

REFRACTORIES and INSULATIONS



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EXHIBIT

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REFRACTORY & INSULATION CORPORATION
100 WALL STREET, NEW YORK, N.Y.

CE0114138

CE/HI (F) 33203

Foreword

Founded a quarter century ago, the Refractory and Insulation Corporation has been constantly developing refractory and insulating materials of superior quality, utility and efficiency to meet the changing requirements of the many industries it serves.

IN THE REFRACTORY FIELD, this Company originated and manufactured the first castable refractory cements, expanding their volume from a small quantity to the large tonnage now being used in modern furnaces, steam generators and coke oven plants, always meeting the new operating conditions set up by changing designs in equipment.

Other refractory products, such as Super Bonding Cements and Chrome Base Cements have been developed through field contact of R & I sales engineers with heat generating problems and backed by careful laboratory research to meet the conditions presented by industry.

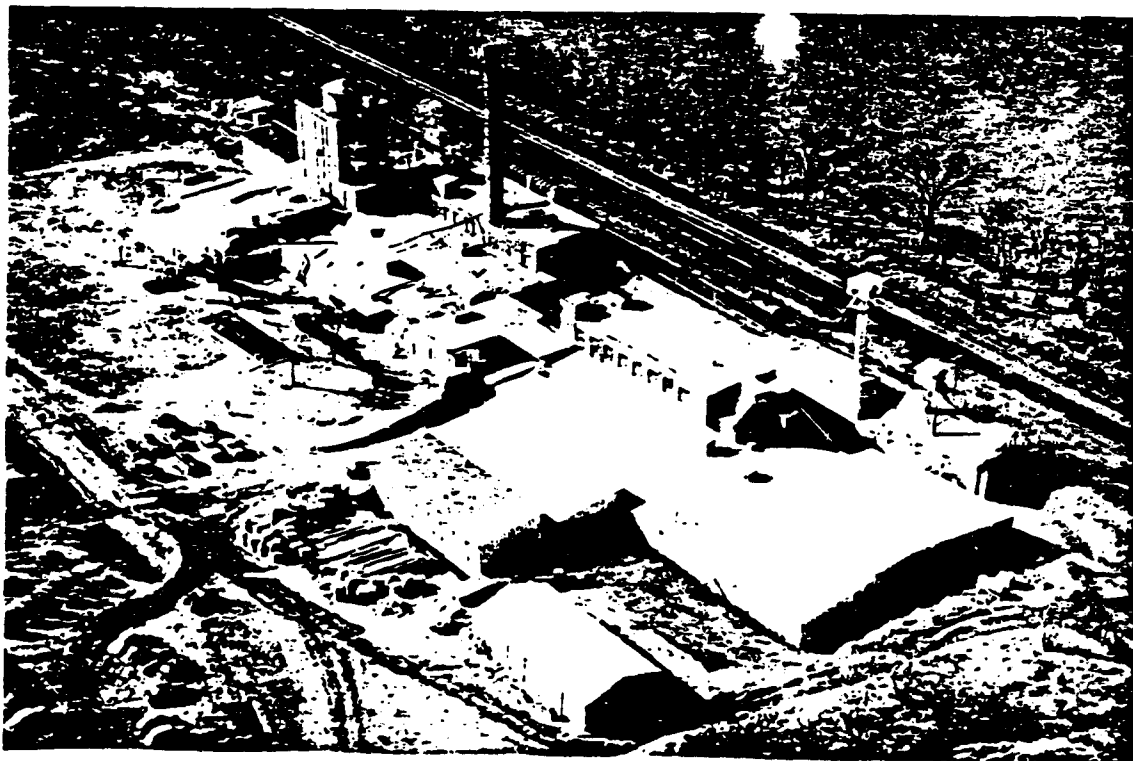
IN THE INSULATION FIELD, the same cooperative, on-the-spot engineering investigation, laboratory studies and practical production methods have resulted in such products as Monolithic Insulations, Water-Resistant High Temperature Block and Intermediate Type Insulating Block, which eliminate the need for double layer construction. Castable, pouring, filling and plastering type insulations are also manufactured to meet growing and ever changing requirements.

New and improved types of R & I Refractories and Insulations have aided materially in the development of the modern steam generating units, from small boilers to large power steam units in the million pound unit class now used in the larger plants.

Our large plant at Port Kennedy, Pa., with its modern production, handling and storing equipment makes R & I an important, assured and ready source of supply for refractory and insulation products of uniform high quality.

It is the purpose of this catalog to help you select materials that will best serve your requirements.

Where unusual conditions prevail, R & I technical facilities and engineering information are available to help solve your refractory and insulation problems.



Aerial view of Refractory & Insulation Corp. plant at Port Kennedy, Pa.

CE/HI (F) 33204

CE0114139



Manufactures

REFRACTORY MATERIALS

	Catalog No.		Catalog No.
Castable Cements		Bonding Cements	
Moldit-A	R-52A	#3000 Cement (Air Setting)	R-53B
Moldit-D	R-52A	Super #3000 (Air Setting)	R-53A
Moldit Pier	R-52A	Recco (Air Setting)	R-53B
Super Moldit	R-52A	Jamb Patch (Air Setting)	R-53B
Moldit-HT	R-52A	Fire Check (Heat Setting)	R-55
Moldit-B	R-52A		
Light Weight Moldit #80	R-52A		
Light Weight Moldit #55	R-52A		
Light Weight Moldit #35	R-52A	Ramming Type Refractories	
Moldit Chrome	R-54	Super Plastic Fire Brick	R-59
Hy-Temp Flexible Cement	R-56	Plastic Chrome	R-59
Special Precast Refractory Shapes	R-58		

INSULATING MATERIALS

Blocks and Blankets		Fill Insulations	
#14 and 18 Insulating Block	I-86	Pakinsul Mineral Wool Mixture	I-92
Mineral Fibre Insulating Blankets	I-87	Loose Wool	I-92
Inside Duct Lining	I-91	Mix A, B and C Dry Filler	I-92
"Krack-Pruf" Combination Insulation	I-92	Expansion Joint Caulking Material	R-56
Plastic Heat Insulations		Electrical Insulation	
Stic-Tite Insulating Cement	I-88	Condu-Seal Cable Packing	I-93
Super Finish Stic-Tite Insulating Cement	I-89	Surface Protective Coatings	
Block-Stick	R-56	Weatherkote Asphaltic Finish	I-89
Air-Check Cement	R-56	Mastic Coating for Refractories & Insulations	R-56

GUARANTEES

Refractory & Insulation Corporation makes every effort to furnish only products of the highest quality, best suited for the purpose for which they are intended. These products require care and skilled knowledge in their selection, handling, application and use.

While the experience and counsel of its engineering and sales staff are always available, Refractory & Insulation Corporation assumes no responsibility for selection, handling, application or use of its products and no performance guarantees are made.

No understandings, agreements or representations with respect to any of its products are binding, unless in writing and signed by an officer of the Corporation.

CE/HI (F) 33205

* Catalogs are filed in numerical order according to the number to be found in the lower right-hand corner on the first page of each catalog.

CE0114140



CASTABLE REFRACTORY MATERIALS

MOLDIT REFRACTORY CEMENTS

*for Monolithic Linings, Facings and Refractory
Shapes of Any Size*

A complete line of dry, fine granular, hydraulic setting materials of outstanding quality for molding monolithic refractory construction and casting shapes of all types such as burner blocks, furnace tile, etc.



Moldit Refractory Cements, when mixed with water to proper consistency, can be poured like ordinary concrete into any monolithic shape, or shoveled, tamped, or shot into place with a cement gun. No pounding or ramming is necessary. Because of their uniform fine grain size, Moldits are ideal for precasting into special shapes of tile, blocks or other simple or complicated sections. They are suitable for smooth surface troweling, and for numerous delicate patching jobs.

Moldit refractory, cast into place, actually cost considerably less than fire brick construction. Moldit construction can be prepared and applied at the point

of installation. No expensive fire clay shapes are necessary, nor is there need to wait for their special manufacture and delivery. No inventory need be carried of those special shapes which may be used only irregularly. It takes less time and labor to install Moldit. Any replacement or repair can be made and equipment put back into service in less than 24 hours.

STRONG — HARD — IMPERVIOUS HEAT-RESISTANT

R & I Moldit Cements are uniformly prepared dry, granular mixtures of alumino-silicate base materials which when mixed with water and cast, "air set" to burned refractory hardness. They set sufficiently hard in about 4 to 12 hours at ordinary temperatures. "Baking out" to prevent shrinkage or disintegration is unnecessary. Since Moldit Refractory Cements "air set," they have high strength at low temperatures. Furthermore, they do not spall due to temperature changes or rapid cooling. Moldit surfaces are entirely water-resistant, and may be readily sprayed or washed for long periods without disintegration.

Furnace linings built from Moldit refractories have about twice the insulating value of fire brick or fire clay linings. They are also lighter and have lower coefficients of expansion. Hence they can be used in somewhat thinner sections, thereby effecting worthwhile economies.



Special shapes of all sizes can be made quickly and easily.

REFRACTORY & INSULATION CORPORATION

MANUFACTURERS OF REFRACTORY BONDING AND CASTABLE CEMENTS, INSULATING BLOCK, BLANKETS AND CEMENTS

120 WALL STREET

NEW YORK 5, N. Y.

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OFFICES

327 So. La Salle St.
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Commercial Trust Bldg.
Philadelphia 2, Pa.

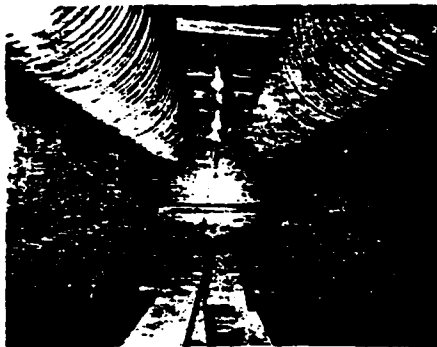
1001 Broad St.
Newark 2, N. J.

1836 Euclid Ave.
Cleveland 15, Ohio

Catalog No. R-52A



Cement gun applicator shooting R & I Moldit-D in place in ash hopper of large public utility boiler.



Aspitt of large boiler with walls completely "gunned" with R & I Moldit D.



Moldit-A used to line these coke oven stand-pipes—still in good service after 18 years.



Coke oven door lined with blocks made of R & I Moldit Pier Cement. Moldit block doors of this type last three to four years - and even longer.

PROPERTIES OF MOLDIT

The user is not limited to one type of Moldit Refractory Cement. There are seven different Moldits, each possessing special advantages as to physical characteristics, workability, density and durability with respect to particular applications. The following table shows the wide range of properties offered by the Moldit family:

Product	Fusion Point	Working Qualities	Storage of Dry Material	Installed Weight
Moldit-A	2552°F.	Smooth, trowels well, pours well. O.K. to use with cement gun.	6 months maximum	108# cu. ft.
Moldit-D	2552°F.	Very smooth, trowels very easily. Pours well. O.K. to use with cement gun.	8 months maximum	115
Moldit Pier	2450°F.	Same as Moldit-A.	6 months maximum	108
Super Moldit	2900°F.	Same as Moldit A. O.K. to use with cement gun.	4 months maximum	112
Moldit-HT	3092°F.	Use for casting sections over 3" thick. Trowels well.	3 months maximum	120
Moldit-B	2552°F.	Trowels and pours well.	6 months maximum	110
Light-Weight Moldit #80	2462°F.	Trowels well; with 33% water will go through 1.8 lath and stick to itself. O.K. to use with cement gun.	4 months maximum	80
Light Weight Moldit #55	2345°F.	Trowels well. Can be poured or gunned.	4 months maximum	55
Light Weight Moldit #35	2280°F.	Trowels well. O.K. to use with cement gun.	1 months maximum	35

Product	Crushing Strength on Cylinders (p.s.i.)	Modulus of Rupture When Fired and Cooled at °F. (p.s.i.)				
		Cured	1000	1500	2000	2400
Moldit-A	3100	1150	725	720	645	2280
Moldit-D	3600	1450	1050	980	930	2580
Moldit-HT	1300	850	705	690	310	950
Super Moldit	800	750	400	350	620	1400
Light Weight Moldit #80	760	310	222	361	336	—
Light Weight Moldit #55	160	305	150	175	275	—
Light Weight Moldit #35	145	170	90	95	100	—

SIMPLE CASTING PROCEDURE

Complete instructions for mixing are printed on colored tags attached to each bag of Moldit Cement. Water must be added slowly while continuously mixing with a shovel or hoe. Moldit which has been mixed with water and allowed to partially set should never be used.

Since the actual hardening of Moldit depends on chemical combination of water with the dry constituents, proper conditions of moisture must be maintained. Therefore, care must be taken to prevent rapid evaporation of water while the mixture is setting in the mold. In the case of a dry atmosphere or where an individual casting or patched area has a large surface area exposed to the atmosphere, sufficient moisture for hardening may be assured by one or more of the following methods:

By placing the mold in a room or chamber with a humid atmosphere.

By covering the mold with waxed paper or other suitable covering.

By spraying water on the exposed surface just enough to counteract the deficiency caused by evaporation.

Temperature is an important factor in determining the time required for hardening of Moldit to maximum strength. At ordinary

room temperature (60-75°F.), curing or hardening proceeds satisfactorily. At lower temperatures the time of hardening is greatly increased. The thinner the cast section, the longer is the time required for strength sufficient for handling. While thick, massive sections harden sufficiently in 4-5 hours, thin, upright sections require 24 hours before it is safe to remove them from the mold. Generally overnight is a convenient period for hardening Moldit in wet pour molds.

A TYPE FOR EVERY NEED

MOLDIT-A

Moldit-A Refractory Cement is a specially prepared, dry granular material of uniform consistency. It has a fusion point of 2552°F. (Orton Cone Test) and may safely be used at temperatures up to 2400°F. It has practically no firing shrinkage.

Moldit-A weighs only 108 lbs. per cu. ft. molded into shape and dried. There may be a slight variation in weight (never more than 3 per cent) from the average, due to molding pressure, shape of molded piece or quantity of water used.

For best results in pouring or casting, the dry refractory material should be mixed with from 22-23 per cent of its weight of water, or 11 qts. of water per 100 lbs. of Moldit-A, which is just enough so that the mix will just flow. Using excessive water may increase fluidity but will produce weaker molded shapes. For tamping, 9 qts. of water should be used, but tamped refractories should be "cured" by water spray at regular intervals. Where metal rod reinforcements are required, they should be painted with tar or thick paint to allow for the metal's expansion and contraction.

Moldit-A is packed in 100-lb. quantities in heavy, water-resistant bags. Directions for use are given on a BLUE TAG attached to each bag.

MOLDIT-D

Moldit-D Refractory Cement is the strongest of the Moldits, with a cold crushing strength of 3200 lbs. per sq. in., which is far in excess of the thermal and mechanical load put on any refractory. Its strength averages 15 to 20% higher than that of any other castables. It has a fusion point of 2552°F. (Orton Cone Test), and may be safely used at any temperature up to 2400°F. If used with water-cooled sections, it can be exposed to higher temperatures. Up to 2200°F., Moldit-D has no shrinkage, and above that its shrinkage is less than 1 per cent. Therefore, because of its high strength and its resistance to heat, abrasion, acids, water and gases, it is especially useful in the walls, baffles and arches of high temperature furnaces and boilers of all types, and especially in ash pits under stoker-fired boilers which are constantly bombarded with falling clinkers and ashes, intermittent spray of water or salt water to flush out the ashes. Cold water sprayed on red hot Moldit-D refractory surfaces does not harm it.

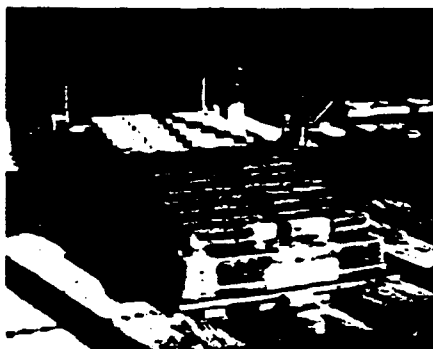
Extensive successful experience with Moldit-D shows reductions in labor cost of as much as 90 per cent because of the ease of its installation and reduction in boiler outage for repairs.

Like Moldit-A, described above, Moldit-D can be poured, troweled, shoveled into place and trowel-finished smooth and abrasion-resistant in large, monolithic sections and in special shapes such as burner blocks, boiler tile, baffles or other shapes. It is particularly suitable for use with a cement gun because, when shot into place at high pressure, it forms a very dense, monolithic mass which gives extra service and wear. For example, by way of contrast, it takes 661 man-hours to pound and hammer 18 tons of plastic refractory in place. The same quantity of Moldit-D can be shot in place in 35 man-hours.

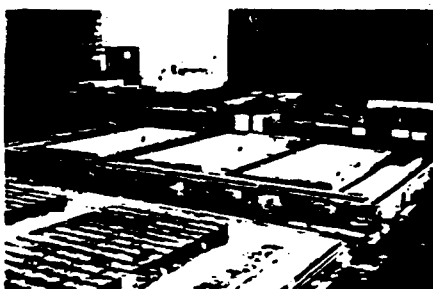
Moldit-D weighs approximately 115 lbs. per cu. ft. molded into place and dried. It is packed in 100-lb. quantities in heavy water-resistant bags. General instructions for mixing, pouring and "curing" are much the same as those for Moldit-A and are given on a GRAY TAG attached to each bag.



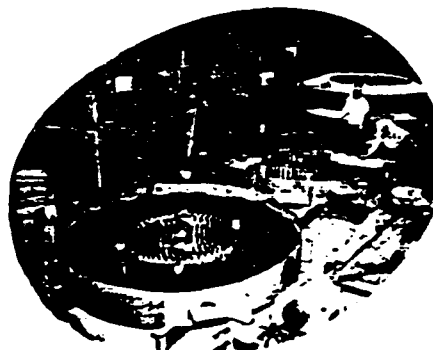
Base of bell type annealing furnace of Moldit-D has a smooth, hard surface that does not bulge or crack due to intermittent firing.



Car bottom and piers of large steel annealing furnace, cast from R & I Moldit Pier Cement. More than 200,000 lbs. were used.



Large rectangular bases for annealing furnaces made of Moldit-D, with sand seal area of Light Weight Moldit #80.



Circular bases of bell type annealing furnaces being cast of Light Weight Moldit #55.

MOLDIT PIER

Moldit Pier Cement has unusual strength for building refractory piers, bases, hearths, car bottoms and other structures in furnaces and boilers which must withstand abrasion, mechanical and thermal shock and be resistant to moisture or acid. It can be used at all temperatures to 2300°F.

Moldit Pier is mixed and cast or applied in the same way as Moldit-A. For pouring it should be mixed with about 22% of its weight of water or with about 11 qts. of water per 100 lbs. of dry cement. It weighs 108 lbs. per cu. ft. in place. Directions are given on GREEN TAG attached to each bag.

SUPER MOLDIT

Super Moldit Cement is used for installations to be exposed to temperatures up to 2800°F. Its fusion point (Orton Cone Test) is 2900°F. Its cold crushing strength is considerably below that of Moldit-A or Moldit-D, however, when fired at temperatures of 2400°F. and higher, it becomes very strong. It is particularly suitable for such refractories as burner cones.

Super Moldit is handled in much the same manner as is Moldit-A. In pouring, it requires agitation to assure a homogeneous casting. Super Moldit weighs approximately 112 lbs. per cu. ft. molded in place, cured, and dry. It is packed in 100-lb. bags. A PINK TAG, attached to each bag, gives directions for mixing.

Moldit-HT

Moldit-HT Cement is a super-duty castable refractory, made for high temperature service to 2900°F. (fusion point—3092°F.). It has excellent resistance to spalling, with no shrinkage at temperatures to 2000°F. Because it can carry full load under high temperatures, it serves as an excellent substitute for super-duty fire brick and special refractory tile and shapes. It outlasts ordinary fire brick.

Linings and shapes of all kinds, conveniently made with Moldit-HT as needed, eliminates carrying expensive shapes in stock and minimizes delays.

Moldit-HT is poured, troweled or gunnited in much the same manner as Moldit-D. For pouring, it should be mixed with 8 qts. (16 lbs.) of water per 100 lbs. of dry cement. Moldit-HT weighs 120 lbs. per cu. ft. cured and dry. It is packed in 100 lb. bags. Directions for mixing are shown on a ROBIN'S EGG BLUE TAG, attached to each bag.

MOLDIT-B

Moldit-B Cement is made especially for use as a plaster for large patching jobs. It has the same non-shrinking, mechanical and thermal characteristics as Moldit-A and is slightly adhesive. Water has no harmful effect on Moldit-B surfaces.

Mixed with 11½ qts. of water per 100 lbs. to a thick, paste mass, it becomes particularly suitable for tamping into large holes or areas broken away or eroded in service as in patching back of water walls and tubes of boilers. It weighs 110 lbs. per cu. ft. of construction. Directions for mixing are on ORANGE TAG attached to each bag.

LIGHT WEIGHT MOLDIT #80

This cement combines refractory and insulating qualities to produce a castable refractory concrete of low thermal conductivity and relatively light weight, with consequent savings in supporting steel work and lower fuel costs. Its heat conductivity and storage capacity are but a small fraction of those of fire brick. Because of its good mechanical strength and resistance to spalling, it is a very satisfactory material for casting special shapes, door linings and furnace sections which will be used at temperatures up to 2200°F. Its fusion point is 2462°F. (Orton Cone Test). It is prepared in the same way as Moldit-A.

Light Weight Moldit #80 weighs 80 lbs. per cu. ft. installed. It is packed in 100-lb. bags. Directions for mixing are shown on a BROWN TAG, attached to each bag.

LIGHT WEIGHT MOLDIT #55

This cement has somewhat lower refractory but better insulating properties than Light Weight Moldit #80. Otherwise, its thermal properties are much the same as those of Light Weight Moldit #80.

Light Weight Moldit #55 weighs about 55 lbs. per cu. ft. installed. It is packed in 60-lb. bags. Directions for mixing are shown on a WHITE TAG, attached to each bag.

Light Weight Moldit #35

It serves as an excellent combination refractory and insulating fill and seal that can withstand temperatures to 2000°F. It weighs 35 lbs. per cu. ft. installed.

Light Weight Moldit #35 is packed dry in 40 lb. bags. It is mixed with 21 qts. (42 lbs.) of water per bag, sufficient to flow, and poured into place. A DARK GREEN TAG, attached to each bag, gives complete directions for mixing.

GENERAL APPLICATIONS

Specific Recommendations Made on Request.

In place of refractory brick, rammed plastic refractory and special shapes.

Making new or repairing old monolithic linings and sections for walls, floors, doors, baffles, roofs, arches and hearths of power boiler furnaces, ash hoppers, air preheaters, metal-heating furnaces, kilns, incinerators, smelters, etc.

Casting burner blocks, header tile, combustion chambers and rotary hearths for oil burners, tile for door linings, stoker hearths, piers and bottoms of annealing furnace cars, tubes, pit fire covers, linings for metal melting furnaces, special shapes of all kinds.

Coke oven door linings in monolithic, sectional or block form; repairing worn doors; lining standpipes.

Steel mill open hearth checker chamber pads, sealing fantails, flues, stacks, bustle pipes; space around wear plates of blast furnaces; patching walls of blast furnace stoves; cinder line and bridge walls of soaking pits, etc.



REFRACTORY BONDING CEMENTS

Make New Refractory Brickwork Permanent Reduce Frequency and Cost of Repairs

R & I "Air Setting" Bonding and Patching Cements are scientifically prepared refractory materials for:

1—Bonding fire clay brick, refractory tile or monolithic sections with air-tight, strong, thin (or thick) joints without fear of shrinkage or separation from the bonded brick or sections because of thermal movement.

2—Adding protection to refractory surfaces by wash-coating to provide smooth surfaces which better resist the destructive action of flame, gases, slagging and clinkering.

3—Hot or cold patching broken down or eroded refractory sections, without shutdown.

These cements are ready-prepared, pure, plastic mixtures of uniform granular texture. They air set to full strength. Their shrinkage before firing is very small. Their resistance to heat penetration and spalling due to sudden temperature changes is very high.

R & I Bonding Cements are matchless for adhesiveness. They produce joints that are stronger than the brick itself. There is no cracking or breaking of the bond to cause heat losses through refractory wall and destruction of backing insulation, or to allow heat to get in between joints, one of the causes of spalling.

Thus, because of their ability to withstand severe firing conditions and flame erosion, the use of R & I Bonding Cements assures increased life of refractories and reduced "outage" and maintenance cost.

Several types of R & I Refractory Cement are available to best meet specific physical and thermal conditions.



The jambs of a coke oven down for repairs, being patched with Super #3000 Cement. The new brickwork is also being bonded in place with Super #3000 Cement.

PHYSICAL DATA

R & I Product	Base	Highest Working Temp. *F. No Water Cooling	Softening Point *F.	Fusion or Melting Point *F.	Dipped-lbs. per 1000 Fire Brick	Washcoat Lbs. per 100 sq. ft.	Maximum Storage Months
# 3000-B	Aluminum Silicate	2650	2600	Cone 18 2714	390	15	3
# 3000-C	Aluminum Silicate	2850	2800	Cone 23 2876	390	12	6
Super #3000	High Alumina	3000	3000	Cone 31 3056	300	12	4
Reeco	Silica	2750	2750	Cone 20 2786	390	15	4
Jamb Patch	Aluminum Silicate	2700*	—	2800*	—	—	—

*When mixed with silica flour.

REFRACTORY & INSULATION CORPORATION

MANUFACTURERS OF REFRACTORY BONDING AND CASTABLE CEMENTS, INSULATING BLOCK, BLANKETS AND CEMENTS

120 WALL STREET

NEW YORK 5, N. Y.

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Commercial Trust Bldg.
Philadelphia 2, Pa.

1001 Broad St.
Newark 2, N. J.

1834 Euclid Ave.
Cleveland 15, Ohio

Catalog No. R-53

SERVICE DATA

R & I Product	Consistency As Shipped	% by Wt. of Water to Add for Trowelling	Stickiness	Working Qualities	Wt. Lbs./Cu. Ft.	Net Wt.-Lbs. per Container
#3000-B	Medium Thick	0	Very Sticky	Good—Cement creamy	130	80 and 200
#3000-C	Fairly Thick	3	Fairly Sticky	Good—Cement thick paste	135	80 and 200
Super #3000	Very Thick	5	Sticky when mixed with water	Heavy consistency for patching. Good when mixed with water	136	100 and 200
Reece	Fairly Thick	5	Sticky	Good—Cement thick paste	140	200
Jamb Patch	Heavy Paste	—	Very Sticky	Good	126	200

R & I SUPER #3000 REFRACTORY CEMENT

For Severe Service at High Temperature

The most remarkable Refractory Cement developed to date, R & I Super #3000 Refractory Cement, meets severe conditions at both high and low temperatures. Where other refractories fail, this Cement is giving extraordinary results in cases of abrasion and other severe refractory service conditions.

This ready-mixed, plastic, dense, air-setting mortar sets extremely hard and bonds very strong. With a fusion point above 3000 deg. F. and its remarkable resistance to wear at both high and low temperatures, it has found wide acceptance for applications where service is severe.

R & I Super #3000 Refractory Cement is excellent for setting new fire brick and fire tile and for hot or cold patching of worn fire clay, silica or other super brick in walls, floors and arches of furnaces, in soaking pits, ladles, etc.

When laying refractory brick or tile, joints can be made as thick as desired because R & I Super #3000 sets hard with little or no shrinkage, holding the brick weld-tight. It can also be thinned to a creamy mix to make the thinnest possible joints. A still thinner mix permits its use as a wash coating which preserves and extends the life of refractory surfaces.

Super #3000 is used extensively in coke ovens for both hot and cold patching of cracks and spalls in liner bricks, leaks in roofs, and for laying up or rebuilding the ends of the regenerator division and front face walls.

The floors in coke ovens are a continuous source of trouble in practically all coke plants and Super #3000 has proved successful for patching or pouring a new surface on the floors of troublesome ovens. It can also be used around charging holes, gas gun blocks, regenerator faces and lasts two to three times as long as other refractory cement in jamb patches.

It has also proved a valuable protective refractory covering over the insulation of inside duct lining to provide the best possible resistance to high temperature, abrasion and erosion of gases. Troweled as a thick paste to the required thickness over expanded metal lath and insulation, it dries to a flint-like hardness.

Because of its abrasion-resistant qualities, Super #3000 has given excellent service when applied over expanded metal wire, which has been welded to the worn plates of induced draft fan housings where the abrasion is most severe. This method of taking care of this kind of wear has reduced the expense of maintenance to practically nothing.

Coke oven floor repaired with Super #3000 Cement while still hot, without expensive labor. Using Super #3000 has saved the plant \$10,000 in a short time.



R & I #3000 REFRACTORY CEMENT

A pioneer and one of the most extensively used refractory cements in industry, R & I #3000 is a top quality, aluminum silicate base, ready mixed, plastic refractory material that air sets at normal temperatures and gains full strength without heat. It maintains its full strength under all operating conditions, withstanding intermittent firing and the expansion and contraction of refractory walls, high temperatures, flame impingement and other destructive heating conditions better than the fire brick, tile, block or other linings for which it is used.

The bond produced by a thin joint of #3000 Cement is actually stronger than the brick itself. The finely milled particles of #3000 penetrate into the brick pores and set extremely hard. It withstands high temperatures as well as #1 Fire Brick. Even for repairing worn or broken brickwork, the application of #3000 adds long periods of service since its strong bond prevents bulging, breaking or falling out of the patch.

Spraying of the refractory surface with an easily diluted coat of #3000 or wash-coating with a corn broom before firing, greatly prolongs the life of brick and joints.

As shown in the table of physical data two types of #3000 Cement are available: Type B has a somewhat lower working and fusion temperature but is stickier, creamier and generally easier material to use for thin joints. Type C is preferred by many users for its advantage of higher temperature resistance and its thicker consistency more suitable for trowelling.

Conveniently Packed — R & I #3000 Refractory Cement is a soft, plastic material packed in air-tight, heavy gauge steel drums containing 200 and 80 lbs., and in steel pails containing 50 and 30 lbs., ready for immediate use. Opened drums need only have the remaining contents covered with one-half inch of fresh water and then covered to retain the cement's full bonding quality.

HOW TO USE R & I #3000

For Thin Joints — Dilute R & I Refractory Cement to a heavy cream (batter) by adding about two quarts of water to every hundred pounds of cement. Mix thoroughly. Dip brick in the batter, so the surfaces of brick which come in contact with other brick or parts of the furnace structure will be covered with a thin coating of cement. Lay the brick in place and tamp with a trowel or mallet to obtain a good thin joint.

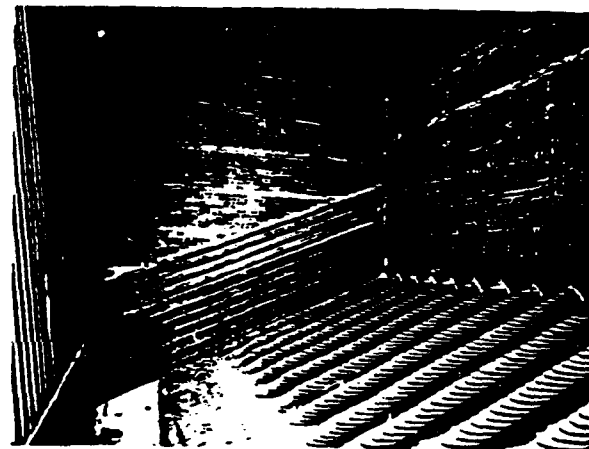
Cement that squeezes out of the joints should be troweled back over the brick as an added protection against firing temperatures. After the brickwork is complete, dip an old broom in the batter and wash-coat the entire refractory surface of the brickwork. This will fill up the pores in the brick and materially retard spalling.

For Repair Work — Walls of combustion chambers, fire doors and other brickwork that have become eroded by flame impingement should be patched with R & I #3000 Cement. If the erosion has just started prompt action will frequently save the setting.

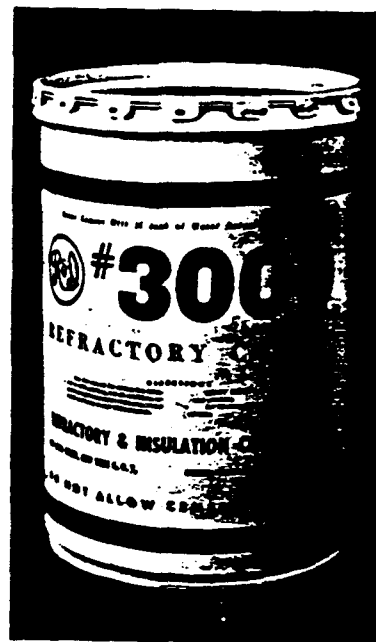
For either hot or cold patching, clean the burned out section by chipping away all slag, old cement or foreign

matter. If a cold patch is to be made, wet the chipped out section with water and apply R & I #3000 Cement, being sure to press it firmly into place. If a hot patch is to be made, apply #3000 with a slice bar or patching tool and press it into place firmly. If cement spraying equipment is available, spray the cement into place until it reaches the desired thickness.

For Loose or Falling Brick — If the brick are still in good condition, clean them thoroughly of all dirt, slag, old cement, etc. Re-lay these same brick with R & I #3000 Cement, being careful to place the "unused" side on the working surface of the new wall. When the re-laying is complete, wash-coat the entire surface.



Interior of large boiler showing fire brick walls bonded with R & I #3000 Refractory Cement.





At left—Typical refractory wall of a large boiler in a bad state of repair, showing how broken and loosened joints have caused fire brick to fall out. At right, the same wall reset with new firebrick and #3000 Refractory Cement, thin joints being made, excess cement troweled back and the surface then entirely washcoated.

R & I REECO CEMENT

Because of its acid resisting properties, Reeco Cement has been developed for use with standard firebrick and silica shapes, where acid conditions exist. It is used extensively in acid type electric furnaces for patching jambs and spouts, and for ladles and on other steel mill furnaces where acid slag is produced.

For such patching work, Reeco is diluted with water and mixed in the proportion of 40% Reeco with 60% Ganister. For patching under the roof of electric furnaces, the brick must be first washcoated with a Reeco batter and then patched with a mixture of 50% Reeco and 50% Silica sand.

For lining large ladles, the brick should be set with Reeco Cement and then washcoated.

R & I JAMB PATCH

Jamb Patch is a very sticky plastic cement specially made for patching the cracks which develop between the jamb castings and the ends of the first walls of coke ovens. It may be rammed or troweled in place or mixed with water to the consistency of a heavy cream and shot into these cracks with a cement gun. For best results the cement should be first mixed with silica flour in equal proportions.

Jamb Patch bonds readily with iron jamb castings and the brick work at the end of the first oven flue wall. Surfaces of castings and brick should be free of loose or foreign material before Jamb Patch is applied.

APPLICATIONS

of R & I Refractory Bonding Cements

Laying brickwork, lining and settings in walls, floors, arches, baffles, jambs, doors of

Boilers	Coal Gas Retorts
Blast Furnaces	Water Gas Superheaters
Soaking Pits	Water Gas Generators
Heating Furnaces	Cupolas
Forge Furnaces	Oil Stills
Enameling Furnaces	Gas Producers
Melting Furnaces	Incinerators
Bake Ovens	Fire Boxes
Coke Ovens	Hot Blast Stoves
Kilns	Flues
Glass Tanks	Valves
Glass Lehrs	Varnish Kettles

Repairing—Hot or Cold Patching of any boiler, furnace or other equipment, walls, floors, arches, linings, baffles, joints, leaks, etc.

Surfacing—troweling, wash coating or spraying over refractory surfaces before firing.

Patching furnace and boiler walls and linings—using #3000 with crushed, reclaimed fire brick for monolithic construction.

Lining foundry ladles and spouts.

CE/HI (F) 33213

CE0114148



REFRACTORY BONDING CEMENTS

3000 REFRACTORY CEMENT

R & I #3000 is a top quality, aluminum silicate base, ready mixed, soft, plastic refractory material that air sets at normal temperatures and gains full strength without heat. It maintains its full strength under all operating conditions, withstanding intermittent firing and the expansion and contraction of refractory walls, high temperatures, flame impingement and other destructive heating conditions better than the fire brick, tile, block or other linings for which it is used.

The bond produced by a thin joint of #3000 Cement is actually stronger than the brick itself. The finely milled particles of #3000 penetrate into the brick pores and set extremely hard. It withstands high temperatures as well as #1 Fire Brick. Even for repairing worn or broken brickwork, the application of #3000 adds long periods of service since its strong bond prevents bulging, breaking or falling out of the patch.

Spraying of the refractory surface with an easily diluted coat of #3000 or wash-coating with a corn broom before firing, greatly prolongs the life of brick and joints.

As shown in the table of physical data (on reverse side), two types of #3000 Cement are available: Type B has a somewhat lower working and fusion temperature but is stickier, creamier and generally easier material to use for thin joints. Type C is preferred by many users for its advantage of higher temperature resistance and its thicker consistency more suitable for trowelling.

HOW TO USE R & I #3000

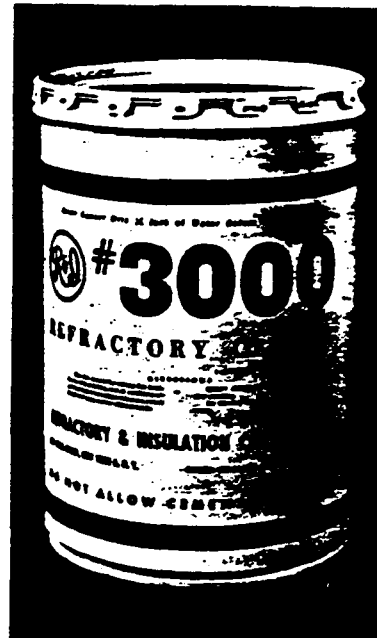
For Thin Joints — Thin #3000 Cement to a heavy cream (batter) by adding about 2 quarts of water to every 100 pounds of cement. Mix thoroughly. Dip brick in the batter, so the surfaces of brick which come in contact with other brick or parts of the furnace structure will be covered with a thin coating of cement. Lay the brick in place and tamp with a trowel or mallet to obtain a good thin joint.

Cement that squeezes out of the joints should be troweled back over the brick as an added protection against firing temperatures. After the brickwork is complete, dip an old broom in the batter and wash-coat the entire refractory surface of the brickwork. This will fill up the pores in the brick and materially retard spalling.

For Repair Work and Patching — Walls of combustion chambers, fire doors and other brickwork that have become eroded by flame impingement should be patched with R & I #3000 Cement. If the erosion has just started prompt action will frequently save the setting.

For hot or cold patching, clean the burned out section by chipping away all slag, old cement or foreign matter. For cold patching, wet the chipped out section with water and apply #3000 Cement, being sure to press it firmly into place. For a hot patch, apply #3000 with a slice bar or patching tool and press it into place firmly. If cement spraying equipment is available, spray the cement into place until it reaches the desired thickness.

For Loose or Falling Brick — If the brick are still in good condition, clean them thoroughly of all dirt, slag, old cement, etc. Re-lay these same brick with #3000 Cement, being careful to place the "unused" side on the working surface of the new wall. When the re-laying is complete, wash-coat the entire surface.



Packed in air-tight, heavy gauge steel drums containing 200 and 100 lbs., and in steel pails containing 50 and 30 lbs., ready for immediate use.

REFRACTORY & INSULATION CORPORATION

MANUFACTURERS OF REFRACTORY BONDING AND CASTABLE CEMENTS, INSULATING BLOCK, BLANKETS AND CEMENTS

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1836 Euclid Ave.
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Catalog No. R-538

PHYSICAL DATA

R & I Product	Base	Highest Working Temp. °F. No Water Cooling	Softening Point °F.	Fusion or Melting Point °F.	Dipped-lbs. per 1000 Fire Brick	Washcoat Lbs. per 100 sq. ft.	Maximum Storage Months
# 3000-B	Aluminum Silicate	2650	2600	Cone 18 2714	390	15	3
# 3000-C	Aluminum Silicate	2850	2800	Cone 23 2876	390	12	6
Reeco	Silica	2750	2750	Cone 20 2786	390	15	4
Jamb Patch	Aluminum Silicate	2700*	—	2800*	—	—	—

*When mixed with silica flour.

SERVICE DATA

R & I Product	Consistency As Shipped	% by Wt. of Water to Add for Trowelling	Stickiness	Working Qualities	Wt. Lbs./Cu. Ft.	Net Wt.-Lbs. per Container
# 3000-B	Medium Thick	0	Very Sticky	Good—Cement creamy	130	30, 50, 100 and 200
# 3000-C	Fairly Thick	3	Fairly Sticky	Good—Cement thick paste	135	30, 50, 100 and 200
Reeco	Fairly Thick	5	Sticky	Good—Cement thick paste	140	200
Jamb Patch	Heavy Paste	—	Very Sticky	Good	126	200

R & I REECO CEMENT

Because of its acid resisting properties, Reeco Cement has been developed for use with standard firebrick and silica shapes, where acid conditions exist. It is used extensively in acid type electric furnaces for patching jambs and spouts, and for ladles and on other steel mill furnaces where acid slag is produced.

For such patching work, Reeco is diluted with water and mixed in the proportion of 40% Reeco with 60% ganister. For patching under the roof of electric furnaces, the brick must be first washcoated with a Reeco batter and then patched with a mixture of 50% Reeco and 50% Silica sand.

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R & I JAMB PATCH

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Jamb Patch bonds readily with iron jamb castings and the brick work at the end of the first oven flue wall. Surfaces of castings and brick should be free of loose or foreign material before Jamb Patch is applied.

APPLICATIONS

of R & I Refractory Bonding Cements

Laying brickwork, lining and settings in walls, floors, arches, baffles, jambs, doors of

Boilers	Coal Gas Retorts
Blast Furnaces	Water Gas Superheaters
Soaking Pits	Water Gas Generators
Heating Furnaces	Cupolas
Forge Furnaces	Oil Stills
Enameling Furnaces	Gas Producers
Melting Furnaces	Incinerators
Bake Ovens	Fire Boxes
Coke Ovens	Hot Blast Stoves
Kilns	Flues
Glass Tanks	Valves
Glass Lehrs	Varnish Kettles

Repairing—Hot or Cold Patching of any boiler, furnace or other equipment, walls, floors, arches, linings, baffles, joints, leaks, etc.

Surfacing—troweling, wash coating or spraying over refractory surfaces before firing.

Patching furnace and boiler walls and linings—using #3000 with crushed, reclaimed fire brick for monolithic construction.

Lining foundry ladles and spouts.



CASTABLE REFRACTORY MATERIALS

MOLDIT CHROME REFRACTORY CEMENT

*A Chrome Base High Temperature Refractory
Easily Castable in Any Shape or Form*

*Highly Resistant to Slag
and Molten Metal*

*Can Be Poured, Troweled
or Applied with a
Cement Gun*



Guniting a $5\frac{1}{2}$ " thickness of Moldit over a boiler floor for protection against molten slag.



Moldit Chrome being poured and troweled over the bottom of a large steel plate mill furnace.



Moldit Chrome packed in heavy burlap bags containing 100 lbs. Material is of dry, granular, uniform quality.

Unlike plastic chromes, R & I Moldit Chrome does not have to be pounded or hammered in place. It is simply mixed with water and poured or trowelled in place or can be applied with a cement gun, saving a great deal of time, labor and money in installation cost over the plastic type of chrome refractory. It weighs approximately 160 lbs. per cu. ft. molded in place and has a melting point of 3092°F. R & I Moldit Chrome may be sprayed, washed or submerged in water for any period of time without disintegration. It is resistant to molten slag, molten metal and spalling.

HOW TO INSTALL

R & I Moldit Chrome is furnished in dry form. It should be mixed with five quarts of clean, fresh water per 100 lb. bag. After mixing with water, according to directions on red tag on bag, shovel the Moldit Chrome mix into place, and with a trowel work the mixture into corners and crevices so as to fill all voids.

Ramming the mixture in place is not necessary, just trowel to a smooth finish. Excessive trowelling is not recommended and trowelling of the surface should be kept to a minimum.

R & I Moldit Chrome also lends itself to installation in large areas with a dry Cement Gun, mixing with water at the nozzle. This is a very desirable way of installing the material both as to labor cost and the quality of the finished product.

REFRACTORY & INSULATION CORPORATION

MANUFACTURERS OF REFRACTORY BONDING AND CASTABLE CEMENTS, INSULATING BLOCK, BLANKETS AND CEMENTS

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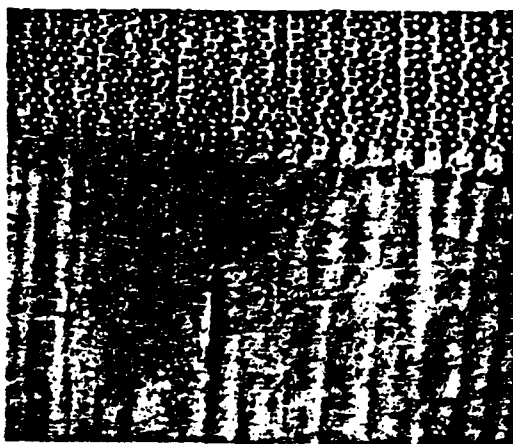
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Newark 2, N. J.

1836 Euclid Ave.
Cleveland 15, Ohio

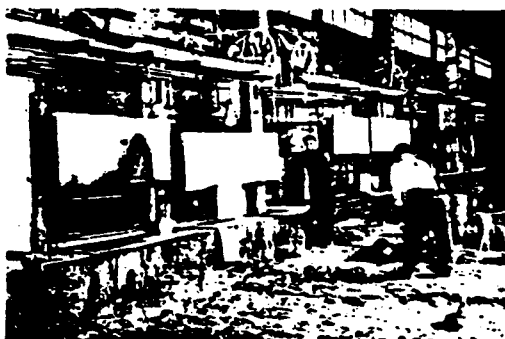
Catalog No. R-34



Corner of slagging bottom boiler, showing water wall tubes and tap hole in center of Moldit Chrome floor.



R & I Moldit Chrome applied with a cement gun to the studded tubes on the inside of boiler wall as a protection against slag, corrosion and erosion.



Battery of forge furnaces the hearths of which were made with Moldit Chrome.

It is important, when placing Moldit Chrome in a furnace hearth, to build up the full thickness with each batch of material. Do not spread batch over batch over the area. Avoid layers. The proper way is to place the material in sections to the full thickness. R & I Moldit Chrome can be installed in any furnace cool enough for a man to work in.

HOW TO CURE

R & I Moldit Chrome should be allowed to set three to five hours until the surface has become hard and firm. The surface of the cement should be kept damp by spraying for 12 to 24 hours before putting it into service. Moldit Chrome should be fired slowly from five to six hours until regular operating temperatures are reached.

TECHNICAL DATA

Base—Chrome

Shipping Weight—100 lbs./bag.

Installed Weight—160 lbs./cu. ft.

Melting Point—3092 F.

Highest Working Temperature—3000°F. (no load).

Working Qualities—Pours easily; trowels smooth; easily shot with gun.

Volume Shrinkage—None.

Storage—3 months maximum.

APPLICATIONS

Studded side walls and floors of slagging type boilers.

Floors of coal and oil fired boilers.

Monolithic hearths and bottoms in forging, rolling mill and tube mill furnaces.

Bolt and nut, bar, plate, angle and other steel heating furnaces.

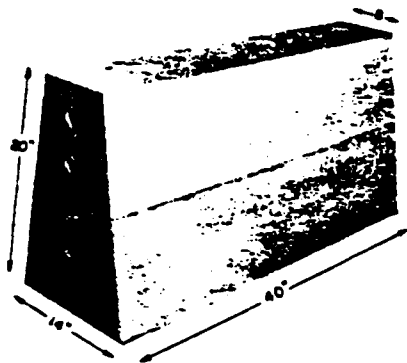
Furnace tap holes.

Burner blocks and special shapes.



CASTABLE REFRACTORY MATERIALS

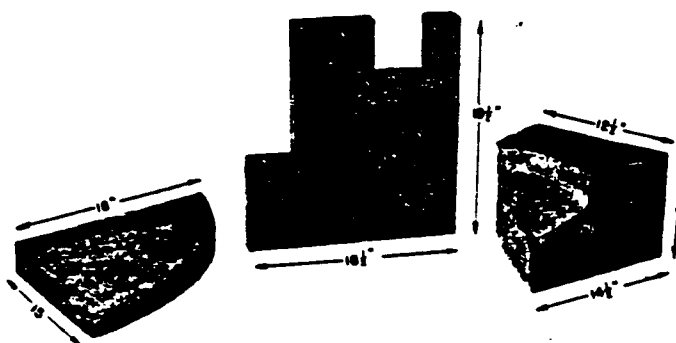
SPECIAL REFRACTORY SHAPES



Precast large two-section pier for car bottom of annealing furnace.



Special piers for spreader stoker.



Two shapes of upper side wall refractory tile for marine boiler; (right)—burner tile.

Precast to Order at the R & I Plant in Any Required Shape, Size and Quantity

R & I Refractory Shapes are precision precast to specifications to meet the highest standards of quality, uniformity, durability and performance. They are made of the Moldit Refractory Cement that best suits requirements of mechanical and thermal resistance. For description of Moldit Cements, see Catalog No. R-52.

Moldit shapes are dense, hard, strong, impervious to moisture and heat resistant. They are cast by modern methods, hydraulically set, carefully cured and inspected before shipment.

Moldit precast shapes are superior to fire clay linings; they are lighter; have lower coefficients of expansion; possess greater insulating quality; withstand considerable shock, abrasion, expansion and contraction. Because of their longer life, labor and replacement costs are considerably reduced.

Moldit shapes may be made of any one of 4 Moldit Cements, depending on required characteristics.

TYPICAL PRECAST SPECIAL SHAPES

Burner blocks, ports and cones.
Boiler tube baffles.
Blocks for water-wall boilers.
Arch and flue sections.
Door arches and arch tile.
Gate tile for chain grate stokers.
Flue damper doors.
Sections or blocks for door linings.
Piers for furnace car bottoms.
Furnace hearth supports.
Furnace hearth tile and bottoms.
Furnace and pit fire sectional linings.
Oil burner combustion chamber and hearth sections.

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Catalog No. R-58

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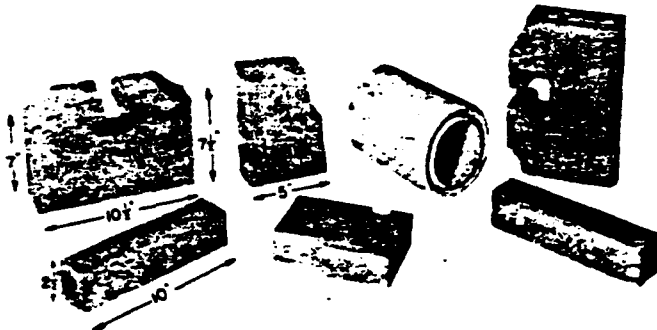
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SPECIFICATIONS

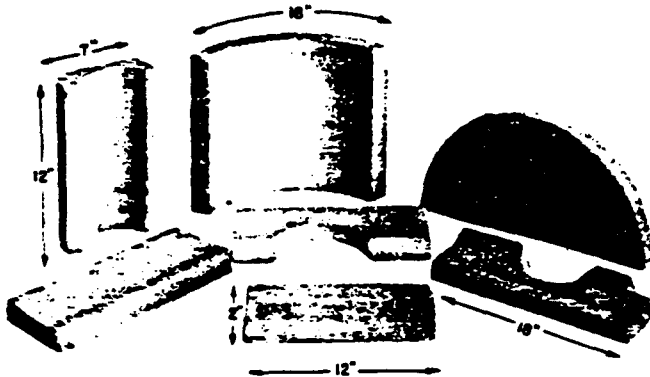


Wall block for annealing lehr.

Moldit Cement	Recommended Maximum Temperature °F.	Fusion Point °F.	Cold Crushing Strength on Cylinders (p.s.i.)
Moldit-D	2400	2552	3200
Moldit Pier	2300	2450	2844
Light Weight Moldit No. 80	2200	2462	760
Super Moldit	2800	3002	600



Hanger tile; superheater tieback hanger sleeves; hanger shape; special arc resistant tubes.



Tube tile, combustion chamber side sections and bottom section.

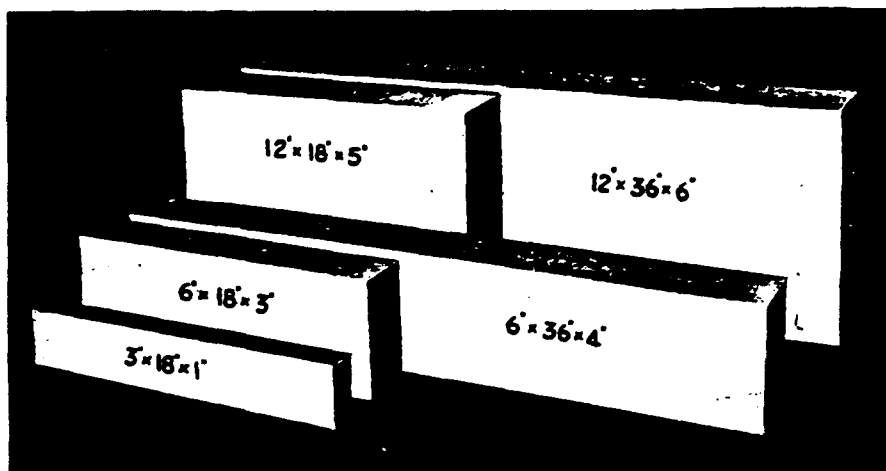


HEAT INSULATING MATERIALS

INSULATING BLOCK

for Efficient Insulation and Heat Resistance to 1800°F.

Strong - Light
Resilient
Resistant to
Steam and Water
Low Thermal
Conductivity
Easy to Handle
Easy to Apply



The Ideal Single Layer Insulation for High or Low Temperatures



R & I Block can be easily cut or sawed at any angle, into rectangular or irregular shapes, and made to fit without cracking, splitting, fraying at the edges or crumbling.

R & I Insulating Block is a material of superior insulating quality, which provides the highest thermal efficiency consistent with good structural strength and low application cost. Because of its low heat conductivity at high or low temperatures, its single layer construction eliminates the need for combination or two-layer construction, thereby saving materially on application costs. R & I Block is made to withstand temperatures up to 1800°F.

Strong — Easy to Install

R & I Insulating Block is molded from chemically stable, inert, heat-resistant materials and long fiber asbestos. Bonded, cured, molded and dried, it provides a block that is exceptionally strong, non-sagging, non-crumbling, yet light, easy to handle and easy to cut into any size and shape. R & I Block is of uniform thickness, has firm, sharp edges which make close, square butt joints, when installed. It resists vibration, compression, impact and abrasion to a remarkable degree.

Two Types of Block

#14 Insulating Block for continuous contact with hot face temperatures to 1400°F. Its flexural strength shows an average modulus of rupture of 60 p.s.i. Density—24 lbs. per cu. ft.

#18 Insulating Block for continuous contact with hot face temperatures up to 1800°F. and for intermittent contact of 1900°F. Its flexural strength shows a modulus of rupture average of 60 p.s.i. Density—25 to 26 lbs. per cu. ft.

REFRACTORY & INSULATION CORPORATION

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Catalog No. I-96

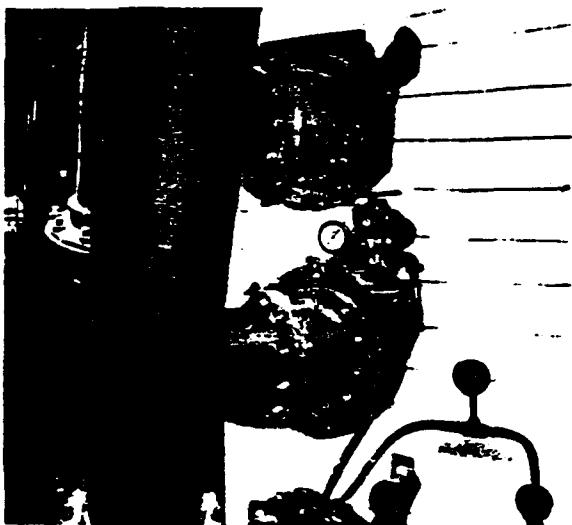
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Comparative water resistance test: R & I Insulating Block in boiling water (beaker at left) stands firm and rigid. Mineral wool block in boiling water (middle beaker) and in cold water (beaker at right) deteriorates almost immediately upon immersion.



Condition of R & I Block and mineral wool block, after water has been drained out.



Refractory tile of boiler wall in place behind boiler tubes being backed up with R & I #14 Insulating Block.

R & I #14 Insulating Block applied to boiler wall in back of refractory and held temporarily in place by R & I Block-Stic Cement, prior to installing boiler casing.

Moisture-Resistant

This block is not affected by moisture. A steam-filled room, a dripping pipe joint, or even complete submersion in boiling water has no ill effects on this remarkable insulation. It dries out without shrinkage to its original shape, sound and strong without structural deterioration of any kind.

SPECIFICATIONS

Both R & I Insulating Blocks are made in:

Thicknesses — 1" to 12".

Standard Sizes: Block up to 2" thick—3" x 18", 6" x 18" and 12" x 18" only. All greater thicknesses—3" x 18", 6" x 18", 6" x 36", 12" x 18" and 12" x 36".

LIST PRICES

Subject to Discount

Block Thickness	Price Per Sq. Ft.	Block Thickness	Price Per Sq. Ft.
1/2"	\$0.27	2-3/4"	\$0.83
3/4"	0.27	3"	0.90
1"	0.30	3-1/4"	0.98
1-1/4"	0.38	3-1/2"	1.05
1-1/2"	0.45	4"	1.20
1-3/4"	0.53	4-1/2"	1.35
2"	0.60	5"	1.50
2-1/4"	0.68	5-1/2"	1.65
2 1/2"	0.75	6"	1.80

Prices on thicknesses greater than 6" and on segmental (curved) block and special sizes, on request.

THERMAL CONDUCTIVITY

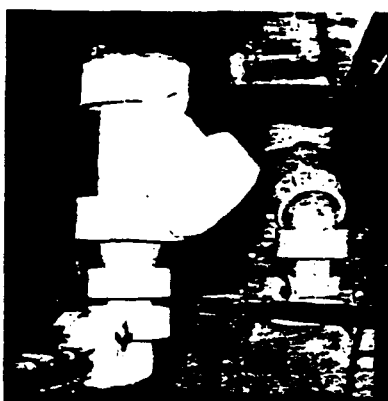
B.t.u./Sq.Ft./Hr./1" Thick/1°F. temperature difference

Mean Temperature °F.	Conductivity
200	0.40
400	0.48
600	0.58
800	0.69
1000	0.80
1200	0.93
1400	1.06





First step—Stic-Tite Cement roughed, followed while still wet with 2" wire mesh.



Second step—Flanges blocked in with #14 Insulating Block, mitre cut and wired in place.



Third step—Finish rough coat of Stic-Tite applied over insulated surface, ready for final hard finish.

These three views show how valves of precipitators were insulated with R & I Stic-Tite Insulating Cement and #14 Insulating Block to prevent condensation and freezing of particles within the valves.

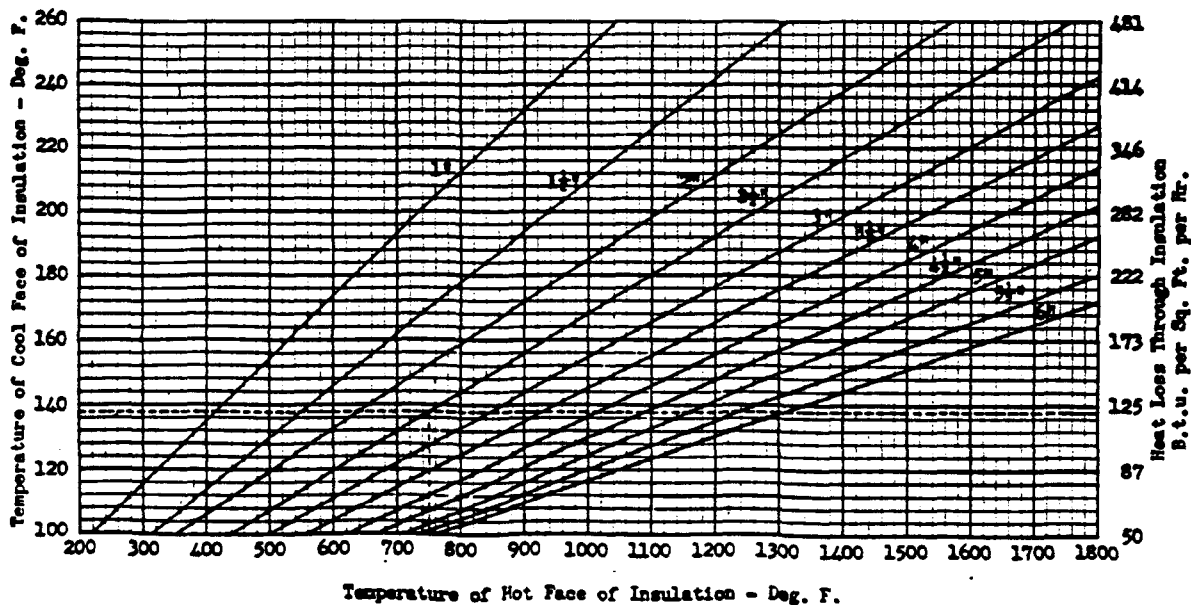
HOW TO SELECT REQUIRED BLOCK THICKNESS

The thickness of insulating block to use depends on the temperature of the surface to be insulated, on the temperature on the outside surface of the block and the heat saving desired, within reasonable economic limits.

For example, on the heat transmission chart (below), if a hot face temperature of 750 deg. F. is assumed and

a cool face of insulation at 138 deg. F. is wanted, follow 750 deg. on horizontal scale of chart upward to horizontal line from 138 deg. at left. Where the two lines intersect, find 2 1/2" of block as the nearest covering thickness required. To find the heat loss, extend horizontal line to right and read about 121 B.t.u. per sq. ft. per hr.

HEAT TRANSMISSION R & I INSULATING BLOCK





Steel panel wall of large heat treating oven insulated with R & I Insulating Block.



Recirculating tank in steam dryer system covered with 2" of R & I Insulating Block and $\frac{1}{2}$ " of Super-Finish Stic-Tite Insulating Cement.

HOW TO APPLY AND FINISH

R & I Insulating Block may be applied to flat or curved refractory surfaces by one of several methods:

By spotting R & I Block-Stick, a very adhesive material, on the Block in about three places and firmly rubbing the Block against the Refractory or steel contact surface in order to spread the Block-Stick somewhat over the surface. This will hold the Block safely in place until the necessary permanent reinforcement is provided.

Tie wires are often used to hold the Block in place permanently. These are previously anchored into the joints or behind the refractory and are long enough to project through the refractory and beyond the Block. The Insulating Block is then applied, and over the surface of the Block mesh wire can be tied tightly against the Block with these tie wires. The mesh wire also provides reinforcement for the finish cement.

When Insulating Block are used on metal surfaces, either inside or outside, tie wires or whiskers are welded to the metal surface to be insulated. These tie wires or metal whiskers should extend about $1\frac{1}{2}$ " beyond the thickness of the Block and can then be bent over either mesh or expanded metal lath to hold the Block in place as well as provide a bolting agent for the finishing material.

Where block is laid in steel panels or back of furnace walls which have a steel plate casing, no tie wires are necessary.

To provide a hard, durable finish coat, the application of R & I Super Finish Stic-Tite in one coat directly on the metal lath or mesh is recommended. A $\frac{3}{8}$ " thickness provides a good protection.

For service outdoors, the application of a coat of R & I Weatherkote, a tough, waterproof material is recommended.

INDUSTRIAL APPLICATIONS

In Power Plants

- Accumulators, Steam
- Boilers: Fire Tube, for boiler shell, wall or settings
- Boilers: Round, Sectional or Water Tube
- Boiler Drums, Air Cooled or Water Cooled Walls
- Boiler and Engine Room Ceilings
- Breechings and Ducts
- Fan Housings
- Heaters, Feed Water
- Heaters, Hot Air
- Heaters, Hot Water
- Storage Tanks
- Turbines

Industrial Drying Equipment

- Dryers
- Enameling Ovens
- Heat Treating Ovens
- Core Ovens

Metallurgical and Metal Working

- Hot Blast Stoves
- Open Hearth Regenerators
- Steel Mill Furnaces
- Heat Treating Furnaces

Cement and Lime Plants

- Producer Gas Mains
- Rotary Kilns

Ceramic Plants

- Glass Tank Generators
- Glass Lehrs
- Kilns, all kinds

Oil Refineries

- Oil Field Boilers
- Oil Still and Cracking Unit Furnaces
- Steam Stills
- Towers, Condensers, Heat Exchangers
- Hot Tanks

Gas-Making Equipment

- Insulating between Shell and Carburetor
- Generators and Superheaters
- Producer Gas Mains
- Pulverizers
- Tanks
- Steam Accumulators

Chemical—Food—Brewing

- Hot Kettles and Cookers
- Hot Tanks and Process Piping
- Rubber Vulcanizers

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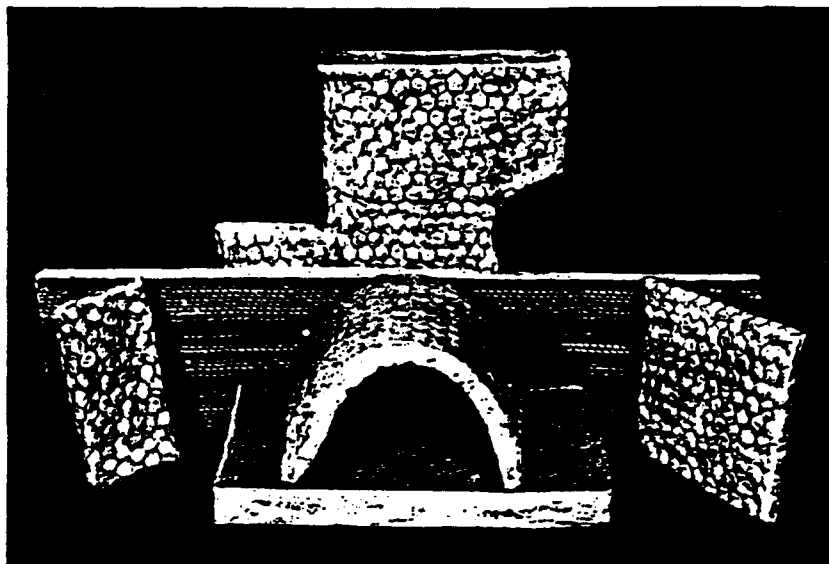
HEAT INSULATING MATERIALS

MINERAL WOOL BLANKET INSULATION

for Large or Small Surfaces — Flat or Curved

Laminated for Greater Insulating Efficiency and Strength.

R & I Blanket Insulation is made in both standard and special sizes. Curved or irregular shapes and blankets with cut-outs can be furnished in accordance with blueprints.



For operating temperatures to 900 deg. F., R. & I Mineral Fibre Blankets offer a most economical, efficient insulation for flat or curved surfaces, large or small. Experience shows that this type of insulation combines the advantages of lower heat conductivity, greater durability and flexibility of application at lower cost than other types of insulation in the temperature range for which it is recommended.

HIGH QUALITY

R & I Insulating Blankets are made of long mineral fibres which aggregate into a soft, flexible, clean, white wool of uniform consistency. This wool is treated to improve its resilience and flexibility and then is laminated and rolled into sheets about $\frac{1}{2}$ " thick. A blanket is built up to the desired thickness by a series of layers of these laminated sheets, then compressed and wire stitched under pressure so as to make it uniformly dense, smooth and firm. This exclusive R & I method produces a superior insulation because

- 1—It avoids the usual unevenness of wool distribution through packing of bulk loose wool onto expanded metal or of single slabs of wool inserted between layers of wire mesh or lath.
- 2—The laminated or precompressed layers of R & I Blankets cannot slide or open up holes which produce hot spots when in service.
- 3—The edges of the R & I Blanket are sharp and can be butted closely against each other for tight fit over the hot surface.

- 4—The R & I Blanket is light in weight—containing no inefficient binder; yet it is strong and flexible. It is so tough that the wires could be removed and the inserted wool handled without tearing.

- 5—R & I Blankets are clean, white and attractive in appearance.

LOW HEAT CONDUCTIVITY

R & I Blanket Insulation has a greater overall efficiency over a greater range than other types of insulation, whether they be in the low or high temperature class. Its conductivity per inch of thickness at mean temperature is less than that of air cell, 85% Magnesia or high temperature insulating block and is about 10% more efficient than other types of mineral wool blankets.

STRONG — DURABLE

R & I Blankets combine strength and serviceability through proper packing, laminating and reinforcement with tie wires between either wire mesh, expanded metal lath or special rib lath, depending on whether flexibility or rigidity is required in the finished blankets. They do not fray at the edges, peel, crack, break, dust or settle down in shipment or installation, maintaining their full body and thickness under all normal service conditions.

R & I Blankets are fireproof, verminproof, resistant to moisture and to sound transmission.

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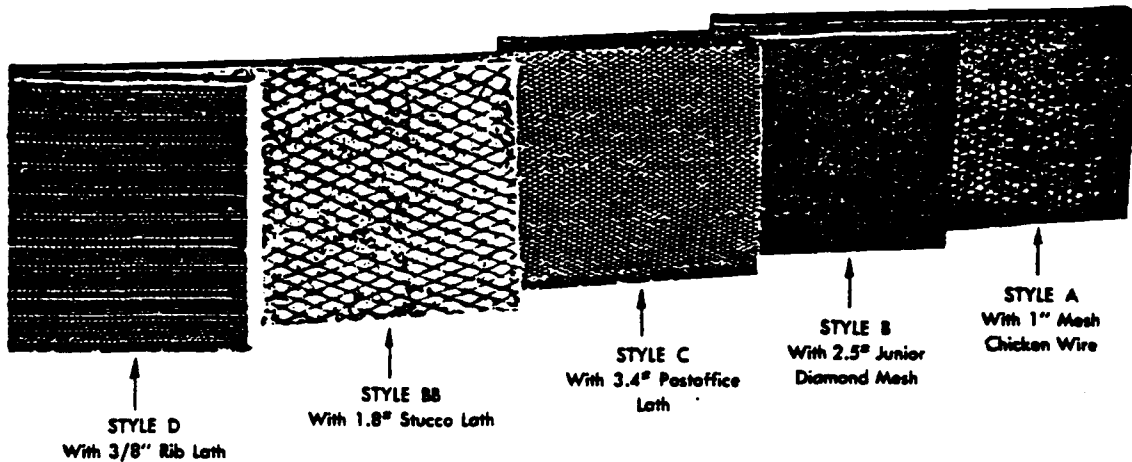
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Catalog No. I-97

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STANDARD TYPES AND SIZES

R & I Insulating Blankets are sewed with galvanized wire between several different types of metal fabrics, depending upon the service for which they are intended. They are held to uniform thickness with overall dimensions true and square and with edges cut smooth. These types are:

- Style A — 1" wire mesh both sides of blanket.
- B — 1" wire mesh one side, metal lath other side.
- BB — 1" wire mesh one side, 1.8" stucco lath other side.
- C — Metal lath both sides.
- *D — 1" wire mesh one side, 3/8" rib lath other side.
- *E — Metal lath one side, 3/8" rib lath other side.
- *F — 1" wire mesh one side, 3/4" rib lath other side.
- *G — Metal lath one side, 3/4" rib lath other side.
- *H — 3/8" rib lath both sides.
- J — No. 12 mesh fly screen both sides.
- Z — Wire mesh one side, fly screen and expanded metal lath other side and edges.

* In the rib lath reinforcement, all ribs are turned in and run lengthwise unless otherwise specified. Where the application calls for an air space between the hot surface and insulation, a turned out rib lath is used to provide that air space.

Size—R & I Blankets are made in 2 ft. by 4 ft., and 2 ft. by 8 ft. sizes. Special sizes are manufactured to desired specifications.

Thickness—Any blanket thickness from 1" to 6".

Packing—All R & I Blankets are packed in heavy, fibre board (500 lb. test) cartons, which provide ample protection in shipment. On overseas shipments, sturdy, wooden boxes circled by steel straps can be provided.

LIST PRICES PER SQUARE FOOT

Subject to Discount

Thickness in Inches	Style A	Style B	Style BB	Style C	Style D	Style E	Style F	Style G	Style H	Style J	Style Z
1	\$0.40	\$0.45	\$0.45	\$0.55	\$0.60	\$0.60	\$0.70	\$0.75	\$0.75	\$0.60	
1 1/4	.45	.53	.53	.60	.65	.65	.75	.83	.83	.65	
1 1/2	.50	.60	.60	.65	.70	.70	.80	.90	.90	.70	
1 3/4	.55	.65	.65	.70	.75	.75	.85	.95	.95	.75	
2	.60	.70	.70	.75	.80	.80	.90	1.00	1.00	.80	
2 1/2	.70	.80	.80	.85	.85	.90	1.00	1.10	1.10		
3	.80	.90	.90	.90	1.00	1.00	1.10	1.20	1.20		
3 1/2	.88	.98	.98	1.03	1.08	1.08	1.18	1.28	1.28		
4	.95	1.05	1.05	1.10	1.15	1.15	1.25	1.35	1.35		
4 1/2	1.03	1.13	1.13	1.18	1.23	1.23	1.35	1.45	1.45		
5	1.10	1.20	1.20	1.25	1.30	1.30	1.45	1.55	1.55		
5 1/2	1.18	1.28	1.28	1.33	1.38	1.38	1.55	1.65	1.65		
6	1.25	1.35	1.35	1.40	1.45	1.45	1.65	1.75	1.75		

Prices on application

HOW TO SELECT THE PROPER THICKNESS

The minimum thicknesses of blanket insulation to use on the hot surface are as follows:

Temperature—deg. F. of Equipment		Thickness of Blanket				
200	300	500	700	900		
1"	1½"	2"	2½"	3"		

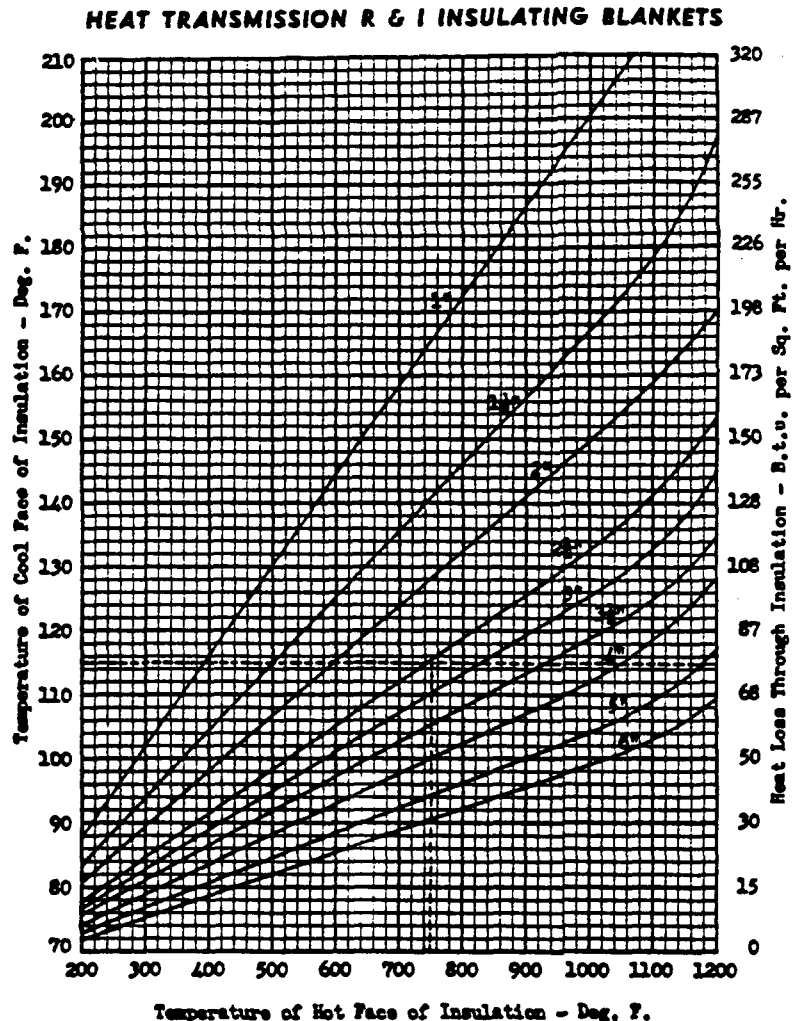
It is obvious that the greater the thickness for corresponding temperatures the greater is the heat saving. There is, however, an economic limit to insulation thickness vs. heat saving. To determine the thickness of insulation required, two factors must first be determined:

- The outside surface (or face) temperature desired.
- The heat loss through a given thickness.

The chart above shows the relationship between the hot face of the metal or refractory equipment under the insulation and the cool face on the outside of the insulation. If, for a given hot face temperature, a certain cool face temperature is desired, the correct thickness of insulation to specify is determined by drawing a line vertically from the hot face temperature scale to intersect at right angles with the horizontal line drawn from the cool face temperature scale.

Example:—If the hot face temperature is 750 deg. F. and the cool face of insulation desired is 115 deg. F., the thickness of insulation to use is 2½". By reading straight across to the extreme right, the heat loss is given, which, in this case is 78 B.t.u. per sq. ft. per hour.

Conversely, if it is desired to insulate for a heat loss of 50 B.t.u. per sq. ft. per hour, trace the line at 50 B.t.u. horizontally to where it meets the vertical line at 750 deg. F. hot face and read 4" thickness (approximately); then extend line to left to read a cool face temperature of 100 deg. F.



HOW TO APPLY R & I BLANKETS

R & I Blankets are relatively easy to handle and install. They may be either flexed over curved surfaces or placed against flat surfaces, without need for additional wire mesh or other fabrics to hold the insulation in place. Adjacent blankets are brought together easily and quickly, the edges bonding to make a tight heat seal. They may be cut to fit around special shapes or obstructions.

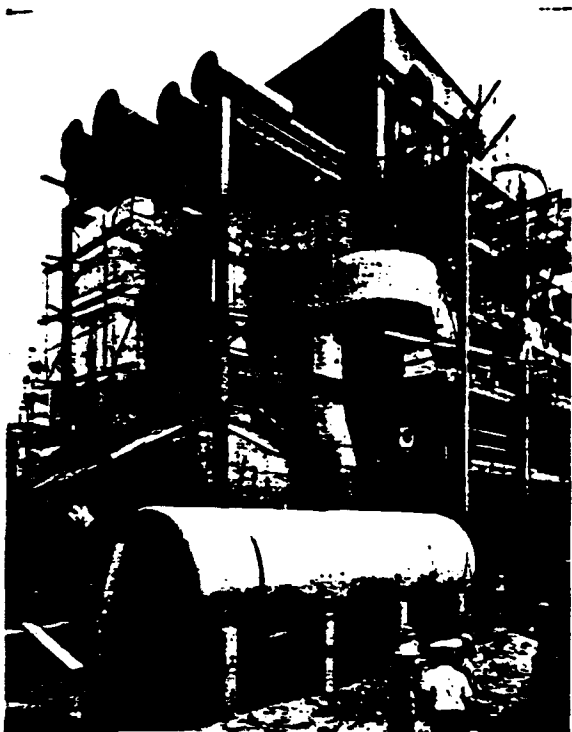
Furthermore, where it is necessary, by using metal lath with ribs (of any height desired) turned out from the blanket face, an air space may be obtained between the hot surface and insulation. Since the wool does not project through the wire lath, the wire surface presents a far better anchor for finish coats of cement.

The most widely successful method of applying blankets is to spot weld wires to the metal surface to be insulated on 14" centers, allowing these wires to lay flat against the metal until ready to apply the blankets.

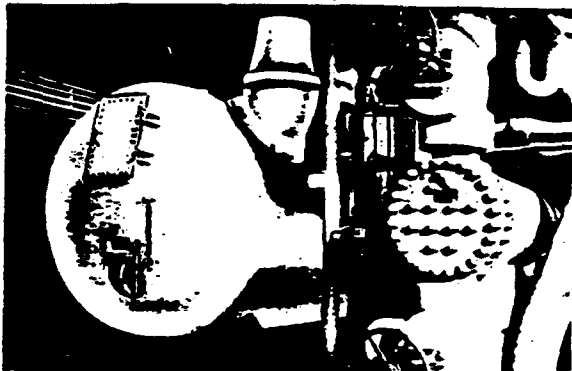
Then the wires are bent upright or at right angles to their original position and the blanket pressed against them, forcing the wires through the blanket so that at least a 2" length protrudes beyond the outside surface of the blanket. These protruding wires may then be bent down tightly against the blanket, holding it firmly against the metal surface to be insulated. The old method of tying the blankets to the surface to be insulated by means of wires or cables can also be used.

Super-Finish Stic-Tite, a hard, durable, adhesive coating may be applied in one coat directly on the expanded metal lath on the outside of the blanket. A ¾" thickness of cement is recommended. No primary or roughing coat is required. The one cement application may be troweled to an exceptionally smooth, glossy finish.

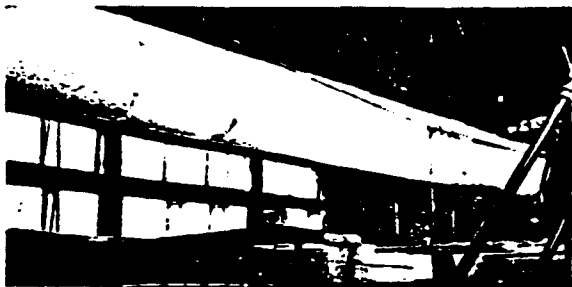
Where waterproofing is necessary, the application of R & I Weatherkote is recommended.



R & I Style B Mineral Fibre blankets installed on the ducts of a large boiler.



Hot water tank in large power plant insulated with 2" of R & I Blankets and a hard, protective coat of Super-Finish Stic-Tite Insulating Cement.



A 25' section of tie line to power plant boilers covered with pre-curved blanket insulation.

INDUSTRIAL APPLICATIONS

Power Plants

Accumulators, Steam
Boilers, Water Cooled Walls
Boilers, Round or Sectional
Boilers, Waste Heat
Breechings, Externally
Ceilings, Boiler Room
Ducts, Hot Air
Fan Housings
Heaters, Feed Water
Heaters, Hot Water
Stacks, Steel, Externally
Tanks, Hot Water Storage
Turbines

Oil Refineries

Boilers, Oil Field
Boiler Breechings
Condensers
Heat Exchangers
Still
Tanks
Towers

Industrial Ovens

Insulating between steel
panels of
Ovens, Enameling
Ovens, Core

Ovens, Drying
Heaters, Air
Spray Dryers

Paper Mills

Digesters, Pulp
Boilers
Evaporators

Breweries

Brew Kettles
Cookers
Lauter Tubs
Tanks, Hot Water

Transportation

Boilers, Locomotive
Railway Tank Cars
Tank Trucks

Domestic Equipment

Oven Panels and Doors
Ducts

Chemical Processing

Precipitators
Reactors
Tanks
Vulcanizers



Exhaust stack covered with R & I Blankets and Stic-Tite and protected against weather by Weatherkote.



HEAT INSULATING MATERIALS

STIC-TITE PLASTIC INSULATION

Strong • Light • Adhesive

Easy to Apply

Gives Maximum Coverage

Durable • Reclaimable

Very Efficient to 1800°F.

Stic-Tite is a plastic material that is outstanding for its economical coverage of heating and heat transfer equipment and for its superior insulating efficiency. It is a special R & I mineral and diatomaceous earth fiber, dry granular composition which requires only mixing with clean water to be ready for easy use. It adheres to any clean surfaces and stays on under practically all conditions to 1800°F.

In compounding Stic-Tite, every consideration was given to combining into one insulating cement the important physical properties of plasticity, ease of application, lightness, adhesiveness and strength over a wide range of temperature to provide an insulation of maximum thermal efficiency.



Piping, valves, flanges, ells, fittings in a power plant heating equipment system covered with Stic-Tite and troweled to a smooth finish.



Bag of Stic-Tite showing uniform, dry material (left) and ready-to-apply plastic mass. Packed in 25, and heavy lined paper bags containing 50 lbs.

HIGH INSULATING EFFICIENCY

Stic-Tite's high insulating value lies in the distribution of billions of minute dead-air cells, uniform in size, which are imprisoned in the spongy, porous mass, after the material has been applied. These resilient cells, which remain intact even after the material has dried out, are well isolated from one another, providing a firm and positive check against air infiltration.

AN ALL-PURPOSE INSULATION

Stic-Tite has been tested and proven over the years in extensive service in power plants and industrial heat processing equipment of all kinds, ducts, piping and fittings. With its efficient coverage for heat insulating requirements up to 1800°F., it is truly an all-purpose insulation that precludes the need for several types of insulation that are limited in temperature and application. It can be used on metal, tile, brick, glass or any other clean surface, hot or cold, adhering permanently, without lifting off or shaking loose even when subjected to severe vibration, abrasion or impact. For greater thickness or for covering large, unsupported areas, wire mesh or pencil rod reinforcement is advisable to give the Stic-Tite insulation greater rigidity and durability.

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HEAT INSULATING MATERIALS

STIC-TITE PLASTIC INSULATION

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Easy to Apply

Gives Maximum Coverage

Durable • Reclaimable

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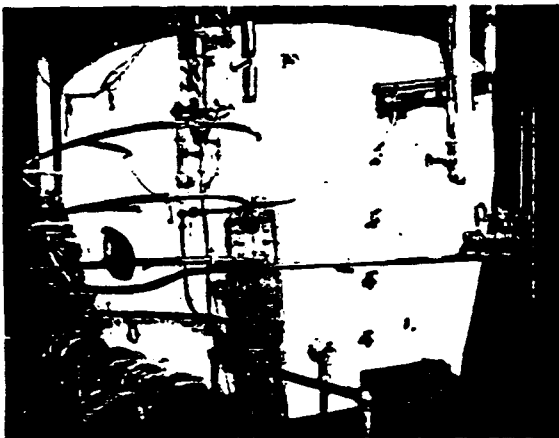
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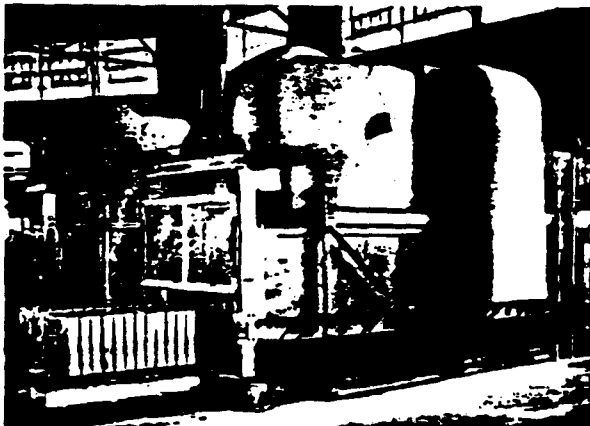
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Water walls of large boiler in a pulp and paper mill insulated with 6" of Stic-Tite over pencil rod reinforcement. Rough coat shown later covered with a smooth finish coat of cement.



Stic-Tite can be readily applied over the surface to the desired thickness. Note how smoothly and completely it is molded around the fittings and openings of this water gas generator.



Two aluminum annealing ovens with oil fired air heaters, recirculating fans and ducts insulated with Stic-Tite.

EASY TO APPLY

Its plastic consistency makes it easy to mold Stic-Tite around pipes, flanges, over or under equipment, difficult places and into difficult shapes. It may be molded by hand or troweled. No special skill is needed to apply. Stic-Tite contains no harmful ingredients, hence it is perfectly safe to handle with bare hands.

Stic-Tite dries to a one-piece, seamless, jointless covering which does not permit loss of heat. It makes a clean, smooth finish requiring no other finishing coat. It may be sized or painted. It can be first applied as a roughing coat and later troweled to a smooth finish with the same material from the same batch. While not waterproof in itself, Stic-Tite may be easily and efficiently waterproofed with R & I Weatherkote.

BETTER COVERAGE

Because Stic-Tite dries with a minimum of shrinkage in thickness, less of it is required to provide the required insulation than of other insulating cements. An inch of Stic-Tite applied wet remains practically an inch thick when dry. Since it remains tough, flexible and resilient as it dries out, any tendency to contract, shrink and crack is minimized.

Mixed and applied as directed, Stic-Tite covers 45 sq. ft. per inch of thickness per 100 lbs. of material used.

FULLY RECLAIMABLE

Stic-Tite need never be discarded, even when removed from equipment for repairs or alterations because it can be used over again without loss of material or insulating efficiency. Where previously used for temperatures up to 900°F., it is only necessary to crush and mix the old Stic-Tite with clean water and the cement is ready for remolding. Where used at higher temperatures, it is advisable to add an equal part of new Stic-Tite to the reclaimed material.

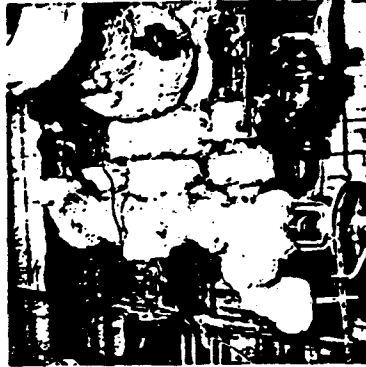
MORE ECONOMICAL

Because of Stic-Tite's ease of application on irregular surfaces, as well as large or small flat or curved surfaces or for patching other insulations, labor cost is relatively low. It sticks to hot or cold surfaces readily, hence the expense of supporting or reinforcing wires is eliminated in most cases, making a uniformly efficient covering that keeps heat losses at a minimum and assures maintenance of desired temperatures in the equipment insulated.

Stic-Tite is an indestructible investment. It is much lower in cost than insulating blankets or block.



Dust collector insulated with Blankets, then covered with Stic-Tite to protect workmen against burns.



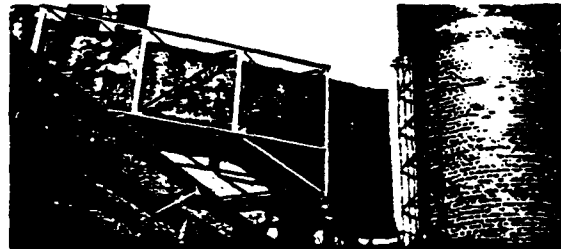
No matter how irregular the surface, as in this job, Stic-Tite is put on without reinforcement or expensive labor. Note how easily it can be roughed out to any desired thickness.



The same job with the same Stic-Tite mixture put over the dry roughing coat and smoothed off with a trowel. In the event of repairs, both roughing and finishing coats are reclaimed, without separation or loss.

PACKED CONVENIENTLY

Stic-Tite is shipped dry in heavy lined, dustless paper bags containing 25 lbs. and 50 lbs. each. It does not deteriorate in dry storage and can be kept indefinitely if damp or wet places are avoided.



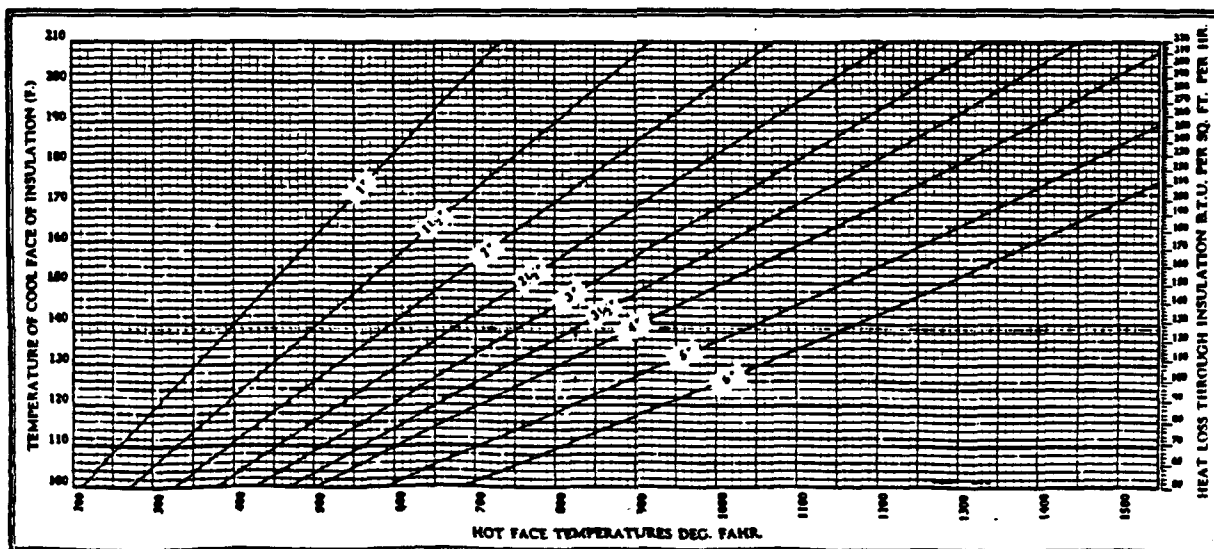
Stic-Tite applied over R & I Krackpruf Blanket Insulation on a large outside boiler stack breeching, 12 ft. x 10 ft. x 60 ft. long and protected with Weatherkote Cement.

HOW TO SELECT PROPER THICKNESS

Estimate the operating temperature of your installation, (hot face). Follow the hot face temperature (bottom of chart) vertically until it intersects the line connecting the cool face (left hand column) or B.t.u. loss (right hand column). Use the amount of Stic-Tite indicated on the Stic-Tite curve nearest the point of intersection.

For example, assume operating temperature is 825°F. and a cool

face of 139° or 126 B.t.u. loss is desired. Follow the 825° line vertically until it intersects the horizontal 139° and 126 B.t.u. loss lines. The intersection is nearest the 3½" Stic-Tite curve. Therefore, 3½" of Stic-Tite should be used. At the same operating temperature if a cool face of 124° or B.t.u. loss of 96 is desired, the intersection would be nearest the 5" Stic-Tite curve. Therefore, 5" of Stic-Tite should be used.

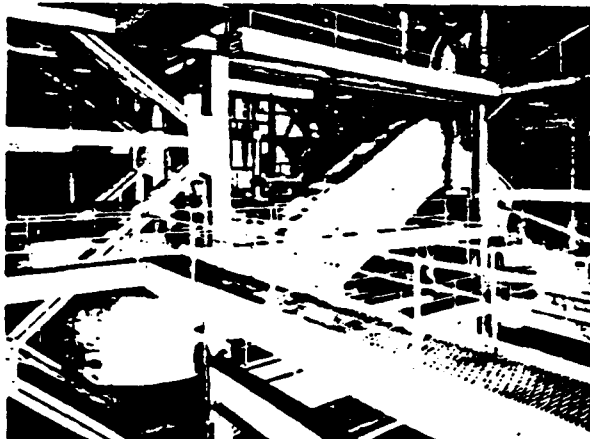




Stic-Tite troweled to a smooth, attractive finish on the casing of a large public utility boiler provides efficient, durable insulation and reduces air leakage to a minimum.



First rough application coat of Stic-Tite to an air pre-heater in a power plant.



Large primary air duct leading to pulverized coal furnace, covered with Stic-Tite over R & I Insulating Block.

HOW TO APPLY STIC-TITE

1. Each 50# bag of Stic-Tite should be mixed with 12 gallons (100 lbs.) of fresh water per 50# bag.
2. After thoroughly mixing, Stic-Tite Insulation Cement can be applied immediately, but better results can be obtained by allowing it to soak for at least half hour or longer.
3. All surfaces to be covered, should be free of paint, dust, dirt and grease.
4. Roughing coats can be applied by hand or trowel or combination of hand and trowel.
5. If hot surfaces are to be insulated with Stic-Tite, the material should be spotted in place with a trowel and dragged down to a feather edge. The spotted material will dry quickly and then a rough coat about 1" thick can be applied over and between the spots.
6. On cold surfaces for covering up to $1\frac{1}{2}$ " thick, after being mixed according to directions on the bag, Stic-Tite should be applied by spreading it over the surface to as even a thickness as possible. After rough coat has dried out, a finish coat up to $\frac{1}{2}$ " thick can be applied over the rough surface and finished with a trowel to a smooth, attractive finish. Stic-Tite can be used up to $1\frac{1}{2}$ " thick without reinforcing.
7. For covering over $1\frac{1}{2}$ " thick, apply a rough coat about 1" thick. When rough coat is dry apply another 1" coat and continue until desired thickness is obtained. Each coat should be dried before additional coats are applied. Prior to application of finish coat, we recommend reinforcing with #20 gauge 1" mesh chicken wire.
8. Finish coats should be applied from $\frac{1}{4}$ " to $\frac{1}{2}$ " thick troweled to a smooth hard finish. Where desired, Stic-Tite finish can be painted. Best results are obtained by painting with a glue sizing and paint over this.
9. If more Stic-Tite is mixed than can be used, the left over material can be laid aside and remixed with water at a later date when it is required.

WHERE TO USE STIC-TITE

- | | |
|--|---------------------|
| Air Heaters | Hot Air Ducts |
| Burner casings | Hot Air Lines |
| Boiler front, side and rear walls | Hot Piping |
| Breechings | Hot Water Heaters |
| Cookers | Kettles |
| Drum Heads | Reaction Vessels |
| Elbows | Regenerator Faces |
| Flanges | Steam Heaters |
| Feed Water Heaters | Steam Pumps |
| Furnace and Oven Doors, Walls, Floors, Roofs | Tanks |
| Gas Generators | Tube Doors |
| | Uptakes |
| | Valves and Fittings |
| All Irregular Surfaces | |

CE0114167

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HEAT INSULATING MATERIALS

SUPER-FINISH STIC-TITE

A One-Coat Finish Plastic Insulation

Smooth Finish • No Cracks

Very Adhesive

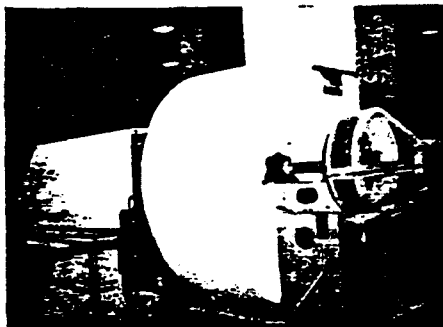
**Hard Surface Resistant
to Abrasion and Water**

Light • Efficient • Economical

R & I Super Finish Stic-Tite is a dry mixture of mineral wool and diatomaceous earth base forming a fibrous insulation that provides a strong, hard finish covering for insulating blankets, block and other insulating cements.



Bag of Super Finish Stic-Tite showing uniform, dry material (left) and easy to handle plastic after mixing with water. Packed in 25 lb. bags.



Housing of large fan for hot gases in cement mill; covered with R & I Insulating and smooth finished with R & I Super Finish Insulating Cement.



Conical bottom of air separator and piping carrying hot air from furnace; covered with R & I Insulating Block and smooth finished with R & I Super Finish Stic-Tite Insulating Cement.

Because it is exceptionally adhesive, Super Finish Stic-Tite can easily be applied to full thickness over other insulations in one coat, finishing very smooth without need for supplementary pointing up or patching after the cement has dried out. Being a finish that can be troweled smooth in one coat, considerable time and labor are saved in eliminating the roughing coat.

Super Finish Stic-Tite has little or no shrinkage; hence it dries hard, without cracking, in about 2 hours. It can be applied directly to cold or warm metal or brick surfaces up to 175°F. When applied to hotter surfaces, a base coat of regular Stic-Tite is recommended.

Super Finish Stic-Tite truly sticks tight the moment the wet cement is troweled on, even on overhead surfaces, so that the workman can easily work the material to a smooth finish. And it stays on for keeps, bonding to the insulating blankets, block or other insulation surfaces permanently.

Its hard finish provides good resistance to moderate impact and abrasion and to moisture. Hence it is used extensively on outside equipment. For protection against weather, however, a covering of R & I Weatherkote is desirable. The surface of Super Finish Stic-Tite is well suited to painting.

Unlike ordinary insulation finishes, Super Finish Stic-Tite is light, weighing only 30 lbs. per cu. ft. It provides excellent insulation at temperatures up to 1700°F.

In material economy, it goes a long way. One hundred lbs. will cover an 80 sq. ft. surface $\frac{1}{2}$ " thick or 120 sq. ft. $\frac{3}{8}$ " thick or 160 sq. ft. $\frac{1}{4}$ " thick. This is considerably greater coverage at much lower overall cost than with any other durable one coat finish insulation available.

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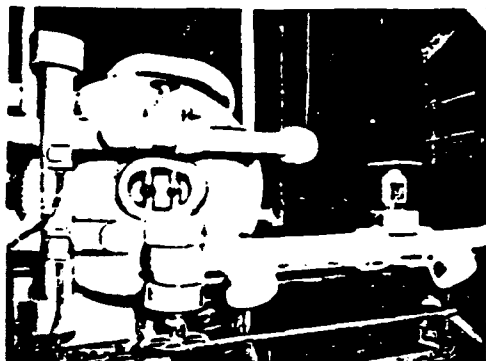
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Catalog No. I-99

CE/HI (F) 33233



Drum head, piping, flanges, ells, valves, insulated with Stic-Tite and then troweled to a smooth, white, hard finish with Super Finish Stic-Tite.

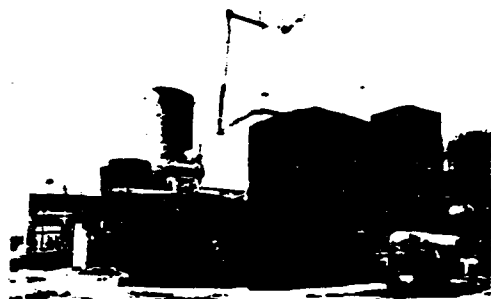
HOW TO APPLY SUPER FINISH STIC-TITE

1. Mix Super Finish Stic-Tite thoroughly with 5 to 6 gals. fresh water per 25 lb. bag.
2. Allow the cement mix to soak for one-half hour before using to insure maximum workability.
3. Mix no more than will be applied in 4 hours.
4. If any of the batch has dried out, do not remix it with water or fresh, dry material as the resultant finish will not be hard. Use only fresh batches.
5. For smoothest finish, trowel the cement to at least $\frac{3}{8}$ " thickness.
6. Where used as a finish coat over an insulating cement roughing coat, be sure the undercoat has set overnight before applying Super Finish Stic-Tite.
7. Where a given area cannot be finished in a continuous application, the joints should be featheredged.

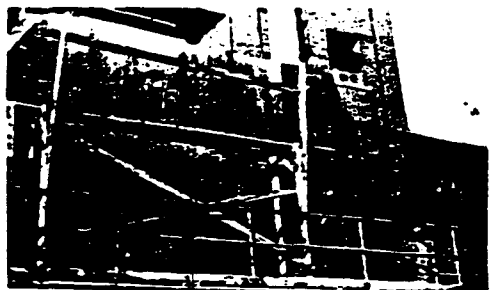
R & I WEATHERKOTE

A Protective Coating Over Insulation for Outdoors

Weatherproof • Waterproof • Resistant to Abrasion



These large insulated storage tanks are protected from the weather by R & I Weatherkote.



Chicken wire was stretched over a nest coat of R & I Weatherkote covering insulation on this large outside duct. To the right is seen an additional light coat of Weatherkote mixed with sharp sand, troweled to a smooth finish.

Weatherkote is a mixture of asphalt emulsion and long fibred asbestos of heavy plastic consistency for applying over the insulation of heating equipment exposed to the outdoors. Its elasticity prevents cracking even under extreme variations in temperature. It serves as an added means of insulation and for preventing air infiltration.

Weatherkote is easy to apply. The surface to be covered should be swept clean and free of loose particles. Then apply chicken wire directly over the insulated surface drawing it tightly to the insulation before applying Weatherkote.

Weatherkote should be mixed with 25% clean sharp sand and applied over the wire to a thickness of approximately $\frac{1}{4}$ " and troweled off smooth. Where a very smooth surface is desired, plain Weatherkote can then be lightly troweled over the material which has been mixed with sand for a very smooth finish.

For a coating which must be resistant to abrasion, hard use and even walking, Weatherkote can be mixed with one part by volume of clean sharp sand.

Applied plain, Weatherkote covers 50 sq. ft. approximately $\frac{1}{4}$ " thick per 100 lbs. Mixed with 25% clean sharp sand by volume, Weatherkote covers approximately 64 sq. ft. $\frac{1}{4}$ " thick per 100 lbs. Mixed one part clean sharp sand by volume with one part Weatherkote it covers approximately 75 sq. ft. $\frac{1}{4}$ " thick per 100 lbs.

Weatherkote is packed in steel drums containing:

- 5 gallons—approx. 50 lbs.
- 30 gallons—approx. 270 lbs.
- 55 gallons—approx. 500 lbs.

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