

INSULAG

Reg. U. S. Pat. Off.

A HIGHLY EFFICIENT INSULATING LAGGING

PLAINTIFF'S EXHIBIT

Q-904

*With Air-setting Properties for a Wide Range
of Temperature Applications*

WATER RESISTANT—ECONOMICAL

Bulletin No. 332-F

A QUIGLEY PRODUCT

Fig. 1—Three Boilers Insulated With INSULAG.



INSULAG is a superior refractory lagging with unsurpassed insulating properties for use on high or low temperature equipment. It can be applied on hot or cold metal surfaces, and as a finishing coat for insulation.

INSULAG possesses at recommended temperatures exceptionally high refractory and insulating properties. INSULAG is used at operating temperatures at which other laggings fail.

Its unusual low heat storage and low thermal conductivity make **INSULAG** a most effective insulator for the control of temperatures. **INSULAG** permits reduction in thickness of heavy refractory walls and, in turn, decreases the heat capacity of the total structure. Fuel savings, constant temperatures and increased production result from its use.

INSULAG increases in thickness after application and retains this increased volume throughout its entire range of service temperatures. **INSULAG**, after it has set, does not dissolve or collapse from contact with water, oil or steam, which properties make it an outstanding product.



Fig. 2—Boilers Insulated With **INSULAG**.

PROPERTIES OF INSULAG vs. FIRE BRICK Heat Conductivity B.t.u./Sq. Ft./In. Thick/°F./per hour		
MEAN TEMPERATURE	INSULAG	FIRE BRICK
500°F.	.56	8.15
1000°F.	.70	9.99
1500°F.	.84	
Approximate weight per cu. ft. applied	36 lbs.	150 lbs.
Heat storage per lb. per °F.	24 B.t.u.	24 B.t.u.
Heat Storage for same insulating effect	1/40	1.

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This bulletin becomes effective as of October 1, 1948, and cancels in its entirety all previously issued bulletins or data referring to this product.



Fig. 3—Walls, Ducts, Casings, Drums of Large Boilers Insulated With **INSULAG**.

POWER PLANTS—**INSULAG** meets the engineer's demand for a suitable material for covering turbines, feed water heaters, hot liquid storage tanks, drums, smoke flues, stacks, pipes and flanges. It is also recommended as insulation in back of refractory tile of water wall boilers and outside fire brick walls in boiler furnace construction.

ON BOILER DRUMS—**INSULAG**, used on the boiler drums because it does not crack in service, can be walked on without destruction, and does not collapse due to steam leaks or water dripping on same.

FIRE-PROOFING—Bins, walls, roof structures, furnace rooms, columns, etc., may be protected against fire by applying **INSULAG** as a veneer coating. The fire retardant properties of **INSULAG** render it ideal for this purpose.

GENERAL USES—**INSULAG** has such a wide range of uses that it is indispensable as a plastic lagging in plants using fuel fired furnaces. It is "the lagging material of a thousand uses."

QUICK SUMMARY

1" equals 9" of fire brick in insulating value.

1/40 heat storage capacity of fire brick for same heat flow.

High mechanical strength.

Operating temperature 2500°F. interface.

Light weight—yet rugged and strong.

Sets quickly.

Adaptable—suitable for practically every lagging need.

Water resistant—steam, oil or water leaks do not destroy.

Expands—an inch applied is more than an inch when dried.

INSULAG is shipped in 50 lb. bags, net.

PROPERTIES OF INSULAG

LOW THERMAL CONDUCTIVITY—INSULAG retains practically constant insulating values throughout its service range, so that under varying conditions and temperature changes there is no appreciable loss of insulating efficiency. One inch of INSULAG has an insulating value equal to about nine inches of fire brick and has about 1/40 the heat storage capacity of fire brick walls of equal heat flow. Therefore, relatively thin applications of INSULAG may be substituted for heavy masses of refractories; heat losses are reduced and furnace production is increased.

HIGH MECHANICAL STRENGTH—INSULAG is different. It develops high mechanical strength upon drying and successfully withstands shock, moderate abrasion and vibration. The impact of a hammer will cause a dent in INSULAG and may even crack it, but the blow will not cause it to break away readily from the equipment to which it was applied. This is most advantageous on drums, tanks, pipe lines and other equipment subject to rough usage.

HIGH TEMPERATURE LIMITS—INSULAG will withstand a wide range of applications for high temperature direct exposure and is recommended for interface temperatures up to 2200°F.

EXPANSION—INSULAG expands after application; physical shrinkage eliminated.

LIGHT WEIGHT—On the average, three pounds of INSULAG covers 1 square foot to a thickness of 1 inch. Varying conditions, methods of application, hard troweling, kinds of surfaces, variations in mixing, water content, and temperature of surfaces at time of application may require more material.

QUICK SETTING—INSULAG cold-sets firmly in 24 hours to 48 hours and in much less time when subjected to heat. The quick drying and setting characteristics of INSULAG permit troweling to a smooth finish suitable for painting.

ADAPTABILITY—INSULAG possesses properties necessary for "roughing" coat and "finishing" coat, or two coats by one application. The user of INSULAG does not find it necessary to carry in stock two or three different materials for the same job.

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NON-INJURIOUS—INSULAG contains no mineral wool, or fine slag particles which are irritants to the hands or other parts of the body.

A feature of INSULAG which particularly appeals to many users is the beautiful, smooth, white surface of a trowelled finished job.

If desired an INSULAG trowelled finished job can be treated with Quigley TRIPLE-A Protective Coatings in white, black, colors or aluminum.

Various combinations of INSULAG with other INSULINE Products can be made for specific applications.

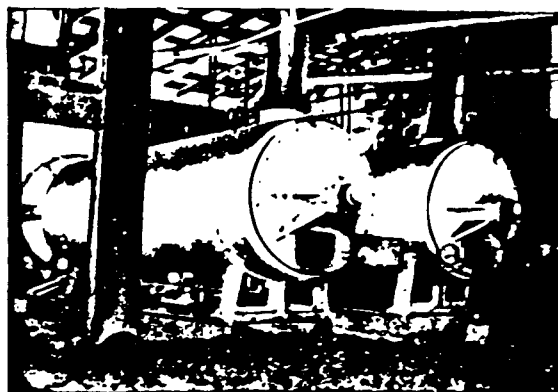


Fig. 4—Steam Drums Coated With INSULAG. No Wrapping or Painting Necessary.

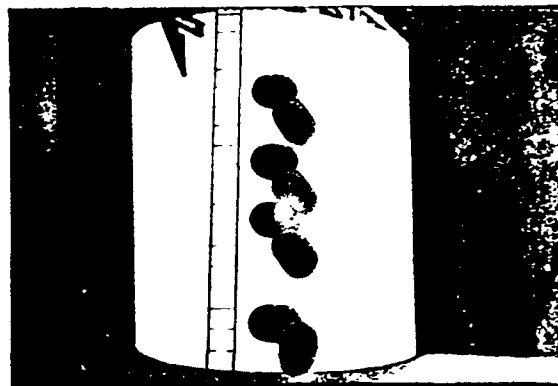


Fig. 5—Dorr Thickener (24 ft. diam. x 10 1/2 ft. high) Insulated With INSULAG.

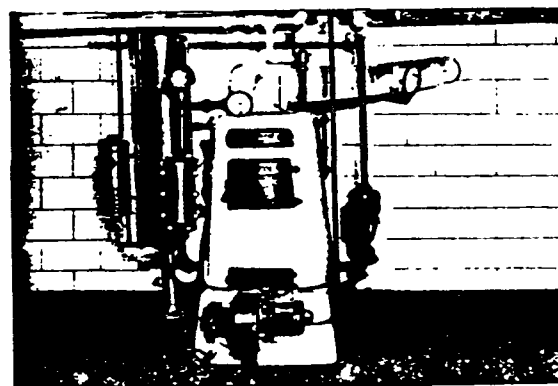
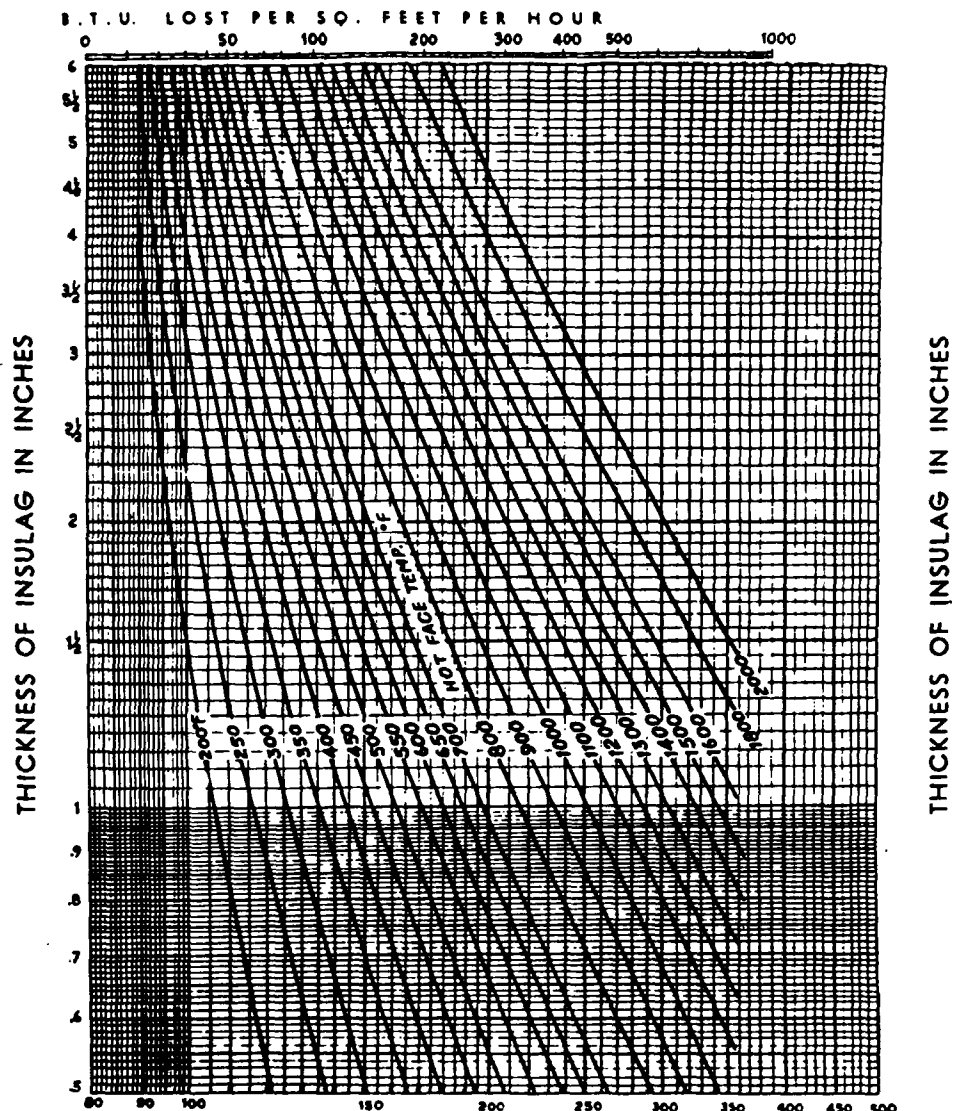


Fig. 6—Water Tank and Boiler Domestic Fuel Oil Burner Insulated With INSULAG.

INSULAG—THICKNESS IN INCHES REQUIRED FOR VARIOUS HOT FACE TEMPERATURES



TEMPERATURE OUTSIDE FACE OF INSULATION DEGREES FAHR. BASED ON STILL AIR AT 80°F.
THIS CURVE IS BASED ON THE INSULATING MATERIAL CAST AND DRIED AND WITH A SURFACE EMISSIVITY FACTOR OF 0.89

How to Determine Heat Savings Effected by INSULAG.

Chart above indicates the heat loss through graduated combination thicknesses of INSULAG, as well as the temperature of the outside surface of the INSULAG at given temperature for the hot surface.

1. To determine the thickness of INSULAG required to give an outside surface temperature.
Example: Temperature of the hot surface is 500°F. What total thickness will give a temperature of about

130°F.? Follow 500°F. line upward until it meets 130°F. curve line. At this point follow horizontal line and read 2 in. Therefore a 2 in. thickness of INSULAG is required.

2. To determine the heat loss through given thickness of INSULAG or from outside face temperature.
Example: Similar conditions as that given under "1". From 130°F. at bottom of chart follow upward until you read 90 B. T. U.'s on the upper scale.

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QUIGLEY COMPANY INC.

New York 17, N. Y.

M & L SUPPLY CO.

BOX 368 - BUTTE, MONTANA.

BOX 2033 - GREAT FALLS, MONT.

ulletin 332F—5M—3-46—AMP.—This cancels and supersedes all previous literature

Printed in U. S.

HOW TO USE INSULAG

(Reg. U. S. Pat. Off.)

A Plastic Refractory Insulator and Sealer for Lugging Interior and Exterior Surfaces of High Temperature Equipment

INSULAG when mixed with water BLOATS. In order to secure maximum insulating efficiency BLOATING MUST TAKE PLACE AFTER APPLICATION—NOT IN THE MORTAR BOX.

Use only quantity of INSULAG that can be mixed and applied within twenty minutes in a clean mortar box or wheelbarrow.

Add sufficient water to INSULAG to make a smooth easy-working mixture. Use clean fresh water at 60-65°F. An average mixture takes about ten and one half (10½) gallons of water to a one hundred pound bag. More or less water may be used for various types of work.

Mix the batch thoroughly and quickly with a hoe or shovel, turning the mixture over to be sure all of the INSULAG is saturated with water. Apply INSULAG promptly after mixing so that the BLOATING TAKES PLACE ON THE WORK INSTEAD OF IN THE MORTAR BOX. Make a fresh batch for each application. Mix only quantity required. Close bag tightly to keep the unused material in good dry condition.

All surfaces which are to be covered with INSULAG should be dry and clean—free of dust, loose scaly rust, paint and grease. When surface is painted with asphalt products, same should be entirely removed before application.

INSULAG is applied by either hand application, premixed pneumatic guns, syphon guns or gunniting. INSULAG should be applied to uniform thickness—allow bloating action to take place and INSULAG to set. Smooth hard finish is obtained by wet troweling finishing coat, which makes INSULAG water resistant.

All applications exceeding ½" should be reinforced, preferably with 2" x 2" x 14 gauge square mesh tied or affixed to the surface being insulated,

this to be on approximately 16" centers. Each additional 1" to 1½" should be similarly reinforced. The previous applied INSULAG should be scored or scratched while still moist to insure proper bonding of the additional thickness.

For hot application, a small quantity of INSULAG should be diluted into a thick paint consistency and painted on the entire surface, which will rapidly dry. Then spot-coat with regular mix INSULAG, allow the spot-coats to set up, and then fill with INSULAG. For additional thickness, use reinforcing as described above.

Where INSULAG is applied over porous surfaces the reinforcement, as described above, should be applied and securely fastened. INSULAG diluted to a stucco consistency should be painted to seal any absorption of this porous material i.e., (85% magnesia, asbestos, rockwool, fibreglass, block insulation). After this priming coat, the normal INSULAG application can be made.

INSULAG will set up hard in 8 to 24 hours depending upon temperature and atmospheric conditions.

For large valves, flanges and intricate shapes, INSULAG may be hand molded to this equipment.

INSULAG, when set, will not dissolve or collapse from contact with water, oil or creosote; is resistant to vapors of steam, acid or alkaline solutions. Should it become wet, heat will restore its original insulating value.

The above instructions cover general applications. However, for large surfaces or Gun applications, or when it is desired to use INSULAG alone or in combination with other materials to form panel construction, recommendations will be furnished upon request.

QUIGLEY COMPANY INC.

Manufacturers of Refractory Specialties and Paints

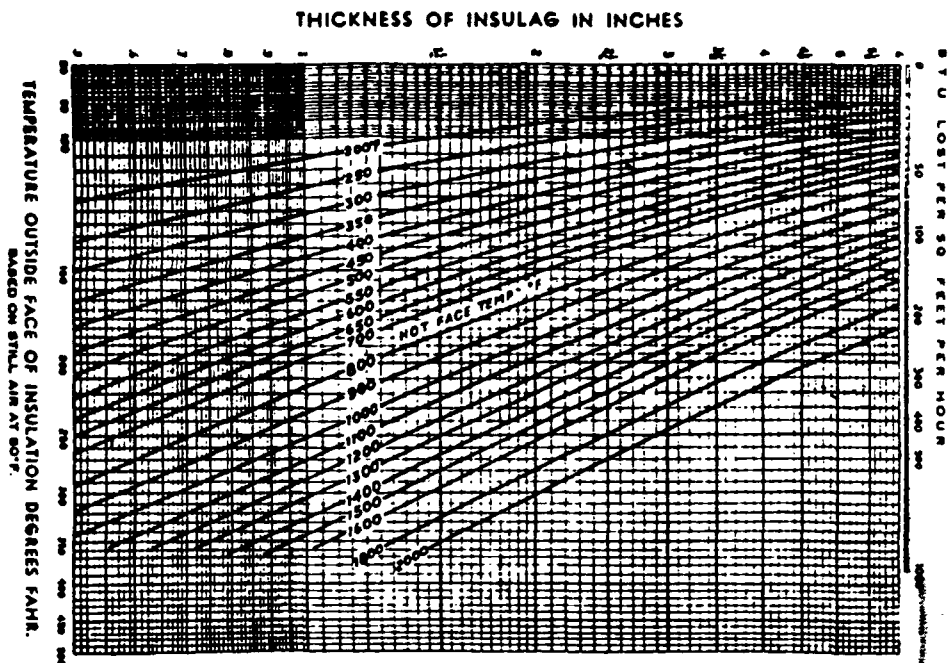
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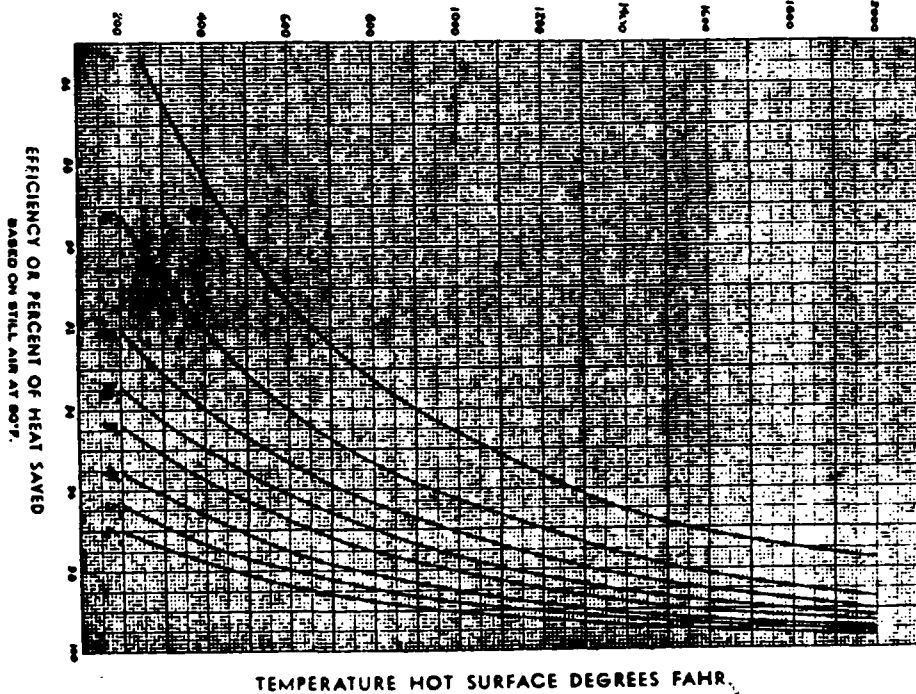
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INSULAG—THICKNESS IN INCHES REQUIRED FOR VARIOUS HOT FACE TEMPERATURES



THICKNESS OF INSULAG IN INCHES
THIS CURVE IS BASED ON THE INSULATING
MATERIAL CAST AND DRIED AND WITH A
SURFACE EMISSIVITY FACTOR OF 0.89.
TEMPERATURE HOT SURFACE DEGREES FAHR.



EFFICIENCY OF VARIOUS THICKNESSES OF INSULAG

Chart above indicates the heat loss through graduated thicknesses of INSULAG as the temperature of the hot surface of the INSULAG is given. To determine the thickness of INSULAG required to give an outside surface temperature:
Example: Temperature of the hot surface is 600°F. What heat thickness will give a temperature of about 120°F? Follow 600°F. line upward until it reaches 120°F. line, then read 2 in. thickness of INSULAG is required.
To determine the heat loss through given thicknesses of INSULAG or from outside face temperatures:
Example: Similar conditions as last given under "1". From 120°F. at bottom of chart follow upward until you reach 2 in. on the upper scale.

The efficiency of INSULAG is obtained by subtracting the heat loss through the INSULAG from the heat loss of the surface not insulated and dividing the difference by the heat loss of the surface not insulated.
Chart above indicates the efficiency or percent of heat saved by the application of various thicknesses of INSULAG.
Example: For same conditions used for chart page "1" from 600°F. following horizontal line until you reach 2 in. on upper line and reading directly downward you have 94.17%. Therefore the application of 2 in. INSULAG is a heat loss of 600°F. saves 94.17% of the radiation heat.

Pfizer

QUIGLEY COMPANY, INC.

236 E. 42ND ST. NEW YORK, N.Y. 10017

212 LR 3-3444

TYPICAL ANALYSIS DATA

PRODUCT: INSULAG
DESCRIPTION: INSULATING LAGGING MATERIAL
P.C.E.: CONE 9 (2345°F)
SERVICE LIMIT: 2000°F (Exposed), 2200°F (Interface)
WEIGHT PER CUBIC FOOT: 36 lbs.

CHEMICAL ANALYSIS:

SiO ₂	46.0%
Al ₂ O ₃	24.6
Fe ₂ O ₃	1.4
CaO	19.5
MgO	4.9
TiO ₂	0.6
Alkalies	1.1
L.O.I.	1.9

THERMAL CONDUCTIVITY:
(BTU/Sq. Ft./Hr./°F/In.)

<u>Mean Temp.</u>	<u>'K'</u>
500°F	.56
1000°F	.70
1500°F	.84

SHRINKAGE: NONE

MODULUS OF RUPTURE: SEE CHART A-4797

*0.7 % asbestos dust
2.1%
" " " " " "*

This data is average results of control tests and is subject to variations on individual tests. These results should not be used as maximum or minimum for specification purposes.

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Manufacturers of Industrial Specialties
527 Fifth Avenue—New York 17, N. Y.

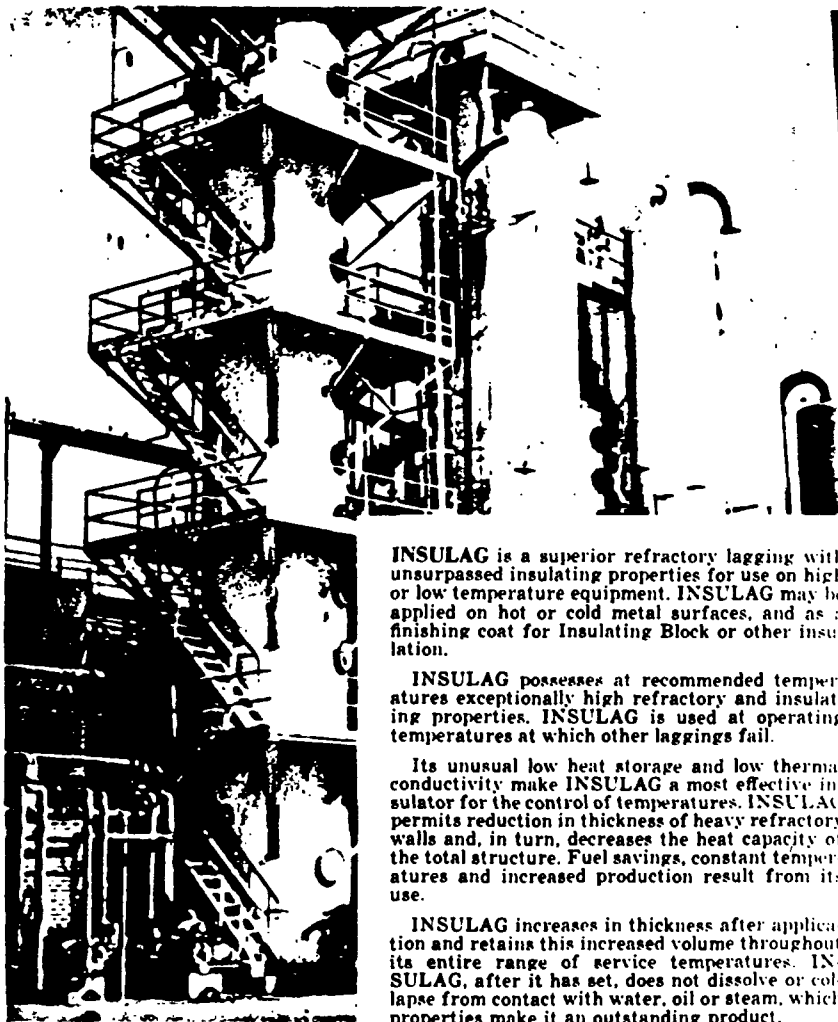
REFRACTORY DIVISION

BULLETIN No. 327-41

INSULAG

(Patents Pending—Reg. U. S. Pat. Off.)

REFRACTORY PLASTIC INSULATING LAGGING



Oil Refinery Towers

INSULAG is a superior refractory lagging with unsurpassed insulating properties for use on high or low temperature equipment. INSULAG may be applied on hot or cold metal surfaces, and as a finishing coat for Insulating Block or other insulation.

INSULAG possesses at recommended temperatures exceptionally high refractory and insulating properties. INSULAG is used at operating temperatures at which other laggings fail.

Its unusual low heat storage and low thermal conductivity make INSULAG a most effective insulator for the control of temperatures. INSULAG permits reduction in thickness of heavy refractory walls and, in turn, decreases the heat capacity of the total structure. Fuel savings, constant temperatures and increased production result from its use.

INSULAG increases in thickness after application and retains this increased volume throughout its entire range of service temperatures. INSULAG, after it has set, does not dissolve or collapse from contact with water, oil or steam, which properties make it an outstanding product.

WHERE TO USE

Boilers—Breechings—Heaters.
Hot Air Ducts—Still—Vessels.
Troughs Aluminum furnaces.
Back up water walls.
Insulate Turbines.
Towers—Vessels—Tanks.
Glass plants on Regenerator.
Recuperator and Brick Pot Cap.
Main Furnace Crown and Lehrs.
Air Heaters.
Combination with Q-PANELCRONE in abrasive resistant linings.
Combination with PLASTIC INSULCRETE for PANELS for Heat Treating Furnaces and other diversified applications.

SUMMARY OF PROPERTIES

Refractoriness	1800°F
Shrinkage	none-wet to dry
Thermal Conductivity	500°F—.56 1000°F—.70 1500°F—.84
Coverage	Cast—28= per cu. ft. Plaster 30= per cu. ft.
Packed	50 lb. Bags

HOW TO USE

Entire contents of bag should be thoroughly mixed before adding water.

For Plastering Mix use approx. 9½ gal. of water per 50 lbs.

For Casting use approx. 10½ gal. water per 50 lbs.

Use fresh water 60° to 70° F and add to dry PANELAG.

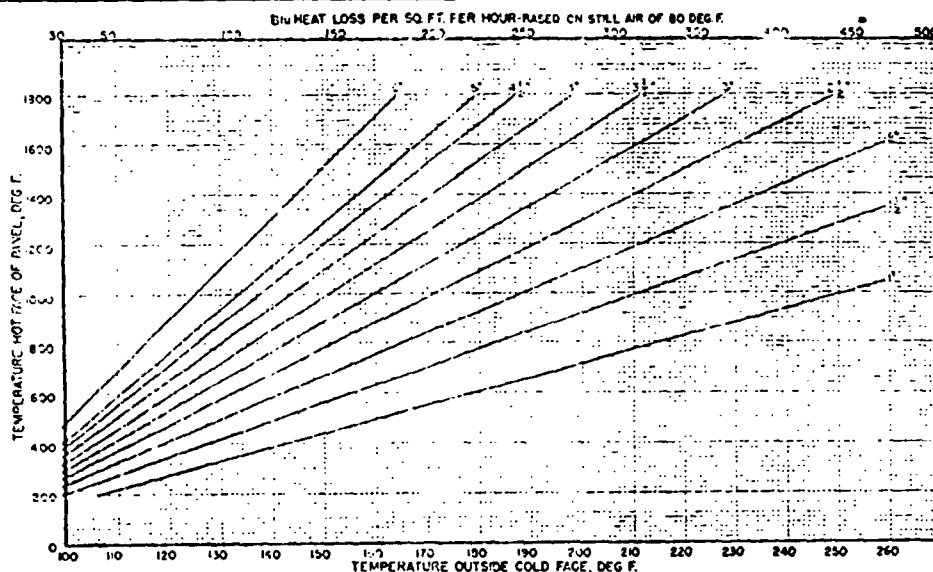
Mix only what can be applied in 30 minutes.

Mix hatch thoroughly in concrete mixer from two to five minutes or with hoe in mortar box.

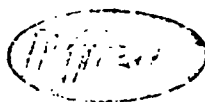
Allow PANELAG to cure for twenty-four (24) hours at temperature of 60°F. to 70°F. but not lower than 50°F. Allow additional twenty-four (24) hours for preliminary air-drying before placing in service.

Do not allow to freeze during applying-curing or air drying stages.

Final drying should be obtained by gradually heating to a temperature of 200°F. to 250°F. and held for twelve (12) hours, then gradually increased to 400°F. and held for twelve (12) hours, then raised 100°F. per hour until maximum operating temperature is reached.



This curve is based on the insulating material cast and dried, and with a surface emissivity factor of 0.89.



QUIGLEY COMPANY, INC.

Manufacturers of Refractories — Insulations — Paints

235 E. 42nd Street

New York, N.Y. 10017

In Canada, Quigley Company of Canada, Ltd., Lacrosse, P. Q.

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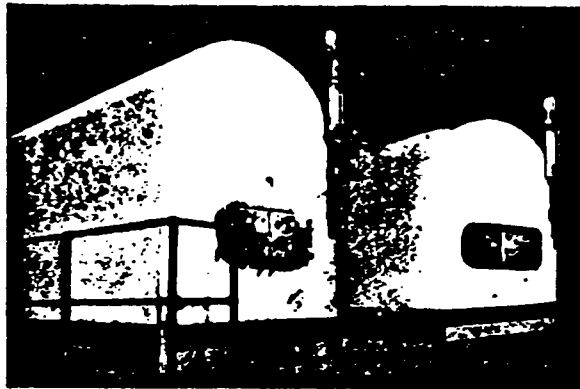


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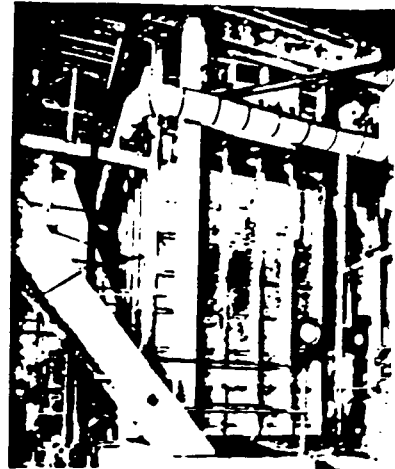


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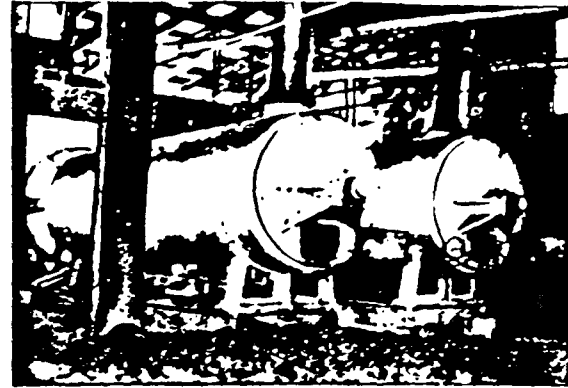


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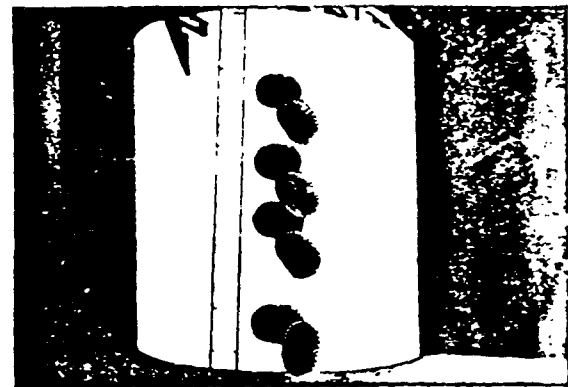


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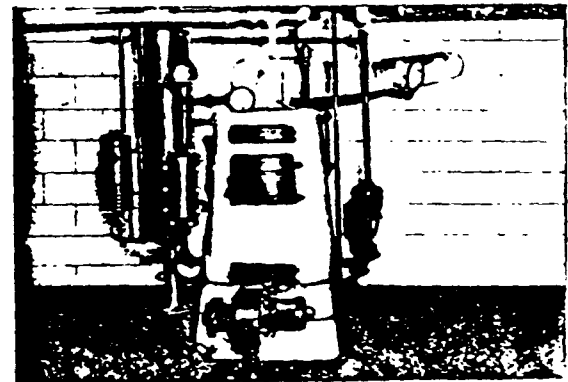
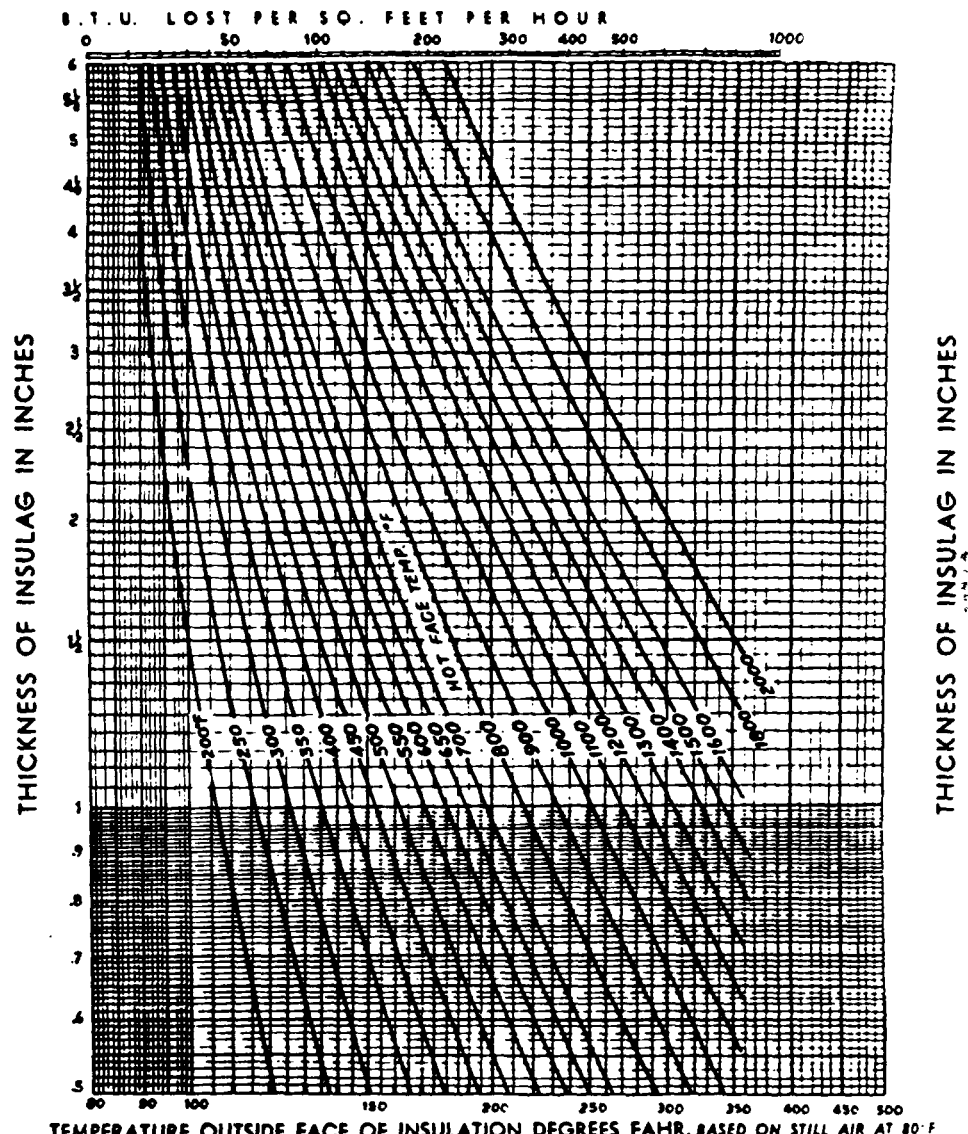


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Mix the batch thoroughly and quickly with a hoe or shovel, turning the mixture over to be sure all of the INSULAG is saturated with water. Apply INSULAG promptly after mixing so that the BLOATING TAKES PLACE ON THE WORK INSTEAD OF IN THE MORTAR BOX. Make a fresh batch for each application. Mix only quantity required. Close bag tightly to keep the unused material in good dry condition.

All surfaces which are to be covered with INSULAG should be dry and clean—free of dust, loose scale, rust, paint and grease. When surface is painted with asphalt products, same should be entirely removed before application.

INSULAG is applied by either hand application, premixed pneumatic guns, syphon guns or gunniting. INSULAG should be applied to uniform thickness—allow bloating action to take place and INSULAG to set. Smooth hard finish is obtained by wet troweling finishing coat, which makes INSULAG water resistant.

All applications exceeding ½" should be reinforced, preferably with 2" x 2" x 14 gauge square mesh tied or affixed to the surface being insulated,

this to be on approximately 16" centers. Each additional 1" to 1½" should be similarly reinforced. The previous applied INSULAG should be scored or scratched while still moist to insure proper bonding of the additional thickness.

For hot application, a small quantity of INSULAG should be diluted into a thick paint consistency and painted on the entire surface, which will rapidly dry. Then spot-coat with regular mix INSULAG, allow the spot-coats to set up, and then fill with INSULAG. For additional thickness, use reinforcing as described above.

Where INSULAG is applied over porous surfaces the reinforcement, as described above, should be applied and securely fastened. INSULAG diluted to a stucco consistency should be painted to seal any absorption of this porous material i.e., (85% magnesia, asbestos, rockwool, fibreglass, block insulation). After this priming coat, the normal INSULAG application can be made.

INSULAG will set up hard in 8 to 24 hours depending upon temperature and atmospheric conditions.

For large valves, flanges and intricate shapes, INSULAG may be hand molded to this equipment.

INSULAG, when set, will not dissolve or collapse from contact with water, oil or creosote; is resistant to vapors of steam, acid or alkaline solutions. Should it become wet, heat will restore its original insulating value.

The above instructions cover general applications. However, for large surfaces or Gun applications, or when it is desired to use INSULAG alone or in combination with other materials to form panel construction, recommendations will be furnished upon request.

QUIGLEY COMPANY INC.

Manufacturers of Refractory Specialties and Paints

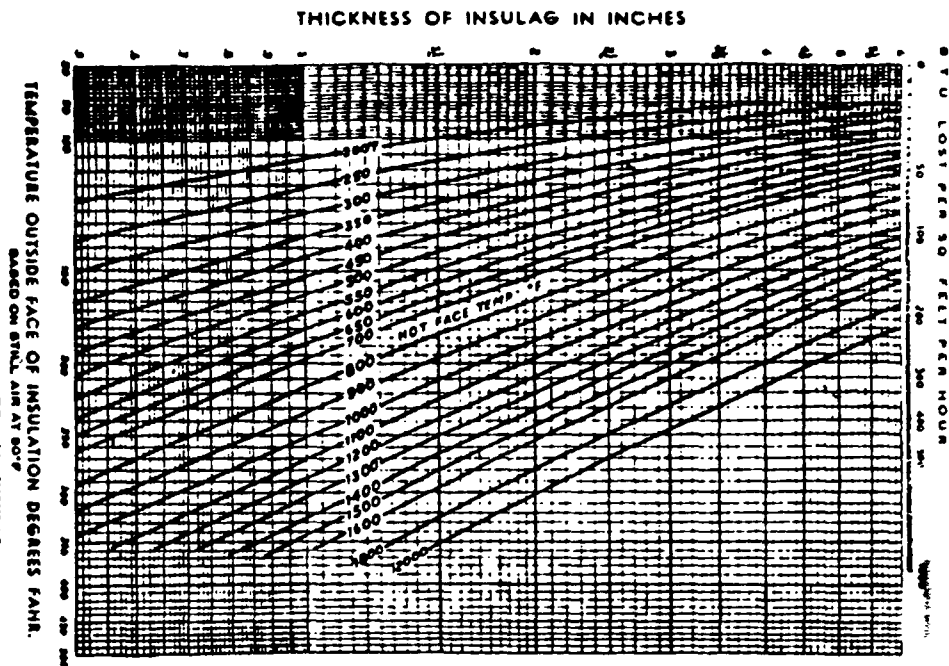
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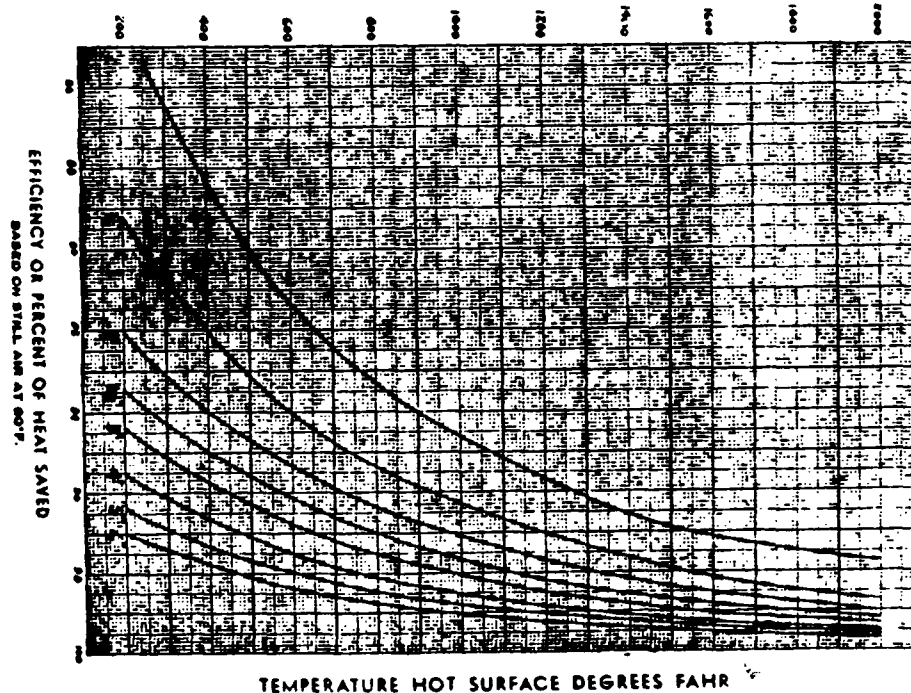
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INSULAG-D1-3M - 8-38 - AMP.

INSULAG—THICKNESS IN INCHES REQUIRED FOR VARIOUS HOT FACE TEMPERATURES



THICKNESS OF INSULAG IN INCHES
THIS CURVE IS BASED ON THE INSULATING
MATERIAL CAST AND DRIED AND WITH A
SURFACE EMISSIVITY FACTOR OF 0.89.
TEMPERATURE HOT SURFACE DEGREES FAHR.



EFFICIENCY OF VARIOUS THICKNESSES OF INSULAG

Chart above indicates the heat loss through insulated surfaces of INSULAG, as well as the temperature of the outside surface of the INSULAG at given temperatures for the hot surface.

1. To determine the thickness of INSULAG required to give an outside surface temperature of 600°F, follow the 600°F. curve from the hot surface temperature of 1000°F. down to the 600°F. curve and read the thickness of INSULAG required.

2. To determine the heat loss through given thickness of INSULAG, follow the 600°F. curve from the hot surface temperature of 1000°F. down to the 600°F. curve and read the heat loss.

3. To determine the heat loss through given thickness of INSULAG, follow the 600°F. curve from the hot surface temperature of 1000°F. down to the 600°F. curve and read the heat loss.

The efficiency of INSULAG is obtained by subtracting the heat loss through the INSULAG from the heat loss of the surface not insulated and dividing the difference by the heat loss of the surface not insulated.

Chart above indicates the efficiency or percent of heat saved by the application of various thicknesses of Insulag.

Example: For same conditions used for chart page 1, from 600°F. following horizontal line until you intersect 8 in. curve line and reading directly down you have 84.1%. Therefore the application of 8 in. INSULAG to a hot face of 600°F. saves 84.1% of the radiation heat loss.



235 E. 42ND ST NEW YORK, N Y 10017

212 LR 3-3444

TYPICAL ANALYSIS DATA

PRODUCT: INSULAG
DESCRIPTION: INSULATING LAGGING MATERIAL
P.C.E.: CONE 9 (2345°F)
SERVICE LIMIT: 2000°F (Exposed), 2200°F (Interface)
WEIGHT PER CUBIC FOOT: 36 lbs.

CHEMICAL ANALYSIS:

SiO ₂	46.0%
Al ₂ O ₃	24.6
Fe ₂ O ₃	1.4
CaO	19.5
MgO	4.9
TiO ₂	0.6
Alkalies	1.1
L.O.I.	1.9

THERMAL CONDUCTIVITY:
(BTU/Sq. Ft./Hr./°F/In.)

<u>Mean Temp.</u>	<u>'K'</u>
500°F	.56
1000°F	.70
1500°F	.84

SHRINKAGE: NONE

MODULUS OF RUPTURE: SEE CHART A-4797

This data is average results of control tests and is subject to variations on individual tests. These results should not be used as maximum or minimum for specification purposes.

770

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CHAS PFIZER & CO INC

16132

QUIGLEY COMPANY INC.

Manufacturers of Industrial Specialties
527 Fifth Avenue—New York 17, N. Y.

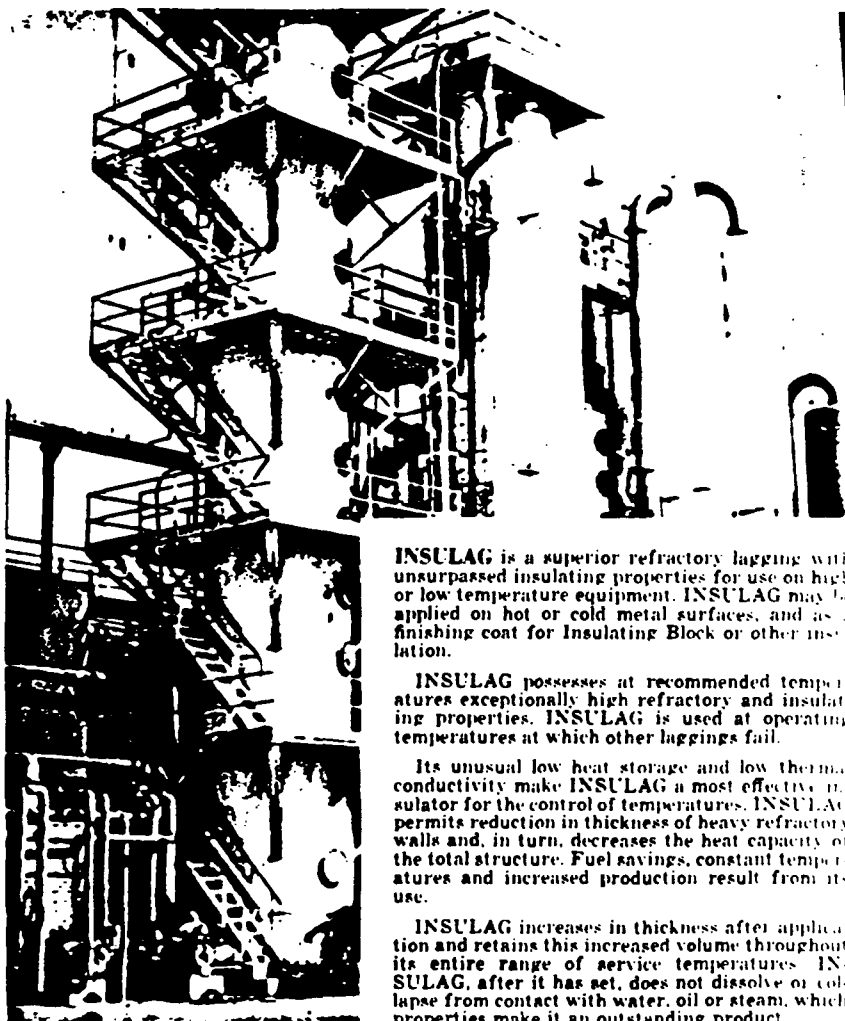
REFRACTORY DIVISION

BULLETIN No. 12541

INSULAG

(Patents Pending—Reg. U. S. Pat. Off.)

REFRACTORY PLASTIC INSULATING LAGGING



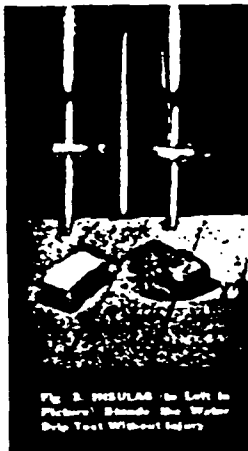
Oil Refinery Towers

INSULAG is a superior refractory lagging with unsurpassed insulating properties for use on high or low temperature equipment. INSULAG may be applied on hot or cold metal surfaces, and as a finishing coat for Insulating Block or other insulation.

INSULAG possesses at recommended temperatures exceptionally high refractory and insulating properties. INSULAG is used at operating temperatures at which other laggings fail.

Its unusual low heat storage and low thermal conductivity make INSULAG a most effective insulator for the control of temperatures. INSULAG permits reduction in thickness of heavy refractory walls and, in turn, decreases the heat capacity of the total structure. Fuel savings, constant temperatures and increased production result from its use.

INSULAG increases in thickness after application and retains this increased volume throughout its entire range of service temperatures. INSULAG, after it has set, does not dissolve or collapse from contact with water, oil or steam, which properties make it an outstanding product.



PROPERTIES OF INSULAG

LOW THERMAL CONDUCTIVITY—INSULAG retains practically constant insulating values throughout its service range, so that under varying conditions and temperature changes there is no appreciable loss of insulating efficiency. One inch of INSULAG has an insulating value equal to about nine inches of fire brick and has about 1/40 the heat storage capacity of fire brick walls of equal heat flow. Therefore, relatively thin applications of INSULAG may be substituted for heavy masses of refractories; heat losses are reduced and furnace production is increased.

HIGH MECHANICAL STRENGTH—INSULAG is different. It develops high mechanical strength upon drying and successfully withstands shock, moderate abrasion and vibration. The impact of a hammer will cause a dent in INSULAG and may even crack it, but the blow will not cause it to break away readily from the equipment to which it was applied. This is most advantageous on drums, tanks, pipe lines and other equipment subject to rough usage.

HIGH TEMPERATURE LIMIT—INSULAG will withstand a wide range of applications for high temperature direct exposure and is recommended for interface temperatures up to 2200°F.

EXPANSION—INSULAG expands after application, physical shrinkage eliminated.

LIGHT WEIGHT—On the average, three pounds of INSULAG covers 1 square foot to a thickness of 1 inch. Varying conditions, methods of application, hard troweling, kinds of surfaces, variations in mixing, water content, and temperature of surfaces at time of application, may require more material.

QUICK SETTING—INSULAG cold-sets firmly in 24 hours to 48 hours and in much less time when subjected to heat. The quick drying and setting characteristics of INSULAG permit troweling to a smooth finish suitable for painting.

ADAPTABILITY—INSULAG possesses properties necessary for "roughing" coat and "finishing" coat, or two coats by one application. The user of INSULAG does not find it necessary to carry in stock two or three different materials for the same job.

WATER RESISTANT—INSULAG, after setting, does not dissolve or collapse from contact with water, oil or steam. This is a decided advantage in plant maintenance. INSULAG is a superior product for insulating equipment exposed to the weather.

NON-INJURIOUS—INSULAG contains no mineral wool or fine slag particles which are irritants to the hands or other parts of the body.

A feature of INSULAG which particularly appeals to many users is the beautiful, smooth, white surface of a trowelled finished job.

If desired an INSULAG trowelled finished job can be treated with Quigley TRIPLE-A Protective Coatings in white, black, colors or aluminum.

Various combinations of INSULAG with other INSULINE Products can be made for specific applications.

PROPERTIES OF INSULAG vs. FIRE BRICK		
Heat Conductivity B.t.u./Sq. Ft./In. Thick /°F./per hour		
MEAN TEMPERATURE	INSULAG	FIRE BRICK
500°F.	.56	8.15
1000°F.	.70	9.99
1500°F.	.84	
Approximate weight per cu. ft. applied	16 lbs.	150 lbs.
Heat storage per lb. per °F.	24 B.t.u.	.24 B.t.u.
Heat Storage for same insulating effect	1/40	1.

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USES OF INSULAG

PETROLEUM INDUSTRY—Refineries and Natural Gasoline plants use INSULAG on towers, tanks, treaters, stills, boilers, breechings, pipe lines and for fire proofing supporting steelwork, panel construction of still furnaces, baffle plates and door linings.

METALLURGICAL FURNACES—INSULAG is used for insulating heat treating, forging, annealing, recuperators, reverberatory, and open hearth furnaces; for hot blast stoves, bustle pipes, hot blast mains, flues, pipes and other heated equipment where insulation is required.

CERAMIC PLANTS—INSULAG is used on kilns, glass lehrs, glass tanks, hot air pipes, underground flues, recuperators and checker chambers.

Plants manufacturing pottery, glass, brick, etc., find it most adaptable.

POWER PLANTS—INSULAG meets the engineer's demand for a suitable material for covering turbines, feed water heaters, hot liquid storage tanks, drums, smoke flues, stacks, pipes and flanges. It is also recommended as insulation in back of refractory tile of water wall boilers and outside fire brick walls in boiler furnace construction.

GENERAL USES—INSULAG has such a wide range of uses that it is indispensable as a plastic lagging in plants using fuel fired furnaces. It is "the lagging material of a thousand uses."

FIRE-PROOFING—Bins, walls, roof structures, furnace rooms, columns, etc., may be protected against fire by applying INSULAG as a veneer coating. The fire retardant properties of INSULAG render it ideal for this purpose.

WEATHER-PROOFING—While INSULAG is not injured by contact with the weather, yet to retain maximum insulating efficiency at all times it is often desirable to waterproof INSULAG with TRIPLE-A Products.

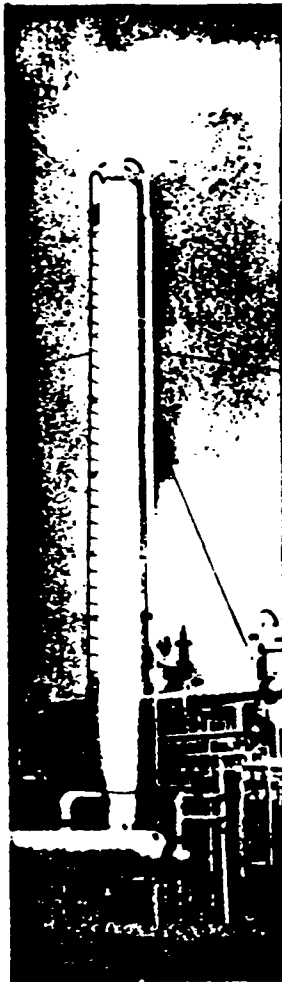


Fig. 1—Tower and Oil Heating Tank Insulated With INSULAG. Petroleum Industry Has Found INSULAG Unsurpassed for Insulation.



Fig. 2—Wells, Duck Casings, Drums of Large Boilers Insulated With INSULAG.

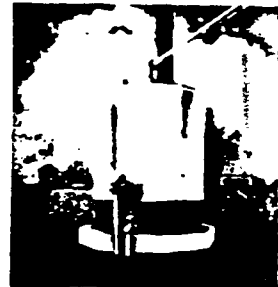


Fig. 3—Field Oil Heater Insulated With INSULAG.

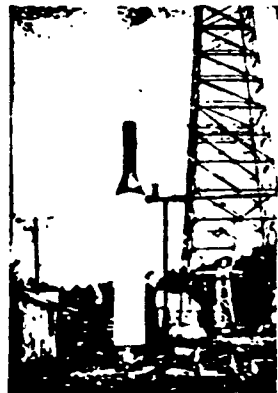


Fig. 4—Field Oil Treater Insulated With INSULAG.

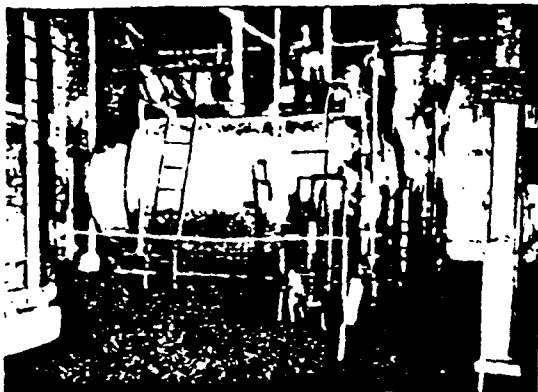


Fig. 5—Smoke Box and Exterior of Oil Fired Marine Type Boilers Insulated With INSULAG.



Fig. 6—Boilers Insulated With INSULAG.

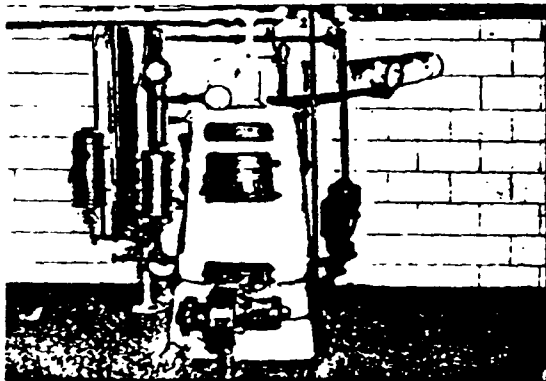


Fig. 7—Water Tank and Boiler Domestic Fuel Oil Burner Insulated With INSULAG.

INSULAG

Cuts Heat Losses • Reduces Fuel Costs • Improves Heat Control

Widely Used in Oil Industry—Oil producers find nothing like INSULAG to insulate field equipment. Permits better heat control. Requires less fuel to maintain constant heat. They simply fasten metal lath on equipment and apply INSULAG, which sets quickly—adheres to hot or cold surfaces—expands after application and retains volume when set—develops high mechanical strength — withstands shock, moderate abrasion and vibration—durable—defies weather—does not lose insulating value after repeated heating and cooling. Makes a white, hard-finish surface, unaffected by moisture.

Good Results on Many Applications

—Famous soap manufacturers use INSULAG for insulating steam headers, breechings and hot water tanks with good results.

On Boiler Drums — INSULAG, used on the boiler drums because it does not crack in service, can be walked on without destruction, and does not collapse due to steam leaks or water dripping on same.

For Oil Burners—Internationally known oil corporation's technical engineer recommends INSULBRIX and INSULAG to fuel oil burner installers in his district for all oil burner work. "Quigley INSULBRIX, combined with INSULAG, have all the desirable requirements for domestic combustion chamber lining and insulation."

INSULAG Applied With Boilers, Stills and Furnaces on the Line—Chief engineers and superintendents who cannot believe brick walls can be insulated successfully with boilers or stills on the line, are invited to look at installations with INSULAG applied under these conditions. INSULAG can be used in Quigley Panel Type Construction which has worked out successfully in many oil refinery stills.

[4]

On Regenerator Chamber Ovens —

Eastern Public Service Corporation coke plant uses INSULAG in walls of ovens. Former practice in repairing fronts of regenerator chambers was to use two $4\frac{1}{2}$ in. walls of fire-brick with a 7 in. clear space in which they used insulating powder in the bottom and middle sections, and insulating brick at top. The outside wall of these regenerator chambers is built of a thickness of $4\frac{1}{2}$ in. of fire-brick. The inside temperature of chamber is 2300° F. In using INSULAG they laid up both the inside and outside fire brick wall, then filled the center with 7 in. of INSULAG. Well pleased with adoption of INSULAG due to increased insulating value, plus ease of application.

On Foundry Furnace Wall — Large foundry applied INSULAG $2\frac{1}{2}$ in. thick on $13\frac{1}{2}$ in. silica brick wall while furnace was under heat. On the very hot surfaces they brush coated the wall of equipment to be insulated with a diluted batter of INSULAG of heavy paint consistency to obtain good adhesion and then built up $2\frac{1}{2}$ in. thickness in three layers applied at intervals. Resulted in a smooth coat which did not shrink or crack. Used nails in wall to help anchor INSULAG.

In Coke Oven Plants—INSULAG shields used for coke oven patching at plant of a large eastern utility. One used on pusher side of ovens and another on coke side. These have been in use several months doing an excellent job in closing the oven and effectively protecting men from the heat. Shields of this character should be used in every by-product coke oven plant for:

1. Protection of the silica brick from the chilling action of the air which might result in spalling.
2. Protection of the men from the blistering effects of the radiant heat; thus permitting them to do a more efficient job of patching.

Supersedes Water Cooling System—

Manufacturer of locomotive parts well pleased with results of using INSULAG to insulate small industrial furnaces. These furnaces were formerly water cooled but this was abandoned in favor of INSULAG which is more satisfactory in every way and eliminates water freezing in winter.

[5]

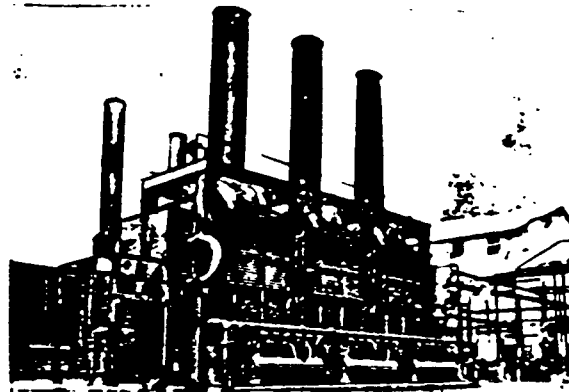


Fig. 8—This OR SM, Constructed of INSULAG Panels in Upper Section, With INSULBRICK, INSULAG and INSULCRETE in Lower Section, Has Not Had a Hot Spot.

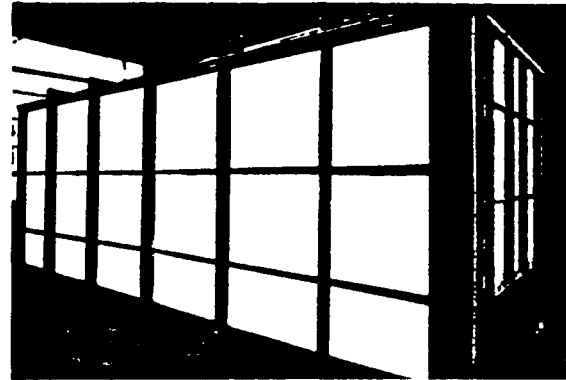
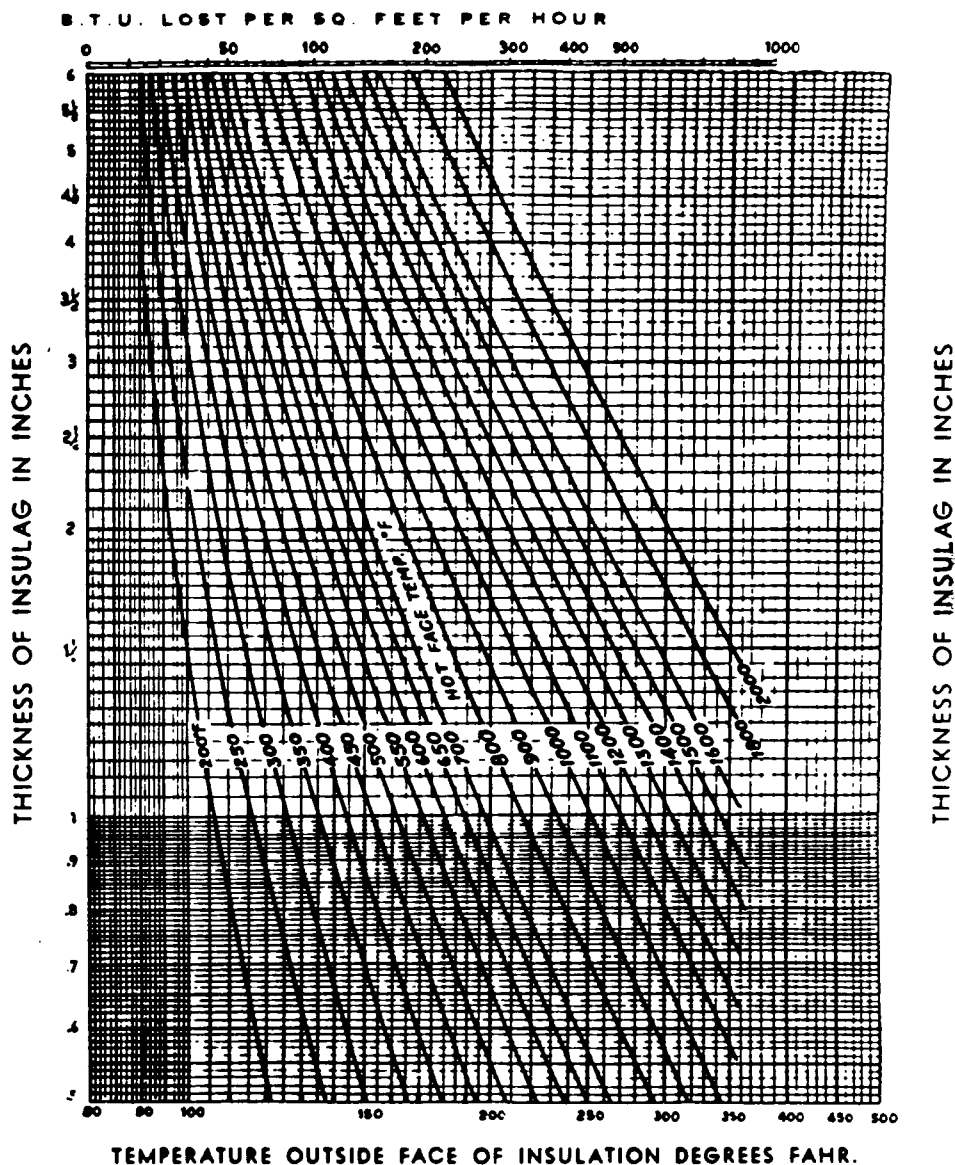


Fig. 9—Stream Refining Furnace Insulated With INSULAG

QUICK SUMMARY

- 1" equals 9" of fire brick in insulating value.
- 1/40 heat storage capacity of fire brick for same heat flow.
- High mechanical strength.
- Operating temperature 2200° F. interface
- Light weight—yet rugged and strong.
- Sets quickly.
- Adaptable—suitable for practically every lagging need.
- Water resistant—steam, oil or water leaks do not destroy
- Expands—an inch applied is more than an inch when dried.
- 3 lbs. of Insulag covers 1 sq. ft. 1" thick
- Packed in 100 lb. bags

INSULAG—THICKNESS IN INCHES REQUIRED FOR VARIOUS HOT FACE TEMPERATURES



How to Determine Heat Savings Effected by INSULAG.

Chart above indicates the heat loss through graduated combination thicknesses of INSULAG, as well as the temperature of the outside surface of the INSULAG at given temperature for the hot surface.

1. To determine the thickness of INSULAG required to give an outside surface temperature.

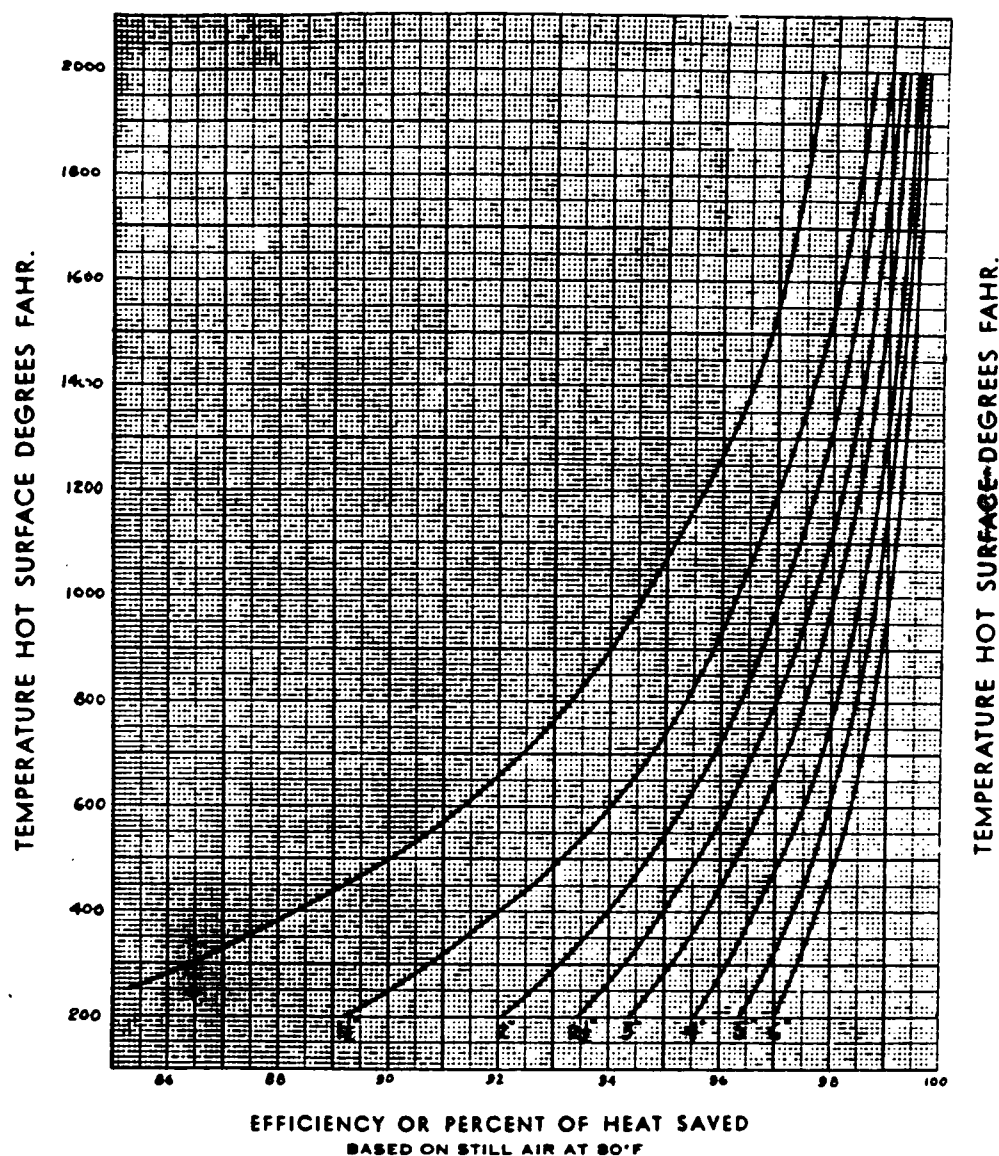
Example: Temperature of the hot surface is 500°F. What total thickness will give a temperature of about

130°F.? Follow 500°F. line upward until it meets 130°F. curve line. At this point follow horizontal line and read 2 in. Therefore a 2 in. thickness of INSULAG is required.

2. To determine the heat loss through given thickness of INSULAG or from outside face temperature.

Example: Similar conditions as that given under "1". From 130°F. at bottom of chart follow upward until you read 90 B. t. u.'s on the upper scale.

EFFICIENCY OF VARIOUS THICKNESSES OF INSULAG



The efficiency of INSULAG is obtained by subtracting the heat loss through the INSULAG from the heat loss of the surface not insulated and dividing the difference by the heat loss of the surface not insulated.

Chart above indicates the efficiency or percent of heat saved by the application of various thicknesses of INSULAG.

Example: For same conditions used for chart page "6", from 800°F. following horizontal line until you intersect 2 in. curve line and reading directly downward you have 94.7%. Therefore the application of 2 in. INSULAG in a hot face of 800°F. saves 94.7% of the radiation losses.

OTHER QUIGLEY INSULINE PRODUCTS

INSULBRIX

(Reg. U. S. Pat. Off.)

INSULBRIX are light weight cellular low heat storage insulating fire brick for direct or indirect exposure to temperatures in boilers, stills, metallurgical furnaces, ovens, and kilns. Made for service temperatures up to 3000°F.

INSULBRIX are made in several brands from one-tenth to one-seventeenth the heat storage capacity of heavy refractories for same heat flows. 1" has an insulating value of 2 1/2" to 5" of fire brick, permits heated equipment to reach operating conditions in less time and meet fluctuations more rapidly.

Result in increased output, conservation of fuel, decreased labor costs, improved furnace control and greater comfort to the workmen.

INSULCRETE

(Reg. U. S. Pat. Off.)

INSULCRETE is a light weight cellular insulating refractory concrete for furnace linings, floors, door linings, heat shields, shapes, covers, and kindred uses; recommended for temperatures up to 2500°F. No cutting, fitting or ramming—just pour into place.

1" of INSULCRETE equals about 4" of fire brick in insulating value and has about one-seventh the heat storage capacity of fire brick walls of equal heat flow.

INSULCLAD

(Reg. U. S. Pat. Off.)

INSULCLAD—is a surfacing material used for armor coating insulating brick. It seals the pores making an impermeable monolithic surface which greatly reduces dusting and gas absorption, reduces heat flow through walls, resists abrasion and penetration.

INSULBOND

(Reg. U. S. Pat. Off.)

INSULBOND—a high refractory bonding mortar in dry or plastic form, for bonding INSULBRIX.

INSULINE

(Reg. U. S. Pat. Off.)

INSULINE GROUND—used as an insulating fill of low heat storage capacity in back of thin furnace walls at service temperatures up to 2600°F. 1" of INSULINE GROUND has insulating properties equal to about 6" of fire brick.

INSULINE SIZED AGGREGATE—used as an insulating fill or with Portland cement or other suitable binders to make an insulating concrete.

OTHER QUIGLEY PRODUCTS

A Quigley Product for every refractory purpose

BONDING MORTARS—Fire Brick—Silica Brick

Insulating Fire Brick

Hytempite—Airset (wet)
Fyre Mortar—Airset (dry)
QT Set—Heat Set (dry)
Q-Chrome—Airset Chrome (dry)
Insulbond 2600—Airset (wet)
Insulbond 2800—Airset (wet)
Insulbond 3000—Airset (wet)

CASTABLES—Fire Brick—Insulating Fire Brick—Chrome Ore

Cast Refract—Fire Clay Fire Brick Castable
Insulcrete—Castable Lightweight Insulating Fire Brick
Hearth-Crete—Chrome Magnesite Castable
Chromcrete—Chrome Base Castable

PLASTICS—Fire Brick—Chrome Ore

Mono-Line—Plastic Fire Brick
Chromix—Chrome Ore Plastic

FIRE BRICK—First Class—Super Duty and High Aluminas

Missouri
Pennsylvania

INSULATING FIRE BRICK

Insulbrix—2600
Insulbrix—2800
Insulbrix—3000

REFRACTORY COATINGS for Insulating Fire Brick, Plastics and Castables

Q-Chromastic—Airset Chrome base (wet)
Insulclad—Airset (dry) Alumina Base

INSULATION

Insulag—Plastic Insulation

ACID PROOF CEMENTS

Black Acid Proof Cement—Airset (wet)
Gray Acid Proof Cement—Airset (wet)
Quick-Setting Acid Proof Cement—Airset (dry)
White Acid Proof Cement—Quickset (dry)

For further information write

QUIGLEY COMPANY, INC.
Manufacturers of Refractory Specialties and Plastics
NEW YORK 17, N. Y.

527 Fifth Avenue

In Canada, Quigley Company of Canada, Ltd., Lachine, P. Q.

Distributors With Stocks and Service in Important Industrial Centers Throughout the United States, Canada, and in 32 Other Countries.

HOW TO USE INSULAG

(Reg. U. S. Pat. Off.)
Patented

**A Plastic Refractory Insulator and Sealer for Lining Interior and
Exterior Surfaces of High Temperature Equipment.**

INSULAG when mixed with water **BLOATS**. In order to secure maximum insulating efficiency **BLOATING MUST TAKE PLACE AFTER APPLICATION—NOT IN THE MORTAR BOX.**

Open bag and pour only quantity of INSULAG into a clean mortar box that can be mixed and applied within twenty minutes.

Add sufficient water to INSULAG to make a smooth easy-working mixture. Use clean, fresh water at 60-65°F. An average mixture takes about ten and one-half (10½) gallons of water to a one hundred pound bag. More or less water may be used for various types of work.

Mix the batch thoroughly and quickly with a hoe or shovel, turning the mixture over to be sure all of the INSULAG is saturated with water. Apply INSULAG promptly after mixing so that the **BLOATING TAKES PLACE ON THE WORK INSTEAD OF IN THE MORTAR BOX.** Make a fresh batch for each application. Mix only quantity required. Close bag tightly to keep the unused material in good dry condition.

Best results are secured by hand application by throwing the INSULAG against the surface. Then smear to a uniform thickness. Allow bloating action to take place and material to set. Then apply finish coat by trowel. Smooth hard finish is obtained by use of wet troweling.

Where more than 1" thickness of INSULAG is to be used, apply 1" and after thoroughly expanded and set, cover with 1" mesh #19 gauge wire netting, or with other suitable metal lath, securely fastened, and proceed with further application of INSULAG in similar manner.

Where large volumes are to be applied at one time heavier gauge metal lath or wire netting will be required.

All surfaces which are to be covered with INSULAG should be dry and clean—free of dust, loose scale, rust, paint and grease. When surface is painted with asphalt products, same should be entirely removed before application.

For hot surface application, a small quantity of INSULAG should be diluted into a thick paint consistency and painted on the entire surface, which will rapidly dry. Then spot-coat with regular mix INSULAG, allow the spot-coats to set up, and then fill in with INSULAG. For

additional thickness, use reinforcing as described above.

Where INSULAG is applied over porous surfaces, this surface should be painted with sufficient INSULAG to seal absorption of the porous material. Then 1" mesh #19 gauge wire netting should be applied and securely fastened and further INSULAG of regular mix applied.

Large flat areas are quickly and efficiently lagged by the use of the Quigley Refractory Gun, which applies INSULAG much more rapidly than is possible by hand.

When two or more coats of INSULAG are to be used, the roughing coat should be allowed to stay rough—not troweled—to provide a bond for the succeeding coats. The finish coat should be applied after the roughing coat has set, but is still damp. A smooth troweled surface can be secured by retroweling the surface of the INSULAG with a moistened trowel or float just before it is thoroughly dry; or by applying another thin coat over the surface of the expanded or bloated INSULAG and troweling this thin coat. This will insure full expanded value of the application.

INSULAG will set up hard in from 2 to 24 hours, depending upon temperature and atmospheric conditions.

For the large valves and intricate shapes, INSULAG may be hand molded to the equipment, or may be precast in knock-down forms (greased inside). The precast form may be fastened in place with light-gauge metal bands or fabric wrappings.

INSULAG, when set, will not dissolve or collapse from contact with water; is resistant to vapors of steam, acid or alkaline solutions. Should it become wet, heat will restore its original insulating value.

Where INSULAG will be exposed to the elements, to keep it from absorbing moisture, weather-proofing with Quigley TRIPLE-A Protective Coatings is recommended. The equipment should be placed in service, in order to thoroughly dry the INSULAG, prior to the application of the TRIPLE-A Products.

The above instructions cover general applications. However, for large surfaces or special applications, or when it is desired to use INSULAG alone or in combination with other materials to form panel construction, recommendations will be furnished upon request.

QUIGLEY COMPANY INC.

Manufacturers of Refractory Specialties and Paints

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Distributors with Stocks and Service in Every Industrial Center

Get Quigley-Wise . . . To Economize

Form ILAG-D-157-1-41-AM7

QUIGLEY CO., INC.

3/61
PANELAG

*High Temperature, Lightweight Refractory Plastic Insulation
For Exterior and Interior Insulation*

PANELAG	is a dry material—packed in 50 lb. bags—when mixed with water, it becomes plastic.
PANELAG	easily cast into forms—molded by hand or plastered on vertical, horizontal or circular surfaces.
PANELAG	can be applied by GUN to any thickness desired with practically no rebound.
PANELAG	when applied in plastering consistency the use of prefabricated forms is eliminated.
PANELAG	can be plastered on flat or irregular surfaces to any thickness required. by building up in layers—use metal reinforcement—16 gauge 2x2 or 4x4 square mesh give best results and stability.
PANELAG	develops high mechanical strength upon drying and successfully withstands shock and vibration. has low thermal conductivity and low heat storage characteristics.
PANELAG	will withstand wide range of applications and is recommended for direct exposure to temperatures up to, but not exceeding 1800°F.
PANELAG	shows no wet to dry shrinkage on normal applications.
PANELAG	is a lightweight insulation—the average weight per cubic foot is, when cast, 28# (21.5 square feet 1" thick per 50 lb. bag) when molded or plastered. 30# required when gunniting (20 sq. ft. 1" thick per bag).
PANELAG	after setting does not dissolve or collapse from contact with water, oil or steam. Where water-proofing is required, a plaster coat of Quigley Water Proof Cement will produce a hard, smooth surface which can be painted if desired.
PANELAG	gives excellent results as lining for troughs of remelt aluminum furnaces. Has long life. eliminates the necessity of costly renewals.
PANELAG	used by Package Boiler builders due to its low weight and high insulation value—eliminates hot spots.
PANELAG	excellent insulation for air heaters—vibration and quick changes in temperatures do not effect it.
PANELAG	is being used in precast and plastered form on steam turbines due to its mechanical strength—resistant to shock—vibration—abrasion and moisture, with excellent thermal insulation.
PANELAG	adopted by many as back up in water walls—heaters—still and kilns, and electric furnaces.
PANELAG	in various combinations with PLASTIC INSULCRETE can be made into PANELS for STRISS RELIEVING FURNACES—KILNS—LEHRS—HEATER and STILL linings—KILN and DUCT linings and other diversified applications for which specifications will be gladly furnished.
PANELAG	as a Back-up Insulation for Q-PANELCROME used in Abrasive Resistant Linings. has been very effective in Oil Refineries. It is also used as a one shot lining in many other applications in the Oil Industry.

PANELAG

High Temperature Lightweight Refractory Plastic Insulation

WHERE TO USE

Boilers—Breechings—Heaters.
Hot Air Ducts—Still—Vessels.
Troughs Aluminum furnaces.
Back up water walls.
Insulate Turbines.
Towers—Vessels—Tanks.
Glass plants on Regenerator.
Recuperator and Brick Pot Cap.
Main Furnace Crown and Lehrs.
Air Heaters.
Combination with Q-PANELCROME in abrasive resistant linings.
Combination with PLASTIC INSULCRETE for PANELS for Heat Treating Furnaces and other diversified applications.

SUMMARY OF PROPERTIES

Refractoriness	1800°F
Shrinkage	none-wet to dry
Thermal Conductivity	500°F—.56 1000°F—.70 1500°F—.84
Coverage	Cast—28 $\frac{1}{2}$ per cu. ft.—Plaster 30 $\frac{1}{2}$ per cu. ft.
Packed	50 lb. Bags

HOW TO USE

Entire contents of bag should be thoroughly mixed before adding water.

For Plastering Mix use approx 9½ gal. of water per 50 lbs.

For Casting use approx. 10½ gal. water per 50 lbs.

Use fresh water 60° to 70° F and add to dry PANELAG.

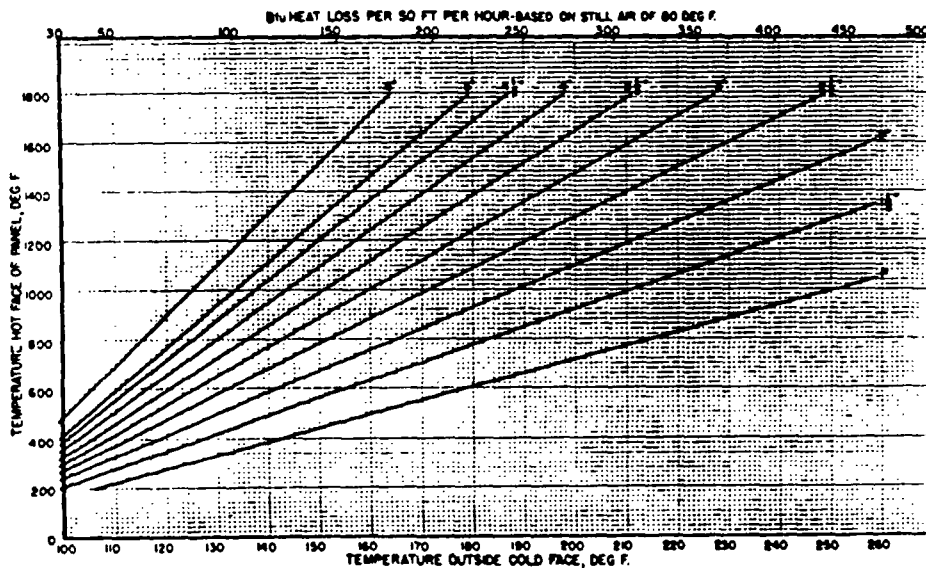
Mix only what can be applied in 30 minutes.

Mix batch thoroughly in concrete mixer from two to five minutes or with hoe in mortar box.

Allow PANELAG to cure for twenty-four (24) hours at temperature of 60°F. to 70°F. but not lower than 50°F. Allow additional twenty-four (24) hours for preliminary air-drying before placing in service.

Do not allow to freeze during applying-curing or air drying stages.

Final drying should be obtained by gradually heating to a temperature of 200°F. to 250°F. and held for twelve (12) hours, then gradually increased to 400°F. and held for twelve (12) hours, then raised 100°F. per hour until maximum operating temperature is reached.



This curve is based on the insulating material cast and dried, and with a surface emissivity factor of 0.89.

For further information write

QUIGLEY COMPANY INC.

415 Madison Ave.

Manufacturers of Refractory Specialties—Paint and Insulation

NEW YORK 17, N. Y.

In Canada, Quigley Company of Canada, Ltd., Lachine, P. Q.

Distributors With Stocks and Service in Important Centers Throughout the United States, Canada, and in 32 Other Countries.

PAG 2-AM - CLAMP - Subject to the Quigley Company



235 E. 47ND ST NEW YORK N Y 10017

212 LR 3 3444

TYPICAL ANALYSIS DATA

PRODUCT: PANELAG
DESCRIPTION: INSULATION
P. C. E.: (ASTM C24) CONE 10-11 (2345-2361)
SERVICE LIMIT: 1800°F
WEIGHT PER CUBIC FOOT: 28 lbs.

CHEMICAL ANALYSIS:

SiO ₂	35.82%
Al ₂ O ₃	9.08
Fe ₂ O ₃	3.15
CaO	31.26
MgO	15.15
TiO ₂	0.10
Alkalies	1.09
L.O.I.	3.82

THERMAL CONDUCTIVITY: (BTU/SQ. FT./HR./°F/IN.)

<u>Mean Temp.</u>	<u>'K'</u>
500°F	.56
1000°F	.70
1500°F	.84

SHRINKAGE:

CAST TO AIR DRIED	0.1%
AIR DRIED TO 220°F	0.3
220°F TO 1000°F	0.7
220°F TO 1500°F	2.4

MODULUS OF RUPTURE:

AIR DRIED	60 psi
AFTER DRYING TO 220°F	30 psi

This data is average results of control tests and is subject to variations on individual tests. These results should not be used as maximum or minimum for specification purposes.

172 (85)
(770 rev.)

A Subsidiary of
PFIZER INC

High Temperature, Lightweight Refractory Plastic Insulation For Exterior and Interior Insulation

PANELAG	is a dry material—packed in 50 lb. bags—when mixed with water, it becomes plastic.
PANELAG	easily cast into forms—molded by hand or plastered on vertical, horizontal or circular surfaces
PANELAG	can be applied by GUN to any thickness desired with practically no rebound.
PANELAG	when applied in plastering consistency the use of prefabricated forms is eliminated.
PANELAG	can be plastered on flat or irregular surfaces to any thickness required, by building up in layers—use metal reinforcement—16 gauge 2x2 or 4x4 square mesh give best results and stability.
PANELAG	develops high mechanical strength upon drying and successfully withstands shock and vibration, has low thermal conductivity and low heat storage characteristics.
PANELAG	will withstand wide range of applications and is recommended for direct exposure to temperatures up to, but not exceeding 1800°F.
PANELAG	shows no wet to dry shrinkage on normal applications.
PANELAG	is a lightweight insulation—the average weight per cubic foot is, when cast, 28# (21.5 square feet 1" thick per 50 lb. bag) when molded or plastered, 36# required when gunning (20 sq. ft. 1" thick per bag).
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PANELAG	in various combinations with PLASTIC INSULCRETE can be made into PANELS for STRESS RELIEVING FURNACES—KILNS—HEATERS and STILL linings—KILN and DUCT linings and other diversified applications for which specifications will be gladly furnished.
PANELAG	as a Back-up Insulation for Q-PANELCROMI used in Abrasive Resistant Linings, has been very effective in Oil Refineries. It is also used as a one shot lining in many other applications in the Oil Industry.

WHERE TO USE

Boilers—Breechings—Heaters.
Hot Air Ducts—Still—Vessels.
Troughs Aluminum Furnaces.
Back up water walls.
Insulate Turbines.
Towers—Vessels—Tanks.
Glass plants on Regenerator.
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Main Furnace Crown and Lehrs.
Air Heaters.
Combination with Q-PANELCROME in abrasive resistant linings.
Combination with PLASTIC INSULCRETE for PANELS for Heat Treating Furnaces and other diversified applications.

SUMMARY OF PROPERTIES

Refractoriness	1800°F
Shrinkage	none-wet to dry
Thermal Conductivity	500°F—0.56 1000°F—0.70 1500°F—0.84
Coverage	Cast 25# per cu. ft. Plaster 40# per cu. ft.
Packed	50 lb. Bags

HOW TO USE

Entire contents of bag should be thoroughly mixed before adding water.

For Plastering Mix use approx. 9½ gal. of water per 50 lbs.

For Casting use approx. 10½ gal. water per 50 lbs.

Use fresh water 60° to 70° F and add to dry PANELAG.

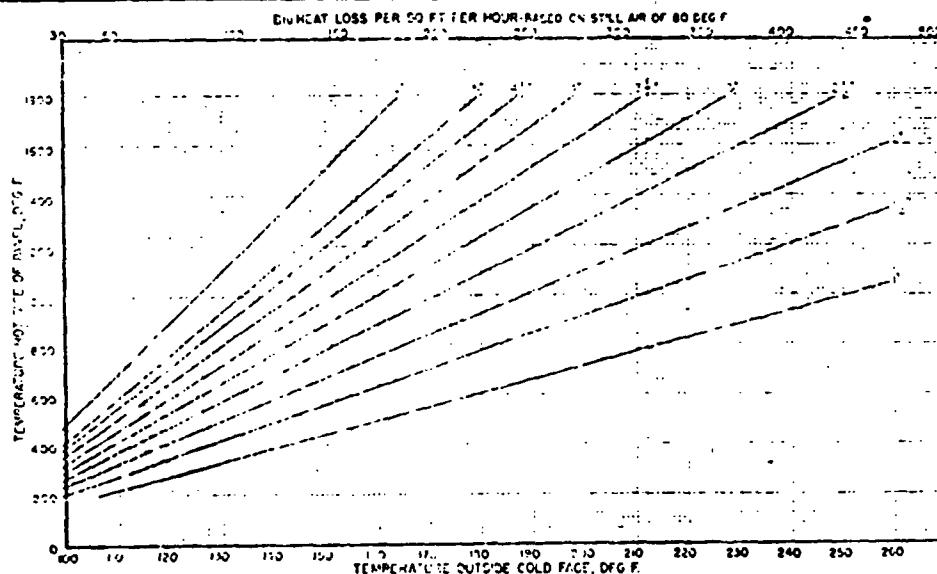
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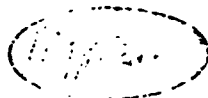
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This curve is based on the insulating material cast and dried, and with a surface emissivity factor of 0.89.



QUIGLEY COMPANY, INC.

Manufacturers of Refractories — Insulations — Paints

235 E. 42nd Street

New York, N.Y. 10017

In Canada, Quigley Company of Canada, Ltd., Toronto, P. Q.

PANELAG, M.C. & AMP. Approved all previous holders.

Printed in U.S.A.

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME QUIGLEY COMPANY, INC.		EMERGENCY TELEPHONE NO. (212) 573-3444
ADDRESS (Number, Street, City, State, and ZIP Code) 235 E. 42nd. Street, New York, N. Y. 10017		
CHEMICAL NAME AND SYNONYMS N.A.		TRADE NAME AND SYNONYMS Insulag
CHEMICAL FAMILY Alumina Silicate	FORMULA N.A.	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Contains crystallite asbestos					

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N.A.	SPECIFIC GRAVITY (H ₂ O=1)	0.65
VAPOR PRESSURE (mm Hg.)	N.A.	PERCENT. VOLATILE BY VOLUME (%)	N.A.
VAPOR DENSITY (AIR=1)	N.A.	EVAPORATION RATE (_____ =1)	N.A.
SOLUBILITY IN WATER	N.A.		
APPEARANCE AND ODOR Dry granular mix - no odor			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	N/A	FLAMMABLE LIMITS	N/A	LeI	UeI
EXTINGUISHING MEDIA	N/A				
SPECIAL FIRE FIGHTING PROCEDURES	Not combustible				
UNUSUAL FIRE AND EXPLOSION HAZARDS	N/A				

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	5 fibers/ml. See OSHA 1910.93 effective 12/7/71.
EFFECTS OF OVEREXPOSURE	May cause pulmonary disease by inhalation.
EMERGENCY AND FIRST AID PROCEDURES	Avoid breathing, dumping, mixing, etc.

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	Avoid breathing dust.
INCOMPATIBILITY (Materials to avoid) None			
HAZARDOUS DECOMPOSITION PRODUCTS None			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	Avoid breathing excessive dust.

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Vacuum clean spillage, repair broken bags. If sweeping is necessary, wet down spillage, use approved respiratory equipment.	
WASTE DISPOSAL METHOD Place waste in closed containers. Dispose of waste in closed containers, avoid breathing excessive dust.	

SECTION VIII - SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type) U.S. Bureau of Mines approved respiratory OSHA part 1910 - 12/7/71.		
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General) Control with mechanical dust collection to within TLV.	OTHER
PROTECTIVE GLOVES		EYE PROTECTION
OTHER PROTECTIVE EQUIPMENT Use respiratory equipment per OSHA part 1910 - 12/2/71.		

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Maintain good housekeeping practices. Vacuum clean waste and place in closed containers.	
OTHER PRECAUTIONS	