, they have a higher modulus of rupture and crushing strength, better load bearing qualities, and are more refractory and more resistant to the fluxing action of various basic oxides. They are exceptionally volume stable and can be used at temperatures as high as 3500° F. (99-AD).

Brand	Al <sub>2</sub> O <sub>3</sub> Content	P.C.E.	Where Manufactured
DV	85% (ceramic bond)	Cone 39-40 (3389-3425°F.)	Massillon, Ohio
DV-38	85% (chemical and ceramic bond)	Cone 39-40 (3389-3425°F.)	Massillon, Ohio
DV-38-P	85% (chemical bond)	Cone 39-40 (3389-3425°F.)	Massillon, Ohio
90-B	90% (ceramic bond)	Cone 40+ (3425°F.+)	Philadelphia, Pa.
GREENAL-90	90% (mullite bond)	Cone 40+ (3425°F.+)	Philadelphia, Pa.
GREENAL-94	94% (mullite bond)	Cone 41-42 (3578-3659°F.)	Philadelphia, Pa.
99-AD	99% (ceramic bond)	Cone 42 (3659°F.)	Philadelphia, Pa.



DV-38 have given outstanding service in this aluminum melting operation.

## DV

85% Alumina Brick

The extra high alumina content (85%) of DV makes them especially resistant to vitrification and to the attack of many slags. They are both effective and economical in installations where excessive temperatures cause premature refractory failure. Other outstanding characteristics of DV are excellent thermal spalling resistance and excellent uniformity, both in dimensions and quality. P.C.E. Cone 39-40 (3389°-3425° F.).



## DV-38-P

85% High Alumina, Chemically Bonded

DV-38-P are chemically bonded, unburned, 85% alumina brick made from the finest quality raw materials. They have an extremely high fusion point . . . Cone 39-40 (3389°-3425° F.), low porosity, good strength, and low shrinkage, plus improved spalling resistance compared to burned DV-38.

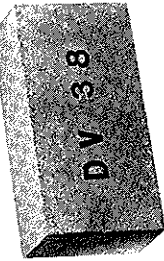
These outstanding properties . . . and the relatively low cost of DV-38-P when compared to other super refractories . . . assure you a premium product at a lower initial cost than you would ordinarily expect to pay.

### TYPICAL APPLICATIONS OF DV-38-P

- Aluminum Holding Furnaces
- Soaking Pits — Bottoms and Sidewalls
- Direct Arc and Induction Furnaces — Selected Areas
- Reheat Furnaces — Hearths
- Open Hearths — Suspended Ends
- Aluminum Furnaces — Hearths, Bottoms, Sidewalls
- Forge Furnaces

## DV-38

85% Alumina Brick



These outstanding extra high alumina brick were developed specifically for use at temperatures where severe service conditions call for an exceptionally inert, strong, and dense refractory. DV-38 have all the desirable properties of DV plus a lower porosity and much higher strength. DV-38 are chemically bonded brick . . . giving them over 2½ times the strength of ordinary 85% alumina type refractories. Their low apparent porosity enables them to better withstand the penetration of fluid slag, metals, and fluxes than other extra high alumina products. DV-38 are exceptional for applications such as aluminum remelt furnaces, steel ladles, and skid rail applications. Produced by the dry press method at Massillon, Ohio.

**EXCELLENT STRENGTH**—DV-38 have a modulus of rupture of 3800-4800 psi and a cold crushing strength of 14,000-20,000 psi. This means exceptional strength and exceptional resistance to abrasion, mechanical abuse and heavy loading.

**LOW POROSITY**—DV-38 have proven amazingly resistant to attack by certain corrosive slags and molten metals. Their low apparent porosity of 12-15% and 85% alumina content enables them to better withstand the penetration of fluid slag, metals, and fluxes than other extra high alumina products.

### DV-38 APPLICATIONS

- Alumina remelt furnace bottoms and sidewalls in the melt area
- Lower sidewalls and bottoms of soaking pits
- Reheat furnace skid rails and hearths
- Hot metal mixer sidewalls
- Hot metal transfer car zoned linings
- Continuous cast iron pipe annealing skid rails
- Cyclone dust collector linings
- Water cooled cupola linings in zone above the tuyeres
- Incinerator linings
- Large coreless induction furnace linings
- Crucible section of large core type induction furnaces
- Tap hole blocks
- Continuous butt weld furnace sidewalls and bungs

**GREENAL-90**  
90% Alumina, Mullite Bonded

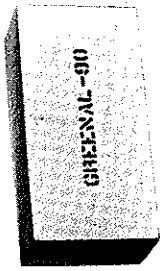
GREENAL-90 are 90% alumina, mullite bonded brick with remarkable resistance to slagging, abrasion and erosion, and deformation under hot load.

**SUPERIOR SLAGGING RESISTANCE** . . . This characteristic is the result of their 13-16% low porosity, a high density of 185-189 lbs./cu./ft., permanence of volume, a very high refractoriness, a mullite bond, high purity raw materials, and a high alumina content.

**EXTREMELY RESISTANT TO ABRASION & EROSION** . . . The extra service of GREENAL-90 in areas of abrasion & erosion is due to the mullite bond which holds the alumina grains tightly into place, reducing the possibility of their washing out or being rubbed off.

**NO DEFORMATION UNDER LOAD** . . . They can be used where most other brick will deform or break. Comparisons with competitive 90% alumina brick indicate GREENAL-90 have the best hot strength at the critical temperatures of 2300°F. to above 3100°F.

GREENAL-90 give extra life in a wide variety of high temperature applications where slagging, abrasion and erosion, and heavy loads create refractory problems.



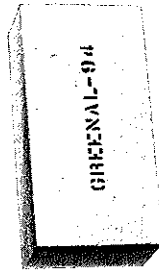
**GREENAL-94**  
94% Alumina, Mullite Bonded

GREENAL-94 are 94% alumina, mullite bonded brick designed for high temperatures under load. They possess those unique properties which enable extended life under severe conditions.

**HIGH REFRACTORINESS** . . . 94% alumina. P.C.E. Cone 41-42 (3578°-3659°F.)

**OUTSTANDING HOT STRENGTH** . . . Specifically designed for carrying heavy loads at high temperatures. Only 1.0% deformation at 3100°F. in A.S.T.M. Hot Load Test.

**VOLUME STABLE** . . . Only 0.2% contraction in reheat tests. Joints stay closed. **ABRASION RESISTANT** . . . Strong and extra dense to resist erosion and impact. **SPALL RESISTANT** . . . No spalling loss in the A.S.T.M. Super Duty Spalling Test.

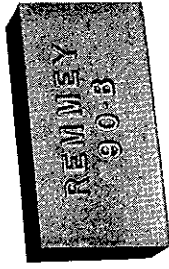


**SUGGESTED APPLICATIONS**

Carbon Black Reactors • Skid Rails • Tundish Impact Pads • Glass Tanks • Port Tile • Setter Tile (high temperature) • Glass Stirrers, Plungers • Sodium Silicate Tanks • Car Blocks • Reaster Combustion Chambers

**90-B**  
90% Alumina Brick

These super refractory brick, containing 90% alumina content, have a P. C. E. of Cone 40+. They have exceptionally high refractoriness, excellent volume stability at high temperatures and great resistance to thermal spalling. Other properties include high resistance to corrosion by slags, volatile alkalis, and alkali dusts such as is found in glass tank atmospheres.



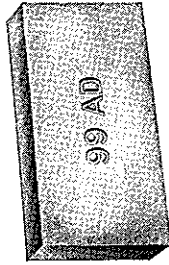
**RECOMMENDED APPLICATIONS FOR 90-B 90% Alumina Brick**

- Kiln furniture for firing ferrites
- Checker brick for glass industry
- Reactor linings
- Pf furnaces
- Rotary calciners
- Melt contact areas in aluminum remelt furnaces
- Forge furnace bottoms
- Skid rails
- Direct arc furnace roofs
- Indirect arc furnace linings
- Non-ferrous melting furnaces

**99-AD**

**Pure Oxide 99% Alumina**

99-AD are the purest form of extra high alumina brick . . . containing over 99% corundum (crystalline alumina). They are extremely inert as they contain no clay, silica, or other impurities to form glass at high temperatures. Their rate of solution in contact with most highly corrosive slags is very low. 99-AD have a P.C.E. of Cone 42 (3659° F.), making them capable of withstanding temperatures too extreme for other refractory brick. 99-AD also are exceptionally resistant to deformation under load even when completely surrounded by excessive heat.



**99-AD ARE IDEAL IN APPLICATIONS SUCH AS:**

- High temperature kiln linings where temperatures reach as high as 3500° F.
- Shadow walls in soda-lime glass tanks
- Non-ferrous melting furnaces where no impurities can be tolerated
- Chemical reactor linings
- Controlled atmosphere furnace linings
- Secondary reformers of ammonia plants

## GREENMUL-60

60% Alumina, Semi-Mullite Brick

Raw materials are the key to any outstanding brick. With this in mind, A. P. Green Refractories Co. acquired the best deposits of Alabama bauxite and kaolin available. The next step was the design and construction of the most modern, technologically advanced calcining facility in the industry. This resulted in a refractory grain that made possible the development of GREENMUL-60 semi-mullite brick.

**LOW ALKALI CONTENT** — The extremely low total alkali content results in a glass-free bond. GREENMUL-60 has excellent behavior under high hot load conditions.

**LOW POROSITY** — The low porosity of GREENMUL-60 provides excellent resistance to the permeation of liquid slags and injurious furnace atmospheres.

**HIGH DENSITY** — The dense structure of GREENMUL-60 provides high heat storage capacity and release. This feature is particularly important for blast furnace stove checkers.

Along with low alkali content - low porosity - and high density, GREENMUL-60 exhibits no spalling loss in a 3000° F. spalling test! It has excellent strength in terms of modulus of rupture and cold crushing! Outstanding volume stability at high temperatures!

### A BALANCED COMBINATION OF CHEMICAL AND PHYSICAL PROPERTIES FOR LONG LASTING SERVICE

- Low Alkali Content
- High Density
- Excellent Strength
- Low Porosity
- Spall Resistant
- Outstanding Volume Stability

## GREENMUL-60 T. I.

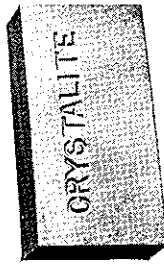
60% Alumina, Semi-Mullite, Pitch Impregnated

GREENMUL-60 T. I. are the same outstanding brick described above plus they have been impregnated with high residual carbon pitch. This additional process provides higher resistance to the chemical attack and washing action of liquid slags.

## CRYSTALITE and CRYSTALITE A

Premium Grade — High Purity Mullite

CRYSTALITE refractories are today's most desirable mullite where service conditions are too severe for regular mullite—having all the best qualities of refractories made from calcined Indian kyanite... plus practically no impurities and no excess silica — with higher density, and much more uniform quality.



CRYSTALITE are stable, both chemically and physically. They have a porosity that is low enough to give very high resistance to chemical attack. In addition, they have good resistance to thermal as well as structural spalling, and compared to other mullite brick have high load bearing strength at extreme temperatures.

CRYSTALITE A are fired to extremely high temperatures, giving them the highest strength at elevated temperatures of all commercial mullite and high alumina refractories up to 94% Al<sub>2</sub>O<sub>3</sub>. They have the highest resistance to slags, glass, or furnace vapors of the types found in furnaces where mullite is used. Because of the high firing temperatures, CRYSTALITE A are not recommended where thermal shock is serious.

## MUL-8

MUL-8 are regular purity, general purpose brick which can provide important savings in those applications where premium quality CRYSTALITE is not required. They are made from a synthetic mullite aggregate completely stabilized by high temperature calcining. The high percentage of alumina in MUL-8 eliminates free silica and its undesirable results.

MUL-8 possess excellent load bearing properties at elevated temperatures, a high modulus of rupture, and outstanding resistance to structural spalling over long periods of service.

These desirable properties create many applications for MUL-8, such as air heaters, glass furnace superstructures, electric furnace roofs, incinerators, tunnel kilns, brass reverberators, and burner blocks.



## Silicon Carbide Brick

### A-1

A. P. Green A-1 Silicon Carbide are made by expert craftsmen under careful quality control — using finest silicon carbide grain bonded with highest quality ceramic bonds.

A-1 brick contain over 85% silicon carbide in the fired product. Their extra high hot load strength insures freedom from deformation at elevated temperatures. The high thermal conductivity of A-1 (approximately 11 times that of fireclay) makes it the ideal product for furnaces using muffle-type construction. This high thermal conductivity eliminates cold spots . . . reducing rejects and fuel costs.

An outstanding modulus of rupture and cold crushing strength give A-1 amazing resistance to abrasion. Their low porosity makes them highly impervious to acid slags and non-ferrous molten metals. Other important characteristics include the ability to withstand flame impingement and erosion, and extreme resistance to thermal shock and spalling.

A-1 are manufactured in Philadelphia and are available in a wide variety of special shapes in addition to the standard brick shapes. Other special silicon carbide brands to handle specific applications also are produced.

## Zircon Brick

### ZIRCON

A. P. Green ZIRCON are compounded of selected grades of refined zirconium silicate, sintered at high temperatures.

Outstanding properties of ZIRCON include a low rate of thermal expansion, a dense structure, high mechanical strength, and exceptional resistance to acid slags and slags high in silica.

ZIRCON are manufactured in Philadelphia.

#### IDEAL APPLICATIONS FOR ZIRCON

Metaphosphate furnace linings.  
Crucibles for melting platinum.  
Tapout blocks of aluminum remelt furnaces.  
Glass tank paver brick where borosilicate, dense opal, flint, and container glasses are being melted.

Sidewalls and bottoms for acid process direct arc furnaces.  
Tap hole blocks for non-ferrous melts.  
Frit furnace melt contact areas.

## Silica and Semi-Silica Brick

### XSIL

#### Super Duty Silica Brick

XSIL are super duty silica brick developed through exhaustive scientific research to open the way to increased furnace life and more trouble-free service at higher operating temperatures. Outstanding properties of XSIL include superior hot load strength, greater bulk density and lower porosity (making them especially resistant to penetration and attack by slags), a low reheat expansion to avoid pinching or mechanical spalling in service, and excellent mechanical strength to assure they arrive at your job site with sharp corners and edges.

Only the purest silica quartz is used in manufacture. This material combines the ideal chemical and physical composition for a silica brick. Screen analyses, density checks, and a rigidly controlled burning schedule assure optimum physical properties in the finished brick.

XSIL are made in all standard shapes by the dry press, and in special shapes and sizes by the air hammer process. They are manufactured in Jackson, Ohio.

XSIL-E, manufactured in Jackson, has greater spalling properties and are ideal for the conditions normally existing in electric furnace roofs.

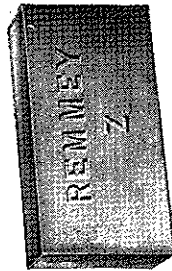
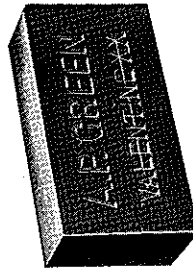
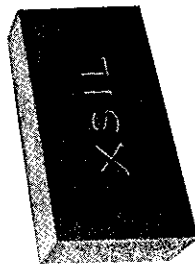
### VALENTINE XX

#### Semi-Silica Brick

VALENTINE XX possess an unusual combination of refractory properties not found in ordinary fireclay brick. They have an exceptionally high silica content and an unusually low percentage of alkalies and other basic oxides. VALENTINE XX brick demonstrate an amazing resistance to structural spalling, a complete lack of shrinkage, and the ability to withstand deformation under load.

Their outstanding resistance to structural spalling is primarily the result of a protective refractory glaze which forms on the surface of the brick in service. This glaze is high in silica and remains on the surface of the brick as a protective coating. It prolongs the service life of the refractory lining by preventing further attack of active fluxes in the furnace gases. Behind this protective coat or glaze, the structure of the brick will be unaffected and in its original condition — without vitrification or shrinkage — even after years of service.

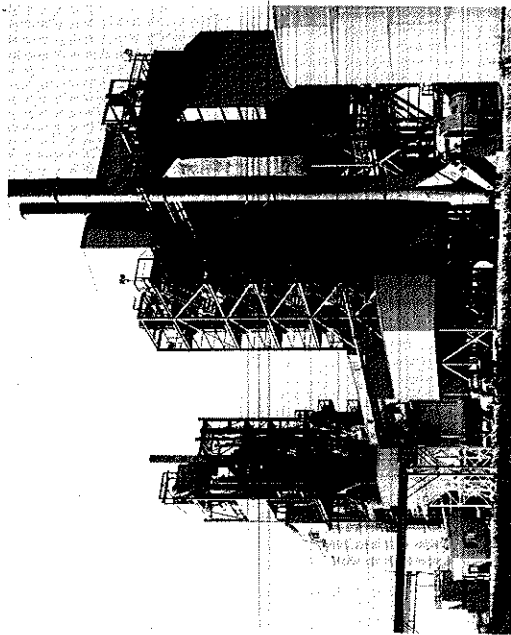
VALENTINE XX brick have given superior service in blast furnace stoves, open hearths, soaking pits, slab heating furnaces, forge furnaces, ceramic kilns, regenerator roofs and many other installations.





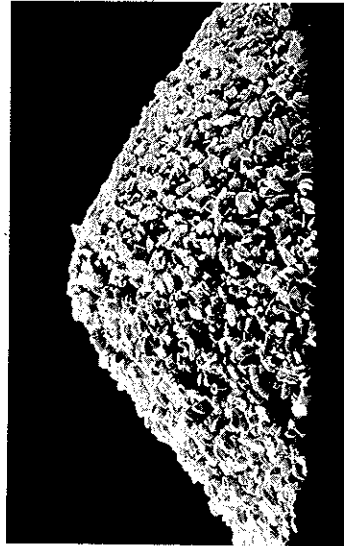
**The Green Line of Basic Refractories Offers . . .**

**. . . a complete line of basic brick and specialty products to keep pace with the ever-changing requirements of industry.**



The key to the complete line of A.P. Green Basic and Pitch Bonded Refractories is this periclase plant at Freeport, Texas. At Freeport, an amazing industrial process takes place beginning with sea water and culminating in the highest quality periclase grain for the production of basic and pitch bonded BOF refractories.

Freeport periclase has:  
 Higher density  
 Higher purity  
 Favorable lime/silica ratio

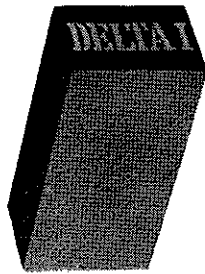


**BASIC REFRACTORIES**

The complete Green Line of Basic Refractories is manufactured in the Pittsburgh area to best serve the nation's greatest steel-producing areas—and is readily accessible to glass—cement—lime—chemical and other metallurgical and process industries. Every step of manufacture is continuously controlled by qualified quality control technicians using well equipped laboratories. Additional control, research, and development programs are conducted at the Research Center in Mexico, Missouri.

Freeport high purity magnesite, Philippine chrome concentrates, strict quality control procedures, and advanced manufacturing equipment and techniques bring you a complete new line of basic refractories.

Brand	% Magnesia	Metal-Encased	Type
GREEN 98	98	No	Chemically Bonded
GREEN 90	90	No	Chemically Bonded
GREEN 70	70	No	Chemically Bonded
GREEN 40	40	No	Chemically Bonded
GREENCLAD 70	70	Yes	Chemically Bonded
GREENCLAD 60	60	Yes	Chemically Bonded
GREEN B 98	98	No	Burned
GREEN B 90	90	No	Burned
GREEN B 80	80	Yes	Burned, Kiln-Liners Only
GREEN B 70	70	No	Burned
GREEN B 40	40	No	Burned
DELTA 1	60	No	Direct Bonded
DELTA 50	50	No	Direct Bonded
DELTA CLAD 1	60	Yes	Direct Bonded
DELTA CLAD 50	50	Yes	Direct Bonded
GREEN-OX T. I.	98	No	Direct Bonded, Pitch Impregnated



**DELTA 1**  
60% Magnesia/Chrome  
Direct Bonded Basic Brick

DELTA 1 are manufactured from high quality sea water periclase and especially selected chrome concentrates, then fired to extra high temperatures to achieve maximum direct bonding. Direct bonding, accomplished by maintaining accessory oxides at low levels and in proper ratio and burning at high temperatures to achieve intimate bonding between periclase and chrome, imparts properties which make DELTA 1 the ideal product for general furnace applications where exceptional hot strength is required and where resistance to extreme temperatures, slag attack, and the penetration of molten metals is a requirement for optimum performance.

PROPERTIES OF DELTA 1

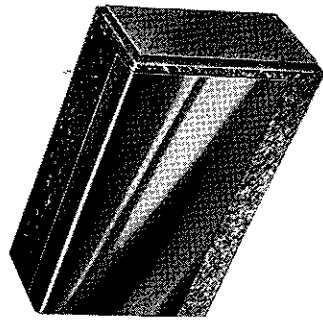
- ★ Exceptional Hot Load Strength
- ★ Good Resistance To Thermal Shock
- ★ Outstanding Resistance To A Wide Variety of Slags
- ★ Excellent Resistance To Abrasion
- ★ Highly Resistant To Chemical Attack
- ★ Volume Stability

TYPICAL APPLICATIONS FOR DELTA 1

- |                                       |                                 |
|---------------------------------------|---------------------------------|
| Open Hearth Furnaces                  | Lead Refining Furnaces          |
| Electric Furnaces                     | Brass and Copper Alloy Furnaces |
| Reheat Furnaces                       | Waste Product Incinerators      |
| Glass Furnaces                        | Cement Kilns                    |
| Copper Smelting and Refining Furnaces | Vertical Lime Kilns             |
|                                       | Ferro Alloy Furnaces            |

**DELTA 50**  
50% Magnesia/Chrome  
Direct Bonded

DELTA 50 are a lower magnesia content brick having most of the same properties as DELTA 1. Developed primarily for use in argon-oxygen decarburization (AOD) vessels, they can be used in a wide variety of applications.



**GREEN B 80**  
KILN LINERS

**CHEMICAL PURITY**—Made from high purity sea water periclase and finest quality refractory grade chrome ore.

**MINERALOGICAL DEVELOPMENT**—All GREEN B 80 liners are burned under accurately controlled conditions to assure the best and most uniform mineralogical structure.

**VOLUME STABILITY**—Excellent resistance to shrinkage and high strength under load at high temperatures.

**PYROCHEMICAL COMPATIBILITY**—The 80 percent MgO content of GREEN B 80 assures pyrochemical compatibility with the basic charge of cement and lime kiln operation.

**DENSE STRUCTURE**—Careful grain-sizing and pressing resulting in extreme density and uniformity in each individual GREEN B 80 liner.

**SPALLING RESISTANCE**—The use of highest quality raw materials, angular shaped periclase grains, careful grain-sizing, advanced manufacturing techniques and exacting quality control procedures give GREEN B 80 excellent spalling resistance.

**DIMENSIONAL UNIFORMITY**—Superior dry pressing and burning facilities assure GREEN B 80 liners of uniform size and shape . . . liners that fit accurately and are easy to install.

**GREEN B 70**  
Kiln Liners

GREEN B 70, 70% MgO kiln liners also are available. These liners give outstanding service in kilns where the higher refractoriness of GREEN B 80 is not required and where a better physical appearance with sharper corners and edges is beneficial.

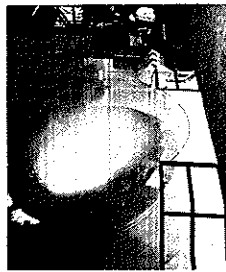
## PITCH BONDED BRICK



GREEN-OX pitch bonded BOF refractories manufactured at Tarentum, Pennsylvania; Taylor, Michigan; and Pueblo, Colorado, are the result of extensive research. They are manufactured from the highest quality raw materials available... assuring the best combination of physical and chemical properties. GREEN-OX brick are available in the following compositions ranging from dolomite through high purity magnesia to permit composite linings yielding the lowest cost per ingot ton.

### PITCH BONDED BASIC BRICK

Brand	Type
GREEN-OX D	Magnesia-Dolomite
GREEN-OX LM	Low Flux Dolomite-Magnesia
GREEN-OX MT	Magnesia, Tempered
GREEN-OX M	Magnesia
GREEN-OX P	Periclase
GREEN-OX P-S	Periclase, Electric Furnaces only
GREEN-OX PT	Periclase, Tempered



### GREEN-OX OFFER THESE ADVANTAGES:

- ★ High density... in both the raw material and the finished product.
- ★ High residual carbon.
- ★ Resistance to "peeling"... built-in burn-in protection.
- ★ Microstructure designed to withstand the corrosive action of extremely hot slags.
- ★ Uniformity from brick to brick... in quality, dimensions, and properties.
- ★ Good strength in service — good strength before it is put in service. Ability to arrive at job site without excessive breakage.
- ★ Longer service life per lining and more economical refractory cost per ton of steel.

## A COMPLETE LINE OF INSULATING FIREBRICK

The Green Company offers you one source of supply for insulating firebrick for all temperatures from 2000° F. to 3300° F. In addition to the GREENLITE line of high temperature insulating brick for temperatures up to 2800°, 3000° and 3300° F., insulating brick also are available for temperatures up to 2000° F., 2300° F., and 2600° F. These lower temperature insulating brick are composed entirely of highest quality materials and possess the three most desirable properties of insulating firebricks; high insulating value, structural strength, and the ability to withstand high temperatures without shrinkage. They are recommended for service in direct contact with flame and furnace gases in furnaces heated with gas, oil, powdered coal and electricity where slagging does not occur.

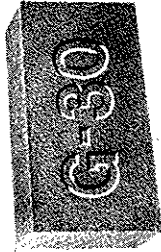
All A. P. Green Insulating Firebrick are manufactured to accurate dimensions and all are packaged in special fiberboard 25 brick cartons except GREENLITE-33, which comes in 10 brick cartons.

The selection of the proper insulating firebrick to meet your own specific operating conditions is easy. Just designate the A. P. Green Insulating Firebrick that meets your particular temperature requirements. You can be sure that all of the other factors necessary to give you maximum economy and efficiency are present to assure you excellent service.

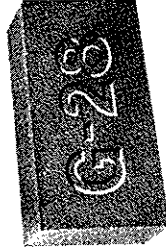
GREENLITE-33 For Temperatures to 3300° F.  
 GREENLITE-30 For Temperatures to 3000° F.  
 GREENLITE-28 For Temperatures to 2800° F.  
 A. P. GREEN G-26 For Temperatures to 2600° F.  
 A. P. GREEN G-23 For Temperatures to 2300° F.  
 A. P. GREEN G-20 For Temperatures to 2000° F.



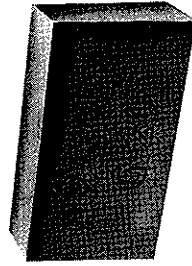
GREENLITE-33



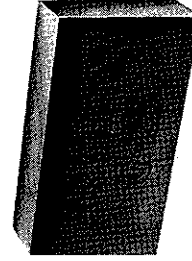
GREENLITE-30



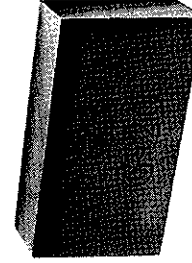
GREENLITE-28



G-26



G-23



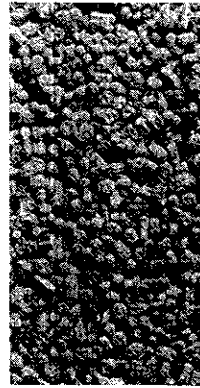
G-20

## GREENLITE A NEW CONCEPT IN HIGH TEMPERATURE INSULATING FIREBRICK

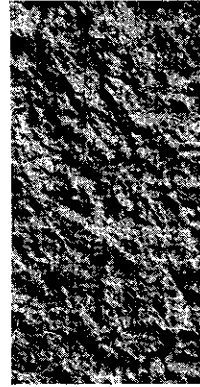
GREENLITE high temperature insulating firebrick are produced by a completely new process which gives them properties superior or equal to any other insulating brick on the market today. They are made from uniform sized, multi-cellular lightweight aggregate having a strong, ribbed internal structure — resulting in extra high strength and low density. They are produced without the aid of artificial burn-out materials, thus they have an extremely uniform internal pore structure . . . free of large voids and free of internal cracking caused by the usual burn-out materials.

GREENLITE now come in three qualities — GREENLITE-28 for temperatures to 2800°F; GREENLITE-30 for temperatures to 3000°F; and GREENLITE-33 for temperatures to 3300°F. In addition, GREENLITE-KL, insulating rotary kiln liners, are available for use in the cooler portions of kilns up to the point where a coating begins to form. GREENLITE contains no low fusion materials, giving improved hot load stability and permanent volume.

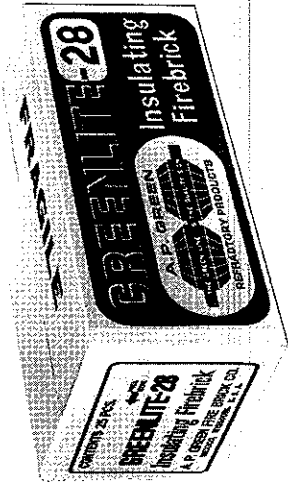
**Basic Properties include: greater insulating values, high refractoriness, outstanding structural strength and excellent stability.**



Magnified photo of GREENLITE showing porous yet exceptionally strong internal structure.

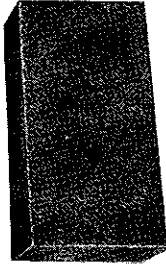


Magnified photo of old type insulating brick.



## XSILITE SILICA INSULATING BRICK

XSILITE are silica insulating brick used primarily as a back-up for heavy silica brick in the crown section of glass tanks. XSILITE combine high mechanical strength and good insulating properties . . . plus outstanding uniformity. XSILITE's unusual strength assures arrival at the job site with sharp corners and edges, ready to lay up quickly and easily with tight joints. Their low "K" factor make them excellent insulators.



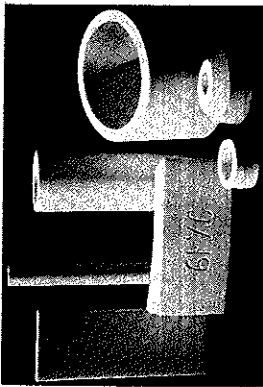
## G-ACID AND G-ACID TYPE-H ACID-RESISTING FIRECLAY BRICK

The true "acid-test" of a corrosion-resistant refractory brick is performance . . . the ability to give long, uninterrupted service in your particular application. That is why the characteristics of G-ACID are important. These products are uniform in quality, texture, and shape. This good uniformity allows for better joints—thus reducing erosion at the joints and providing longer life.

These products were developed for use in applications where refractory linings are required to withstand the action of corrosive chemicals and the penetration of acids at most working temperatures. G-ACID are manufactured in Kimberly, Alabama, by the stiff mud process. C-ACID are manufactured in Pueblo, Colorado. Both have relatively high refractoriness, permitting use at temperatures as high as 2300°F.

## ARC-HARD D

### A 99% Plus Alumina Ceramic



Offering superb resistance to wear caused by moving abrasive materials.

ARC-HARD D is produced by a unique manufacturing process employing isostatic pressing. It can outperform tool steels and hard faced overlays. It has a uniform density that is as armor-hard in the center as on the surface. It is free of surface pores that normally trap foreign materials causing structural breakdown and erosion. It resists the corrosive action of fuel impurities.

ARC-HARD D is already being produced in a variety of shapes to fit specific needs. We believe it can be adapted to many others.

## ARC-HARD D is already being utilized extensively in these two demanding applications.

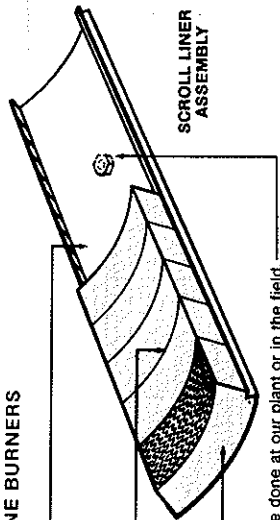
### SCROLL LINERS FOR CYCLONE BURNERS

Steel mounting plate, rolled, crimped, and with tab holders. Available made from 16 GA mild steel or 12 GA #304 stainless steel

ARC-HARD D ceramic segments

Hard faced steel block, to be used on end exposed to combustion.

Nut welded to plate for mounting on water jacket. This may be done at our plant or in the field. (Ceramic should be removed before nuts are welded to the plate)



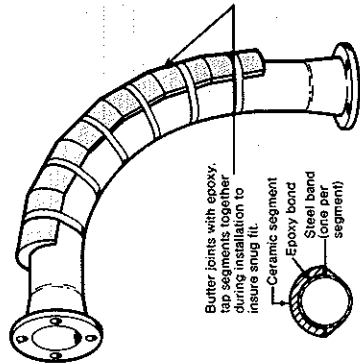
### ELBOW LINERS FOR "BAND AID" REPAIRS

1. ARC-HARD D elbow liners offer a method of repair simple to apply--no craft or skilled mechanic required or equipment change necessary.

2. It's quick and sure--a repair is made in minutes using epoxy and retaining bands.

3. It's economical--the convenient 4" lengths can be installed as required.

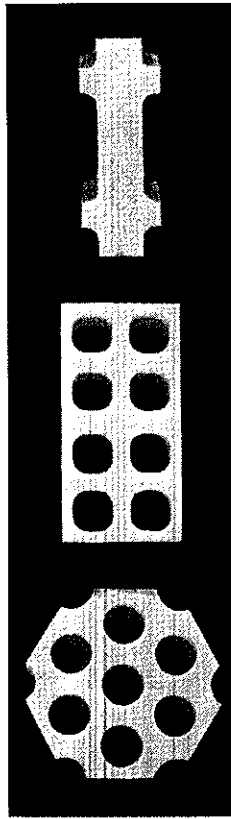
Liners are made for piping diameters 2" through 8", in 4" long segments. Segment liners are mitered to fit at the joints to match the elbow radius. The most popular sizes of elbow liners are available from stock.



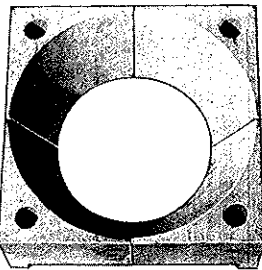
## CHECKERS

A. P. Green manufactures a full line of checkers specifically developed to meet the higher operating temperatures and increased severity of operations in blast furnace stoves, open hearth furnaces, and glass tanks. These checkers are manufactured in a wide range of qualities to assure the proper checker for any application: High Duty, Super Duty, High Fired Super Duty, Semi-Silica, Semi-Mullite, Mullite, and Basic.

All qualities are produced under strict laboratory control. Expert workmanship results in checkers with extremely close size tolerances . . . plus freedom from injurious cracks, internal fissures, or laminations. All dimensions are interfitting for mechanical stability and flue continuity.



Checkers are available in many designs. In addition to standard rectangular shapes for conventional checker patterns, the Green Company manufactures special designs such as Climax, Mohr, Freyn (Koppers), McKee, and Kennedy (Bailey). Regardless of quality, design, or tolerances required, A. P. Green checkers assure you of those properties which give longer service life and lower maintenance costs.



## BTG MARINE BURNER TILE

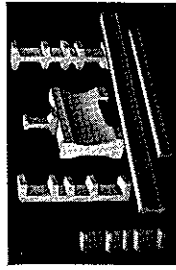
Pre-formed, hard-burned mullite tile designed to meet the increased demands and higher output of marine boilers. No painstaking forming by hand.

## LADLE BRICK

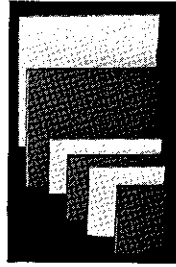
The A. P. Green Company manufactures ladle brick for lining open hearth ladles at several locations. These brick are manufactured to close tolerances under rigid quality control procedures. Plants manufacturing ladle brick are located in Alabama and Colorado.

## KILN FURNITURE

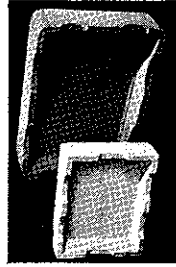
The A. P. Green Company offers a single source for kiln car refractories: The Philadelphia plant manufactures all types of kiln furniture — slabs, posts, supports, girders, beams, and saggars. These products are available in a wide range of mixtures to meet virtually every need.



Posts, Girders, Beams



Slabs



Saggars

A wide variety of methods are employed in the manufacture of kiln car refractories—slip casting, dry pressing, wood molding, air hammer ramming, and jolting. Each item is rigidly quality controlled to assure longer life and lower refractory costs. Many kiln car items are carried in stock.

## INERT SUPPORTS

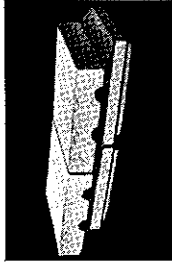
A. P. Green offers inert supports for fixed-bed catalytic reforming and a dehydrogenation processes in three extra high alumina brands and a wide variety of sizes. Manufactured in diameters from 1/4 in. to 2 in., these special refractory spheres feature high purity, chemical inertness, high strength and hardness, complete structural homogeneity and long trouble-free service. Less cracking and shelling reduces replacement costs. They are made in two grades of plus 90% alumina and contain exceedingly low percentages of iron, magnesia, lime, alkalies, titania, and other contaminants.

## NOSE BLOCKS for ROTARY KILNS

68-B Nose Blocks are internationally known for solving problems at the discharge ring where all other refractories have proved unsatisfactory. These semi-silicon carbide blocks, manufactured at Philadelphia, are highly resistant to hot clinkers, rapid thermal change, and abrasion. Their long life reduces both refractory and retainer ring replacement costs. 68-B Nose Blocks are recommended where service conditions are too severe for high duty and super duty fireclay blocks.

## CAR TOP BLOCKS

The A. P. Green Company manufactures a variety of quality car top blocks in fireclay and special mixtures, including famous SKC and CTX. These blocks have set service records in numerous plants throughout the country. In addition to car top blocks, the Company supplies several types of castable refractories that have proved successful as car top materials.



Car Blocks

## SKC

These blocks are unparalleled by any other. They are 50% alumina blocks containing a special bond which gives them an extremely low rate of thermal expansion. They are especially designed to resist cracking and spalling due to fast changes in temperature and have outstanding strength. Ideal for fast cycle kilns and car bottom furnaces.

## CTX

Rapidly achieving popularity as the most efficient and economical car top block available. CTX has a relatively low coefficient of expansion and good resistance to thermal shock, enabling them to retain their high strength longer upon repeated heating and cooling. Ideal for most ceramic and structural clay kiln car applications.

## SPECIAL CAR BLOCKS

The Green Company manufactures a line of car blocks for use in special high temperature kilns firing at temperatures to 3500°F. These can be produced in a variety of types — high alumina, mullite — and by a variety of methods — wood mold, dry press and by ramming.

## SIMPLIFIED DESIGN

A. P. Green is a leader in new, lighter weight design resulting in better insulation of metal frame of car, less refractory to heat and cool on each trip through the kiln, and less wear and tear on car pushing mechanism.



## Mortars

The Green Company manufactures mortars specifically developed for laying up every type of refractory brick. In each case the mortar has the chemical composition best suited for the type of brick and service conditions for which it was designed. All A. P. Green mortars possess the fine grain sizing and smooth workability needed to produce thin brick-to-brick joints . . . a necessity in good brick construction.

Note in the following table that the Green Family of Mortars is available in both heat and air setting bonds and in wet and dry consistencies.

### MORTARS DATA CHART

PRODUCT	Type	Setting Characteristic	Shipping Condition	Container Size	Pounds Required Per 1000 sq. Straights — Dipped	Maximum Recommended Temperature
HEXI-KORO	Fireclay	Heat-Set	Dry	100 Lb. Bags	250-300	3000°F.
SATANITE	High Alumina	Heat-Set	Dry	100 Lb. Bags	250-300	3200°F.
ATMOSSET	Silica—Fireclay	Air-Set	Wet	100 Lb. Pails 200 Lb. Drums	350-400	2800°F.
KD-2	Super Duty Fireclay	Air-Set	Dry	100 Lb. Bags	250-300	3000°F.
HEATITE	Super Duty Fireclay	Air-Set	Wet	100 Lb. Pails 200 Lb. Drums	350-400	3000°F.
'SAIRSET	Super Duty Fireclay	Air-Set	Wet	5, 15, 25, 50, 100, 200 Lb. Drums	350-400	3000°F.
'SAIRBOND	Super Duty Fireclay	Air-Set	Dry	100 Lb. Bags	250-300	3000°F.
'SAIRMIX-7	Super Duty Fireclay	Air-Set	Wet	100 Lb. Pails 200 Lb. Drums 100 Lb. Cartons	350-400	3000°F.
No. 36 REFRACTORY CEMENT	High Alumina	Air-Set	Wet	15, 50, 100, 200 Lb. Drums 100 Lb. Cartons	400-450	3200°F.
LOXOL-55	High Alumina	Air-Set	Dry	100 Lb. Bags	350-400	3200°F.
No. 1-36 REFRACTORY CEMENT	High Alumina	Air-Set	Wet	100 Lb. Pails 200 Lb. Drums	400-450	3200°F.
GREENSET-78	78% Alumina	Heat-Set	Dry	100 Lb. Bags	250-300	3250°F.
GREENSET-85-P	85% Alumina	Air-Set	Wet	100 Lb. Pails	450-500	3000°F.
GREENSET-90	90% Alumina	Heat-Set	Dry	100 Lb. Bags	Troweled 450-500	3350°F.
GREEN MAGNESITE MORTAR	Magnesite	Heat-Set	Dry	100 Lb. Bags	600-700	
GREEN CHROME MORTAR	Chrome	Air or Heat-Set	Dry	100 Lb. Bags	700-800	

A. P. GREEN

REFRACTORY  
MORTARS



## 'SAIRSET



'SAIRSET is a wet, high temperature, air-setting bonding mortar that protects firebrick linings against destructive spalling, reduces joint erosion due to chemical attack of slags or dust laden fumes, and prevents penetration of joints by molten metal or fluid slag. It forms a strong bond at all temperatures — a bond stronger than the brick itself.

'SAIRSET gives outstanding service in all types of boilers, ceramic kilns, rotary kilns, ladles, flues and stacks, and industrial furnaces. It is ideal for laying all types of fireclay and fireclay insulating firebrick. 'SAIRSET welds the brick into a one-piece unit at temperatures too high for less refractory mortars — or at temperatures too low for heat-setting mortars to form a good ceramic bond.

'SAIRSET stays in suspension in the mortar box. It comes on the job ready-mixed to trowelling consistency — with all of its plasticity and other properties fully developed for maximum efficiency.

'SAIRSET is packaged in ready mixed form . . . no long soaking period is required to develop the plasticity and smooth workability.

## 'SAIRMIX-7

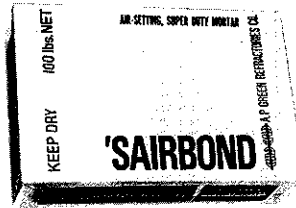
'SAIRMIX-7, a wet, air-setting, high temperature mortar, combines the two most desirable characteristics of high temperature bonding mortars: smooth, easy workability, and a strong bond for added life and protection to firebrick joints. 'SAIRMIX-7 was developed especially for easy trowelling and reduced settling in the drum in storage. 'SAIRMIX-7 is ideal for laying high duty and super duty fireclay, high alumina, and insulating firebrick. It forms a strong bond as soon as completely dried and maintains an excellent bond at all temperatures.

'SAIRMIX-7 is a blending of outstanding working and physical properties. Installation personnel like its long storage life and excellent workability . . . while long service is assured by its good refractoriness, high bonding strength, and lack of shrinkage.

- \* Excellent workability
- \* High refractoriness
- \* Outstanding bonding strength
- \* No shrinkage
- \* Long storage life.

## 'SAIRBOND

'SAIRBOND is a dry, air-setting bonding mortar that gives an exceptionally strong bond at all temperatures. 'SAIRBOND, unlike most dry mortars, is ready for use immediately after mixed with water. When mixing is completed, its fine workability has already been developed and the bonding agent is completely dissolved, ready to bond the brick.



'SAIRBOND contains all the properties of an outstanding wet mortar combined with the economy of a dry, high temperature cement. It possesses extremely good refractoriness. As 'SAIRBOND is a dry material, there is no waiting in cold weather for it to thaw before mixing.

With 'SAIRBOND it is easy to obtain the thin brick-to-brick joints so necessary to good refractory construction. It will perform with amazing results in a variety of applications: boilers, ceramic kilns, rotary kilns, ladles, flues and stacks, and industrial furnaces.

## HEATITE

HEATITE is an air-setting, high temperature, super duty bonding mortar that can be used effectively in either troweling or dipping consistency. Can be used to lay high duty and super duty fireclay, high alumina, and insulating firebrick.

## LOXOL-65

LOXOL-65 is a dry, air-setting 65% alumina mortar possessing exceptionally high refractoriness and unusual bonding strength. It provides an extra margin of safety when laying high alumina brick, super duty brick, or high temperature insulating brick where service conditions are extremely severe. The high fusion point of LOXOL-65 makes it ideal for use at temperatures up to 3200° F.

## No. 36 REFRACTORY CEMENT

For Temperatures As High As 3200° F.



No. 36 REFRACTORY CEMENT is a wet, air-setting, high temperature cement with exceptionally high bonding strength and refractoriness.

No. 36 REFRACTORY CEMENT is recommended for all types of brick where extra high bonding strength is needed in the joints for structural stability — and as a brush coat over new or old brick-work. It has a high alumina base and is recommended for laying high alumina brick, super duty brick, or mullite brick where service conditions are extremely severe. Due to its alumina content and high strength, it has proved especially good in applications where slugging presents a problem. With its high fusion point, it may be used for temperatures as high as 3200°F.

## No. T-36 REFRACTORY CEMENT

No. T-36 REFRACTORY CEMENT is a companion product designed especially for troweling. It has all the desirable properties contained in No. 36 REFRACTORY CEMENT but is shipped in a heavier consistency for troweling in greater thickness. Extra low shrinkage makes it desirable for all troweling applications and for filling the scallops on the back side of tangent tube boilers.

## KD-2

KD-2 is a dry, air-setting high temperature mortar. Unlike other mortars of this type, KD-2 will not deteriorate nor lose its working and bonding characteristics in storage. Develops excellent working properties without lengthy soaking. For laying and surfacing high duty, super duty, and high alumina brick. Do not use in enamelware furnaces, bright annealing furnaces, other controlled atmosphere furnaces, or furnaces heated by electric elements.

## SATANITE

### A Slag Resistant Mortar

SATANITE is a high alumina, slag resistant mortar developed for laying firebrick or as a wash coating in all types of furnaces and ladles in which molten iron or steel is in contact with the brick . . . and joint erosion is unusually severe. SATANITE is also an excellent mortar for laying high alumina brick in furnaces operating at extremely high temperatures.

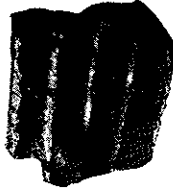
• **Slag Resistance** — SATANITE is specifically designed to resist the chemical attack of fluid slags and washing action of molten metal.

• **High Refractoriness** — P. C. E. Cone 36 (3279°F.) — No shrinkage at high temperatures.

• **Excellent Workability** — Finely ground with smooth workability . . . permitting thin, tight joints.

• **Greater Coverage** — Only 250 to 300 pounds required to lay 1000 firebrick.

SATANITE is shipped in 100-lb. multi-wall bags. Will store indefinitely — will not freeze or deteriorate.



Section from a malleable iron air furnace side wall showing protrusion of SATANITE joints after firebrick had worn back several inches.

## MEXI-KOMO

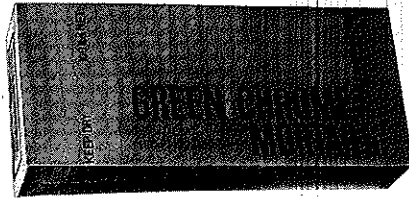
MEXI-KOMO is a super duty, heat set mortar for laying firebrick. Does away with the extreme shrinkage encountered with raw fire clay. Finely ground — forms good tight joints. Packed in 100-lb. bags.

## MILLED FIRE CLAY

A. P. Green Dry Milled Fire Clay is the same high quality Missouri clay used in making EMPIRE firebrick. Unlike lower quality clays, it is free of low melting impurities that fuse and react with the firebrick. When used as a mortar, Dry Milled Clay should be mixed with grog to reduce shrinkage. Packed in 100-lb. bags. Bulk shipments can be made in carload quantities only.

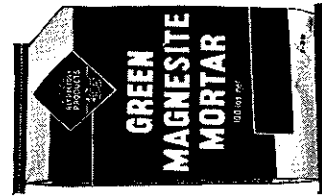
## GREEN CHROME MORTAR

GREEN CHROME MORTAR is manufactured from rigorously controlled, high quality chrome ores. It is designed for balanced chemical and physical properties and is grain sized to assure excellent workability . . . thus superior masonry. Chrome mortar being chemically neutral assures resistance to a wide variety of furnace slag, fluxes and atmospheres. Recommended for laying up basic, silica and fireclay brick to effect an optimum mineralogical union and desirable bonding for structural stability. Available either as air-setting or heat-setting in 200 lb. fibre drums or 100 lbs. bag, 700-800 pounds required to lay 1000—9-inch straights.



## GREEN MAGNESITE MORTAR

GREEN MAGNESITE MORTAR was developed especially for those applications requiring high magnesia brick to be laid up with mortar. It has good working characteristics and forms joints offering utmost protection against chemical attack of basic type slags and fluxes. It is available in both standard and super qualities depending upon the severity of service demanded. Available in either air- or heat-set types in 100 lb. bags or 200 lb. fibre drums, 600-700 lbs. required per 1000—9-inch straights.



A. P. GREEN

PLASTIC  
REFRACTORIES

## PLASTIC REFRACTORIES

A. P. Green plastics are firebrick in plastic, moldable form, shipped ready to pound into place. They may be installed to form a solid monolithic refractory lining in all types of boilers and industrial furnaces. These plastics also are used as an effective patching material for quick repairs. Easy to use — saves time and labor.

A. P. Green plastics combine high fusion, load bearing strength, spalling resistance and lack of shrinkage to give longer, trouble-free service and to prevent costly shutdowns.

### ADVANTAGES OF A. P. GREEN PLASTICS

1. SPALLING RESISTANCE—provide outstanding resistance to spalling compared to similar grades of brick.
2. JOINT-FREE FURNACE LININGS—present a solid monolithic front to slag and furnace gases.
3. ELIMINATION OF AIR INFILTRATION—lower fuel cost and increased efficiency.
4. ADAPTABLE TO ANY THICKNESS OR CONTOUR—eliminating need for special refractory shapes.
5. FREEDOM FOR EXPANSION AND CONTRACTION—with A. P. Green floating anchors.

**A. P. GREEN PACKAGING — EXTRA VALUE AT NO EXTRA COST**  
A. P. Green plastic refractories (except JADE PAK-88-P) are shipped in 100-pound cartons with a moisture retaining inner lining. For ease of handling, the plastic in each carton is presliced into five 2" x 8" x 14" slabs. JADE PAK-88-P is available in 100-pound steel pails, which can be returned for credit.

**ZIP-STRIP CARTONS** — A. P. Green plastic refractories are packed in zip-strip cartons for quick, easy opening. Just grab the tab . . . pull . . . and zip . . . the plastic is exposed, ready for immediate installation. This carton has proved to save approximately one-third of the time normally required to open ordinary cartons . . . eliminates knives and other opening devices.

**INNER WRAPPER** — The entire line of Green plastics are wrapped in a material constructed of a polyethylene sheet and asphalt laminated paper. This wrapper has the superior moisture retention of straight polyethylene and the puncture resistance of strong Kraft paper. It folds tightly and stays in place . . . preventing the escape of moisture.

FOR ESTIMATING DATA ON A. P. GREEN PLASTICS SEE PAGE 205

## A. P. GREEN'S COMPLETE LINE ASSURES A PLASTIC FOR YOUR SPECIFIC OPERATION

During operation all furnaces, and even different sections of the same furnace, are subjected to varying conditions. With this in mind, the A. P. Green Company has developed a plastic "just right" for each furnace, operation, service condition, and zone.

**QUIK-PAK** — A general purpose high duty plastic. Ideal for complete furnace linings and patching where service conditions are not too severe. See Page 50.

**SUPER FIRE WALL** — Super duty general purpose plastic.

**SUPER-PLASTIC** — Super duty plastic with outstanding properties. Excellent where spalling and slagging conditions exist. See Page 50.

**SUPER H** — Super duty plastic especially for steel mill applications. See Page 51.

**SUPER HYBOND** — Extra strong super duty plastic. Especially recommended for flat suspended arches, firing hoods and similar applications requiring unusual strength. See Page 51.

**SUPER G** — Special super duty plastic developed for steel mill applications where high temperatures and severe spalling exist. See Page 52.

**HIGH ALUMINA PLASTIC** — 70% alumina content. A superior product for extra tough service. See Page 52.

**GREENPAK-80** — An 80% alumina plastic for use at extreme temperatures where severe service conditions require performances superior to regular fireclay plastics and others of lower alumina content. See Page 53.

**GRAPHPAK** — High alumina (81-85%) graphite plastic for severe high temperature applications where iron is being melted. See Page 57.

**GREENPAK-85-P** — 85% alumina, phosphate bonded plastic for severe service conditions. See Page 53.

**GREENPAK-85-PF** — 85% alumina, phosphate bonded, with patching. See page 54.

**GREENPAK-90-P** — 90% alumina, phosphate bonded plastic. See Page 54.

**GREENPAK-90-PF** — 90% alumina, fine grained, phosphate bonded plastic for use as a patching material in areas of severe abrasion and erosion. See Page 54.

**JADE PAK-88-P** — Alumina-chromic oxide, phosphate bonded. Outstanding in severe metal and slag contact applications. See page 55.

**RED-X** — Slag resistant graphite-type plastic. Outstanding where severe erosion are problems. See Page 56.

**GREEN-X** — Super duty graphite-type plastic. For iron and steel ladles in foundries, blast furnace and open hearth tops, and in metallurgical furnaces. See Page 57.

**METAL-PAK** — High alumina-graphite plastic for severe service conditions in steel plant applications where regular graphite plastics fail. See Page 57.

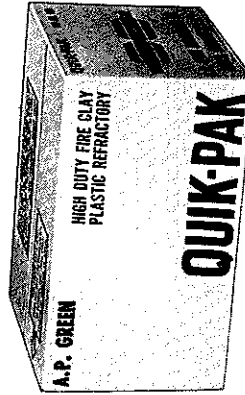
**VAL-PAK** — Extruded plastic block in a variety of qualities. Easily installed with a minimum of ramming. See page 58.

## QUIK-PAK

A. P. Green QUIK-PAK is a high duty plastic refractory and meets the specifications for this classification (A.S.T.M. Designation: C64).

QUIK-PAK has a high fusion point (P.C.E. Cone No. 31) and resists spalling better than high duty firebrick. Load bearing strength and low shrinkage in service are also characteristic of A. P. Green QUIK-PAK. It is recommended for complete furnace linings and for repair work where conditions require a high duty material.

Among the many uses for QUIK-PAK are boiler furnaces of all types and sizes, forging furnaces, cupolas, ladles, incinerators, duff ovens, metallurgical furnaces, annealing furnaces and many of the special furnaces used in the process industries.

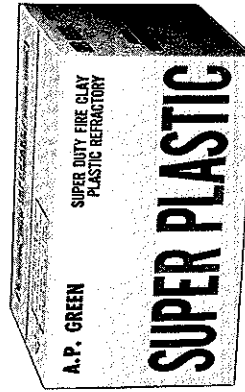


Shipped in 100-pound cartons. 140 pounds required per cubic foot.

## SUPER-PLASTIC

A. P. Green SUPER-PLASTIC is a super duty plastic refractory for use in the zone of high temperatures and where severe spalling or slagging occurs. (A.S.T.M. Designation: C64).

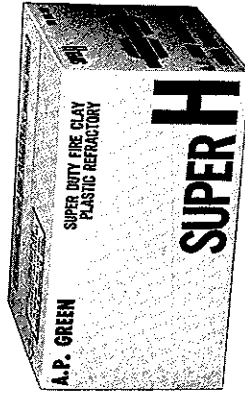
In addition to the natural advantages of flexible monolithic construction and easy working properties, A. P. Green SUPER-PLASTIC has the following very exceptional refractory properties: (1) High fusion temperature. SUPER-PLASTIC has a P.C.E. of Cone 33-34 (3169°—3205°F.); (2) Permanent volume in service. SUPER-PLASTIC test specimens (2½x4½x9) show a slight expansion after being subjected to a soaking heat of 2910°F. on all sides for five hours. (3) Resistance to spalling. SUPER-PLASTIC meets the very stringent spalling resistance requirements for super duty fireclay brick. (4) Load bearing characteristics. SUPER-PLASTIC approaches its high fusion temperature without softening or vitrification. This quality is responsible for the load bearing strength as well as the unusual spalling resistance of SUPER-PLASTIC at high temperatures.



Shipped in 100-pound cartons. 145 pounds required per cubic foot.

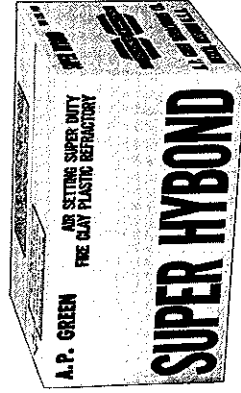
## SUPER H

SUPER H is a super duty plastic refractory especially developed to render long, trouble-free service in steel mill furnaces where high temperatures and severe spalling occurs. It has excellent workability and is easily rammed into place in massive or small installations. Properties include minimum shrinkage, superior strength, good load bearing ability, and excellent spalling and slagging resistance. SUPER H will prove economical in slab and billet heating furnaces, soaking pit covers and walls, rotary hearth furnaces, forge furnaces, and other steel mill applications. Shipped in 100-pound cartons: 145 pounds required per cubic foot.



## SUPER HYBOND

A. P. Green SUPER HYBOND is a special super duty plastic specifically created to meet the need for a plastic refractory that develops high strength throughout its entire thickness—regardless of furnace operating temperature or total thickness of the furnace lining. In a SUPER HYBOND furnace lining, the back or cool portion against the casing will form a strong bond as soon as enough heat has been applied to dry it.



Shipped in 100-pound cartons. 145 pounds required per cubic foot.

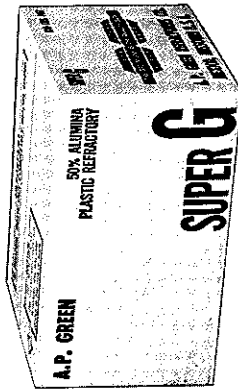
This characteristic makes SUPER HYBOND ideal for the construction of flat suspended arches. The top surface of these arches is generally air-cooled which prevents the development of full strength when a regular plastic is used. SUPER HYBOND gives added strength here, because it develops a strong bond throughout the entire thickness of the arch.

When high temperatures, severe spalling conditions or slagging prohibit the use of a castable refractory, SUPER HYBOND will insure a monolithic lining of exceptionally high strength.

NOTE: SUPER HYBOND should not be used in enamelware or ceramic glazed ware furnaces, bright annealing furnaces, controlled atmosphere furnaces, furnaces heated by electric elements, or in any other furnace where a small percentage of sulphur is detrimental. Specify A. P. Green QUIK-PAK or SUPER-PLASTIC in these furnaces.

SUPER HYBOND is sold in Canada under the brand name "SUPER BOND"

## SUPER G



Shipped ready to use in 100 pound cartons, 148 pounds required per cubic foot in place.

### RESISTANT TO SPALLING

The extra refractoriness of SUPER G (P.C.E. 35-36) reduces vitrification and spalling.

### PERMANENT IN VOLUME

Super G maintains permanent volume characteristics throughout the high temperature range. Even at 3000°F., it shows no shrinkage.

### GOOD LOAD BEARING ABILITY

The hot load bearing ability of SUPER G is due to its high refractoriness and high density.

### RESISTANT TO SLAGGING

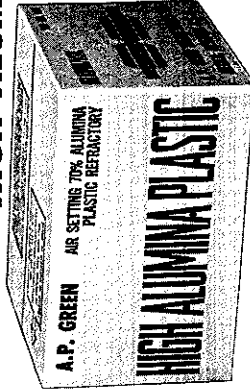
Excellent resistance to slagging. Resists the high temperature chemical attack of corrosive slags, fumes, or dusts.

SUPER G is a special super duty 50% alumina plastic refractory designed to give longer, trouble-free service in steel mill furnaces where extremely high temperatures and severe spalling conditions exist. SUPER G is ideal for many industrial furnace applications that present extremely tough operating conditions.

### TYPICAL USES FOR SUPER G

- Slab Heating Furnaces
- Billet Heating Furnaces
- Soaking Pit Covers
- Soaking Pit Walls
- Forge Furnaces
- Rotary Hearth Furnaces
- Burner Blocks
- Ladle Linings
- Driers
- High Temperature Combustion Chambers

## HIGH ALUMINA PLASTIC

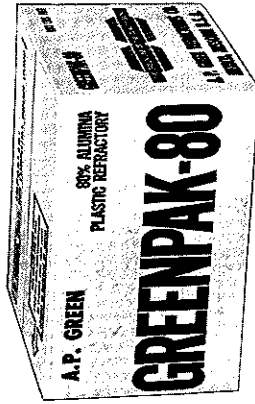


Shipped ready to use in 100 pound cartons, 165 pounds required per cubic foot in place.

### HIGH ALUMINA PLASTIC Is Recommended For Use In . . .

- ELECTRIC FURNACE ROOFS
- BOILERS
- BURNER PORTS
- FORGE FURNACES
- HEATING FURNACES

## GREENPAK-80 80% ALUMINA PLASTIC



GREENPAK-80 is an 80% alumina plastic with truly remarkable properties. Its extra refractoriness (P.C.E. 38-39) reduces vitrification and spalling. It maintains permanent volume characteristics throughout high temperatures — actually showing a slight expansion at temperatures of 3100°F. The pure high alumina clays used in GREENPAK-80 help resist slagging, vitrification, and spalling. In addition, the high refractoriness and extra density of GREENPAK-80 enable it to support heavy loads at high temperatures for prolonged periods.

Shipped in 100-pound cartons, 175 pounds required to ram one cubic foot net.

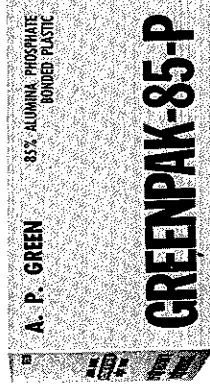
GREENPAK-80 is made to withstand the most rugged operating conditions in such applications as slab, billet, and forge furnaces; soaking pits, delta sections of direct arc furnace roofs; alloy steel ladles; firing hoods of high temperature calcining kilns; spouts and runners; and patching and lining high temperature combustion chambers.

## GREENPAK-85-P

### 85% Alumina, Phosphate Bonded Plastic

GREENPAK-85-P is an 85% alumina, coarse grained, air setting, phosphate bonded plastic developed to solve tough slagging and abrasion problems.

High quality raw materials give GREENPAK-85-P high refractoriness and a strong bonding which promotes a special "sintering" effect that seals surface pores to prevent damage by slag attack. Installation personnel praise its excellent workability and its ability to enable easy removal of slag.



GREENPAK-85-P requires 185 pounds to ram one cubic foot net. Shipped in 100-pound polyethylene-lined cartons with convenient strip opening tab. NOTE: As the shelf life of GREENPAK-85-P is three to four months from the date of manufacture, it is recommended that the material not arrive at the job site earlier than one month prior to installation.

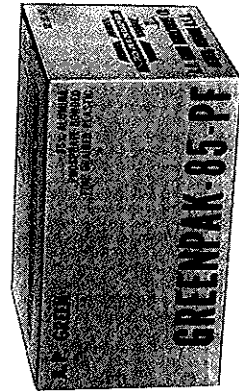
### OUTSTANDING PROPERTIES OF GREENPAK-85-P

- High Refractoriness (85% Alumina)
- Excellent Slagging Resistance
- Superior Strength
- Low Shrinkage (0-0.5% at 3000° F.)
- Outstanding Workability



## GREENPAK-85-PF

85% Alumina, Fine Grain, Phosphate Bonded Plastic



GREENPAK-85-PF is an 85% alumina, phosphate bonded plastic with fine grain sizing.

It was developed specifically for use as a patching material in areas of severe abrasion and erosion. GREENPAK-85-PF is an extra sticky plastic with excellent workability. It can provide equal or superior service in many severe wear areas at a lower cost than higher alumina, phosphate bonded plastics.

GREENPAK-85-PF requires 185 pounds to ram one cubic foot-net. It is shipped in 100-pound cartons. Usage within 45 days of manufacture is recommended for best workability, although shelf life is three to four months.

PROPERTIES OF GREENPAK-85-PF

- High Refractoriness • Outstanding Workability
- Resistance to Slagging • High Strength
- Low Shrinkage

### RECOMMENDED APPLICATIONS

- Induction furnaces
- Spouts
- Iron foundry maintenance
- Tundish ladles
- Cyclones
- Catalyst lines
- Furnace sidewalls
- Foundry ladles
- Troughs and tap out areas

## GREENPAK-90-PF

90% Alumina, Phosphate Bonded Plastic

GREENPAK-90-PF represents the finest, extra high alumina, phosphate bonded plastic refractory available today. Its tabular alumina base provides high chemical purity and refractoriness which, combined with its phosphate bond, provides high strength and makes GREENPAK-90-PF an excellent material for resisting very severe service conditions. As an added benefit, it has good workability to permit easier and faster installation.

GREENPAK-90-PF requires 195 pounds to ram one cubic foot net. Shipped in 100-pound, polyethylene lined cartons with convenient top opening tab. Note: As the shelf life of GREENPAK-90-PF is three to four months from the date of manufacture, it is recommended that the material not arrive at the job site earlier than one month prior to installation.

### APPLICATIONS

- Foundry Ladles • Billet Heating Furnaces • Tundishes • Heat Treating Furnaces
- Troughs • Incinerators • Cyclones • Induction Furnaces • Chemical Reactors
- Electric Furnace Roofs • Tilting Reverts • Seaking Pits • Cupolas

## GREENPAK-90-PF

90% Alumina, Fine Grain, Phosphate Bonded Plastic

GREENPAK-90-PF is a 90% alumina, phosphate bonded plastic with a fine grain size. It was developed specifically for use as a patching material in areas of severe abrasion and erosion. GREENPAK-90-PF demonstrates high refractoriness, excellent resistance to abrasion, good strength, resistance to slagging and spalling, and outstanding workability. It is recommended for severe abrasion areas such as in cyclones or catalyst lines in refineries and as a multi-purpose maintenance material in ferrous and non-ferrous foundries and in steel plants.

### RECOMMENDED APPLICATIONS

- Cyclones
- Induction Furnaces
- Spouts
- Iron Foundry Maintenance
- Catalyst Lines
- Furnace Sidewalls
- Foundry Ladles
- Tundish Ladles
- Troughs
- Sodium Silicate Furnaces
- For Placing into Hexsteel Grids

## JADE PAK-88-P

Alumina-Chromic Oxide, Phosphate Bonded Plastic

JADE PAK-88-P represents a totally new concept for a strong and dependable plastic refractory. The combination of high purity alumina and chromic oxide grains with a phosphate bond creates a product that gives excellent service life in the most severe metal and slag contact applications. JADE PAK-88-P has proved its ability to extend service life from 1½ to 10 times longer than previously tried products in foundry, steel mill, and a variety of other applications.

### Features of JADE PAK-88-P

- High Refractoriness
- Resistance to Slagging
- Extra High Density
- Outstanding Strength
- Superb Spalling Resistance
- Exceptional Workability



200 pounds required to ram one cubic foot-net. As the shelf life of JADE PAK-88-P is three to four months from the date of manufacture, it is recommended that it not arrive at the job site earlier than one month prior to installation. For maximum protection, JADE PAK-88-P is shipped in 100-pound steel pails with a polyethylene liner. This extra tight steel container extends shelf life and can be returned for credit.



## GREEN-X

GREEN-X is a super duty graphite-type plastic refractory, used as a slag resistant lining in foundry ladles and metallurgical furnaces.

GREEN-X is made from the highest quality Missouri fire clays and graphite — plus a special binder which (1) helps seal in the graphite, preventing excessive oxidation, and (2) develops an exceptionally high bonding strength that withstands severe erosion. The resistance of GREEN-X to washing action of molten iron and corrosive slag means longer lining life and cleaner metal.

### FOR MANY APPLICATIONS

- Forhearth of Holding Ladles • Bull Ladles • Pouring Ladles • Hand Ladles • Cupola Wells • Cupola Slag Holes
- Malleable Furnace (runners and spouts) • Cupola (runners and spouts).

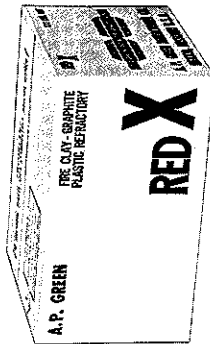
## RED-X

RED-X is a graphite containing plastic that effectively resists the slagging and erosion of molten metal. RED-X was developed to meet those conditions encountered where other graphite plastics fail to give the required service because operating temperatures are not high enough to achieve an effective surface seal. At metal melting temperatures, the surface of RED-X forms a protective seal which prevents the graphite from burning out.

The fine grain of RED-X gives it excellent workability . . . makes it easier to install thin linings and also to place the material in installations where a certain amount of hand forming is necessary.

### WHERE RED-X IS USED

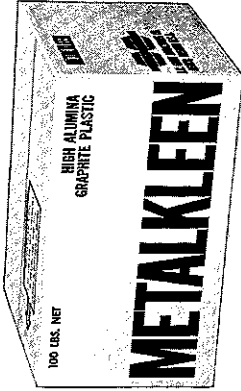
- Open Hearth & Blast Furnace Troughs • Patching Cupola Wells • Cupola Breast Block
- Troughs for Gray Iron and Malleable Iron • Ladles for Gray Iron and Malleable Iron
- Linings for Non-Ferrous Handling Equipment . . . Also many Other Types of Industrial Applications.



Shipped in 100 pound cartons. 138 pounds required per cubic foot in place.

## METALKLEEN HIGH ALUMINA GRAPHITE PLASTIC

METALKLEEN is a high alumina graphite plastic developed for foundry and steel plant applications where regular graphite plastics fail to give maximum service due to the extreme temperatures and longer heats required to meet modern production schedules. The high alumina content of METALKLEEN gives it an added edge at temperatures "too hot" for normal graphite plastics while its graphite content gives it resistance to wetting and to penetration by molten metals and slags.



150 pounds required per cubic foot.

METALKLEEN has proved economical in desulphurizing ladles, cupola runners, teapot ladles where soda ash is injected, tapour and slag hole blocks, and as a covering for basic brick or acid cupola blocks from the bottom of the tuyeres.

## GRAPHPAK HIGH ALUMINA GRAPHITE PLASTIC

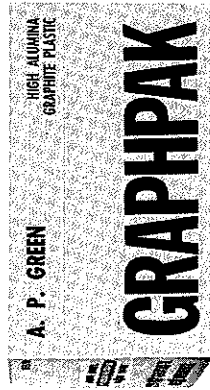
GRAPHPAK is a high alumina (81-85%) graphite plastic which gives exceptional service in very severe high temperature applications where iron is being melted. Important characteristics of GRAPHPAK which assure more tons of metal per refractory dollar include:

Outstanding Workability — Easily rammed into place with a minimum of labor costs.

High Refractoriness — High alumina content of 81-85%.

Non-Wetting — The addition of graphite to GRAPHPAK gives it added resistance to wetting and to the penetration of both acid and basic slags.

No Shrinkage — GRAPHPAK demonstrates positive expansion characteristics at iron melting temperatures.



GRAPHPAK is shipped in 100-pound cartons. For ease of handling, the plastic in each carton is pre-sliced into five 2"x8"x1/4" slabs. If specified, it can be sliced into 1" slabs. 165 pounds required per cubic foot—net.

Good Density — The high density of GRAPHPAK helps it resist the slagging and erosion of molten metal.

### APPLICATIONS FOR GRAPHPAK

FRONT SLAGGING CUPOLAS . . . Troughs, Breasts, Well Areas, Skimmers, Slag Dams, Separators, Launderers, and Runners • LADLES . . . Iron Holding Ladles, Spout Areas of Torpedo and Transfer Ladles • BLAST FURNACES . . . Around Cooler Plates, Troughs • SPOUTS OF CORELESS FURNACES . . . Iron • SPOUTS OF ROTARY DRUM INDUCTION FURNACES . . . Iron • SPOUTS OF DIRECT ARC ELECTRIC FURNACES . . . Iron Acid Practice.

# VAL-PAK

## Semi-Silica Plastic

VAL-PAK is a semi-silica, plastic refractory which provides an economical answer to problems in soaking pit covers and other heating furnaces where physical abuse or abrasion is not a factor.

The high 76% silica content of VAL-PAK enables it to form a unique refractory glaze on the surface of the plastic. This protective coating is high in silica and prolongs service life by preventing the attack of harmful impurities and improving thermal shock resistance. Beneath this coating, VAL-PAK's structure remains unaffected and in its original condition—without vitrification or shrinkage—even after extended service.

VAL-PAK weighs 135 pounds per cubic foot net. It is shipped pre-cut and ready to use in 100-pound cartons with polyethylene wrapping.

### VAL-PAK offers several other outstanding benefits:

● Permanent Volume ● Tight Monolithic Construction ● Ease of Installation ● Good Thermal Shock and Slag Resistance.

### VAL-PAK APPLICATIONS

- Soaking Pit Roofs
  - Billet Heating Furnace Roofs
  - Slab Heating Furnace Roofs
  - Upper Sidewalls of Furnaces
- Where Abrasion is Not a Major Problem

### EXTRUDED PLASTIC BLOCK

EXTRUDED PLASTIC BLOCK is an extruded, high density, de-aired plastic which can be manufactured in a number of different sizes to meet any installation requirement. The length and thickness can be varied to meet customer requirements. It is extruded in a column and cut into the length required. Each block is firm enough to be handled without bending or breaking. They can be laid up as close and as tight together as possible as it is not necessary to allow for expansion between blocks. These blocks are also designed with sharp corners and square ends so they will fit together without voids, thereby giving a solid monolithic lining.

EXTRUDED PLASTIC BLOCK reduces installation costs and downtime. Regular plastic walls, although doing away with the expensive and time consuming job of bricklaying, still requires considerable time to install, as well as some special equipment, such as pneumatic rammers. The block wall can be built in less time without special equipment and still give the same monolithic type structure as the rammed plastic wall.

EXTRUDED PLASTIC BLOCK is stacked on pallets with separators between layers and covered with shrink-wrap protection. No cartons. It is used primarily for laying up soaking pits, reheat furnaces, and boiler walls. Extruded plastics have been found to be superior to other types of walls in resistance to spalling and mechanical failure.

### Extruded Plastic Block Available in 6 Qualities:

GREENPAK-80	80% Alumina
HIGH ALUMINA	70% Alumina
SUPER G	Special Super Duty
SUPER H	Super Duty
SUPER HYBOND	Extra Strong Super Duty
VAL-BLOK	Semi-silica

A. P. GREEN

# CASTABLE

# REFRACTORIES

**Advantages of A. P. Green Castable Construction**

Monolithic furnace construction, properly installed with A. P. Green refractory castables, gives better combustion efficiency and longer, more trouble-free service life than any other type of lining. In monolithic wall and arch construction, the joints of brickwork are eliminated. Slagging and erosion at the brick joints expose more surface to the attack of flame and furnace gases. In castable construction, only the surface face is exposed.

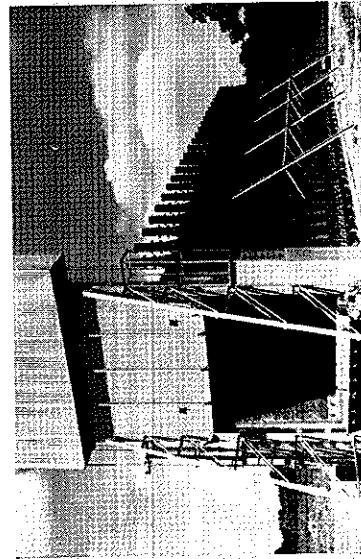
The complete line of A. P. Green castables for temperatures through 3400° F. permits the application of a specific product developed especially to meet the service requirements of your particular job. These materials can be handled where other products may be difficult to handle. A. P. Green castables are easy to install. With proper supervision, monolithic furnace linings can be installed by average labor.

**A. P. GREEN CASTABLES ARE:**

1. **HYDRAULIC-SETTING** — No heat required to develop strength.
2. **LOW THERMAL CONDUCTIVITY** — Less heat loss through furnace walls.
3. **ECONOMICAL** — No cutting and fitting of firebrick or costly inventory of special shapes.
4. **EASY TO INSTALL** — Eliminates costly masonry — can be installed by average labor with supervision.
5. **COMPLETE LINE** — A castable designed to meet the requirements of every type of service to 3400° F.

FOR ESTIMATING DATA ON A. P. GREEN CASTABLES, SEE PAGE 204.

Temperatures are maintained at 1180° F., plus or minus 3° F., in this large stress relieving furnace lined with lightweight KAST-O-LITE. This furnace can be brought up to operating temperature in 25 minutes.



A. P. Green Castable Refractories

REMARKS	TYPE	LBS. RECD. PER CU. FT.	MAX. SERV. TEMP.	METHOD OF INSTALLATION	PRODUCT BRAND NAME	EXTREME TEMPERATURE			EXTRA STRENGTH			BASIC					
						GREENCAST-97	KRUZITE CASTABLE	MIZZOU CASTABLE	STEEL PLANT CASTABLE A	MC-30	STEELKON	MC-25	LO-ABRADE	MC-22	GREENCAST-12	GREENCRETE ARC	GREENCRETE C STANDARD
Extremely abrasion resistant	94% Alumina	163	3400° F.	Pour	GREENCAST-94												
For extreme temperature furnace construction.	97% Alumina	153	3400° F.	Pour	GREENCAST-97												
True 3200° F. product. Spill resistant	74-78% Alumina	150	3200° F.	Pour	KRUZITE CASTABLE												
Spill resistant, strong.	60-63% Alumina	140	3000° F.	Pour	MIZZOU CASTABLE												
For steel industry.	60-63% Alumina	144	3000° F.	Pour	STEEL PLANT CASTABLE A												
Very coarse for thermal shock and withstanding abrasion.	Fire Clay	145	3000° F.	Pour	MC-30												
Dense, strong, abrasion resistant.	Fire Clay	133	2800° F.	Pour	STEELKON												
Very coarse for thermal shock and withstanding load and abrasion.	Fire Clay	125	2550° F.	Pour	MC-25												
Resist abrasion and/or erosion.	Fire Clay	132	2400° F.	Pour	LO-ABRADE												
Very coarse for thermal shock and withstanding load and abrasion.	Fire Clay	128	2350° F.	Pour	MC-22												
High strength, abrasion resistant.	Fire Clay	122	2200° F.	Pour	GREENCAST-12												
Especially abrasion resistant	Chrome	172	2900° F.	Gun, Pour, Trowel	GREENCRETE ARC												
General purpose chrome castable.	Chrome	167	2700° F.	Pour	GREENCRETE C STANDARD												
Extra refractoriness, strength and abrasion resistance.	Chrome	175	3000° F.	Pour	GREENCRETE C SUPER												

A. P. Green Castable Refractories — cont'd

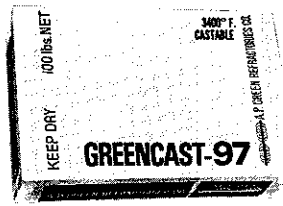
PRODUCT BRAND NAME	METHOD OF INSTALLATION	MAX. SERV. TEMP.	lbs. REQD. PER CU. FT.	TYPE	REMARKS
GREENCAST-94 GR	Gun	3400°F.	160	94% Alumina	For resisting abrasion, erosion and high temperatures.
GREENCAST-97 GR	Gun	3400°F.	160	97% Alumina	For extreme temperature furnace construction.
MIZOU GR	Gun	3000°F.	140	60-63% Alumina	Spall resistant, strong.
STEELKON GR	Gun	2800°F.	130	Fire Clay	For blast furnace repair.
STEELKON 8F	Gun	2800°F.	135	Fire Clay	For blast furnace repair.
GREENCAST-28 GR	Gun	2800°F.	123	Fire Clay	For blast furnace repair.
KS-4V	Gun	2600°F.	122	Fire Clay	For blast furnace repair.
KS-4	Pour	2550°F.	118	Fire Clay	Dense, strong, abrasion resistant.
LO-ABRADE GR	Gun	2400°F.	130	Fire Clay	Resist abrasion and/or erosion.
GREENCAST-12 GR	Gun	2200°F.	122	Fire Clay	Companion product to GREENCAST-12 for pneumatic applications.
SUPER KAST-SET	Pour	2800°F.	122	Fire Clay	Resists vitrification, balanced properties.
STEEL PLANT CASTABLE B	Pour	2800°F.	122	Fire Clay	Good hot load bearing strength for steel industry.
KAST-SET	Pour	2700°F.	115	Fire Clay	Outstanding general purpose material.
CASITITE	Pour	2550°F.	115	Fire Clay	General purpose material.
CASTEX 25 C	Pour	2500°F.	122	Fire Clay	Gun or pour in a variety of applications.
CASTEX 24 C	Pour	2400°F.	115	Fire Clay	Gun or pour in a variety of applications.
HYDROSET	Pour	2200°F.	125	Fire Clay	Resists mechanical abuse and abrasion.
HYDROCRETE	Pour	2200°F.	120	Fire Clay	High strength, resistant to carbon monoxide atmospheres.

PRODUCT BRAND NAME	METHOD OF INSTALLATION	MAX. SERV. TEMP.	lbs. REQD. PER CU. FT.	TYPE	REMARKS
GREENCAST-97-L	Pour	3300°F.	85	Bubble Alumina	For very high temperatures, resists carbon monoxide distillation.
KAST-O-LITE 30	Pour	3000°F.	90	Insulating Aggregate	For high temperatures. Replaces heavy and insulating brick.
KAST-O-LITE 25	Pour	2500°F.	82	Insulating Aggregate	Good strength, replaces heavy and insulating firebrick.
CASTABLE NO. 22	Pour	2200°F.	50	Insulating Aggregate	Good strength, low thermal conductivity, low shrinkage.
CASTABLE NO. 20	Pour	2000°F.	55	Insulating Aggregate	Low thermal conductivity, good structural stability.
CASTABLE BLOCK MIX	Pour	1600°F.	21	Insulating Aggregate	Extra low thermal conductivity — block insulation in castable form.
GREENCAST-97-L GR	Gun	3300°F.	105	Bubble Alumina	For very high temperatures. Resistant to carbon monoxide atmospheres.
KAST-O-LITE 30 GR	Gun	3000°F.	97	Insulating Aggregate	For high temperatures, good strength.
GREENCAST-22-L GR	Gun	2200°F.	80	Insulating Aggregate	Excellent insulating properties, good erosion resistance, low rebound, low shrinkage.
VSL-50	Gun	2300°F.	57	Insulating Aggregate	Low iron — excellent for use in highly reducing atmospheres.
SK-7	Gun	1800°F.	44	Insulating Aggregate	Light weight combined with good strength.

**EXTREME TEMPERATURE**

**GREENCAST-97** — GREENCAST-97 is a 3400°F. high purity, 97% tabular alumina castable for withstanding temperatures too extreme for other types of castables. It has a very low iron content . . . giving it unexcelled resistance to carbon monoxide disintegration.

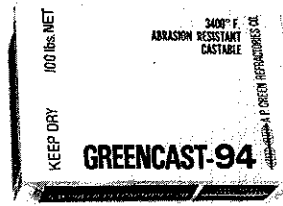
It is especially recommended for applications where a rapid initial heating schedule must be employed. Other castables of this type must be used only as a thin lining or must be heated up slowly the first time . . . or steam will develop in the material faster than it can escape and the face of the lining will explode. GREENCAST-97 permits heating up even the thicker linings normally used for these extreme temperatures at a practical rate without fear of destroying the lining from steam formation. Furnaces operating at the intense heat for which this product is designed often are heated and cooled rapidly. The ruggedness built into GREENCAST-97 enables it to withstand this severe thermal shock with a good margin of safety. Shipped in 100-pound bags. 153 pounds required per cubic foot.



**GREENCAST-94** — GREENCAST-94 is a 3400°F. tabular alumina castable for withstanding conditions of extreme abrasion.

The handling of catalysts or the processing of a charge as air-borne material introduces terrific abrasion problems. To withstand this type of service, GREENCAST-94 is made as dense, hard, and strong as modern science permits. As a result, GREENCAST-94 tops all castables in resistance to abrasion — whether from dust erosion, rubbing, or heavy impact. GREENCAST-94 is most frequently

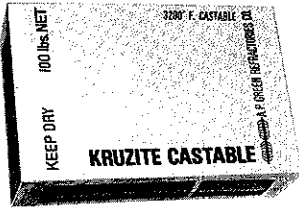
used as a thin troweled-in-place lining. Since no compromise in properties is required in its manufacture, easy troweling characteristics have been built into it . . . resulting in faster installation and reduced labor costs. Shipped in 100-pound bags. 163 pounds required per cubic foot.



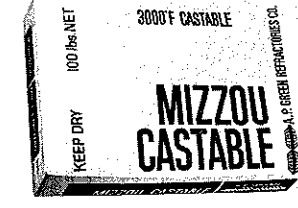
**CASTABLES**

**KRUZITE CASTABLE** — KRUZITE CASTABLE is a hydraulic setting, 3200° F. castable developed to fill an important need between 3000° F. products and the much more expensive high purity alumina products. KRUZITE CASTABLE's 74-78% high alumina content provides that little "extra" for those applications where other 3000°, 3100° or 3200° F. castables have not proven sufficiently refractory to give the needed economical furnace life. KRUZITE CASTABLE is shipped in 100-pound, moisture-resistant bags. 150 pounds required to pour one cubic foot net.

Features include high refractoriness, spalling resistance, good reheat stability, and the ability to resist a number of different slags.

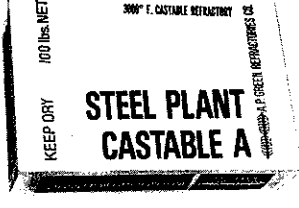


**MIZZOU CASTABLE** — MIZZOU CASTABLE is a high alumina castable for use in applications to 3000° F. Even at these high temperatures, it demonstrates remarkable properties. Its high alumina content — 60-63% — makes MIZZOU CASTABLE a true 3000° F. product and provides good resistance to a number of different slags. It is permanent in volume . . . actually showing expansion rather than shrinkage at high temperatures. Its excellent resistance to vitrification assures longer service life. The spalling resistance of MIZZOU CASTABLE is truly outstanding for a castable material . . . only 1-3% loss in the super duty panel spalling test.



In addition, MIZZOU CASTABLE has good strength. This structural strength throughout its entire temperature range provides stability in furnace walls and arches. Packaged in 100-pound multi-wall bags. 140 pounds required to pour one cubic foot.

**STEEL PLANT CASTABLE A** — STEEL PLANT CASTABLE A is a 3000° F. castable refractory developed primarily for use in the steel industry. It is high in alumina content . . . containing a minimum of 60% . . . has good volume stability and will not shrink at high temperatures. In addition, STEEL PLANT CASTABLE A is spall-resistant and unusually strong throughout its entire temperature range. This product is ideal for use in steel plant applications requiring a high alumina product to meet severe operating conditions at high temperatures. Shipped in 100-pound bags. 144 pounds required per cubic foot.



**EXTRA STRENGTH**

**MC-30, MC-25 and MC-22**

**Coarse aggregate castables**

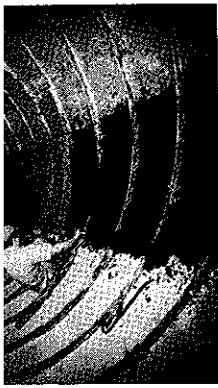
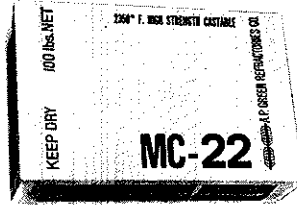
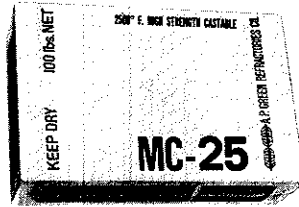
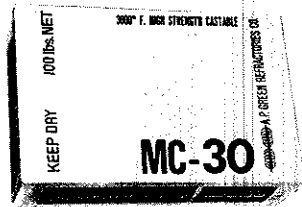
These three products are the finest of their type on the market. They are high strength, hydraulic-setting castables which can be used up to their maximum recommended temperatures either in direct contact with flame or behind other refractories. Their outstanding properties — resulting from their extremely coarse aggregate and special grain sizing — produce unexcelled service in many types of installations. They have two or three times the strength of ordinary refractory castables, have excellent resistance to thermal shock, and withstand heavy loads and mechanical abuse. And, even in massive construction, they demonstrate negligible shrinkage.

**MC-30 for temperatures to 3000° F.**

**MC-25 for temperatures to 2550° F.**

**MC-22 for temperatures to 2350° F.**

MC-30, MC-25, and MC-22 are recommended for the following conditions: Heavy massive castable construction; where high compressive strength is needed to carry heavy loads; or where resistance to thermal shock is an important factor. All are packed in 100-pound bags. MC-30 requires 145 pounds per cubic foot in place; MC-25 requires 125 pounds; MC-22 requires 128 pounds.



MC-22 and GREENCAST-12 are used as an abrasion resistant lining . . . easily installed . . . between the spiral chain supports in rotary kilns.

**CASTABLES**

**STEELKON** — STEELKON is a 2800°F. castable refractory that is particularly strong and has good abrasion resistance. It also demonstrates good permanent volume characteristics.

STEELKON is recommended for those high temperature applications requiring extra resistance to abrasion caused by dust erosion, rubbing, heavy impact or similar conditions encountered in service.

Shipped in 100-pound bags. 133 pounds required to pour one cubic foot.

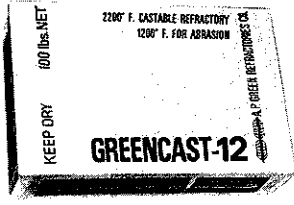
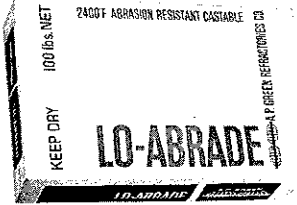
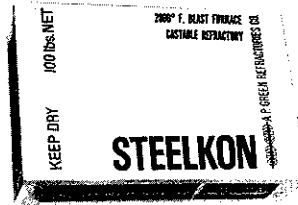
**LO-ABRADE** — LO-ABRADE is a 2400°F. castable for resistance to abrasion and/or erosion. It is recommended for those applications where abrasion is encountered — whether from rubbing, grinding, high energy impact or erosion, such as is experienced with high velocity, high temperature dust laden gases.

Recommended applications include: transfer lines and ducts, cyclones and dust collectors, slide valves, blow pipes, charging hearths, stacks, baffle plates, vessels and vessel internals, and catalyst carrying lines . . . plus many other fluidized and moving-bed process units. In addition, its low iron content makes it particularly good for use in specialized atmosphere furnaces.

Shipped in 100-pound bags. 132 pounds required per cubic foot.

**GREENCAST-12** — GREENCAST-12 is a strong castable particularly suitable for application where great strength and abrasion resistance are required at temperatures of 1200°F. or lower. Above 1200°F. it loses some of its strength, but can be used at temperatures as high as 2200° F. where resistance to abrasion is not a factor. At 1200° F. and below, it is two or three times as strong as ordinary castables and equal to hard burned firebrick in abrasion resistance.

GREENCAST-12 is resistant to moderate carbon monoxide disintegration. It also has good resistance to mild acid attack such as is found in installations handling sour crude oils. Shipped in 100-pound bags. 122 pounds required per cubic foot.





## GUNNING

**GREENCAST-94 GR** — GREENCAST-94 GR is a companion product to GREENCAST-94 developed specifically for those extreme temperature applications where gunning materials are preferred. It is a high temperature, high purity, erosion and abrasion resisting castable. This product, like its poured counterpart, will top all other castables in resistance to erosion — whether from dust erosion, rubbing, or heavy impact.

GREENCAST-94 GR is recommended where high temperature, chemical purity, or abrasion and erosion is a factor. Secondary reformers for ammonia producing plants having high hydrogen atmospheres and high temperatures where silica is reduced to silicon monoxide or dissolved by steam are places it will perform best. Shipped in 100-pound bags. 160 pounds required per cubic foot.

**GREENCAST-97 GR** — GREENCAST-97 GR is almost identical with its poured companion product, GREENCAST-97, except that it was designed exclusively for gunning and thus has low rebound loss. This is a 97% tabular alumina castable for those temperatures too high for other types of castables . . . as high as 3400°F. In addition, it has unparalleled purity, making it especially good in resistance to carbon monoxide disintegration.

GREENCAST-97 GR does not have the extreme spalling sensitivity of most products of its type and thus can be brought up to operating temperatures fairly rapidly as compared to others in its class. GREENCAST-97 GR also can withstand the severe thermal shock of furnaces operating at high temperatures being heated and cooled rapidly.

Shipped in 100-pound bags. 160 pounds required per cubic foot.

**MIZZOU GR** — MIZZOU GR is an old stand-by — MIZZOU CASTABLE — with the added advantage of low rebound for pneumatic placement. MIZZOU GR features low iron content, good slag resistance, and excellent volume stability . . . plus a high alumina content that makes it a true 3000°F. product.

MIZZOU GR has all the properties of a high alumina castable plus the ability to be installed by gunning. This allows quick installations and/or repairs with a minimum of downtime. Recommended for high temperature atmospheric work such as carbon monoxide boilers, blast furnace stacks in the lower portion of the hearth and bosh sections, combustion chamber walls for blast furnace stoves, ammonia plant secondary reformer linings up to 2300°F., vertical lime kiln repairs, and aluminum melting furnace maintenance. It is shipped in 100-pound bags. 140 pounds required per cubic foot.

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## CASTABLES

**STEELKON GR** — STEELKON GR is a 2800°F. castable developed primarily for use as a gun applied blast furnace patching material . . . especially for the bottom of the furnace to a point one-third of the way up the stack.

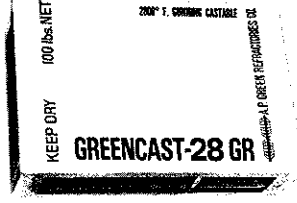
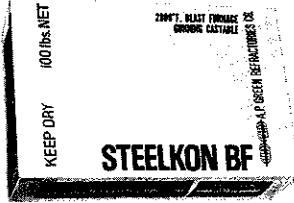
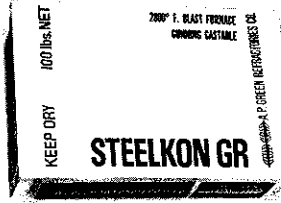
It is highly refractory, strong, and has good abrasion resistance. STEELKON GR also demonstrates good permanent volume characteristics and, due to its low iron content, is capable of withstanding carbon monoxide atmospheres. Shipped in 100-pound bags, 130 pounds required to pour one cubic foot.

**STEELKON BF** — STEELKON BF is a 2800°F. castable with all the properties necessary in an outstanding gun applied blast furnace material. It can be used throughout the furnace but is specifically designed for use in the bosh and lower stack.

STEELKON BF has low rebound and demonstrates excellent ability to withstand the carbon monoxide atmosphere found in blast furnaces. It is particularly strong and has good abrasion resistance, enabling it to withstand the severe physical abuse and shock of the charge. Shipped in 100-pound moisture-resistant bags. 133 pounds net required to gun one cubic foot.

**GREENCAST-28 GR** — GREENCAST-28 GR is a 2800°F. gunning refractory with properties slightly less admirable than those of STEELKON GR but with some big pluses. In rebound tests against comparable products, it has proved lowest in rebound loss . . . meaning less material to fill out a wall. It has outstanding resistance to carbon monoxide disintegration and above average strength.

GREENCAST-28 GR is ideal for gunning blast furnace stacks, hot metal mixers, iron ladles, and all types of moderate-temperature patchwork around steel mills. Shipped in 100-pound bags. 123 pounds required to gun one cubic foot.

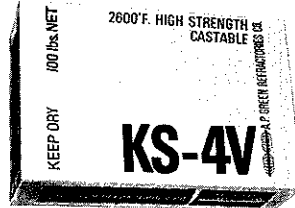




## GUNNING

**KS-4V** — KS-4V was developed specifically for patching linings in the upper portion of blast furnaces. It is highly abrasion resistant . . . will not fail due to abrasion caused by the movement of the charge down the stack. It is permanent in volume . . . will not shrink in massive patches such as is normal in repairing blast furnace linings. It is highly refractory . . . a maximum service temperature of 2600° F., plus resistance to vitrification, enables KS-4V to withstand blast furnace temperatures in this zone without failure.

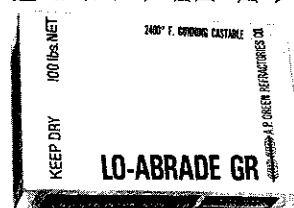
In addition, KS-4V withstands carbon monoxide atmospheres to which it is subjected in this type service. Another property which makes KS-4V an exceptional product for blast furnace linings is its excellent adhesiveness and plasticity . . . a necessity in gunning heavy sections with a minimum rebound loss. In difficult spots where gunning is not possible, KS-4V also can be poured satisfactorily. Shipped in 100-pound bags, 125 pounds required to gun one cubic foot.



**LO-ABRADE GR** — LO-ABRADE GR is a 2400° F. hydraulic-setting, erosion and abrasion resisting castable designed specifically for gunned linings. LO-ABRADE GR can be gunned with very low rebound loss while retaining the fine properties of the conventional poured product, LO-ABRADE.

It is especially recommended for those applications with high velocity, dust-laden gases at high temperatures where severe erosion is experienced; impingement areas of BOF quenching towers; fluid catalyst unit transfer lines, cyclones, slide valves, and stacks. It also has been used as a patching refractory in firing hoods of rotary phosphate calcining kilns with good success.

LO-ABRADE GR is shipped in 100-pound bags, 130 pounds required per cubic foot.

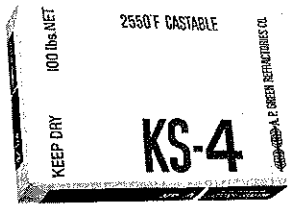


STEELKON is ideal for patching blast furnace linings.

## CASTABLES

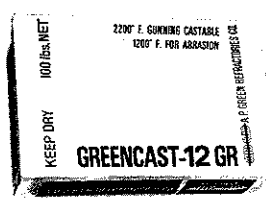
**KS-4** — KS-4 is a dense, strong castable refractory scientifically compounded for use in applications up to 2550° F. KS-4 was developed primarily for gun application; however, it also works well when troweled or poured. It has a sticky, adhesive quality that means low rebound loss when gunned — smooth workability when poured.

KS-4 combines high strength with good abrasion resistance. It is especially effective in installations involving large areas and relatively thin linings . . . providing a heat and wear-resistant wall with balanced properties. It is the ideal product for catalytic regenerator linings, stack linings, bubble towers, and duct linings exposed to abrasion or corrosion. Gunning of KS-4 greatly reduces installation time and labor costs . . . lowers construction costs by eliminating forms. 121 pounds necessary per cubic foot when gunned into place. Shipped in 100-pound bags.

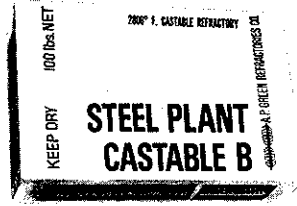
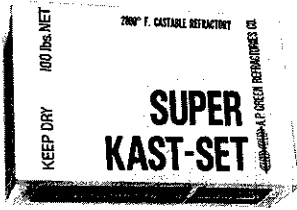


**GREENCAST-12 GR** — GREENCAST-12 GUNNING REFRACTORY is a high strength, hydraulic-setting refractory castable for withstanding severe abrasion at temperatures up to 1200° F. It is a companion product to GREENCAST-12 . . . designed specifically for application in relatively thin linings (1" to 3") by means of a pneumatic gun.

The outstanding feature of GREENCAST-12 GUNNING REFRACTORY is its resistance to conditions of severe abrasion or erosion. It also has extremely high strength in the lower temperature ranges (up to 1200° F.) . . . as much as two to four times the strength of many regular castables used for gun application. Strength and abrasion resistance drop off rapidly above 1200° F., but it may be used up to 2200° F. in applications where abrasion is not a factor. It also possesses the ability to withstand carbon monoxide disintegration. Shipped in 100-pound bags, 122 pounds required per cubic foot in place.



**GENERAL PURPOSE**



**CASTEX 25 C** — Castex 25 C is a 2500° F. general purpose refractory castable. CASTEX 25 C can be used in poured or gunned applications. It has low shrinkage and good strength. Shipped in 100-pound bags. 120 pounds required per cubic foot-net when poured, 122 when gunned.

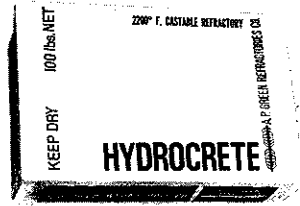
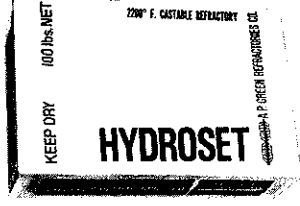
**SUPER KAST-SET** — SUPER KAST-SET is a 2800° F. general purpose castable refractory which has excellent resistance to vitrification even at its maximum temperature . . . assuring effective and economical service in installations where excessive temperatures frequently cause premature failure of castables.

SUPER KAST-SET has good strength, negligible shrinkage, high refractoriness, and resistance to vitrification. It also has good resistance to moderate abrasion. Available in 100-pound multi-wall bags. 122 pounds required to pour one cubic foot.

**STEEL PLANT CASTABLE B** — STEEL PLANT CASTABLE B is a hydraulic-setting, general purpose castable refractory designed primarily for use in steel plants. It may be used for temperatures up to 2800° F. either in direct contact with flame or as a high temperature back-up for other refractories. This product demonstrates exceptional hot load bearing properties, making it ideal for a variety of uses within steel plants. Shipped in 100-pound bags. 122 pounds required to pour one cubic foot.

**CASTEX 24 C** — CASTEX 24 C is a 2400° F. general purpose refractory castable. It can be poured or gunned with excellent results. Shipped in 100-pound bags. 115 pounds required per cubic foot-net whether poured or gunned.

**CASTABLES**



**KAST-SET** — KAST-SET has proved to be an outstanding, general purpose castable for pouring special shapes and complete monolithic linings in applications requiring a material that will withstand temperatures to 2700°F. KAST-SET can be used in direct contact with flame up to its maximum service temperature. It has the necessary permanent volume characteristics and strength to produce a stable lining for long service. Its negligible shrinkage eliminates cracks which waste fuel and reduce furnace efficiency.  
Shipped in 50- and 100-pound bags. 115 pounds required to pour one cubic foot.

**HYDROSET** — HYDROSET is recommended for poured monolithic construction at all temperatures up to 2200°F. When temperatures do not exceed this maximum, HYDROSET provides a more economical refractory lining than castables with higher temperature limits. HYDROSET is a very durable material and has good resistance to abrasion and moderate resistance to carbon monoxide disintegration. It is well adapted for applications requiring resistance to mechanical abuse up to 1200°F. Shipped in 100-pound bags. 125 pounds required per cubic foot.

**HYDROCRETE** — HYDROCRETE is a 2000°F. castable refractory originally developed to anchor wear plates in blast furnaces . . . an application requiring high strength to withstand the mechanical abuse transmitted to it by the charge hitting against the wear plates and the ability to withstand carbon monoxide atmospheres. With these good properties, it has proved to be an excellent backing-up material between firebrick and the blast furnace shell and in other types of applications such as hot blast ducts. Shipped in 100-pound bags. 120 pounds required per cubic foot.

**CASTITE** — CASTITE is a medium grained, general purpose castable that provides an economical refractory lining for withstanding temperatures to 2550° F. It has the necessary permanent volume characteristics and strength to produce a stable monolithic lining. Shipped in 100-pound bags. 115 pounds required per cubic foot-net.

GREEN CRETE C STANDARD is produced at Tarentum, Pennsylvania, a plant devoted exclusively to the manufacture of high quality basic refractories.

## BASIC CASTABLES

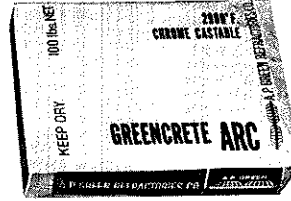
**GREEN CRETE C SUPER** — GREEN CRETE C SUPER is a super grade chrome castable developed to extend the refractory utility of GREEN CRETE C STANDARD. It can be used for temperatures up to 3000° F. This greatly increased refractoriness gives extra resistance to vitrification and assures greater volume stability at excessive temperatures.

Rigid quality control assures a balance of properties that gives confidence to the furnace designer for specifying in those "tough" applications where standard products do not offer maximum economy. Shipped in 100-pound bags. 175 pounds required per cubic foot.

**GREEN CRETE C STANDARD** — GREEN CRETE C STANDARD is a chrome castable refractory developed for temperatures up to 2700° F. It is manufactured from high quality chrome ores. Rigid specifications in raw material selection and in every step of manufacturing assures high refractoriness — resistance to vitrification and spalling — resistance to abrasion — and negligible shrinkage even at maximum operating temperatures.

This optimum balance of properties assures ease of installation, long life and low refractory costs under a wide variety of refractory service conditions. Shipped in 100-pound bags. 167 pounds required per cubic foot.

**GREENCRETE ARC** — GREENCRETE ARC is a strong chrome castable especially developed to withstand erosion and abrasion. It shows very low shrinkage at temperatures as high as 2900° F., giving improved lining stability and a wide safety range from a refractoriness standpoint. Hard chrome ore is properly grain sized and combined with a strong binder to give GREENCRETE ARC the super strength needed to resist the bombardment of catalysts or fluidized charges in the petroleum, petrochemical, chemical, and metallurgical industries. Where very severe abrasion is a problem, this product is the answer. Shipped in 100-pound bags. 172 pounds per cubic foot required.



## Castable Refractories

### INSULATING CASTABLES . . . GENERAL PURPOSE

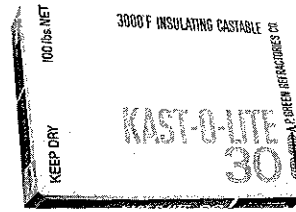
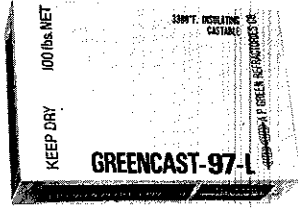
**GREENCAST-97-L** — GREENCAST-97-L is a lightweight, bubble-type castable refractory for use at temperatures too extreme for other insulating castable materials. With a maximum service temperature of 3300° F., this product will give excellent protection in applications formerly thought "too hot" for an insulating material. GREENCAST-97-L is made of pure alumina bubbles . . . forming many air spaces for efficient insulation and adding the high temperature strength and refractoriness of alumina.

GREENCAST-97-L has high resistance to carbon monoxide disintegration and is extremely strong for an insulating castable. It is easy to mix and use . . . pours like structural concrete. Shipped in 100-pound, moisture-proof bags. 85 pounds required to pour one cubic foot.

**KAST-O-LITE 30** — KAST-O-LITE 30 is a 60% alumina, 3000°F. insulating castable featuring unusually high strength. The scientific blending of alumina, insulating aggregate, and a high purity binder give this product remarkable properties: the ability to withstand direct exposure to flame and furnace gases up to 3000°F.; extremely low thermal conductivity for a high temperature insulating product; and outstanding strength.

KAST-O-LITE 30 is an excellent back-up material for high temperature brick such as extra high alumina and mullite. It also has definite application in such areas as air heaters, furnace door linings, soaking pit covers, over-the-road aluminum transfer ladles, and as sub-bases on high temperature tunnel kiln cars.

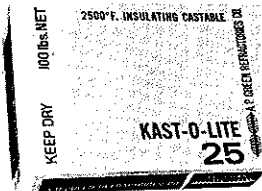
KAST-O-LITE 30 is shipped in 100-pound bags, 90 pounds required per cubic foot.



**INSULATING CASTABLES . . .**

**KAST-O-LITE 25**—KAST-O-LITE 25 combines insulating properties with light weight and strength in one dependable, easy-to-use castable refractory. It will withstand direct exposure to flame and furnace gases at temperatures up to 2500° F. and takes the place of a lining composed of heavy firebrick backed up with block insulation. Thus, one material does two jobs.

KAST-O-LITE 25 can be poured or gun applied. Lightweight linings of KAST-O-LITE 25 afford faster heating and cooling, better combustion, less heat loss, and more even heat distribution. With fewer joints than firebrick linings, air infiltration is reduced to a minimum—increasing operating efficiency. The conductivity of KAST-O-LITE 25 is approximately 30% that of an equal thickness of firebrick. Light weight and low conductivity make it an ideal material for furnaces where uniform temperature, low heat loss, and a rapid heating cycle are required. Shipped in 100-pound bags, 82 lbs. per cubic foot required when poured, 92 lbs. when gunned.



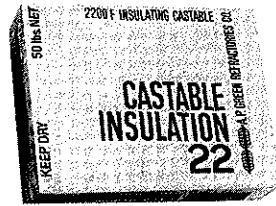
**CASTABLE NO. 22** — CASTABLE NO.

22 is an extremely lightweight insulating castable capable of withstanding temperatures up to 2200° F. Outstanding features, other than good refractoriness and low thermal conductivity, are excellent strength for such a lightweight material and low shrinkage.

CASTABLE NO. 22 has excellent properties. It has a modulus of rupture of 70-100 Psi and a cold crushing strength of 200-300 when heated to 2000° F. and then cooled, and a "K" factor of 1.89 at a mean temperature of 1600° F.

It is recommended for those applications where a 2200° F. material with low thermal conductivity could be used to advantage: Oil stills and heaters, lightweight panel construction, complete monolithic linings, flue and duct linings and as a high temperature back-up material in a multitude of applications.

CASTABLE NO. 22 is shipped in 50-pound bags. 50 pounds required per cubic foot.



CASTABLE INSULATION NO. 20 has proved highly successful in pouring precast panels for oil heater installations.

**General Purpose (Cont'd)**

**CASTABLE INSULATION NO. 20** — CASTABLE INSULATION NO. 20 is a hydraulic-setting castable insulation for use at temperatures up to 2000° F. in direct contact with flame without excessive shrinkage or loss in thermal efficiency. Outstanding features include good strength and low thermal conductivity for a lightweight material.

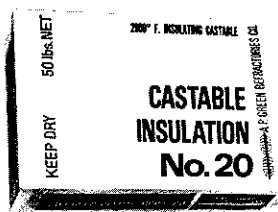
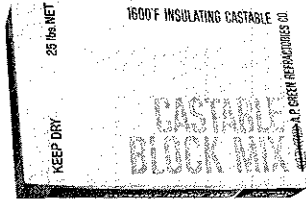
It is recommended for complete monolithic linings or lightweight panel construction for industrial furnaces, oil stills and heaters, and flue or duct linings. Also used as a high temperature backing-up insulation for hearths, car tops, and arches. It has a modulus of rupture (dried) of 150 lb./sq. in. and a "K" factor of 2.01 at 1200° F. Shipped in 50-pound multi-wall, moisture-resistant bags. 55 pounds required to pour one cubic foot.

**CASTABLE BLOCK MIX** — An extreme-

ly lightweight castable insulation for temperatures up to 1600° F. . . either in direct contact with furnace atmosphere or behind other refractories. When mixed with water and poured or tamped into place, it has about the same insulating value, weight, and strength as block insulation.

CASTABLE BLOCK MIX has an exceptionally low thermal conductivity . . . lowest of any product in the A. P. Green family of castables. One inch of CASTABLE BLOCK MIX is the equivalent of 12 inches of firebrick as a heat insulator. The "K" factor is only .46 Btu/sq. ft./hr./° F./in. at 500° F.

Low initial cost, high coverage, and ease of installation make CASTABLE BLOCK MIX the most economical insulation possible for boiler top decks, drum coverings, and furnace arch insulation. Shipped in 25-pound, multi-wall bags. Only 21 pounds needed to pour one cubic foot.

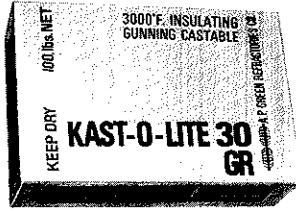
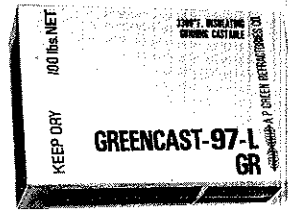


INSULATING CASTABLES . . .

**GREENCAST-97-L GR** — GREENCAST-97-L GR is a bubble alumina insulating castable with a maximum recommended temperature of 3300°F. It has low silica, light weight, good strength, high refractoriness, the ability to withstand hydrogen and steam, resistance to carbon monoxide disintegration, and low rebound loss when gunned.

It is ideal for gunning secondary reformers in ammonia plants. Other applications include those spots requiring a gunned product in low to medium temperature areas where low silica or very high purity is necessary. GREENCAST-97-L GR can be used in applications with temperatures ranging up to 3300°F. . . . the result of its very low silica and impurity content. For most high temperature applications GREENCAST-97-L GR is recommended due to the need for a thicker lining than is desirable with a gunned product. Shipped in 100-pound bags. 105 pounds required per cubic foot for gunning.

**KAST-O-LITE 30 GR** — KAST-O-LITE 30 GR is a 3000°F., 60% alumina insulating castable combining light weight, strength and gunning properties. It is an outstanding product for those applications where a gun applied insulating castable is needed for high temperature service. Its light weight, combined with its low thermal conductivity, makes it an excellent product where uniform temperatures, low heat loss, and a rapid heating cycle are required. The low thermal conductivity of KAST-O-LITE 30 GR affords faster heating and cooling, better combustion, less heat loss, and more even heat distribution. A 60% alumina content gives it the ability to withstand direct exposure to flame and gases to 3000°F. An iron content of less than 1% gives it high resistance to carbon monoxide disintegration. Shipped in 100-pound bags. 97 pounds required per cubic foot.

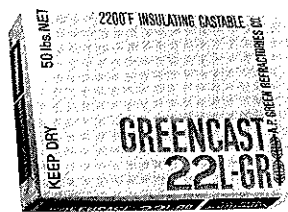


GUN APPLIED

**GREENCAST-22-L GR** — GREENCAST-22-L GR is a gunnable, 2200°F. insulating refractory castable which has excellent insulating properties, good erosion resistance, extremely low rebound, and low shrinkage.

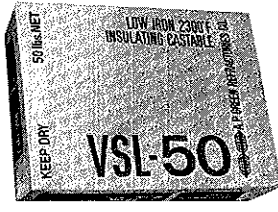
The low weight and low rebound of this product means more area per bag on the furnace wall . . . a better wall at a lower cost per ton. Another big plus for GREENCAST-22-L GR is its constant uniformity. From one bag to one carload there are no variations in properties. Bag to bag, year to year, it will provide the same consistently long, efficient service.

GREENCAST-22-L GR is shipped in 50-pound bags. 80 pounds per cubic foot required.



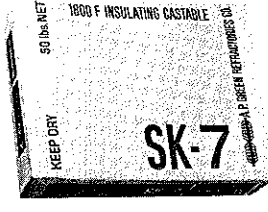
**VSL-50** — VSL-50 was developed specifically for applications requiring a product with low iron content and for use in highly reducing atmospheres. It has a maximum service temperature of 2300° F.

This product was originally created for use in catalytic reformers which required a product with less than 1% iron content to avoid poisoning the catalyst. Because of its ability to withstand atmospheres containing carbon monoxide and high percentages of hydrogen, its use has spread to other applications requiring a high purity material. Lightweight (57 pounds when gunned, 50 when poured) and high insulating efficiency assure an economical lining. Shipped in 50-pound bags.



**SK-7** — SK-7 is recommended for temperatures to 1800° F. Specifically designed for pneumatic gun application, it has low rebound loss. SK-7 also works well for troweling and pouring. Weighs only 55 pounds per cubic foot when gunned into place . . . resulting in low construction costs, low thermal conductivity, and high operating efficiency.

It is especially adaptable to installations involving large areas with relatively thin linings, such as: stack linings, breechings, catalyst regenerators, reactors, and other large vessels in the petroleum and chemical industries. Shipped in 50-pound bags.



## GUNWELD

### An outstanding product line of Hot or Cold Plastic Gunning Materials

The GUNWELD line consists of 90%, 70% and 50% alumina plastic gunning materials for repairs or complete furnace linings. Their high alumina content enables them to give outstanding service at high temperatures and in applications where service conditions are severe.

GUNWELD products have all the outstanding characteristics of regular high alumina plastics installed by conventional ramming procedures . . . plus, they can be easily gunned onto either hot or cold surfaces with low rebound loss. They are ideal for making hot repairs to prolong campaign life. Maintenance with GUNWELD refractories is fast and economical with a minimum of downtime and labor.

GUNWELD-90, -70, and -50 are extremely versatile . . . can be used with equal success for repairs to fireclay, silica, and high alumina.

- **High alumina for extreme temperatures and severe conditions.**
- **Adheres to hot or cold surfaces with low rebound.**
- **Fast installation cuts downtime and labor costs.**

**GUNWELD-90 . . . 90% Alumina, 165 pounds required per cubic foot.**

**GUNWELD-70 . . . 70% Alumina, 155 pounds required per cubic foot.**

**GUNWELD-50 . . . 50% Alumina, 140 pounds required per cubic foot.**

All GUNWELD refractories are shipped in 100-pound, moisture-resistant bags.

GUNWELD-90, -70, -50 are used in:

- Coreless Induction Furnaces
- Rotary Drum Furnaces
- Soaking Pits
- Malleable Air Furnaces
- Direct Arc Furnaces
- Reheat Furnaces
- Billet Heating Furnaces
- Aluminum Reverb Furnaces
- Slab Heating Furnaces
- Hot Metal Transfer Cars
- Glass Furnaces
- Oil Heaters
- Forge Furnaces
- Heat Treating Furnaces
- Rotary Kiln Firing Hoods
- Carbon Baking Furnaces
- Holding and Transfer Ladles
- Boilers
- Incinerators

For Further Information, Contact Your Nearby A. P. Green Representative.

## PETROCRETE-ER

### Chemical Setting, Erosion Resistant, Refractory Mix

PETROCRETE-ER is a dual bonded, high strength, erosion resistant refractory mix developed especially for those highly abrasive applications in the petroleum and petro-chemical industries.

PETROCRETE-ER can be troweled or tamped into place. It is used primarily with hexagon steel mesh, either in new installations or as maintenance material. Shipped in 100-pound bags. 130 pounds required per cubic foot-net.



### OUTSTANDING CHARACTERISTICS

**ABRASION RESISTANCE . . .** A hard, dense fireclay aggregate helps PETROCRETE-ER develop outstanding abrasion and erosion resistance. It has a recommended service temperature of 1700° F. for use in highly abrasive areas and a maximum recommended temperature of 2300° F. where temperature is the only destructive force.

**UNIQUE DOUBLE BOND . . .** PETROCRETE-ER is the only dual bonded refractory mix of its type which is available in a single container . . . no mixing of two materials. This unique, high purity bonding system combines two bonding agents that produce a chemical bond for added strength. The controlled setting rate allows a practical length of time to install the material. PETROCRETE-ER allows 2½ hours at 70° F. from the time the water is added to completing the installation. As with all chemical reactions, the chemical setting of PETROCRETE-ER proceeds more rapidly at higher temperatures, but still allows one hour before setting when the material is mixed at 100° F. Special mixing instructions are supplied. PETROCRETE-ER mixes to a smooth troweling consistency, easy to work with and having excellent adhesiveness for sticking to spalled areas.

**LOW SHRINKAGE . . .** PETROCRETE-ER's unique bond and good grain sizing are the reasons for its low rate of shrinkage. In the A.S.T.M. permanent linear change test, PETROCRETE-ER showed only 0.4% shrinkage when heated to 1500° F. and then cooled.

### TYPICAL APPLICATIONS

Transfer lines and ducts	Cyclones	Vessels and Vessel Internals
Catalyst carrying lines	Dust Collectors	Slide valve areas of cat crackers
Other fluidized and moving bed process units	Charging Hearths	Baffle plates
	Stacks	Heat treating furnaces



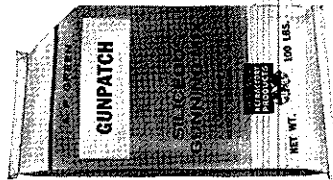
## GUNPATCH

GUNPATCH is a special siliceous mix manufactured from extremely high grade quartz pebbles and sized quartz sands. It has proved especially successful for patching cupolas and blast furnace iron ladles. GUNPATCH forms a glazed, vitrified surface layer that has good resistance to both the erosion and chemical attack of iron and slag.

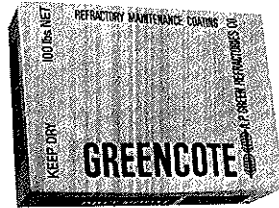
Some of the principal advantages of GUNPATCH are:

1. EXTREME UNIFORMITY — no variations from shipment to shipment, speeds up application, gives a better installation.
2. EXCELLENT BURN IN AND GLAZING — develops a ceramic bond further back in the lining enabling it to cure trouble spots. Does not tend to slab off in service.
3. LOW REBOUND — reduced rebound loss cuts waste.
4. WITHSTANDS ATTACK OF IRON AND SLAG.
5. REDUCES LABOR COSTS.

GUNPATCH can be furnished in either coarse or fine grain sizes. Packed in 100 lb. bags.



## GREENCOTE



A. P. Green GREENCOTE is a refractory maintenance coating for reconditioning furnace linings. GREENCOTE is easily applied by either spraying or troweling. An A. P. Green PERFECTO SPRAY GUN (page 93) will add greatly to the ease and economy of application although a satisfactory coating can be obtained by troweling.

GREENCOTE may be used as a protective coating over new brickwork or for filling and smoothing up badly spalled or slagged sections of old refractory walls. Regular and systematic application of GREENCOTE compensates for uneven erosion and permits building up of the areas where wear is most severe.

GREENCOTE is shipped dry, in 100-lb. bags and is not affected by exposure to air or moisture. Mixing instructions are on each bag. 100 pounds of GREENCOTE will coat approximately 45 square feet  $\frac{1}{4}$ -inch thick.

## A. P. GREEN RAMMING MIXES

### A QUALITY FOR ALL INDUSTRIAL USES

Based on many years experience in the manufacture of refractory specialties, the A. P. Green Company has developed a line of ramming mixes unavailable from any other single source.

These products combine the advantages of easy installation, joint free surfaces, adaptability, high refractoriness and freedom from shrinkage. Green Company ramming mixes include silica, magnesia, mullite, silicon carbide, extra high alumina, zircon, and magnesia-alumina.

For estimating data on A. P. Green Ramming Mixes see page 205.

### A. P. GREEN RAMMING MIXES

BRAND	DESCRIPTION
DAUBPAX	Silica Base
GRAPHIRAM	High Alumina Graphite
GREEN RAM SUPER	Magnesia (High Purity)
GREENRAM-80	80% Alumina, Dry, Heat-Set
GREENRAM-87-W	87% Alumina, Wet, Heat-Set
GREENRAM-90-W	90% Alumina, Wet, Heat-Set
GREEN TARAM 60	Magnesia-Dolomite, Pitch Bonded
GREENRAM-SC	High Quality Silicon Carbide, Dry, Heat-Set
GREENRAM-ZP	Zircon, Wet, Mild Heat-Set
GREENRAM-MA	Magnesia Alumina, Dry, Heat-Set