Carey
ASBESTOS & MAGNESIA PRODUCTS

Pipe & Boiler Coverings

Catalog 1362

Jones Brothers Asbestos Supply Co.,
(INCORPORATED)
512 SECOND STREET,
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Carey
ASBESTOS & MAGNESIA PRODUCTS

Pipe & Boiler Coverings

Catalog
1362

THE PHILIP CAREY COMPANY
General Offices
LOCKLAND, CINCINNATI, U.S.A.

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INTRODUCTION.

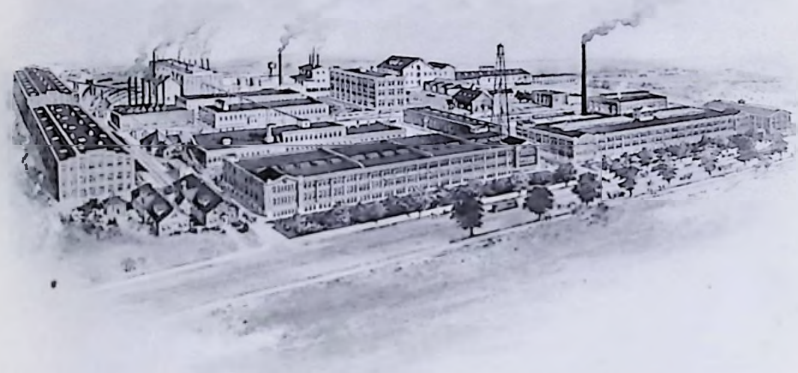
IN presenting this catalogue of Pipe and Boiler Coverings, and various forms of insulating and fireproofing materials, we extend to our patrons our heartiest thanks for the support they have given our materials, and our assurance that the same high standard of quality and value as heretofore found will be maintained. To those who are not familiar with Carey Products we extend an invitation to join the long list of our satisfied customers, knowing that our experience, covering nearly a half a century, cannot do otherwise than benefit them.

THE PHILIP CAREY COMPANY
CINCINNATI, OHIO.

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Plant of the Philip Carey Mfg. Co. Plymouth Meeting Pa.



General Offices & Factory of the Philip Carey Mfg. Co. Lockland, Cincinnati, Ohio.

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HEAT LOSS AND HEAT INSULATION.

HOT surfaces lose heat, and lost heat means wasted fuel—wasted power—wasted boiler capacity—unnecessary overhead charges. The lost heat from bare or improperly insulated steam pipes and boilers amounts to astonishing and unbelievable figures—often from 15% to 25% of the entire boiler capacity. The cost of fuel enters into practically every manufactured article. It is one of the very large cost factors in every public service utility such as light, heat, transportation, etc. Anything that will reduce to a minimum the cost of power—fuel—gives a decided advantage in cost of production or operation.

To reduce heat losses a non-conductor of heat must be applied to the hot surface. The best of the practically available non-conductors is non-circulating or "dead" air. Briefly then the insulating covering containing the greatest amount of "dead" air is the most efficient, and all Carey Coverings are designed on this basic principle. A good covering will save from 80% to 95% of the bare surface losses, depending upon the temperature, shape and size of the surface, etc.

There are, however, numerous conditions which make it impossible to devise any one form of covering which will answer for every purpose. The higher steam pressures make it necessary to use absolutely fire-proof materials, while on hot water and cold lines better results can be obtained otherwise. Vibrating lines call for the use of coverings of high tensile strength; pipes exposed to moisture must have waterproof coverings, and so on through the long list of conditions to be found. We have studied each condition carefully and have perfected the coverings mentioned in this catalogue so that in every case they give the highest insulating value consistent with strength, durability and cost.

In general, steam pipe and boiler coverings will pay for the cost of their installation, particularly on high pressure steam lines, within a period of from three to six months. Even with the cheapest of fuels it seldom requires a longer period of time than one year for the savings effected to pay for the cost of the installation. For proper materials to use for the different conditions found in practice, see pages 10 to 17, giving sample specifications.

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SPECIFICATIONS.

POWER PLANT.

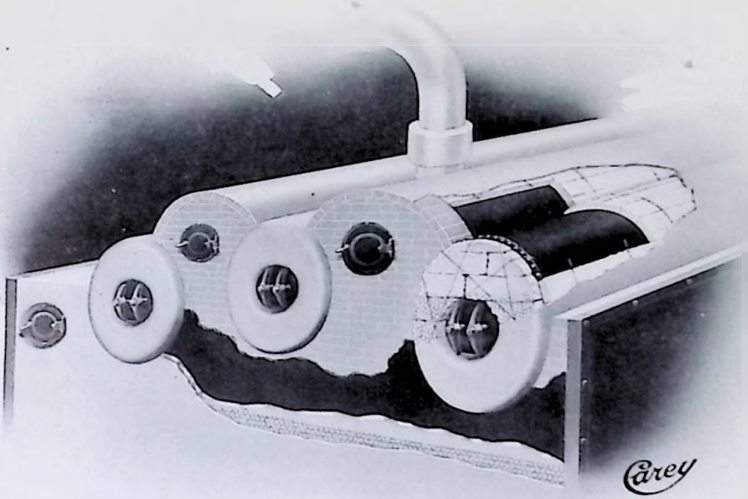
Boilers.—Cover all exposed boiler tops including the top of the combustion chamber, also the ends of drums with Carey 85% Magnesia Blocks 2" thick, firmly wired on and finished with a ½" thick coat of Carey No. 100 Hard Finish Asbestos Cement, troweled smooth. All covering around manholes and handholes shall be neatly beveled.

On connections from boiler to main smoke stack apply V-rib expanded metal lath to provide an air space of approximately ¾", or if the breeching is re-enforced with angle irons, the projecting ribs of these may be drilled on 6" centers and ¼" round iron rods spaced 6" apart, inserted through these holes to form an air space of not less than ¾" when blocks are applied over these rods. Then apply Carey 85% Magnesia Blocks, 2" thick firmly laced in place and covered with hexagonal wire mesh, stretched tight, and finished with a ½" thick coat of Carey No. 100 Hard Finish Asbestos Cement.

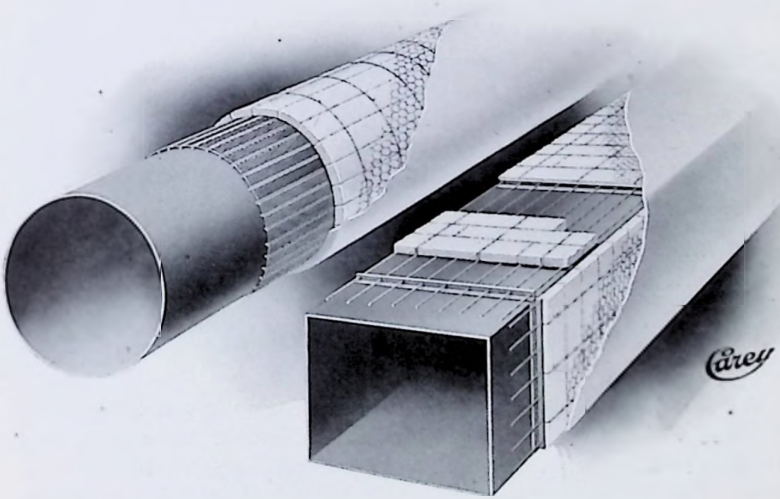
Alternate Specification.—On connections from boiler to main smoke stack apply Felted Asbestos Fibre Blocks 2" thick directly to the metal surfaces either by means of ¼" bolts and iron washers, the bolts being spaced 12" apart on each block, or if the breeching is stiffened by angle irons, hold the blocks in place by lacing wire between such stiffening irons. Cover the blocks with hexagonal wire mesh, stretched tight, and finish with a ½" thick coat of Carey No. 100 Hard Finish Asbestos Cement.

Apply with a trowel a thin coating of Carey B. T. U. Cement over the entire exposed brick boiler wall surface. Use from 45 to 50 pounds of cement per 100 square feet of surface. Over the B. T. U. Cement apply a 2" thick coat of Carey 85% Magnesia Cement re-enforced with wire mesh fastened to the brick work and finish with a coat of Carey No. 100 Hard Finish Asbestos Cement.

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Illustrating Method of Insulating Boiler Tops, Ends and Walls.



Illustrating Methods of Insulating Boiler Breechings.

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SPECIFICATIONS.

(*Continued.*)

POWER PLANT.

High Pressure Steam Piping.—Cover all high pressure saturated steam pipes 4" in diameter and larger with double standard thick 85% Magnesia Pipe Covering. Wire the first layer securely in place and apply the second layer to break all first layer seams and joints. Cover all high pressure steam pipes under 4" in diameter and all high pressure drip pipes with 2" thick Carey 85% Magnesia Pipe Covering.

For superheated steam pipes use double 1½" thick Carey 85% Magnesia Pipe Covering on all pipes 4" in diameter and larger; on pipes smaller than 4" use double standard thick 85% Magnesia Pipe Covering, all coverings being applied by the broken joint method as described.

Exhaust Steam Piping.—Cover all exhaust pipes and mains within buildings with Carocel Asbestos Sectional Pipe Covering 1½" thick applied in one layer.

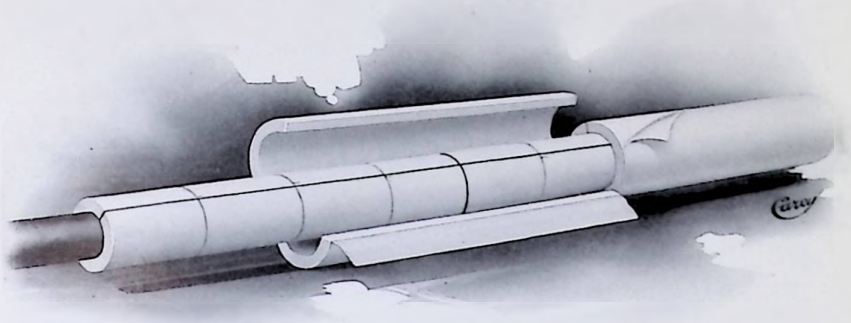
Feed Water Piping.—Cover all feed water pipes with Carocel Asbestos Sectional Pipe Covering 1" thick applied in one layer.

Fittings.—Cover all high pressure and exhaust steam fittings, valves and flanges with Carey 85% Magnesia Blocks and 85% Magnesia Cement, or all 85% Magnesia Cement, to a thickness corresponding to the covering on the adjacent pipe. Trowel the cement smooth and finish with canvas jacket smoothly pasted on, the canvas to be of the same weight as used on the 85% Magnesia Pipe Covering.

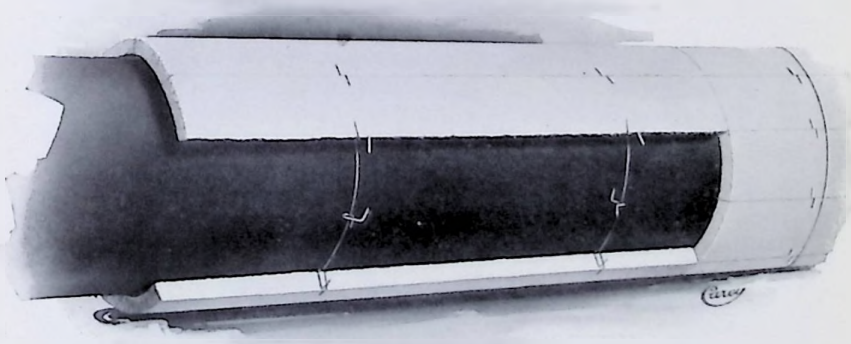
Finish.—Over all the pipe covering apply a 16 lb. asbestos paper and an extra 8 ounce canvas jacket, tightly stretched and sewed on, approximately 3 stitches to the inch. All canvas surfaces are to be sized and finished with 2 coats of lead and oil paint of color to be selected by the architect.

Finish.—(*Alternate Specification.*)—All pipe coverings shall be finished with standard commercial canvas jackets pasted on, and all laps neatly pasted down and with bands applied on 18" centers. Paint all finished canvas surfaces with 2 coats of approved cold water paint.

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Illustrating Broken Joint Method of Applying Pipe Covering.



Illustrating Application of Segmental Blocks on Large Pipes.

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SPECIFICATIONS.

(*Continued.*)

POWER PLANT.

Heaters, Receivers, Tanks, Traps, Etc.—Cover all such appurtenances with Carey 85% Magnesia Blocks and Carey No. 100 Hard Finish Asbestos Cement to a minimum thickness of 1½", or with 1" thick Carocel Blocks and ½" thickness of Carey No. 100 Hard Finish Asbestos Cement. Wire blocks securely in place, cover with 2" hexagonal wire mesh, stretched tight, and apply Hard Finish Asbestos Cement, troweled smooth. Finish with canvas jacket smoothly pasted on. Canvas jacket shall be of the same weight as used on 85% Magnesia Pipe Coverings.

HEATING SYSTEM.

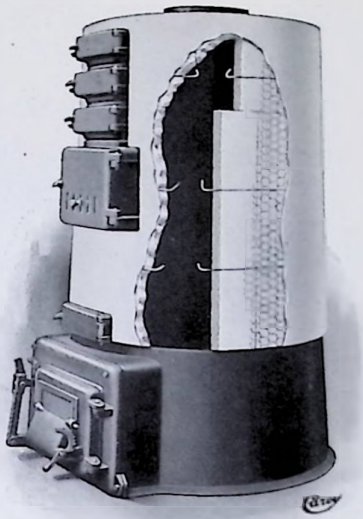
Boilers, Heaters, Etc.—Cover all such appurtenances with Carey 85% Magnesia Blocks and Carey No. 100 Hard Finish Asbestos Cement to a minimum thickness of 1½", or with 1" thick Carocel Blocks and ½" thickness of Carey No. 100 Hard Finish Asbestos Cement. Wire blocks securely in place, cover with 2" hexagonal wire mesh, stretched tight, and finish with Hard Finish Asbestos Cement, troweled smooth.

Heating Pipes.—Cover all mains, risers and returns (except horizontal radiator connections) with 1" thick Carocel Asbestos Sectional Pipe Covering.

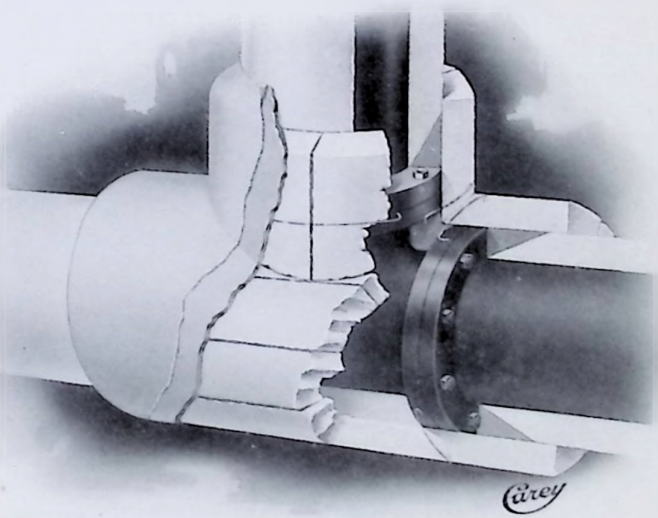
Fittings.—Covering all fittings and valves (except radiator valves) with Asbestos Cement approximately 1" thick, troweled smooth, and finish with canvas jacket smoothly pasted on. The canvas shall be the same weight as that used on the pipe covering.

Finish.—All exposed canvas jackets shall be sized and painted with two coats of lead and oil paint of color approved by the architect. Pipe covering bands shall be applied on 18" centers.

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Illustrating Method of Insulating Boilers, Heaters, Tanks, Etc.



Illustrating Method of Insulating Fittings, Flanges, Etc.

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SPECIFICATIONS.

(*Continued.*)

PLUMBING SYSTEM.

Hot Water Piping.—Cover all hot water mains and piping with Carocel Asbestos Sectional Pipe Covering 1" thick.

Cold Water Piping.—Cover all cold water pipes within buildings, whether exposed or concealed, with Impervo Pipe Covering, in two layers, applied by the broken joint method, each layer being ½" thick. Cover all cold water pipes in entrances, area-ways, unheated rooms or otherwise exposed to freezing, with Protecto Pipe Covering 1" thick.

Ice Water Piping.—Cover all ice water pipes, whether exposed or concealed, with Impervo Pipe Covering, in two layers, applied by the broken joint method, each layer being ¾" thick.

Finish.—All exposed canvas jackets shall be sized and painted with two coats of lead and oil paint of color approved by the architect. Pipe covering bands shall be applied on 18" centers.

OUT-DOOR PIPING.

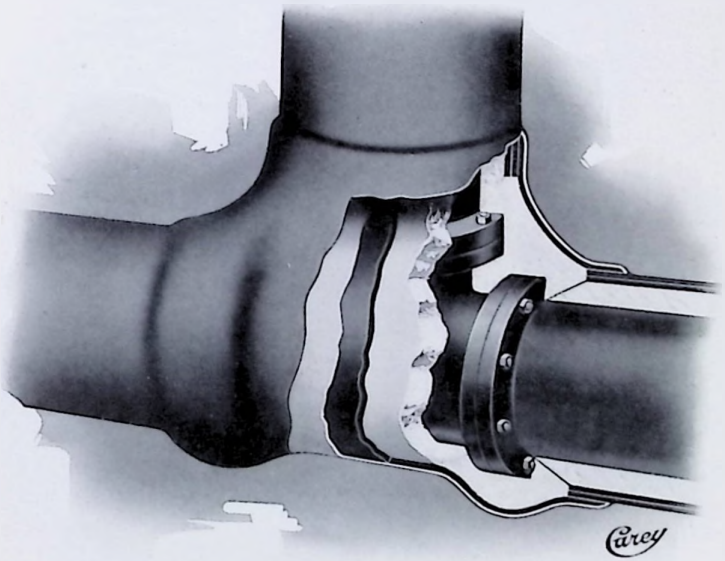
Cover all steam and hot water pipes exposed to the weather as previously specified for pipes of similar steam pressure and water temperature, but finish with two layers of Argentum Shells, each layer being ¼" thick and applied by the broken joint method. The seams of the shells are to be drawn tightly together and stapled at intervals of two inches. All butt joints are to be stapled together with at least four staples at each joint. The outside surface of each layer of Argentum Shells is to be thoroughly coated with Liquid Waterproof Cement provided by the manufacturer for this purpose.

Cover all fittings with 85% Magnesia Blocks and Cement, or all 85% Magnesia Cement, to a thickness not less than the covering on the pipe, and build this cement up flush with the outer surface of the Argentum Shells on the adjacent pipe; then apply a coat of B. T. U. Plastic Waterproof Cement approximately ¼" thick, extending this Plastic Cement at least 4" over the adjacent Argentum Shells. Finish with a canvas jacket imbedded in the B. T. U. Cement and a coat of Liquid Waterproof Cement over the canvas.

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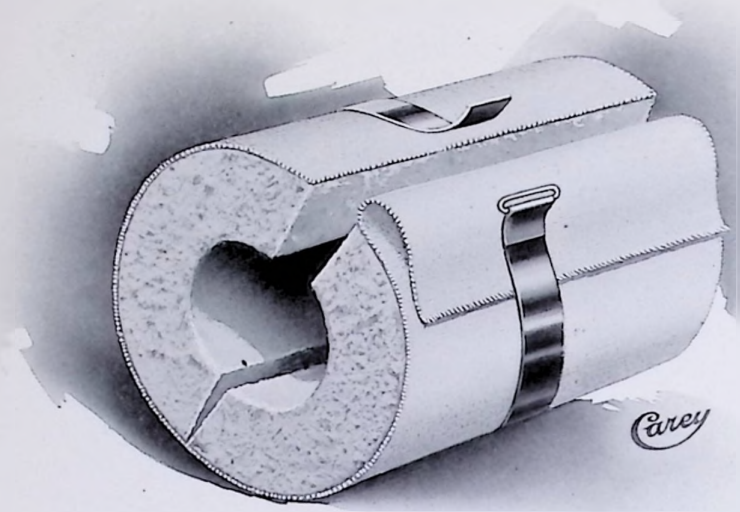


Illustrating Method of Applying Argentum Shells for Waterproofing.



Illustrating Method of Insulating and Waterproofing Out Door Fittings.

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CAREY 85% MAGNESIA

Sectional Pipe Covering

For High Pressure Steam Pipes.

CAREY 85% MAGNESIA COVERING is composed of approximately 85% Carbonate of Magnesia and 15% Fibrous Asbestos. It is very light in weight, fire-proof, extremely durable, not subject to deterioration, will not injure piping, and has a very high heat insulation value. Magnesia Coverings have been the standard of the Navy Department for over 30 years. More of it has been used in stationary power plants, in marine work, and on locomotives in the form of lagging than all other high pressure coverings combined. It is recognized as the most permanent practical conserver of heat.

(*See Data Section, pages 59-71, for Price Lists, etc.*)

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It is recommended for use particularly on high pressure and superheated steam lines, but can be used to excellent advantage on medium and low pressure lines. See pages 66 and 67 for proper thicknesses to use. A special complete scientific specification for its use will be sent upon request.

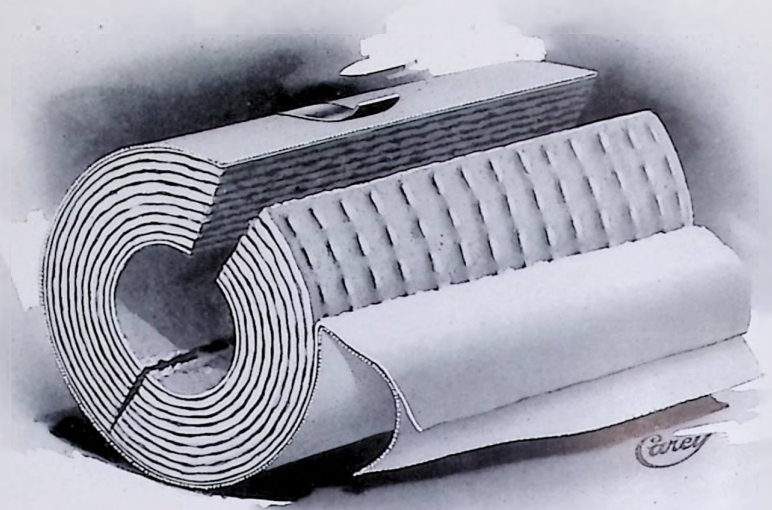
It is furnished in sections three (3) feet long, canvas covered, and with bands for applying for all pipes up to and including ten (10) inches. For pipes over ten (10) inch size, segmental blocks with necessary wire, hooks, canvas and bands are furnished. It is made in five (5) styles: standard (approximately 1"), 1½", 2", double standard and double 1½" thick.

BLOCKS.—Flat blocks for covering boilers, breechings, tanks and similar large surfaces are furnished in standard sizes of 6" by 36", 6" by 18" and 3" by 18" in thicknesses from ⅞" to 4" inclusive.

(*See Data Section, pages 59-71, for Price Lists, etc.*)



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CAREY PYREX

Asbestos Sectional Pipe Covering

For Vibrating High Pressure Steam Pipes.

CAREY PYREX ASBESTOS COVERING is made of alternate layers of plain and indented asbestos paper firmly bound together to form an extremely tough, durable, fire-proof covering. The indentations of each layer are sealed by the following layer, so that a great number of dead air spaces are formed, and it is this construction that gives to Pyrex Covering a very high insulating efficiency.

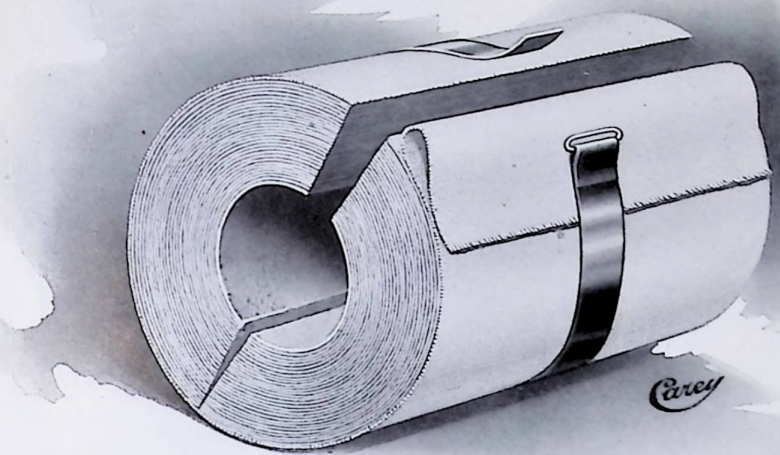
It is recommended for use on vibrating high pressure steam lines or on lines given such rough usage that a moulded form of covering would be destroyed. Its insulating value is only slightly less than that of 85% Magnesia. For high pressure (over 100 pounds) steam pipes, Pyrex Covering 2" thick, and applied in two layers by the broken joint method, should be used. The same general method of application as used for Magnesia Coverings should be used for Pyrex Covering. See page 12.

It is furnished in sections three (3) feet long, split lengthwise into halves, canvas covered and with bands for applying, for all pipe sizes. It is regularly made 1" thick, but can be furnished in any thickness desired.

BLOCKS.—Flat blocks for covering boilers, tanks and similar large surfaces are furnished in standard sizes of 6" by 36", 6" by 18" and 3" by 18", in thicknesses from ½" to 4" inclusive. For description of larger sheets see page 40,

(*See Data Section, pages 59-71, for Price Lists, etc.*)

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CAREY MULTI-PLY

Asbestos Sectional Pipe Covering

For Medium and High Pressure Steam Pipes.

CAREY MULTI-PLY ASBESTOS PIPE COVERING is made of successive layers of thin, tough, Asbestos paper, in which is imbedded particles of finely ground sponge-like material. The covering is built up in successive layers in laminated form. A large number of air spaces are confined between the layers producing very high insulating efficiency. The successive layers are firmly bound together to make a strong, tough, durable sectional covering.

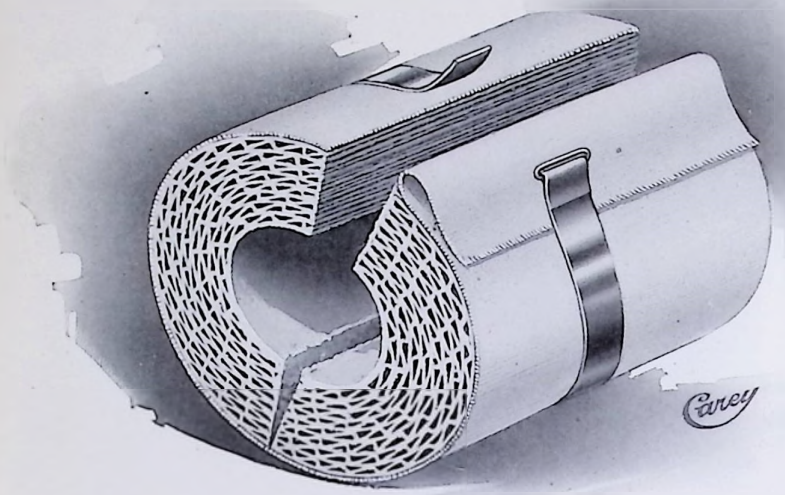
It is recommended for use on medium and high pressure steam lines. Its mechanical construction makes it highly resistive to jars, blows and general abuse. For high steam pressures (over 100 pounds) Multi-Ply Covering 2" thick should be used and applied in two layers by the broken joint method. The same general method of application as specified for Magnesia Coverings will apply for Multi-Ply Coverings. (See page 12.)

It is furnished in sections 3 feet long, canvas covered, with bands for applying for all pipe sizes. It is regularly furnished in 1", 1½", 2" and 3" thicknesses in either single or double layers.

BLOCKS.—Flat blocks for covering boilers, heaters, tanks and similar large surfaces are furnished in standard sizes of 6" by 36" and 6" by 18" and in thicknesses from ½" to 1½" inclusive.

(*See Data Section, pages 59–71, for Price Lists, etc.*)

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CAREY CAROCEL

Asbestos Sectional Pipe Covering

For Medium and Low Pressure Steam Pipes.

CAREY CAROCEL COVERING is composed of alternate layers of plain and corrugated asbestos paper, firmly bound together. The corrugations are approximately one-eighth (⅛) inch deep and this construction forms a very strong, medium weight covering with very high insulating efficiency. It is firm, clean cut, easy to apply and will last indefinitely.

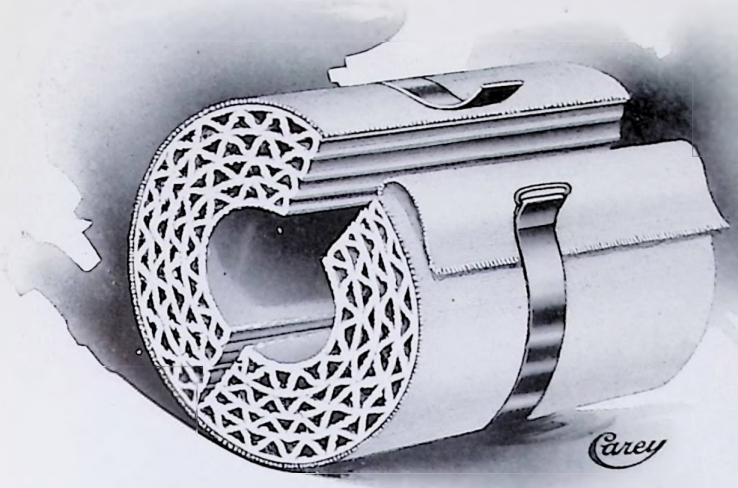
It is recommended in preference to all other coverings for medium and low pressure steam lines and hot water lines, upon which it will give the maximum return for the initial investment. It can be used to advantage on high pressure lines where the installation is more or less temporary and the relatively high cost of 85% Magnesia would not justify the use of that covering for temporary work.

It is furnished in sections three (3) feet long, canvas covered, and with bands for applying, for all pipe sizes. It is made regularly in 1" thickness, but other thicknesses can be furnished.

BLOCKS.—Flat blocks for covering boilers, heaters, tanks and similar large surfaces are furnished in standard sizes of 6" by 36", 6" by 18", and 3" by 18", in thicknesses from ½" up to any thickness desired. For description of larger sheets see page 41.

(*See Data Section, pages 59–71, for Price Lists, etc.*)

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CAREY AIR CELL

Asbestos Sectional Pipe Covering

For Medium and Low Pressure Steam Pipes.

CAREY AIR CELL COVERING is made of alternate layers of plain and corrugated asbestos paper, firmly bound together to form a strong, inexpensive, light weight, fire-proof covering. This covering has good heat insulating efficiency and secures its non-conducting properties from the air cells formed by the corrugations which are approximately ¼" deep. It can be handled and shipped very satisfactorily, with very little danger of breakage.

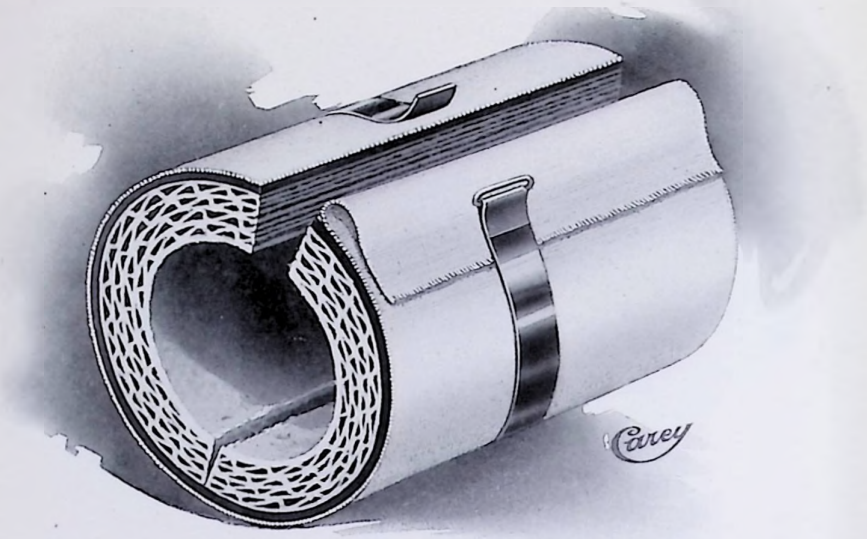
It is recommended for use on hot water and low pressure steam lines, particularly in connection with residence heating systems where it gives very satisfactory results. It is best adapted for use on small systems; for the larger heating systems greater economy is obtained by the use of Carocel Covering.

It is furnished in sections three feet long, split in halves lengthwise, canvas covered, and with bands for all pipe sizes. It is regularly made in two thicknesses —3-ply and 4-ply—which correspond approximately to ¾" and 1" thicknesses respectively; it can be furnished, however, in any number of plies desired.

BLOCKS.—Flat blocks for covering boilers, heaters, tanks and similar large surfaces are furnished in standard sizes of 6" by 36", 6" by 18" and 3" by 18", in any number of plies desired. For description of larger sheets of this material see page 42.

(*See Data Section, pages 59–71, for Price Lists, etc.*)

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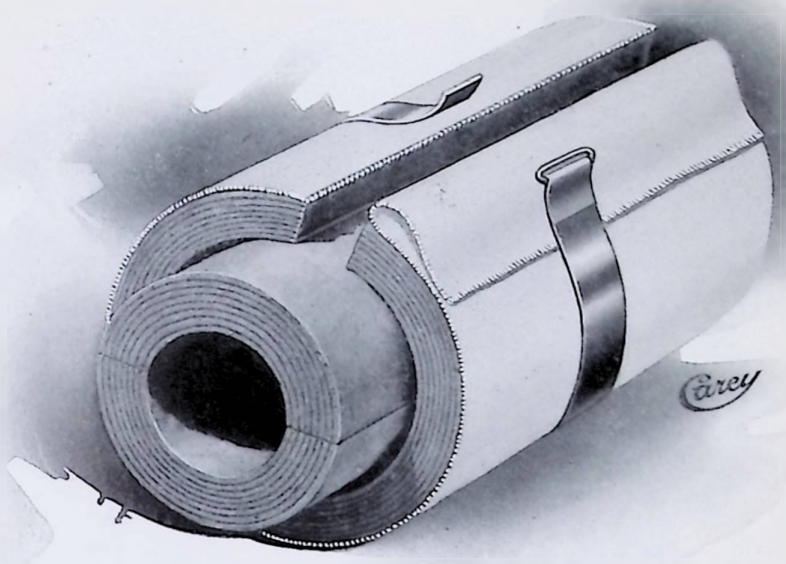
CAREY TRAIN PIPE COVERING.

THE requirements of an insulating pipe covering for train line service are that it shall have high insulating efficiency; that it shall be fire-proof; that it shall be tough and durable to withstand the excessive vibration it receives, and that it shall be waterproofed. To meet the severe requirements of this service we recommend Carey Combino Train Pipe Covering (see above illustration) as the most satisfactory. This covering has Carocel construction, that is, is made up of alternate layers of corrugated and flat paper firmly bound together at the rate of 8 plies to the inch. This is the most efficient form of insulation for steam heating lines. (See page 22.) The covering is finished with a waterproof felt under a canvas jacket. It is furnished in sections 3 feet long, split in halves lengthwise, canvas covered, and with bands for applying for all pipe sizes. The standard train pipe thickness is $\frac{5}{8}$", but this covering can be furnished in any thickness desired.

For train line service we can also furnish Carey Pyrex Covering (page 20) or Carey Multi-Ply Covering (page 21) finished with a waterproof felt under the canvas jacket, in the standard $\frac{5}{8}$" thickness or any other thickness desired. We are also in position to make up special train pipe coverings of any description to meet the varying requirements of individual railroads.

(*See Data Section, pages 59-71, for Price Lists, etc.*)

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CAREY IMPERVO

Sectional Pipe Covering

For Sweating Cold Water Pipes.

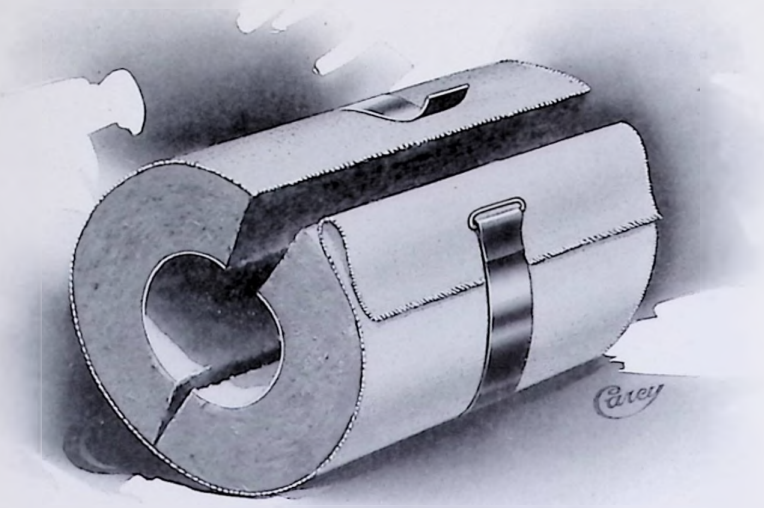
CAREY IMPERVO COVERING is composed of alternate layers of fine wool felt and waterproof paraffin paper, and has an inner lining of paraffin paper. This construction gives all the advantages of the insulating qualities of wool felt, and at the same time makes practically a waterproof covering. For this reason it is more satisfactory than the plain wool felt covering, particularly on large installations.

It is recommended for use on cold pipe lines passing through warm, humid rooms to prevent the constant annoying sweating of such pipes. It can also be used to very good advantage for insulating cold water and ice water pipes in factories, office buildings, etc., where it is desired to keep the water at as low a temperature as possible. For cold water pipes use double ½" thick covering, and for ice water pipes use double ¾" thick covering, all applied by the broken joint method.

It is furnished in sections three (3) feet long, canvas covered, and with bands for applying for all pipe sizes. It is regularly made in the following thicknesses: ½", ¾", 1", double ½" and double ¾".

(*See Data Section, pages 59–71, for Price Lists, etc.*)

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CAREY PERFECTO

Wool Felt Sectional Pipe Covering

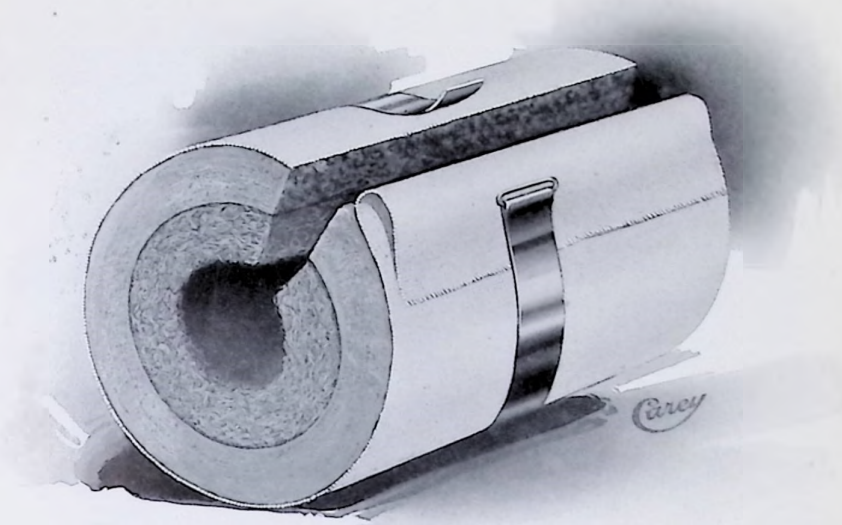
For Cold Water Pipes.

CAREY PERFECTO COVERING is composed of successive layers of wool felt with an inner lining of either asbestos paper or waterproof saturated felt. This is the standard type of covering largely used for cold water insulation, also to prevent sweating and freezing.

It is furnished in sections three feet long, split in half lengthwise, canvas covered and with bands for applying for all pipe sizes. It is regularly furnished in ½", ¾" and 1" thicknesses, but can be furnished in any thickness desired.

(*See Data Section, pages 59–71, for Price Lists, etc.*)

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CAREY PROTECTO

Sectional Pipe Covering

To Prevent Freezing of Cold Water Lines.

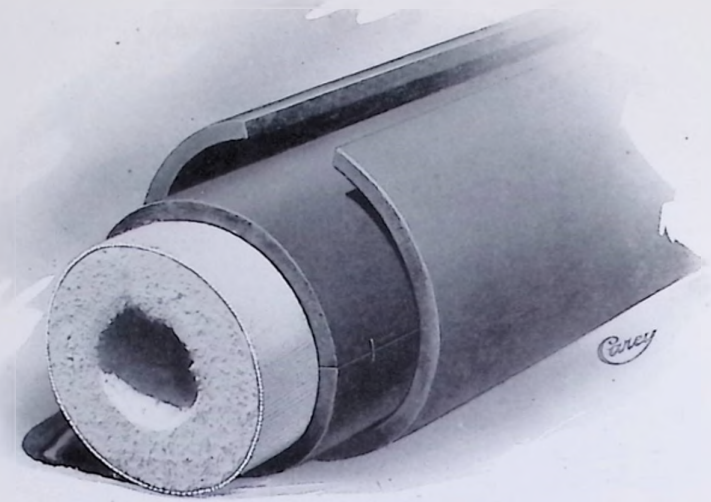
CAREY PROTECTO COVERING is composed of an inner layer of hair felt, reinforced by an outer shell of wool felt. The insulating properties of both these materials are well known and the combination forms a very durable sectional covering.

It is recommended for use on exposed cold water or similar lines to prevent freezing. For very severe conditions it is always advisable to use two layers of this covering applied so as to break all seams and joints. All covering exposed to the weather should be finished with a roofing jacket wired on with coppered wire on 8 inch centers.

It is furnished in sections three (3) feet long, canvas covered, and with bands for applying for all pipe sizes. It is regularly made with a ½" thick hair felt lining and a ½" thick wool felt shell, the shell being split on one side only for springing the covering over the pipe.

(*See Data Section, pages 59–71, for Price Lists, etc.*)

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CAREY ARGENTUM SHELLS

Waterproof Pipe Covering Armor for Exposed Steam Pipes.

CAREY ARGENTUM SHELLS are composed of successive layers of a special waterproof saturated felt, cemented together, and treated so that they cure to almost the consistency of hard rubber after a short period of service. These shells when used over other insulating coverings act as a waterproofing medium, a protective armor against abuse, and also materially add to the insulation value of the other pipe coverings.

They are recommended for use over other pipe coverings on all outdoor lines, and on lines subject to abuse. They should be applied in two layers, by the broken joint method, each layer being given a heavy coating of the waterproof liquid cement regularly furnished. The seams are to be stapled together at intervals of two inches. (See page 17 for method of application.)

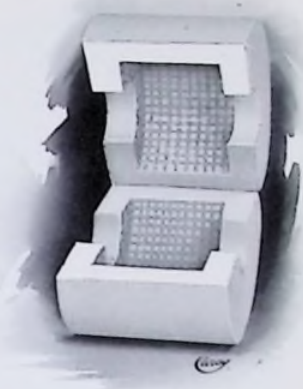
These shells are furnished in sections three feet long, cut lengthwise, either on one side only for springing over the pipe, or into two pieces for all pipe sizes. No canvas is used. Staples and liquid waterproof cement are regularly included. The shells are one-quarter inch thick for pipe sizes up to and including 6 inch pipe size and one-half inch thick for larger sizes.

(*See Data Section, pages 59-71, for Price Lists, etc.*)

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Standard.



Wire Mesh.

CAREY 85% MAGNESIA

Removable Flange Covers.

THE two types of Carey 85% Magnesia Removable Flange Covers are illustrated above.

Carey Standard 85% Magnesia Removable Flange Covers are made in one inch and two inch thicknesses for either standard or extra heavy flanges. They are furnished unassembled in the form of side pieces and segmental blocks, as illustrated, with necessary staples, canvas and bands, for building up and applying.

Carey Wire Mesh 85% Magnesia Removable Flange Covers are furnished in two sections, as illustrated, ready for application over the flange. They consist of wire mesh bases upon which are firmly built Magnesia blocks and cement. The finished covers have canvas jackets and are furnished with staples and bands for applying. They are made in one inch and two inch thicknesses for either standard or extra heavy flanges.

Prices for any size upon application.

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SPECIAL COVERINGS.

WE make special coverings to meet special conditions. Following is a brief description of a few of such special coverings:

DUPLEX COVERING.—This is a covering similar to ordinary Asbestos Air Cell Covering, but has Wool Felt substituted for the flat Asbestos backing sheet. For hot water systems or temporary low pressure steam lines only.

ARGENTUM SECTIONAL COVERING. — This covering consists of a one-eighth inch thick Asbestos eye and five-eighth inch thickness of Argentum waterproof felt structure. For use on low pressure steam pipes in mines or similar places where unusual abuse and moisture are found.

REINFORCED AIR CELL.—This covering consists of standard 3 or 4-ply Asbestos Air Cell Covering reinforced with a one-quarter inch thick jacket of Asbestos to provide extra mechanical strength, and is finished with canvas.

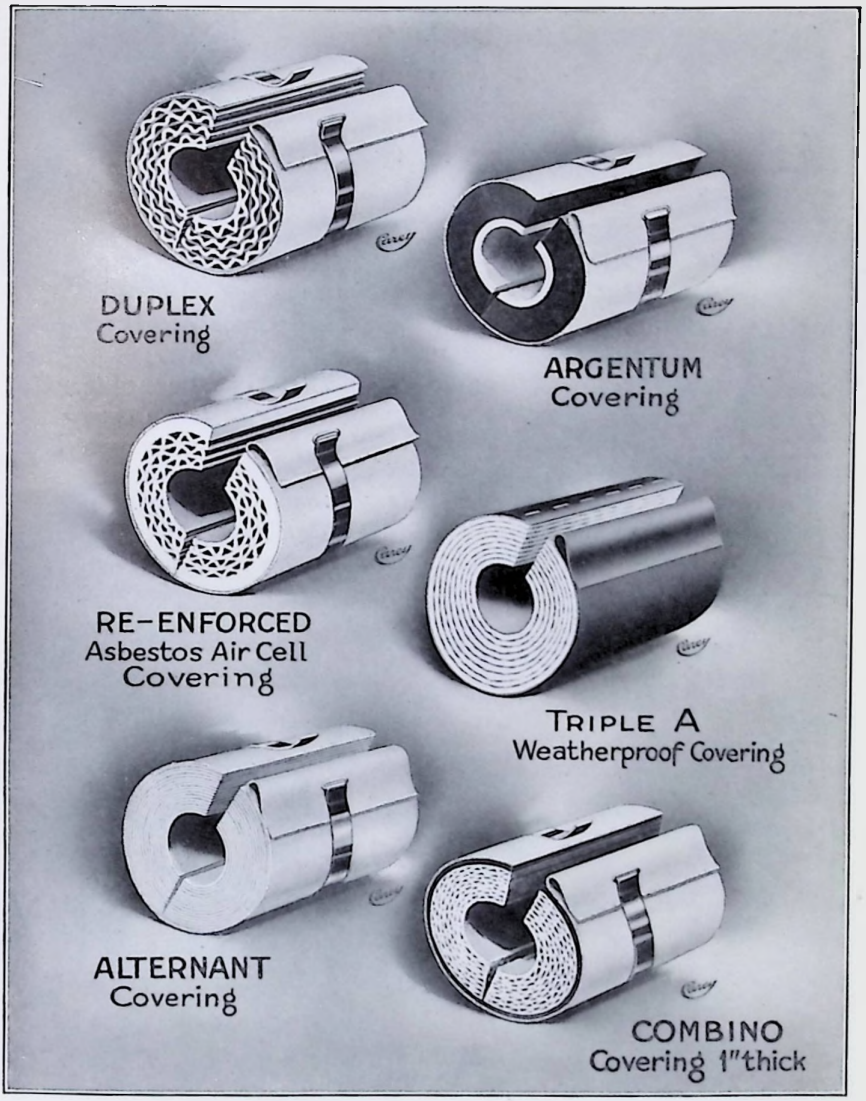
"TRIPLE A" WEATHERPROOF COVERING.—This covering consists of alternate layers of flat and indented Asbestos Paper, finished with a roofing jacket, all being bound together with wire stitches only. Specially designed for either high or low pressure exposed out-door or underground steam pipes.

ALTERNANT COVERING.—This covering consists of alternate layers of Asbestos and Wool Felt, with a heavy Asbestos eye and heavy Asbestos jacket under the canvas jacket. For low and medium pressure steam pipes subject to abuse.

COMBINO COVERING, ONE INCH THICK.—This covering consists of standard one inch thick Asbestos Carocel Covering, with a one-eighth inch thick Argentum jacket attached, and finished with canvas. The Argentum jacket provides extra strength and makes the covering moisture-proof.

(See Data Section, pages 59-71, for Price Lists, etc.)

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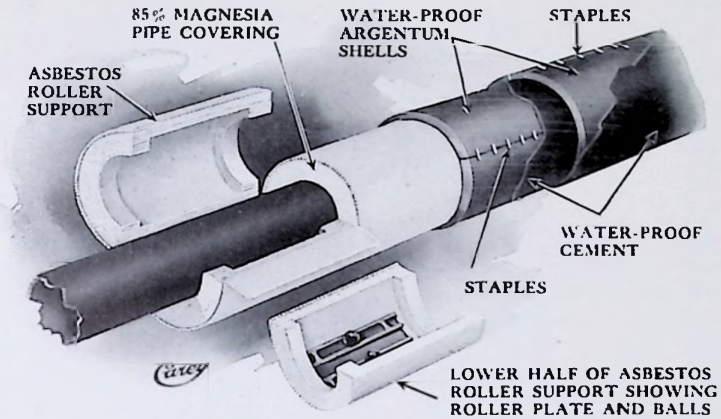
CAREY SYSTEM OF INSULATION

For Underground Steam Pipes.

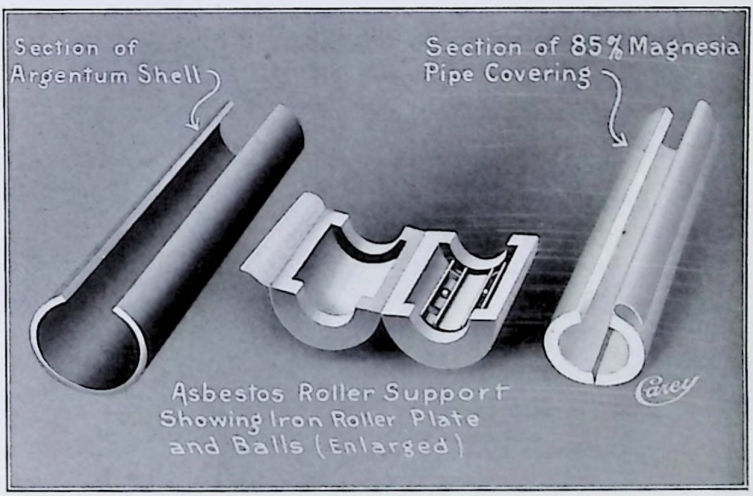
THIS system provides the simplest and most logical method of insulating underground pipes. 85% Carbonate of Magnesia pipe covering of standard thickness (see pages 18 and 19) is used as the insulating medium because it is recognized as the most permanent, practical conserver of heat. Expansion is taken care of by means of ball bearings running in grooved iron plates which fit accurately the inner curved surface of a solidly constructed asbestos roller support. One of these roller supports complete is furnished for every fifteen feet of sectional pipe covering. Waterproofing and mechanical protection are secured by two layers of Argentum Shells (see page 28) split on one side only for springing over the pipe, and applied by the broken joint method. These shells are each ¼" thick for pipe sizes up to and including 6" pipe size and each ½" thick for larger sizes. Since there is but one seam to draw tight and seal on each shell, this important work can be done and inspected from above, and a tight job insured. These seams are held together with staples at 2" intervals. Each shell is to be finished with a heavy coat of liquid waterproof cement. The system is furnished complete including all materials described.

(*See Data Section, pages 59–71, for Price Lists, etc.*)

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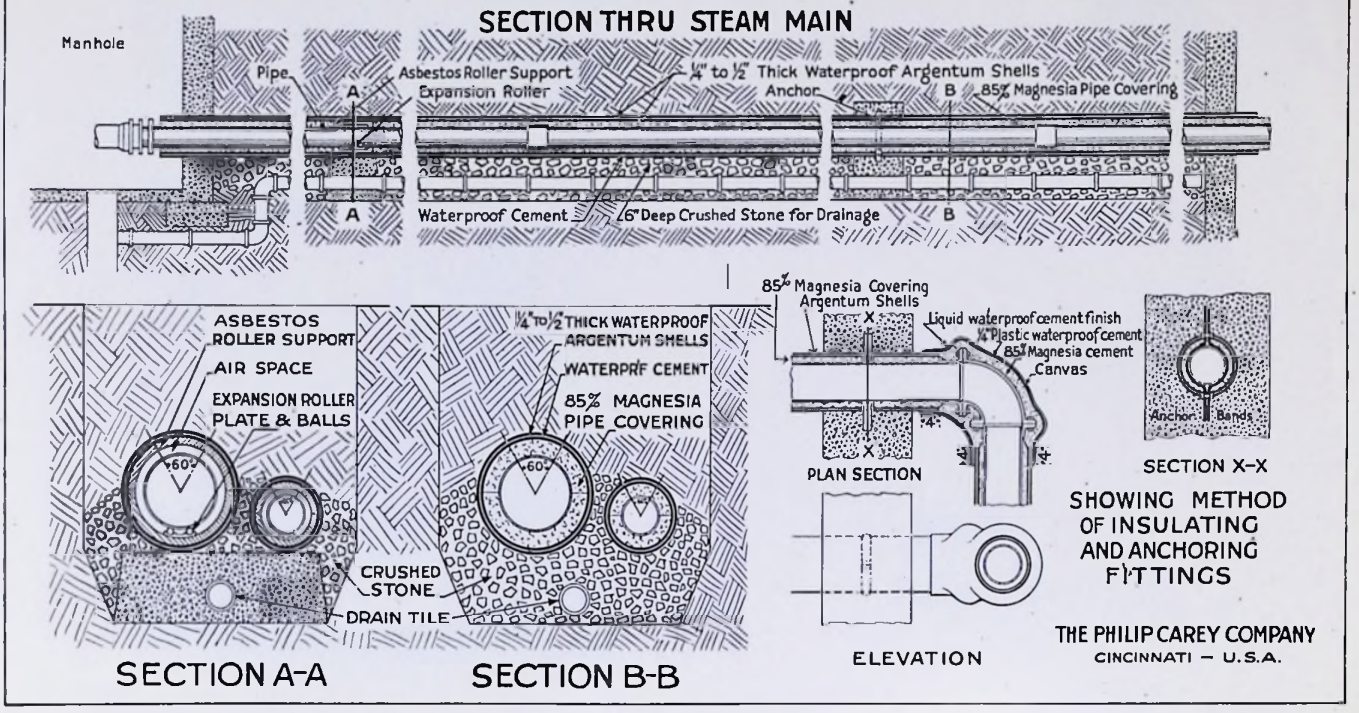
Showing Method of Assembling Carey System.



Showing Details of Carey System.

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CAREY SYSTEM OF INSULATION FOR UNDERGROUND PIPES



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CAREY SYSTEM OF INSULATION
For Underground Steam Pipes.
SPECIFICATIONS FOR APPLYING.

TRENCH.—Grade the pipe trench to proper levels, making necessary allowances for drainage bed and underdrain as provided hereafter.

DRAINAGE.—Provide a drainage bed of not less than 6" depth of broken rock in the bottom of the trench. (Where moisture conditions are severe install an underdrain as illustrated, using 4" sewer pipe laid with open joints and surrounded with broken rock to a distance of not less than 6" at any point.) After the pipe covering is installed fill the trench with broken rock to approximately the center line of the pipes to provide free drainage. Install drains from low points of the trench to sewers or other points below the level of the trench.

PIPING.—Use screwed couplings or welded joints (depending upon conditions) for all underground piping to be insulated by this system. No flange couplings can be used except in manholes, inspection pits, or inside of buildings. Lay all piping to rest upon blocks or removable supports to a height of approximately one foot above the rock drain, to permit the pipe covering being applied.

PIERS.—At intervals of fifteen feet and eight inches, install concrete piers of suitable size to properly support the piping, the tops of the piers being flat and level with the surface of the rock drain. Provide suitable passages through the bases of the piers to permit free drainage. (For small pipes, up to 3", these piers can be omitted.)

PIPE COVERING.—Apply standard thick 85% Magnesia Sectional Pipe Covering in the usual manner, butting sections closely together and with all seams horizontal. At the end of every five sections (15 feet) of Magnesia Covering apply an asbestos roller support with roller plate and balls properly inserted. Over the Magnesia Covering and Asbestos Roller Supports apply first course of Argentum Shells so that no seam or joints coincide with those of the Magnesia Covering. Draw seams tight with a rope in the form of a tourniquet, and staple together at intervals of two inches. Also staple abutting sections together. Apply thoroughly a coat of liquid waterproof cement to the outer sur-

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face of first course of Argentum Shells. Apply the second course of Argentum Shells over the first course in the same manner as previously described, breaking all seams and joints with the first course, and finish with a heavy coat of liquid waterproof cement. (For moist or marshy ground a final coat of coal tar pitch is recommended.)

ANCHORS.—At anchors the pipe covering and Argentum Shells shall fit as closely as possible, and the space between sections shall be filled with 85% Magnesia Cement flush with the surface of the Argentum Shells. Spiral wind two plies of strip canvas from shell to shell over this cement joint and finish with a heavy coating of liquid waterproof cement. Cast a solid anchor block of concrete to completely cover the Argentum Shells for a distance of at least eight inches on each side of the anchors.

FITTINGS.—All ells, tees and crosses shall be anchor points. Cover such fittings (when not in manholes) with 85% Magnesia Cement flush with the outer surface of the abutting Argentum Shells. Over the 85% Magnesia Cement apply a coat of plastic waterproof B. T. U. Cement to a thickness of not less than ¼"; this plastic cement to extend at least 4" over the surfaces of the abutting Argentum Shells. Completely cover this plastic waterproof B. T. U. Cement with a layer of 4 ounce canvas, smoothly applied and imbedded in the plastic waterproof cement. Finish with a heavy coating of liquid waterproof cement. Iron anchor bands at fittings shall be applied to the pipe, not less than 15" from the fittings, and these anchor bands shall extend at least 8" into an anchor block of concrete which shall completely cover the pipe covering, and extend over the adjacent Argentum Shells to a distance of 8" on each side. There must be maintained sufficient distance between the concrete block and the fitting to permit easy removal and application of flange bolts. All expansion joints and valves (and any other fittings it may be desirable to include) shall be contained in manholes. Cover all such fittings in manholes with 85% Magnesia Cement not less than 1½" thick.

Where the underground pipe covering passes through walls into manholes, pits or buildings, the Argentum Shells shall extend through such walls and terminate not less than three inches from the inside of such walls.

NOTE.—Each underground piping system usually presents some special problem in insulation. The services of our Engineering Department are at your disposal to assist you in solving all such problems.

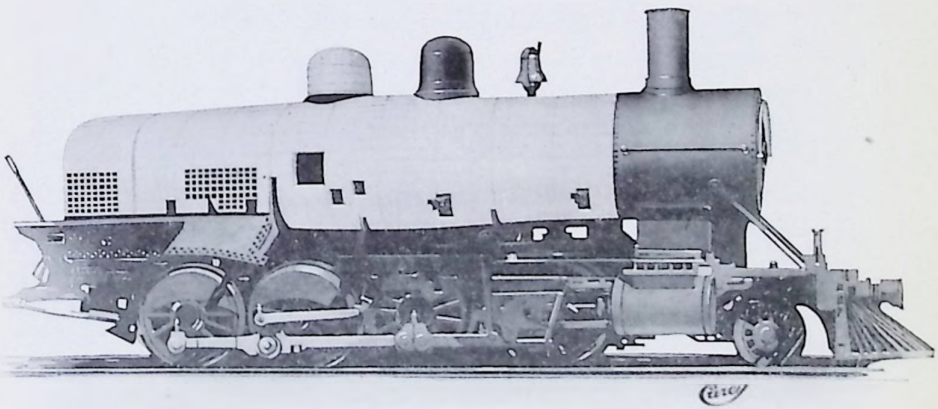
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Carey 85% Magnesia Locomotive Lagging.

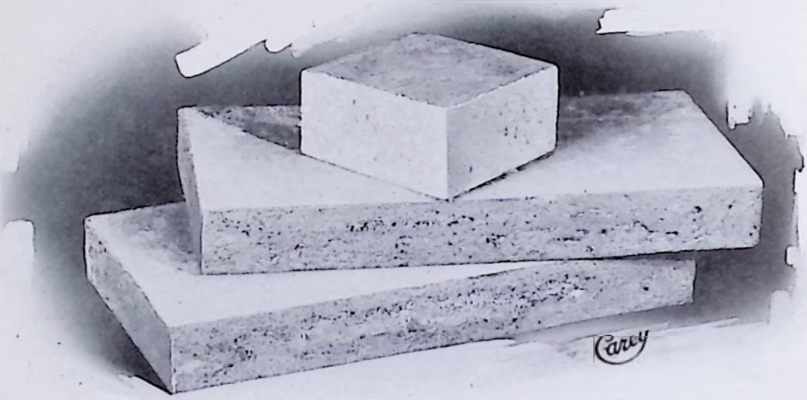
CAREY 85% MAGNESIA LOCOMOTIVE LAGGING is composed of approximately 85% basic Carbonate of Magnesia and approximately 15% long Asbestos fibre. The insulating value and durability of this type of locomotive lagging is so pronounced that it is used by practically all railroads and locomotive builders. Carey Lagging is specially prepared to have high tensile strength.

It is furnished in block form either flat or curved to the radius of the boiler. Standard blocks are 6" wide x 36" long. It can also be furnished in special size blocks cut to widths and lengths which may be specified. We are prepared to supply necessary wire and hooks for application purposes.

(*See Data Section, pages 59-71, for Price Lists, etc.*)



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CAREY HI-TEMP BLOCKS

For High Temperature Insulation.

CAREY HI-TEMP BLOCKS and sheets are composed of asbestos and refractory insulating materials capable of withstanding very high temperatures. A special hard surfacing reinforcement is provided so that the blocks can be shipped and applied with a minimum of breakage, and this surfacing becomes harder with the application of heat, insuring a permanent installation. Hi-Temp Blocks are specially constructed for covering oil stills and breechings. Their insulating value is much superior to that of any blocks previously offered for high temperature work.

They are furnished in flat blocks or sheets 6", 12" or 24" wide, 36" long, and in thicknesses from 1" up. They weigh approximately 2 pounds per square foot per inch of thickness.

(*See page 62 for Price List.*)

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Carey Felted Asbestos Fibre Blocks

For High Temperature Insulation.

CAREY FELTED ASBESTOS FIBRE BLOCKS are composed of long, finely divided asbestos fibres, matted and firmly bound with a fireproof adhesive into blocks or sheets. A large amount of finely divided dead air space is entrapped by this construction, with the result that this block has a very good heat insulating efficiency and also great resistance to high temperatures. These blocks are particularly adapted for use on boiler breechings, oil stills and similar places where insulation is required for temperatures exceeding those ordinarily found in steam practice.

They are furnished in flat blocks or sheets 6", 12" or 24" wide, 36" long and in thicknesses from ½" up. They weigh approximately 2½ pounds per square foot per inch of thickness.

(See Data Section, pages 59-71, for Price Lists, etc.)

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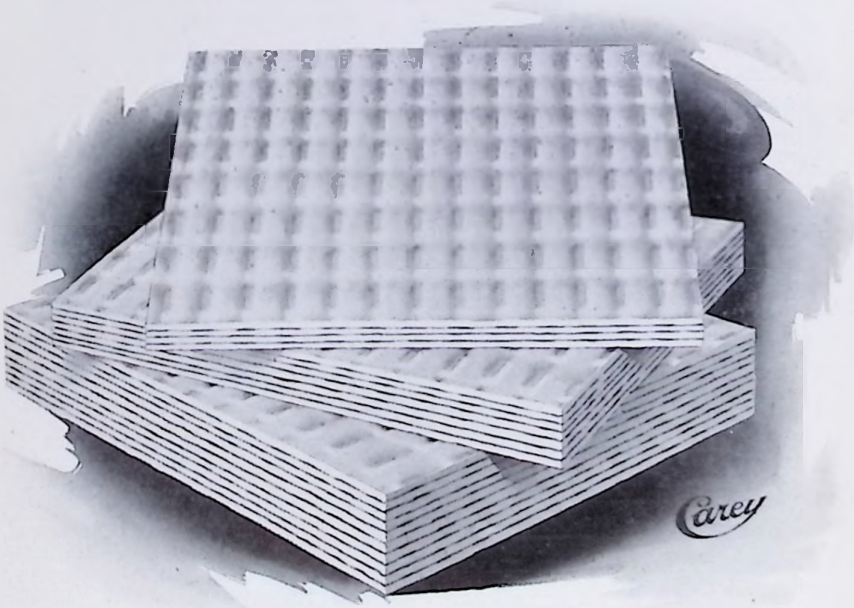
CAREY PYREX ASBESTOS SHEETS

For Medium and High Pressure Steam.

CAREY PYREX ASBESTOS SHEETS consist of alternate layers of plain and indented asbestos felt firmly bound together. They have high heat resistance, a tough construction and good insulating value. They can be used to advantage in block or sheet form on high and medium pressure steam surfaces, and also are specially valuable in lining ovens, stoves, kilns, etc., where a relatively high temperature exists.

Blocks are furnished 3" and 6" wide by 36" long, and sheets are furnished 12", 24" and 36" wide by 36" long, in thicknesses from ½" up. Sizes cut to meet special conditions can also be furnished. The weight is approximately 3 pounds per square foot per inch of thickness.

(*See page 65 for efficiency.*)



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CAREY CAROCEL ASBESTOS SHEETS

For Medium Temperature Insulation.

CAREY CAROCEL ASBESTOS SHEETS are composed of alternate layers of corrugated and flat asbestos paper, the alternate layers of corrugations being crossed to give equal strength in both dimensions. The corrugations are approximately 1/8" in depth. All layers are firmly cemented together and the sheets thus formed are medium weight, fire-resisting and give exceptionally high insulating value. They are recommended for use in block form on low and medium pressure boilers, heaters, tanks, etc. For lining stoves, ovens, kilns, etc., they are superior to any other form of sheet insulation. They can be used to exceptional advantage in making false ceilings in engine rooms in public buildings.

These sheets are furnished regularly 36" by 36", in thicknesses from ½" up. The material is also furnished in blocks 6" and 12" wide by 36" long. Special cut sizes can also be furnished. The weight is approximately 2 pounds per square foot per inch of thickness.

(*See page 65 for efficiency.*)



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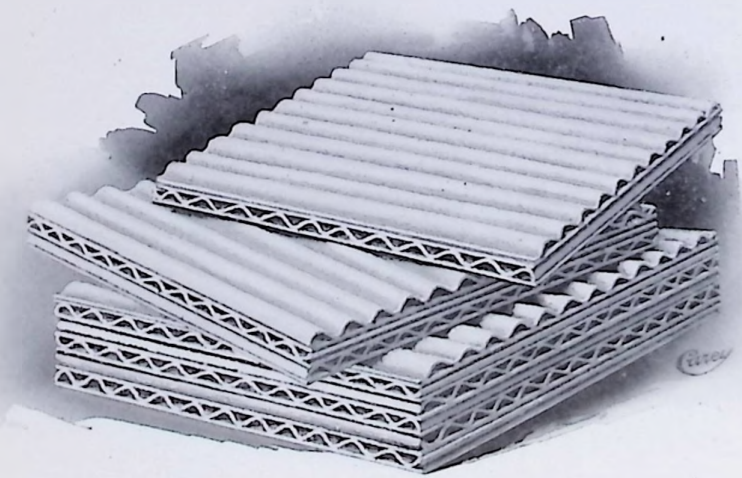
CAREY AIR CELL ASBESTOS BOARD

For Medium Temperature Insulation.

CAREY AIR CELL BOARD is composed of alternate layers of corrugated and flat asbestos paper, the alternate layers or corrugations being crossed to make a board of equal strength in both dimensions. The corrugations are approximately ¼" deep. All layers are firmly cemented together and the board thus formed is exceptionally light, fire-resisting and one of the least expensive forms of heat insulation for medium temperatures. It is recommended for fire-proofing generally and is particularly adapted for lining dry kilns, ovens, stoves, etc., where a light weight, low price insulation is required.

It is regularly furnished in sheets 36" by 36", or in blocks 6" and 12" wide by 36" long, and in thicknesses from ½" up, by ¼" graduations. It weighs approximately one pound per square foot per inch of thickness.

(*See page 65 for efficiency.*)



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ASBESTOS FIBRE.

ASBESTOS is one of the most marvelous productions of nature. It is a natural fiberous mineral, consisting chiefly of Magnesia and Silica and usually embodying small amounts of iron and alumina together with about 15% of water in combination.

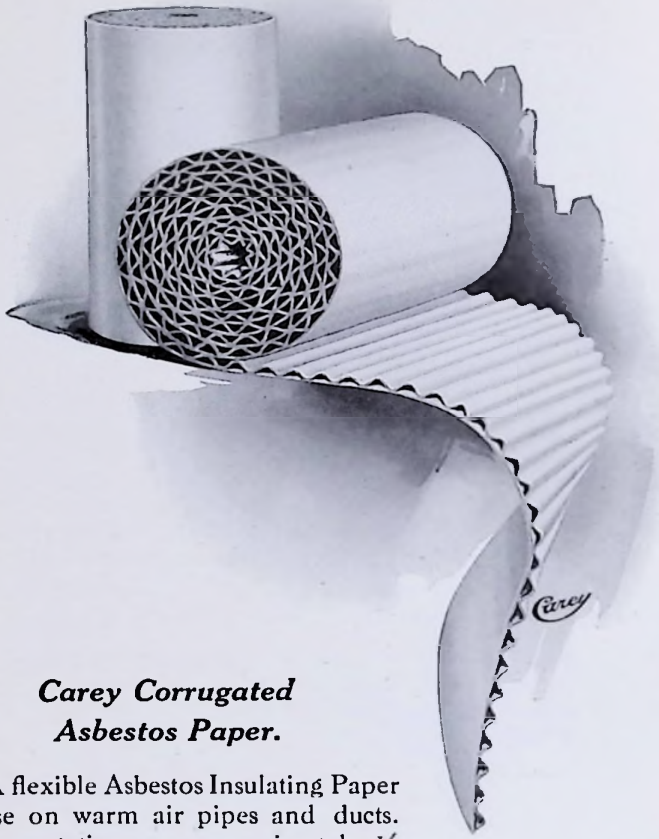
It is usually mined in an open quarry and by process of crushing and screening is separated into various grades, according to the length of the fibre. We furnish eight standard grades of asbestos, as indicated below:

XXXXX,	48 lbs.	per cu. ft.	
XXXX,	45 "	"	"
XXX,	30 "	"	"
XX,	23 "	"	"
D,	27 "	"	"
E-2,	21 "	"	"
X,	20 "	"	"
M,	18 "	"	"

Packed in bags of 100 lbs. each.

Asbestos Fibre is used in combination with such materials as Portland Cement, Magnesia, Land Plaster and other material as a fire-proof binder for the making of asbestos slate and shingles, moulded electrical devices, pipe and boiler coverings, fire-proof cements and for a great variety of roof and repair cements.

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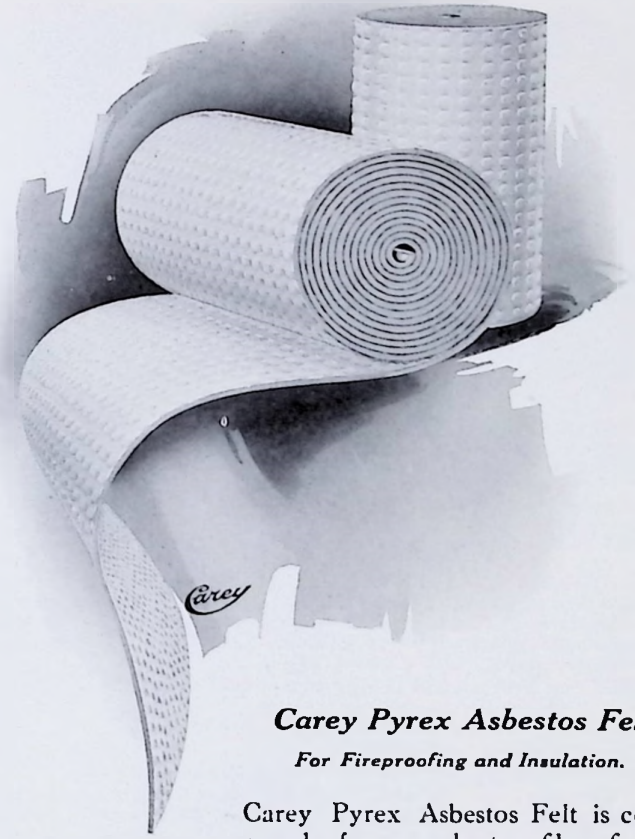
Carey Corrugated Asbestos Paper.

A flexible Asbestos Insulating Paper for use on warm air pipes and ducts. The corrugations are approximately ¼ inch deep. Furnished in rolls 36" to 37" wide, containing 250 square feet each. Weight approximately 60 lbs. per roll.

Carey Carocel Asbestos Paper.

A flexible Asbestos Insulating Paper for use on warm air pipes and ducts. The corrugations are approximately ⅛ inch deep. Furnished in rolls 36" to 37" wide, containing 500 square feet each. Weight approximately 100 lbs. per roll.

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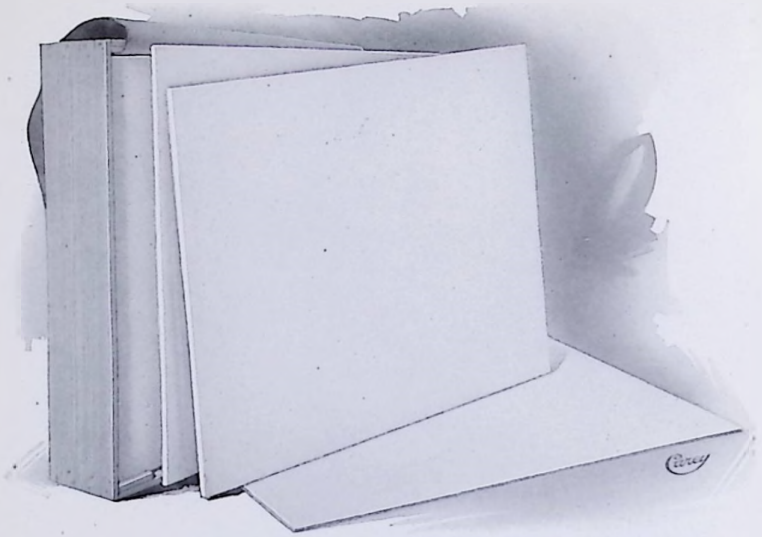
Carey Pyrex Asbestos Felt

For Fireproofing and Insulation.

Carey Pyrex Asbestos Felt is composed of pure asbestos fibre firmly matted into a strong, flexible, fireproof sheet in which indentations are formed during the process of manufacture. In addition to being fireproof this felt is a highly efficient heat non-conductor due to the air spaces formed by the indentations when the felt is wrapped in several layers. It is recommended for use on furnace pipes, and on grouped steam pipes which are too close together for sectional covering. It can be used to advantage in place of plain asbestos paper or rollboard wherever a better form of insulation is desired.

It is furnished in rolls 36" wide, weighing approximately 100 pounds each. The flat asbestos felt is 1/16" thick and the indentations give an over-all thickness of approximately 3/32". The weight is approximately 30 pounds per 100 square feet.

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ASBESTOS MILLBOARD.

CAREY Asbestos Sheet Millboard is produced from high grade asbestos fibre and is of special value for making fire screens, partitions and for protecting walls and ceilings, lining furnaces, stoves and grates and an indefinite number of purposes requiring heat and fire protection. Carey Sheet Millboard is manufactured in the following standard grades:

No. 1.—A hard compact board due to closely matted fibre.
No. 7.—A board of medium consistency.
No. 11.—A soft board, due to loosely matted fibre.

Special grades to meet special requirements will be furnished on order. No orders for a special grade of less than 2000 lbs. will be accepted.

Thicknesses from 1/32" to 1/8" are furnished in standard size sheets 36" x 36", and thicknesses from 1/8" to 1/2" in standard size sheets 42" x 48".

WEIGHTS OF STANDARD SHEETS.

1/32"	thick,	36"x36"	weight	approximately	1¼	lb. per sheet.
3/64"	"	36"x36"	"	"	2¼	lb. "
1/16"	"	36"x36"	"	"	3	lb. "
3/32"	"	36"x36"	"	"	5	lb. "
1/8"	"	36"x36"	"	"	6	lb. "
1/8"	"	42"x48"	"	"	11	lb. "
3/16"	"	42"x48"	"	"	15	lb. "
1/4"	"	42"x48"	"	"	21	lb. "
3/8"	"	42"x48"	"	"	32	lb. "
1/2"	"	42"x48"	"	"	44	lb. "

Crates contain 500 to 550 pounds.

HEAVY ASBESTOS PAPER.

CAREY Heavy Asbestos Paper is composed of the same materials entering into the construction of our Asbestos Millboard, but for the convenience of those requiring a flexible sheet, it is put up in rolls 36" wide, averaging 100 pounds each. Is supplied in two thicknesses, and weighs per hundred square feet as follows:

Approximate Thickness.	Approximate Weight per 100 Sq. Ft.	Approximate Number of Sq. Ft. per 100 lbs.
3/32"	50	200
1/8"	65	154

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ASBESTOS PAPER.

CAREY ASBESTOS PAPER is an excellent fire-resisting sheathing material, extensively used and especially valuable for the protection of wood partitions, walls, ceilings and in all kinds of building construction. Also used for lining weather boards, floors, etc., being especially desirable for such purposes as it is practically indestructible and is absolutely vermin proof.

The 6 and 8 pound paper is extensively used in the manufacture of pipe covering and in connection with the insulation of electrical devices. 8, 10 and 12 pound papers are used for wrapping furnace pipes, also by pipe covering manufacturers in the production of various kinds of covering. The heavier weights of asbestos paper are used in the lining of stoves, ovens, gas ranges, etc.

Carey Standard Asbestos Paper is 36" wide and is furnished in rolls containing approximately 100 pounds each. It can be furnished in 50 pound rolls when so ordered; also cut to special width for which an extra charge will be made.

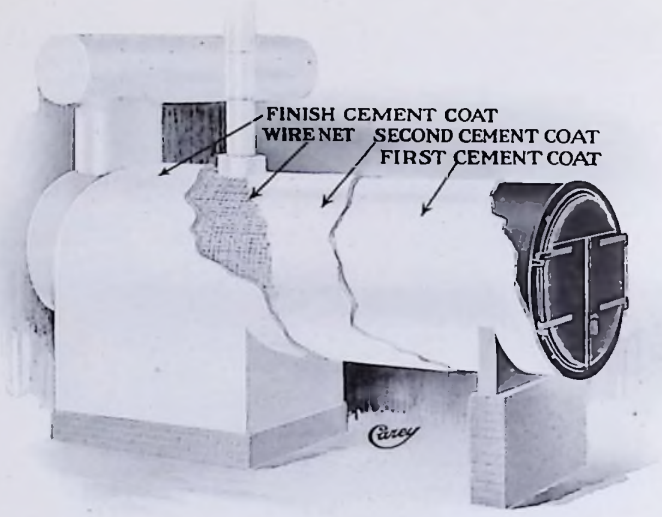
All rolls are wrapped, capped, labeled and weight of paper and number of pounds contained in roll are stenciled on the label.

Weight per 100 Sq. Ft.	Average Thickness	Sq. Ft. per 100 lbs.
6 lbs.	.015	1667
8 lbs.	.018	1250
10 lbs.	.022	1000
12 lbs.	.025	833
14 lbs.	.029	714
16 lbs.	.032	625
32 lbs.	1/16"	312

(*See Dimension Table, page 71.*)



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CAREY INSULATING CEMENTS.

For insulating irregular surfaces, fittings, heating boilers, etc., also for finishing over blocks and sheets, we recommend the use of the following cements:

Carey 85% Magnesia Cement is composed of 85% Carbonate of Magnesia and approximately 15% Asbestos Fibre. It is exceptionally light, has a large covering capacity, and is the most efficient form of insulating cement to be had. It is recommended in all cases where the best insulation is desired.

It is furnished in bags containing 60 pounds each, and has a covering capacity of approximately 35 to 40 square feet, one inch thick, per bag. List price per bag $7.50.

Carey Asbestos Cements are carefully prepared to meet the various conditions found in American industrial plants. In general they are composed of pure Asbestos Fibres and fireproof adhesive insulating compounds.

Carey No. 101 Asbestos Cement has a covering capacity of 35 to 40 square feet, 1" thick, per 100 pounds. It is prepared to meet the demand of those requiring an Asbestos Cement having the very highest heat insulating value, with sufficient mechanical strength. It should be finished with either canvas or Carey No. 100 Hard Finish Cement. Furnished in bags containing 60 pounds each.

Carey No. 202 Asbestos Cement has a covering capacity of 35 to 40 square feet, 1" thick, per 100 pounds. It has high insulating value and is prepared for

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the pipe covering trade requiring a high grade insulating cement at the lowest price per square foot of applied material. It should be finished either with canvas or Carey No. 100 Hard Finish Asbestos Cement. Furnished in bags containing 60 pounds each.

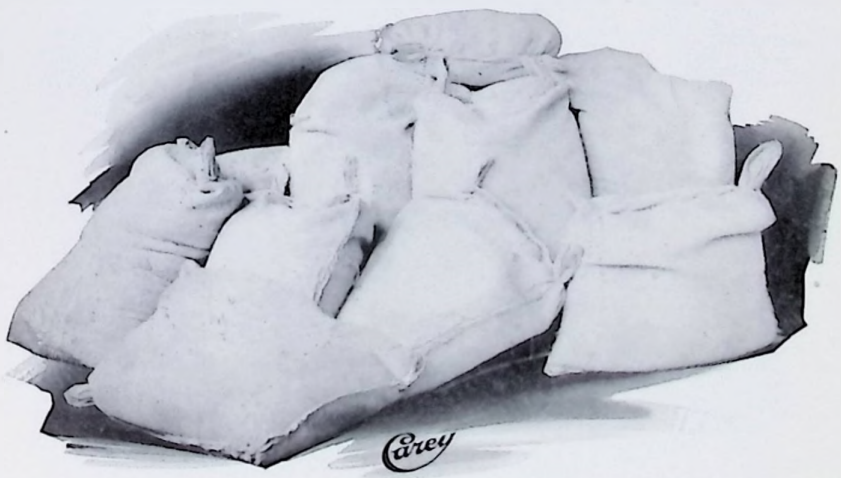
Carey No. 303 Asbestos Cement has a covering capacity of approximately 16 to 18 square feet, 1" thick, per 100 pounds. It works very easily and is a popular standard, prepared for those not skilled in application and requiring an easy working cement. Furnished in bags containing 100 pounds each.

Carey No. 404 Asbestos Cement is an all-asbestos cement having a covering capacity of from 23 to 25 square feet, 1" thick, per 100 pounds. It is specially prepared for the pipe covering contract trade. Furnished in bags containing 100 pounds each.

Carey Nos. 100 and 500 Asbestos Cements are special hard finish cements to give the final hard smooth finish required over blocks or other insulating cements. Covering capacities range from 22 to 28 square feet, 1" thick, per 100 pound bag. No. 500 Cement is a special quality containing an extra quantity of long asbestos fibre for exceptional strength, and has a slightly higher covering capacity than No. 100.

APPLICATION.—All insulating cements are furnished in dry form and should be mixed with water to the consistency of mortar for applying. The first coat, approximately ½" thick, should be applied roughly directly to the metal surface. When the first coat is dry apply a second rough coat, and cover it with ordinary wire mesh firmly wired on. Over the wire mesh apply a light coat of No. 100 or No. 500 hard finish cement, troweled to a smooth hard surface to give thickness desired.

(See Cement Fittings Table, page 68.)



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RETORT CEMENT.

CAREY RETORT CEMENT is a plastic cement with great fire-resisting qualities, strongly bound together by asbestos fibre and cementing compounds. Will withstand a continuous temperature of 1800° F. and is used for repairing clay and iron retorts, cementing fittings and sealing joints, setting up and facing fire brick. Adheres readily and when subjected to intense heat vitrifies without shrinking. One hundred pounds will cover approximately 8⅓ square feet, applied 1" thick.

Carey Retort ement is made in two colors, black or gray, furnished in various size packages and packed for shipment as follows:

1 lb.	cans,	packed	12	per case.	Shipping	weight,	per case,	25 lbs.
2	"	"	12	"	"	"	"	35 lbs.
5	"	"	12	"	"	"	"	75 lbs.
10	"	"	6	"	"	"	"	75 lbs.
25	"	"	4	"	"	"	"	125 lbs.
50	"	"	1	"	"	"	"	70 lbs.
100	"	"	1	"	"	"	"	125 lbs.

Also in 400 to 800 pound barrels.

CAREY AMALGAM CEMENT.

CAREY AMALGAM CEMENT is used for the same purposes as Retort Cement, but is furnished in the dry form. Will withstand the direct action of heat and flame and can be used under a continuous heat up to 2400° F.

One hundred pounds of dry Amalgam Cement when properly mixed with water will cover 20 square feet 1" thick. Carey Amalgam Cement is furnished in various size packages as follows:

5	lb.	cartons,	shipping	weight	approximately	6 lbs.
10	"	"	"	"	"	10 lbs.
100	"	"	"	"	"	100 lbs.
500	"	"	"	"	"	565 lbs.



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Asbestos High Temperature Cements.

CAREY HIGH TEMPERATURE CEMENTS are scientific combinations of asbestos fibre and other refractory materials, for bonding and protecting fire-brick, and for making high temperature furnace linings. When mixed with water and subjected to heat they form cementing compounds which successfully resist high temperatures.

Carey High Temperature Cements will withstand the cutting action of flames and form lasting unions between the materials to be joined. Their field of usefulness lies in the range of temperatures from 2000° F. up to 3100° F. They are particularly adapted for use in boiler settings, annealing furnaces, case hardening furnaces, bolt furnaces, brick kilns, crematories, glass lehrs, reverberatory furnaces, and for lining ladels and crucible furnaces.

These cements are made in three grades known as Carey 2500° Cement, Carey 3000° Cement, and Carey 3100° Cement, and each is designed to give best results at approximately the temperature designated by its name.

All grades are furnished in 100 lb. bags and have covering capacities of approximately 20 square feet 1" thick per bag. From 350 to 450 lbs. are required to set up 1000 fire-brick.

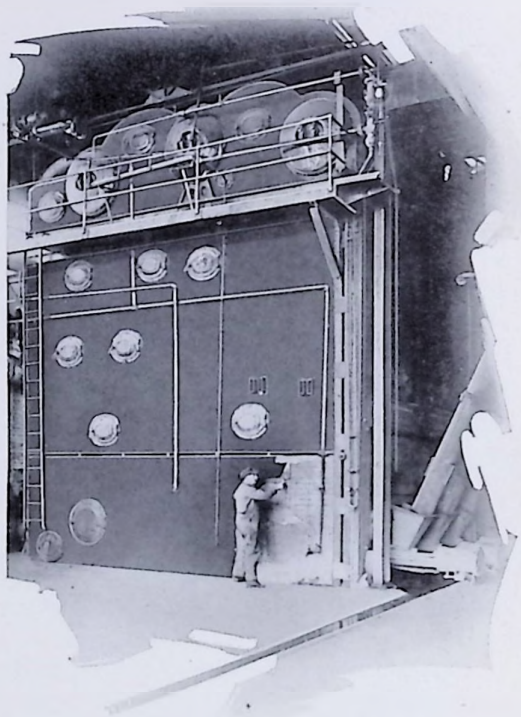
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Carey Magnesia

Carey B.T.U. Boiler Setting Cement

is a combination of Pure Asbestos Fibre combined with a special High Temperature Elastic Compound and Non-drying Oils.

The life of every Brick Boiler Setting depends entirely on the mortar joints. All brick and mortar is porous, but mortar cracks and in time will fall out of the setting.



Old boilers settings that are unprotected develop serious leaks in the brick surface and around fire doors or cleaning out holes, on all sides of the boiler setting walls.

B. T. U. Boiler Setting Cement forms an absolutely air-tight blanket over the entire setting, sealing the pores of the brick and cementing together the mortar joints.

5% to 15% in fuel can be saved with one application.

The older your Boiler Setting gets the more heat radiates, and the more cold air filters through the crevices. This creates a wastage of thermal units that eats into your coal pile.

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Carey B.T.U. Boiler Setting Cement

B. T. U. Boiler Setting Cement is a heavy plastic material, applied with a plasterer's trowel approximately 1/8 inch thick, producing a smooth air-tight surface.

This material will resist temperature changes and does not peel, crack or blister.

Application should be made while the boilers are in operation, and if properly applied, one coat will last for years.

The covering capacity of B. T. U. Cement, 1/8" thick, is approximately 100 pounds to 100 sq. ft. of surface.



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ASBESTOS ROPE AND WICK PACKING.

THESE materials are made from long select asbestos fibre. The fibre is carefully carded, free from all grit and hard particles and is twisted into strands of very soft texture.

Asbestos Wick Packing is furnished in ½ and 1 lb. balls, each ball wrapped in tissue paper and packed in 50 lb. cases for shipment. Owing to its great flexibility it can be formed and packed in almost any conceivable cavity. Used for packing small steam pumps, tubes, valve stems.

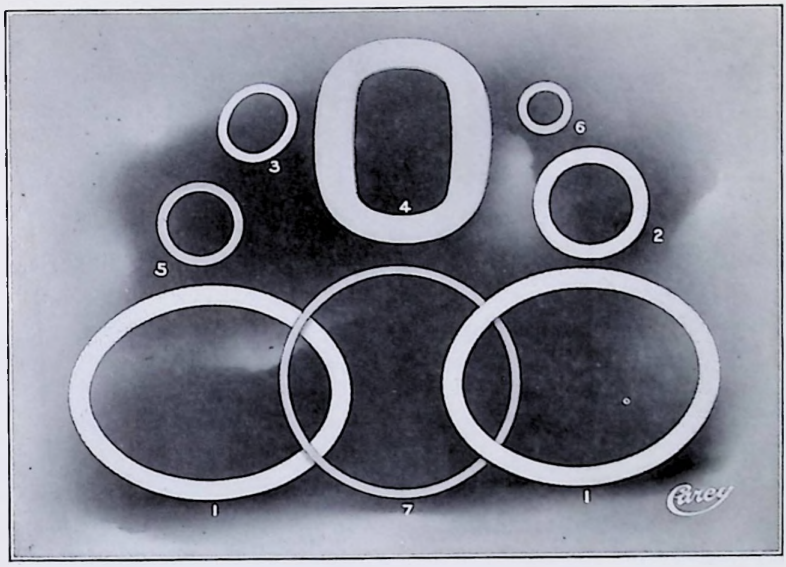
Asbestos Rope Packing is made by twisting a number of strands of Asbestos Wick together to produce the diameter required. Furnished in coils of 25 and 50 lbs. each and in sizes from ¼" to 2" in diameter. Used for packing engines, joints, chemical containers, etc. Being fire resisting as well as acid and oil proof, the scope of its adaptability is still further widened.

Weights of the various sizes are approximately as follows:

¼"	⅓	ounce per lineal foot.	⅜"	4	ounce per lineal foot.
⅜"	¾	ounce per lineal foot.	1"	5	ounce per lineal foot.
½"	1	ounce per lineal foot.	1¼"	7	ounce per lineal foot.
⅝"	1½	ounce per lineal foot.	1½"	10	ounce per lineal foot.
¾"	2½	ounce per lineal foot.	2"	15	ounce per lineal foot.



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ASBESTOS METALLIC GASKETS.

CAREY ASBESTOS METALLIC GASKETS are made of the highest quality wire inserted Asbestos Cloth, which is frictioned with the best grade of heat resisting rubber compound. These gaskets are specially designed to give long service for high pressure steam conditions.

Manhole Gaskets are designated by the No. 751.

Handhole Gaskets are designated by the No. 752.

All shapes and sizes of Asbestos Metallic Gaskets can be furnished. When ordering, specify the inside diameter for round gaskets or the two inside diameters for oval gaskets, and in every case also specify the width of flange and the thickness of gasket required.

MILLBOARD GASKETS.

CAREY ASBESTOS MILLBOARD GASKETS are furnished in all sizes and shapes; in thicknesses from 1/16" to 1/2". When ordering, carefully specify all dimensions. If odd or irregular shapes are required, it will be necessary to submit template or blue print.

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ASBESTOS GLOVES AND MITTENS.

No. 2 B.—Interchangeable mitten, thumb and index finger defined. Mitten is lined with either duck or wool fleece.

No. 5.—Mitten, thumb only defined. Lined with either duck or wool fleece.

No. 9.—Glove. A four finger glove for use where finger action is required; gloves lined with either duck or wool fleece.

No. 25.—Enameler's Mitten, thumb only defined. Full asbestos palm and thumb of double thickness, lined with either duck or wool fleece. This style is the same as No. 5 with reinforced palm and thumb.



Asbestos Gloves and Mittens are extensively used in iron and steel works, glass works, and other plants where workmen have to handle and come in contact with hot surfaces. They are extremely valuable as a protection to the hands and arms of men handling hot or molten materials and as a result of their fire-proof and heat resisting properties, it is possible for hot materials that would cause serious burns to be handled with safety.

Furnished in any quantity required.

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PIPE COVERING ACCESSORIES.

We are prepared to supply the following pipe covering accessories where they are required:

CANVAS.—37" wide in weights of 4 oz., 5 oz., 6 oz. and 8 oz. per yard, also 6.50 sheeting for low pressure coverings.

BANDS.—Black japanned tin, 1" wide for 85% Magnesia coverings; brass lacquered tin, ¾" wide (standard) or 1" wide for asbestos coverings; pure brass to any specification.

WIRE.—Black or galvanized, No. 16 or No. 18 gauge.

HOOKS.—For applying block coverings. Furnished for any thickness of block.

PREPARED ROOFING.—1, 2 and 3 ply, in rolls containing 108 square feet.

PASTE.—Dry powder for mixing with water, in 100 pound bags or smaller quantities.

SHEATHING PAPER.—For applying over pipe covering under sewed canvas jacket use 16 pound asbestos paper. See page 42.

MISCELLANEOUS MATERIALS.

COLD WATER PAINT.—A dry powder to be mixed with water to make an inexpensive paint for interiors of factories, warehouses, etc., and for painting pipe coverings. Furnished in white and colors in barrels of 350 to 400 pounds each, kegs of 50 to 100 pounds each, paper packages of 25 and 5 pounds each. 5 pounds will make one gallon of paint which will cover approximately as follows:

Brick, cement, plaster or stone	125 to 150 sq. ft.
Rough boards	165 to 200 "
Smooth boards	325 to 375 "

PAINTING MACHINES.—We are prepared to furnish specially designed painting machines for applying cold water paint by a spraying process. These painting machines effect a large saving in both time and money in the application of cold water paint to large surfaces. Special catalog of such machines will be furnished on request.

MINERAL WOOL.—This is a fibrous mineral used extensively as a heat retardant and sound deadener in walls, floors, partitions, etc. It is fire and vermin proof. It is furnished in bags containing approximately 50 pounds each. When lightly tamped, it should weigh approximately 15 pounds per cubic foot.

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HAIR FELT.—This material consists of felted cattle hair and is furnished in rolls either 3 or 6 feet wide in the following thickness: ¼", ½", ¾", 1", 1¼", 1½", 2". There are 300 square feet in either the 3 foot or 6 foot wide rolls.

This material is particularly valuable for use on cold water lines, gas lines, etc., to prevent freezing.

ASBESTOS BRAKE BLOCKS.—Our Asbestos Brake Blocks are cut from a specially prepared hard asbestos millboard. These blocks are cut to width, length, and radius desired. A number of these blocks when bolted together to give a width equal to the width of the brake wheel are applied to the brake wheel with ends butting together to form a continuous asbestos braking surface on the rim of the wheel. We furnish either the individual asbestos segments or assembled blocks complete including side steel plates and segments all firmly bolted together.

INSULATION FOR ELECTRIC HEATERS.—We are prepared to furnish various types of asbestos insulation for electrical heating appliances, such as electric irons, toasters, hot plates, percolators, etc. Recommendations for proper type of insulation are made to suit each individual case.

CARBONATE OF MAGNESIA POWDER.—A very fine, light weight, pure white powder adapted for use as a filler in paints, varnishes, rubber compounds, inks, etc. It weighs approximately 9 pounds per cubic foot, and is furnished in standard packages as follows:

Burlap bags, unlined, containing	140 pounds each.
Burlap bags, paper lined, containing	100 pounds each.
Burlap bags, paper lined, containing	50 pounds each.
Barrels, paper lined, containing	75 pounds each.
Kegs, containing	30 pounds each.

CALCINED MANGESIA (Light).—A very fine, light weight, pure white powder, being practically a pure Magnesium Oxide. (MgO.) Furnished in either Technical or U. S. P. quality. Supplied in barrels of 50 pounds each and in 1 pound tins, packed 50 per case.

We are also prepared to furnish asbestos stove mats, asbestos table mats, asbestos dental soldering blocks, jeweler's soldering blocks, etc. Prices and descriptions of these special articles upon application.

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Data Section.

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STANDARD PRICE LIST

OF

CAREY SECTIONAL COVERINGS AND FITTINGS.

EFFECTIVE 1907

Nominal Pipe Size	Price per Lineal Foot	Elbows	Tees	Crosses	Valves
½ inch	$0.22	$0.30	$0.36	$0.48	$0.54
¾ "	.24	.30	.36	.48	.54
1 "	.27	.30	.36	.48	.54
1¼ "	.30	.30	.36	.48	.54
1½ "	.33	.30	.36	.48	.54
2 "	.36	.36	.42	.54	.60
2½ "	.40	.42	.48	.60	.78
3 "	.45	.48	.54	.70	.96
3½ "	.50	.54	.60	.80	1.20
4 "	.60	.60	.75	.95	1.50
4½ "	.65	.72	.90	1.10	1.85
5 "	.70	.90	1.20	1.50	2.25
6 "	.80	1.30	1.60	2.00	2.80
7 "	1.00	1.80	2.20	2.80	3.60
8 "	1.10	2.40	3.00	3.60	4.40
9 "	1.20	3.00	3.80	4.40	5.30
10 "	1.30	3.60	4.60	5.20	6.20
12 "	1.85				
14 "	2.10				
16 "	2.35				
18 "	2.60				
20 "	2.85				
24 "	3.30				
30 "	4.00				

All pipe coverings furnished in sections three (3) feet long, canvas covered, and with bands except where printed specifications indicate otherwise.

(*See Block Price List, page 62.*)

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PRICE LISTS

85% CARBONATE OF MAGNESIA PIPE COVERINGS,

For Wrought Iron Pipes.

Nominal Inside Diameter of Pipe	Standard Thickness		1½ Inch Thickness	2 Inch Thickness	Double Standard Thickness			Double 1½" Thick
	Thickness of Covering	Price per Lineal Foot	Price per Lineal Foot	Price per Lineal Foot	Thickness Inner Layer Covering	Thickness Outer Layer Covering	Price per Lineal Foot	Price per Lineal Foot
Inches	Inches				Inches	Inches		
½	⅞	$0.22	$0.46	$0.75	⅞	1 1/32	$0.65	$1.20
¾	⅞	.24	.49	.80	⅞	1 1/32	.70	1.35
1	⅞	.27	.52	.85	⅞	1 1/32	.75	1.40
1¼	⅞	.30	.56	.90	⅞	1 1/32	.80	1.45
1½	⅞	.33	.60	.95	⅞	1 1/32	.85	1.55
2	1 1/32	.36	.64	1.00	1 1/32	1⅛	.90	1.65
2½	1 1/32	.40	.70	1.05	1 1/32	1⅛	1.00	1.75
3	1 1/32	.45	.76	1.15	1 1/32	1⅛	1.10	1.90
3½	1 1/32	.50	.82	1.25	1 1/32	1⅛	1.20	2.05
4	1⅛	.60	.88	1.35	1⅛	1⅛	1.40	2.20
4½	1⅛	.65	.94	1.45	1⅛	1⅛	1.50	2.35
5	1⅛	.70	1.00	1.55	1⅛	1¼	1.60	2.50
6	1⅛	.80	1.10	1.70	1⅛	1¼	1.80	2.70
7	1¼	1.00	1.20	1.85	1¼	1¼	2.25	2.90
8	1¼	1.10	1.35	2.00	1¼	1¼	2.50	3.15
9	1¼	1.20	1.50	2.20	1¼	1¼	2.70	3.40
10	1¼	1.30	1.65	2.40	1¼	1¼	2.90	3.65
*12	1½	1.85	1.85	2.70	1½	1½	4.10	4.10
14	1½	2.10	2.10	3.00	1½	1½	4.60	4.60
16	1½	2.35	2.35	3.30	1½	1½	5.10	5.10
18	1½	2.60	2.60	3.60	1½	1½	5.60	5.60
20	1½	2.85	2.85	4.00	1½	1½	6.00	6.00
24	1½	3.30	3.30	4.50	1½	1½	7.00	7.00
30	1½	4.00	4.00	5.50	1½	1½	8.40	8.40

Sections and Segments (curved block) are 36 inches in length. Sections are furnished with canvas jackets attached and bands for applying.

*Standard thickness, 1½ inch thickness, and 2 inch thickness Magnesia Coverings are furnished in sections for pipe sizes up to and including 10 inches. For larger pipe sizes segments (curved blocks) are furnished.

Double standard thickness—the inner layer is furnished in sections for pipe sizes up to and including 10 inches, and in segments (curved blocks) for larger sizes. The outer layer is furnished in sections for pipe sizes up to and including 8 inches, and in segments (curved blocks) for larger sizes.

Double 1½ inch thickness—the inner layer is furnished in sections for pipe sizes up to and including 10 inches, and in segments (curved blocks) for larger sizes. The outer layer is furnished in sections for pipe sizes up to and including 7 inches, and in segments (curved blocks) for larger sizes.

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PRICE LIST
OF
CAREY BLOCKS AND SHEETS.

Thickness	Price Sq. Ft.	Thickness	Price Sq. Ft.
⅞ inch	$0.30	2¼ inch	$0.68
1 "	.30	2⅜ "	.72
1⅛ "	.34	2½ "	.75
1¼ "	.38	2⅝ "	.79
1⅜ "	.42	2¾ "	.83
1½ "	.45	2⅞ "	.87
1⅝ "	.49	3 "	.90
1¾ "	.53	3¼ "	.98
1⅞ "	.57	3½ "	1.05
2 "	.60	4 "	1.20
2⅛ "	.64		

FREIGHT TABLES.

The following table shows the approximate freight cost for various coverings in percent of list price, based on $1.00 per cwt. freight rate.

	Bulk	Crated		Bulk	Crated
85% Magnesia Covg.		5.4%	Multi-PlyCovg (1" th.)	6.5 %	7.5%
85% Magnesia Blocks		7.0%	Duplex Covg. (2-ply)	1.8 %	2.3%
85% Magnesia Cement	8.0%		Duplex Covg. (3-ply)	2.5 %	3.1%
Pyrex Covg. (1" th.)	8.0%	10.0%	Duplex Covg. (4-ply)	3.4 %	4.3%
Carocel Covg. (1" th.)	5.6%	7.0%	Protecto Cov. (1" th.)	4.0 %	5.0%
Carocel Covg. (¾" th.)	4.5%	5.6%	ImpervoCovg (½" th.)	2.6 %	3.3%
Carocel Covg. (½" th.)	2.8%	3.5%	ImpervoCovg (¾" th.)	3.7 %	4.6%
Air Cell Covg. (2-ply)	1.5%	1.9%	Impervo Covg (1" th.)	5.0 %	6.3%
Air Cell Covg. (3-ply)	2.2%	2.8%	Argentum Covg.	6.25%	7.8%
Air Cell Covg. (4-ply)	2.8%	3.5%	Argentum Sh. ½" to 6"	11.0 %	12.0%
AlternantCovg. (1" th.)	5.0%	6.3%	Argentum Sh. 7" to 12"	16.0 %	18.0%
PerfectoCovg. (½" th.)	2.4%	3.0%	Combino Train Pipe Covering.	4.5 %	5.6%
PerfectoCovg. (¾" th.)	3.4%	4.3%			
Perfecto Covg. (1" th.)	4.7%	5.9%			

To obtain approximate freight in percent of list price for any rate of freight multiply the percentage given above by the freight rate in dollars. For example, to determine the freight cost on Magnesia covering when the freight rate is 35c. per cwt.

5.4% x $0.35 = 1.89% of the list price.

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Pipe Covering Weights in Pounds per Three Foot Section.

Kind of Covering	Thickness	PIPE SIZE. ½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"	4½"	5"	6"	7"	8"	9"	10"	12"
85% Magnesia	Std.	2.0	2.2	2.7	2.9	3.2	4.0	4.5	5.0	5.5	7.0	7.5	8.0	9.5	11.0	12.5	15.0	16.5	23.0
85% Magnesia	1½"	4.0	4.4	5.4	5.8	6.4	7.0	7.9	8.8	9.6	10.5	11.3	12.0	14.0	15.0	16.7	19.0	21.0	23.0
85% Magnesia	2"	6.0	6.5	7.2	7.7	8.2	9.4	10.6	12.0	12.8	14.0	15.3	16.5	18.5	20.5	23.0	25.0	27.5	31.5
85% Magnesia	Dbl. Std.	6.5	6.7	7.7	7.9	8.7	11.0	12.0	13.0	13.5	16.5	17.0	19.0	22.0	26.0	27.0	32.0	39.5	50.0
85% Magnesia	3"	12.5	13.5	14.0	15.4	16.2	17.5	19.2	21.0	22.5	24.5	26.0	27.8	31.0	34.5	37.5	40.5	45.0	50.0
Pyrex	1"	5.4	5.7	6.8	7.4	8.0	9.4	10.8	12.0	13.5	14.8	16.5	19.0	22.0	24.0	27.0	30.0	33.0	38.0
Carocel	1"	3.0	3.5	3.7	4.0	5.0	6.0	6.5	7.5	8.5	9.5	10.5	12.0	14.5	18.0	20.0	22.0	24.0	28.5
Carocel	¾"	2.2	2.6	2.8	3.0	3.7	4.5	4.9	5.6	6.4	7.1	8.2	9.0	11.0	13.5	15.0	17.0	18.0	21.0
Carocel	½"	1.5	1.7	1.9	2.0	2.5	3.0	3.3	3.7	4.2	4.7	5.2	6.0	7.2	9.0	10.0	11.0	12.0	14.0
Multi-Ply	1"	4.0	4.2	5.0	5.5	6.0	7.0	8.0	9.0	10.0	11.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	28.0
Air Cell	1"	1.7	2.0	2.2	2.5	2.7	3.2	3.5	4.0	4.2	4.7	5.0	5.5	6.2	7.2	8.2	9.5	10.5	12.0
Air Cell	¾"	1.2	1.5	1.7	2.0	2.2	2.5	3.0	3.2	3.5	3.7	4.0	4.5	5.0	5.7	6.5	7.0	7.7	8.7
Air Cell	½"	0.7	1.0	1.2	1.4	1.5	1.7	1.8	2.2	2.4	2.6	2.7	2.9	3.2	3.7	4.0	4.7	5.2	6.2
Combino	⅝"	1.7	2.0	2.2	2.5	3.0	3.7	4.5	5.2	6.0	6.7	7.5	8.2	.....	.....	.....	.....	.....	.....
Impervo	1"	3.0	3.5	4.0	4.5	5.0	5.5	6.0	7.0	8.0	9.0	10.0	11.0	13.5	15.0	16.5	18.0	19.5	22.5
Impervo	¾"	2.2	2.5	2.7	3.0	3.2	3.7	4.5	5.5	6.0	6.7	7.5	8.2	9.5	10.2	11.5	12.7	14.0	16.5
Impervo	½"	1.2	1.7	2.5	2.7	3.0	3.2	4.7	4.2	4.7	5.2	5.7	6.2	6.7	7.3	8.7	9.2	16.0	11.7
Perfecto	1"	3.0	3.2	3.5	4.0	4.5	5.0	5.5	6.5	7.5	8.5	9.2	10.2	12.0	13.5	15.0	16.7	19.0	21.5
Perfecto	¾"	2.0	2.2	2.5	2.7	3.0	3.5	4.5	5.0	5.5	6.2	7.0	7.7	9.0	9.7	11.0	12.2	13.5	16.0
Perfecto	½"	1.2	1.5	1.7	2.0	2.2	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	7.0	8.0	8.5	9.2	11.0
Protecto	1"	2.2	2.7	3.2	3.5	4.0	4.5	5.0	5.5	6.5	7.5	8.0	8.5	9.5	10.7	12.2	13.7	15.2	18.2
Argentum Shells	½"	3.5	4.0	4.5	5.0	5.5	6.2	7.0	7.5	8.2	9.0	9.5	10.2	11.0	.....	.....	.....	.....	.....
For 1" thick covering	1"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25.0	30.0	35.0	40.0	45.0

The weights given in the tables above are subject to some variation, but represent averages from which fairly accurate estimates can be made. These weights are not guaranteed.

Magnesia covering crates for less than carload shipments measure 36" by 36" and weigh approximately 90 pounds each. Crates for all other coverings measure 36" by 25" by 45" and weigh approximately 70 pounds each. An estimate of the weight of crated coverings can be obtained by adding 25% to the weight of coverings.

Magnesia block cases measure 24" by 24" by 36" and weigh approximately 45 lbs.each. Other block cases measure 15" by 36" by 36" and weigh approximately 45 lbs. each.

Air Cell board crates measure 24" by 36" by 36" and weigh approximately 55 pounds each.

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Losses From Horizontal Bare Iron Steam Pipes

From 100 lineal feet of pipe, per month of 30 days, with steam in pipes 24 hours per day. Coal at $4.00 per ton of 2000 lbs.

Gauge Press.	Hot Water			10 lbs.			80 lbs.			120 lbs.			160 lbs.			200 lbs.			200 lbs. and 100° F. Superheat		
Temp.	180° F.			239.4° F.			324.0° F.			350.0° F.			370.7° F.			387.9° F.			487.9° F.		
Pipe Size	Dollars Loss	Pounds Coal	B. T. U. per lin. ft. per F° diff. per hour	Dollars Loss	Pounds Coal	B. T. U. per lin. ft. per F° diff. per hour	Dollars Loss	Pounds Coal	B. T. U. per lin. ft. per F° diff. per hour	Dollars Loss	Pounds Coal	B. T. U. per lin. ft. per F° diff. per hour	Dollars Loss	Pounds Coal	B. T. U. per lin. ft. per F° diff. per hour	Dollars Loss	Pounds Coal	B. T. U. per lin. ft. per F° diff. per hour	Dollars Loss	Pounds Coal	B. T. U. per lin. ft. per F° diff. per hour
½"	$1.38	550	.633	$2.40	960	.714	$4.20	1680	.835	$4.84	1935	.874	$5.38	2150	.906	$5.86	2345	.933	$9.13	3650	1.104
¾"	1.63	650	.749	2.84	1135	.847	4.99	1995	.993	5.76	2305	1.040	6.43	2570	1.080	7.00	2800	1.113	10.93	4370	1.323
1"	1.94	775	.889	3.37	1350	1.006	5.95	2380	1.184	6.88	2750	1.242	7.68	3070	1.291	8.36	3345	1.331	13.15	5260	1.591
1¼"	2.33	930	1.068	4.06	1625	1.211	7.18	2870	1.428	8.30	3320	1.501	9.28	3710	1.561	10.13	4050	1.611	16.00	6400	1.936
1½"	2.58	1030	1.184	4.50	1800	1.342	7.98	3190	1.588	9.25	3700	1.670	10.33	4130	1.738	11.28	4510	1.794	17.89	7145	2.161
2"	3.09	1235	1.421	5.40	2160	1.614	9.63	3850	1.916	11.15	4460	2.016	12.48	4990	2.100	13.65	5460	2.170	21.70	8680	2.625
2½"	3.63	1450	1.669	6.35	2540	1.898	11.43	4530	2.256	13.15	5260	2.375	14.73	5890	2.478	16.10	6440	2.560	25.70	10280	3.108
3"	4.31	1725	1.983	7.56	3025	2.258	13.50	5400	2.688	15.68	6270	2.831	17.55	7020	2.953	19.20	7680	3.053	30.70	12280	3.715
3½"	4.88	1940	2.232	8.51	3405	2.540	15.23	6090	3.031	17.68	7070	3.193	19.81	7925	3.334	21.65	8660	3.447	34.70	13880	4.200
4"	5.40	2160	2.482	9.48	3790	2.828	16.95	6780	3.372	19.70	7880	3.558	22.08	8830	3.715	24.15	9660	3.840	38.73	15490	4.687
4½"	5.94	2375	2.730	10.43	4170	3.110	18.66	7465	3.717	21.70	8680	3.920	24.43	9730	4.092	26.60	10640	4.232	42.70	17080	5.168
5"	6.60	2640	3.032	11.50	4600	3.435	20.64	8255	4.105	23.98	9590	4.330	26.88	10750	4.521	29.40	11760	4.680	47.25	18900	5.720
6"	7.73	3090	3.548	13.54	5415	4.040	24.25	9700	4.830	28.23	11290	5.100	31.70	12680	5.333	34.65	13860	5.515	55.75	22300	6.750
7"	8.81	3525	4.052	15.48	6190	4.620	27 73	11090	5.525	32.30	12920	5.835	36.20	14480	6.096	39.63	15850	6.306	63.80	25520	7.725
8"	9.90	3960	4.550	17.38	6950	5.185	31.40	12560	6.252	36.28	14510	6.556	40.73	16290	6.852	44.55	17820	7.09	71.93	28770	8.700
9"	10.98	4390	5.050	19.40	7720	5.758	34.63	13850	6.897	40.33	16130	7.282	45.25	18100	7.614	49.50	19800	7.88	79.83	31930	9.665
10"	12.23	4890	5.620	21.45	8580	6.405	38.58	15430	7.680	44.88	17950	8.108	50.28	20110	8.46	55.10	22040	8.77	88.95	35580	10.76
12"	14.41	5765	6.625	25.33	10130	7.560	45.50	18200	9.060	53.00	21200	9.570	59.48	23790	10.01	65.05	26020	10.35	105.10	42040	12.72
14"	15.75	6300	7.237	27.65	11060	8.255	49.75	19900	9.902	57.95	23180	10.46	65.50	26200	10.94	71.23	28490	11.33	114.95	45980	13.91
16"	17.95	7180	8.254	31.55	12620	9.420	56.73	22690	11.29	66.03	26410	11.93	74.20	29680	12.48	81.18	32470	12.91	131.20	52480	15.88

In these tables coal has been figured at $4.00 per ton of 2000 lbs.—13000 B. T. U. per lb. of coal—labor, boiler room expense, etc., taken at $1.00 per ton, making total value of coal fired at $5.00 per ton. Boiler efficiency taken at 70 per cent. Air temperature 70° F. Experimental data obtained at the Mellon Institute and applied to Peclet's formulas.

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EFFICIENCIES OF PIPE COVERINGS.

(The term "efficiency" as used in connection with pipe covering means the percent of reduction of heat loss from bare pipes by the use of pipe covering, *i. e.*, the saving expressed in percent of bare pipe loss.) Example: A given length of bare steam piping loses the equivalent of 100 lbs. of coal per hour. A pipe covering which has an efficiency of 85% saves 85 lbs. of coal per hour.

Steam Pressure	Hot Water		10 lbs.		80 lbs.		120 lbs.		160 lbs.		200 lbs.		200 lbs. 100° F. Superheat	
Steam Temperature ° F.	180° F.		239.4° F.		324° F.		350° F.		370.7° F.		388° F.		488° F.	
Temperature Difference ° F.	110° F.		169.4° F.		254° F.		280° F.		300° F.		318° F.		418° F.	
	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss
85% Magnesia, 1" thick	81.8	0.420	83.1	0.422	85.5	0.430	86.2	0.433	86.7	0.436	87.1	0.440	88.9	0.458
85% Magnesia, 1½" thick	83.9	0.351	85.8	0.355	87.6	0.360	88.5	0.362	88.9	0.363	89.2	0.369	91.0	0.380
85% Magnesia, 2" thick	86.6	0.294	88.1	0,299	88.8	0.300	90.4	0.301	90.8	0.302	91.1	0.304	92.5	0.316
85% Magnesia, 3" thick	98.5	0.230	90.7	0.232	92.1	0.233	92.5	0.234	92.8	0.235	93.1	0.237	94.2	0.244
Multi-Ply, 1" thick	83.8	0.354	85.7	0.358	87.2	0.380	87.7	0.386	88.2	0.388	88.5	0.391	89.9	0.426
Multi-Ply, 1½" thick	86.4	0.298	87.9	0.303	89.2	0.320	98.7	0.323	90.1	0.324	90.3	0.330	91.6	0.354
Multi-Ply, 2" thick	88.7	0.257	89.9	0.252	91.1	0.264	91.4	0.270	91.7	0.272	92.0	0.274	93.1	0.291
Multi-Ply, 3" thick	91.2	0.193	92.3	0.195	93.2	0.201	93.5	0.204	93.7	0.206	93.9	0.208	94.7	0.224
Pyrex, 1" thick	78.8	0.471	80.4	0.491	82.2	0.527	82.9	0.538	83.3	0.546	83.7	0.554	85.9	0.596
Pyrex, 1½" thick	83.3	0.369	84.7	0.384	86.1	0.412	86.7	0.419	87.0	0.420	87.4	0.427	89.1	0.460
Pyrex, 2" thick	85.9	0.310	87.1	0.322	88.5	0.342	88.9	0.350	89.2	0.355	89.4	0.360	90.9	0.383
Pyrex, 3" thick	88.9	0.243	89.9	0.252	90.9	0.268	91.2	0.274	91.5	0.278	91.7	0.281	92.9	0.298
Carocel, 1" thick	82.5	0.384	83.7	0.408	85.0	0.445	85.5	0.456	85.8	0.465	86.1	0.474	87.7	0.571
Carocel, 1½" thick	86.4	0.2935	87.1	0.324	88.2	0.349	88.7	0.354	89.1	0.359	89.3	0.365	90.5	0.398
Carocel, 2" thick	88.8	0.246	89.6	0.260	90.4	0.283	90.7	0.292	90.9	0.293	91.1	0.302	92.1	0.331
Air Cell, 1" thick	75.0	0.547	76.6	0 586	78.2	0.646	78.8	0.665	79.2	0.680	79.6	0.696	81.7	0.880
Air Cell, 1½" thick	80.0	0.440	80.8	0.480	82.5	0.520	82.8	0.540	83.2	0.550	83.6	0.560	85.5	0.610
Air Cell, 2" thick	84.0	0.350	85.2	0.370	86.8	0.390	87.1	0.405	87.2	0.420	87.4	0.430	89.1	0.470

The columns headed "Loss" give the loss in B. T. U., per square foot of pipe surface, per degree F. difference in temperature between the pipe and air, per hour.

INSULATION FOR COLD PIPES.—The heat transmission values given are in B. T. U.'s per square foot of pipe surface, per degree F. difference in temperature between the air and the liquid in the pipe, per hour.

Impervo Covering ½" thick, 0.71 B. T. U. | Impervo Covering 1" thick, 0.44 B. T. U. | Protecto Covering, single thickness, 0.38 B. T. U.
Impervo Covering ¾" thick, 0.53 B. T. U. | Impervo Covering 1½" thick, 0.36 B. T. U. | Protecto Covering, double thickness, 0.28 B. T. U.

NOTE—All data on heat transmission through pipe coverings given above is based on 5" pipe size. The efficiencies will be slightly less for smaller pipe sizes and slightly greater for larger pipe sizes. For all practical engineering purposes the above data will be satisfactory because variations due to temperature, humidity of air, air currents, condition of pipe covering surface, etc., will affect values in actual practice as much if not more than variations due to difference in curvature.

EFFICIENCIES OF BLOCKS AND SHEETS.—The efficiency of block and sheet insulation is slightly higher than the efficiency of pipe covering made of the same material, due to the elimination of curvature. This difference in efficiency is not great and for all practical engineering purposes the rates of loss through, and efficiencies of, block and sheet insulations may be considered the same as the losses through, and efficiencies of, the same material in the form of pipe covering. The data given in the tables above for pipe coverings can accordingly be used for flat blocks and sheets of the same material.

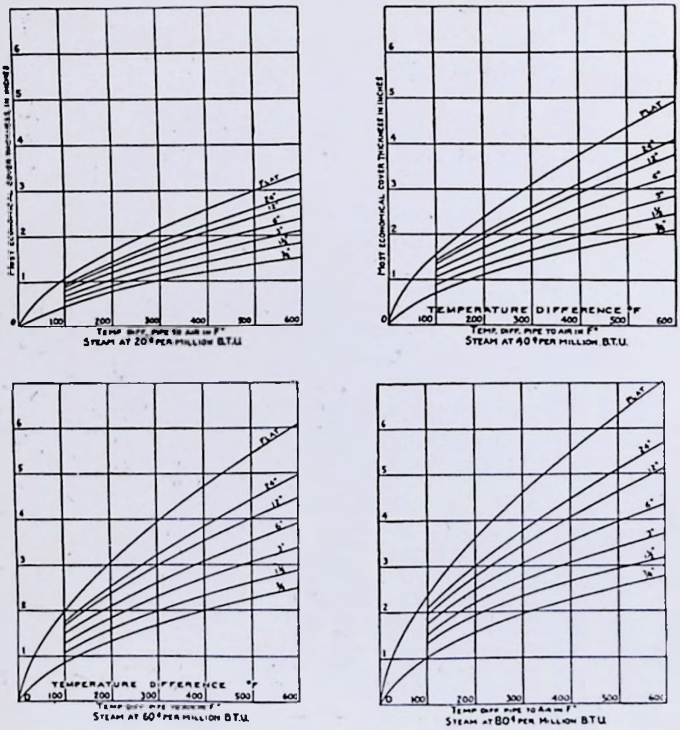
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PROPER THICKNESS OF COVERING

For Maximum Net Saving.

For use in Plants where Steam Costs are Accurately Known.



Reproduced by the courtesy of the Magnesia Association of America.

These curves are taken from paper by Glen D. Bagley, read before the American Society of Mechanical Engineers, December, 1918, and republished through the courtesy of the Magnesia Association of America.

These curves give the proper thickness for maximum net saving for different costs of steam and different sizes of pipe. They refer particularly to 85% Carbonate of Magnesia Coverings, but can be used with satisfactory results for any type of pipe covering having approximately the same efficiency as 85% Carbonate of Magnesia.

They are based on a period of service of 8,760 hours per year. If pipes are cold part of the year these curves can still be used, providing the cost of steam is multiplied by the number of hours per year the pipes are hot and divided by 8,760. Then take this revised cost of steam and select the set of curves whose steam cost most nearly corresponds. The thicknesses specified are conservative since in arriving at these curves it was assumed that the cost of covering would be list price plus the proper cost of application. The annual fixed charges were figured at 6% on the investment, 5% depreciation and 2% miscellaneous.

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PROPER THICKNESS OF COVERING

For Maximum Net Saving.

For use in Plants where Steam Costs are not Accurately Known.

COAL AT $2.00 PER TON

SIZE PIPE	Hot Water 175° F.	Steam 5 Lbs.	Steam 100-200 Lbs.	200 Lb. 150° F. Superheat	200 Lb. 300° F. Superheat
¾"	S	S	S	1½"	DS
1½"	S	S	S	1½"	DS
3"	S	S	S	1½"	DS
6"	S	S	1½"	2"	DS
12"	S	S	1½"	2"	DS
24"	S	S	2"	3"	DS
Flat	1"	1½"	2"	3"	3½"

COAL AT $4.00 PER TON

SIZE PIPE	Hot Wate 175° F.	Steam 5 Lbs.	Steam 100-200 Lbs.	200 Lb. 150° F. Superheat	200 Lb. 300° F. Superheat
¾"	S	S	1½"	DS	2"
1½"	S	S	1½"	DS	2"
3"	S	S	DS	DS	3"
6"	S	1½"	DS	3"	3"
12"	S	1½"	DS	3½"	4"
24"	S	1½"	DS	3½"	4"
Flat	1½"	2"	3"	4"	5"

COAL AT $6.00 PER TON

¾"	S	S	DS	2"	2"
1½"	S	1½"	DS	2"	3"
3"	S	1½"	DS	3"	3"
6"	1½"	2"	DS	3"	4"
12"	1½"	2"	DS	4"	4"
24"	1½"	2"	DS	4"	5"
Flat	2"	3"	4"	5"	6"

COAL AT $8.00 PER TON

¾"	S	1½"	1½"	2"	3"
1½"	S	1½"	2"	3"	3"
3"	1½"	2"	3"	3"	3"
6"	1½"	2"	3"	4"	4"
12"	2"	3"	3"	4"	5"
24"	2"	3"	4"	5"	5½"
Flat	2½"	3½"	4½"	6"	7"

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These tables are taken from paper by Glen D. Bagley, read before the American Society of Mechanical Engineers, December, 1918, and republished through the courtesy of the Magnesia Association of America.

These tables give the proper thickness for maximum net saving for different costs of steam and different sizes of pipe. They refer particularly to 85% Carbonate of Magnesia Coverings, but can be used with satisfactory results for any type of pipe covering having approximately the same efficiency as 85% Carbonate of Magnesia.

These tables are based on average conditions. In transforming the steam cost to coal cost it has been assumed that 75% of the cost of steam is coal cost, that one pound of coal will evaporate 7 pounds of water, and that each pound of steam contains about 1,000 B. T. U. above the feed water temperature.

HOW TO USE THESE TABLES.

Determine your cost of coal, steam pressure and size of pipes; select the table where the coal cost most nearly corresponds to your coal cost. Then select the column where the steam pressure most nearly corresponds to your steam pressure. The thicknesses in this column are the proper thicknesses for the pipe sizes given at the left of the table.

EXAMPLE.—Cost of coal $3.75, steam pressure 150 pounds, size of pipe 12 inches. Select the $4.00 per ton table and the third column headed "Steam at 100-200 pounds." Run down this column to the 12" pipe size line and find the proper thickness to be 3".

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ASBESTOS CEMENT

For Standard Fittings.

Nominal Pipe Size	Pounds Asbestos Cement			
	90° Ells	Valves and Tees	Crosses	One Pair Flanges
½", ¾", and 1"	2.0	2.5	2.7	4.5
1¼", 1½" and 2"	3.5	4.3	4.7	6.1
2½" and 3"	6.0	7.5	8.0	8.9
3½" and 4"	9.0	12.3	12.0	13.1
4½" and 5"	12.5	15.6	16.7	14.1
6"	15.0	18.8	20.0	16.4
7"	18.5	23.1	24.3	19.0
8"	19.5	24.2	26.0	22.0
9"	24.0	30.0	32.0	26.0
10"	29.0	36.1	38.9	27.5
12"	37.5	47.0	50.0	38.0

This table gives the approximate number of pounds of asbestos cement which will cover standard screwed fittings and flanges 1" thick. It is based upon asbestos cement having a covering capacity of 15 square feet 1" thick per 100 pound bag.

If 85% Magnesia cement is used, one-fourth the amount will be required.

Where fittings are covered flush with adjacent 1" thick pipe covering only approximately ½" thickness is required and consequently one-half the amount specified in this table.

For flanged fittings figure the amount required for screwed fittings and in addition the amount required for the number of sets of flanges on such flanged fitting.

Where sleeves of sectional covering or blocks are used around the outer surface of flanges only one-third the amount of cement specified in the table will be needed for filling cracks and filling in space between such sleeve and the outer surface of 1" thick pipe covering.

For 45 degree ells approximately one-half the amount specified for 90 degree ells will be required.

For long radius ells approximately two times the amount specified for 90 degree ells will be required.

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Properties of Saturated Steam.

(*Peabody.*)

Gauge Pressure In Pounds Per Sq. In.	Temperature in Degrees F.	Heat Units in Liquid Above 32° F.	Heat of Vaporization. (Latent Heat)	Total Heat Units in Steam Above 32° F.	Weight of One Cu. Ft. In Pounds.	Number of Cu. Ft. per Lb. of Steam.
0	212.00	180.8	965.8	1146.6	0.03760	26.60
5	227.10	196.2	955.0	1151.1	0.04999	19.91
10	239.36	208.4	946.5	1154.9	0.06128	16.32
20	258.68	227.9	932.9	1160.8	0.08439	11.85
30	273.87	243.2	922.3	1165.5	0.1070	9.347
40	286.54	255.9	913.4	1169.3	0.1292	7.736
50	297.46	266.9	905.7	1172.6	0.1512	6.612
55	302.42	271.9	902.3	1174.2	0.1621	6.169
60	307.10	276.6	899.0	1175.6	0.1729	5.784
65	311.54	281.1	895.8	1176.9	0.1837	5.443
70	315.77	285.6	892.7	1178.2	0.1945	5.142
75	319.80	289.8	887.8	1179.5	0.2052	4.873
80	326.66	293.8	886.9	1180.6	0.2159	4.633
85	327.36	297.7	884.2	1181.8	0.2265	4.415
90	330.92	301.5	881.5	1182.8	0.2371	4.218
95	334.35	305.0	879.0	1183.9	0.2477	4.037
100	337.66	308.5	876.5	1184.9	0.2583	3.872
105	340.86	311.8	874.1	1185.9	0.2689	3.720
110	343.95	315.0	871.8	1186.8	0.2794	3.580
115	346.94	318.2	869.6	1187.7	0.2898	3.452
120	349.85	321.2	867.4	1188.6	0.3003	3.330
125	352.68	324.2	865.3	1189.5	0.3107	3.219
130	355.43	327.0	863.3	1190.3	0.3212	3.113
135	358.10	329.8	861.3	1191.1	0.3315	3.017
140	360.70	332.5	859.4	1191.9	0.3420	2.924
145	363.25	335.2	857.5	1192.8	0.3524	2.838
150	365.73	337.8	855.7	1193.5	0.3629	2.756
155	368.62	340.3	853.9	1194.3	0.3731	2.681
160	370.51	342.8	852.1	1195.0	0.3835	2.808
165	372.83	345.2	850.4	1195.7	0.3939	2.539
170	375.09	347.6	848.7	1196.3	0.4043	2.474
175	377.31	349.9	847.1	1197.0	0.4147	2.412
180	379.48	352.2	845.4	1197.7	0.4251	2.353
185	381.60	354.4	843.9	1198.3	0.4353	2.297
190	383.70	356.6	842.3	1199.0	0.4455	2.244
195	385.75	358.8	840.8	1199.6	0.4559	2.193
200	387.76	360.9	839.2	1200.2	0.4663	2.145
205	397.36	370.9	832.2	1203.1	0.5179	1.930
250	406.07	380.1	825.7	1205.8	0.5699	1.755
275	414.22	388.5	819.8	1208.3	0.621	1.604
300	421.83	396.5	814.1	1210.6	0.674	1.483

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Wrought Iron and Steel Steam, Gas and Water Pipe.

TABLE OF STANDARD DIMENSIONS

Diameter			Nominal Thickness	Circumference		Transverse Area			Lgth. Pipe per Sq. Ft.		Length of Pipe Containing 1 Cub. Ft.	Nominal Weight Per Ft. lbs.	Number of Threads per In.
Nominal Internal	Actual External	Actual Internal		External	Internal	External	Internal	Metal	External Surface	Internal Surface			
Inches	Inches	Inches	Inches	Inches	Inches	Sq. In.	Sq. In.	Sq. In.	Feet	Feet	Feet	Pounds	
⅛	.405	.269	.068	1.272	.845	.129	.057	.0717	9.431	14.199	2533.	.244	27
¼	.54	.364	.088	1.696	1.144	.229	.104	.1249	7.075	10.49	1383.3	.42	18
⅜	.675	.493	.091	2.121	1.549	.358	.191	.167	5.657	7.747	754.3	.567	18
½	.84	.622	.109	2.639	1.954	.554	.304	.250	4.547	6.141	473.9	.850	14
¾	1.05	.824	.113	3.299	2.589	.966	.533	.3327	3.637	4.635	270.	1.115	14
1	1.315	1.049	.133	4.131	3.296	1.358	.864	.494	2.904	3.641	166.6	1.678	11½
1¼	1.66	1.38	.14	5.215	4.333	2.164	1.496	.668	2.301	2.768	96.25	2.244	11½
1½	1.9	1.610	.145	5.969	5.058	2.835	2.036	.799	2.01	2.372	70.73	2.717	11½
2	2.375	2.067	.154	7.461	6.494	4.43	3.356	1.074	1.608	1.848	42.91	3.609	11½
2½	2.875	2.469	.203	9.032	7.757	6.492	4.788	1.704	1.328	1.547	30.07	5.793	8
3	3.5	3.068	.216	10.996	9.638	9.621	7.393	2.228	1.091	1.245	19.47	7.575	8
3½	4.0	3.548	.226	12.566	11.146	12.566	9.887	2.679	.955	1.077	14.57	9.001	8
4	4.5	4.026	.237	14.137	12.648	15.904	12.73	3.174	.849	.949	11.31	10.665	8
4½	5.0	4.506	.247	15.708	14.156	19.635	15.947	3.688	.763	.847	9.03	12.538	8
5	5.563	5.047	.258	17.477	15.856	24.306	20.006	4.300	.686	.756	7.198	14.671	8
6	6.625	6.065	.28	20.813	19.054	34.472	28.888	5.584	.577	.63	4.98	18.762	8
7	7.625	7.023	.301	23.955	22.063	45.664	38.738	6.926	.501	.544	3.72	23.271	8
8	8.625	7.981	.322	27.096	25.073	58.426	50.027	8.399	.442	.478	2 878	28.544	8
9	9.625	8.941	.342	30.238	28.089	72.76	62.786	9.974	.396	.427	2.294	33.907	8
10	10.75	10.020	.365	33.772	31.479	90.763	78.855	11.908	.355	.381	1.826	40.483	8
11	11.75	11	. . . .	36.914	34.558	108.434	95.033	13.401	.325	.347	1.51	45.028	8
12	12.75	12	. . . .	40.055	37.7	127.677	113.098	14.579	.299	.319	1.27	48.985	8
	14.0	13.25	.375	43.982	41.626	153.938	137.887		.273	.288			8
	16.0	15.25	.375	50.266	47.909	201.062	182.655		.239	.250			8
	18.0	17.25	.375	56.549	54.193	254.470	239.706		.212	.221			
	20.0	19.25	.375	62.832	60.476	314.159	291.040		.191	,198			
	22.0	21.25	.375	69.115	66.759	380.134	354.657		.174	.180			
	24.0	23.25	.375	75.398	73.042	452.390	424.558		.159	.164			

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Asbestos Paper Weights and Measurements.

Weight per 100 Sq. Ft.	One Pound will Cover	Weight of One Sq. Ft.	Theoretical Gauge, 65 lbs. per Cu. Ft.	Average Actual Gauge	Fractional Thickness	Sq. Feet per 100 Pounds
Pound	Sq. Feet	Pounds	Inches	Inches		
2	50.00	.02	.00363	.005		5000
3	33.33	.03	.00545	.007		3333
4	25.00	.04	.00727	.010		2500
5	20.00	.05	.00909	.012		2000
6	16.66	.06	.0109	.014		1666
7	14.28	.07	.0127	.016		1428
8	12.50	.08	.0145	.018	1/64	1250
9	11.11	.09	.0163	.020		1111
10	10.00	.10	.0181	.022		1000
11	9.09	.11	.0199	.023		909
12	8.33	.12	.0218	.025		833
13	7.69	.13	.0236	.027		769
14	7.14	.14	.0254	.029		714
15	6.66	.15	.0272	.030		666
16	6.25	.16	.0290	.032	1/32	623
17	5.88	.17	.0308	.034		588
18	5.55	.18	.0327	.035		555
19	5.26	.19	.0345	.037		526
20	5.00	.20	.0363	.039		500
21	4.75	.21	.0381	.041		475
22	4.54	.22	.0399	.042		454
23	4.34	.23	.0417	.044		434
24	4.16	.24	.0435	.046	3/64	416
25	4.00	.25	.0454	.048		400
26	3.84	.26	.0472	.049		384
27	3.70	.27	.0490	.051		370
28	3.57	.28	.0508	.053		357
29	3.44	.29	.0526	.055		344
30	3.33	.30	.0545	.056		333
31	3.22	.31	.0563	.058		322
32	3.12	.32	.0581	.060	1/16	312
35	2.85	.35	.0636	.065		285
40	2.50	.40	.0727	.074	5/64	250
45	2.22	.45	.0818	.083		222
48	2.08	.48	.0872	.089	3/32	208
50	2.00	.50	.0909	.092		200
55	1.81	.55	.0999	.102		181
56	1.78	.56	.1017	.105	7/64	178
60	1.66	.60	.1090	.111		166
64	1.56	.64	.1162	.125	1/8	156
65	1.53	.65	.1180	.127		153
70	1.42	.70	.1271	.136		142
75	1.33	.75	.1362	.146		133

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