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FIRE-RESISTANT DECORATED COMPOSITE LAMINATE MEMBERS AND METHOD OF PRODUCING SAME

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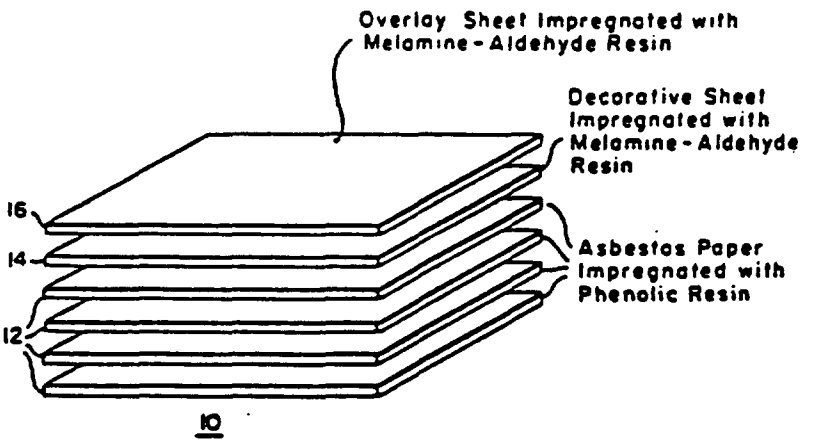

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FIRE-RESISTANT DECORATED COMPOSITE LAMINATE MEMBERS AND METHOD OF PRODUCING SAME

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5 Claims. (Cl. 154—45.9)

This invention relates to composite laminate members and particularly to composite decorated laminate members having good fire-resistance and to the method of producing same.

Decorated laminate members have enjoyed widespread use in the building industry, especially as decorative wall panels, ceiling panels and the like. Many applications require that the decorative panels be fire-resistant. This is particularly true when the decorative panels are used as bulkhead construction in ships, and wall construction in hospitals, office buildings and the like. Heretofore, attempts have been made to produce fire-resistant decorated laminate members, however, the laminates have not possessed adequate physical strength and other desirable physical properties. Attempts to improve physical properties have resulted in a considerable reduction in fire-resistance to a point where the material could not be classified as fire-resistant. It is highly desirable to have available in the art decorated laminate members that have good fire-resistance and high physical strength.

The object of this invention is to provide composite decorated laminates comprising sheet fibrous material impregnated and bonded together by thermoset resinous compositions, which laminates have good fire-resistance and high physical strength.

Another object of this invention is to provide a method for producing decorated laminates of high physical strength and good fire-resistance.

Other objects of this invention will, in part, be obvious and will, in part, appear hereinafter.

For a better understanding of the nature and objects of the invention, reference should be had to the following detailed description and drawing in which the single FIGURE is a schematic view of an assembly of sheets in accordance with this invention.

In accordance with this invention a decorated composite laminate member is prepared which has good fire-resistance and high physical strength. The composite laminate member comprises a core or body layer comprising a plurality of sheets of asbestos paper impregnated with a phenolic condensation product and a decorated surface layer impregnated with a clear melamine-aldehyde resin.

The decorated laminate members of this invention will usually be adhesively bonded to a rigid backing sheet of fire-resistant material having a thickness of from about ¼ inch to 1 inch to provide suitable fire-resistant panels. The panels thus produced are well suited for structural materials for the marine industry, hospitals and the like where fireproof structures are required. An example of a suitable rigid backing material is that available commercially under the proprietary name Marinite. The adhesive composition employed is preferably a fire-resistant type such as the silicon type adhesives.

The decorated surface layer may comprise a sheet of alpha-cellulose paper, thin cotton fabric, silk, glass fabric, asbestos paper or like fibrous sheet material with a design imprinted thereon or the sheet may be pigmented throughout. Pigmented sheets with designs imprinted thereon may also be employed. Ordinarily, a resin impregnated protective overlay sheet is employed over sheets having designs imprinted thereon to provide better abrasion resistance and good surface appearance thereto. Pigmented sheets that have no design imprinted thereon will ordinarily have good abrasion resistance and hence an overlay sheet is not required. Suitable materials for overlay sheets include rayon, glass fabric and alpha-cellulose paper. In accordance with this invention, when an overlay sheet is employed, it will be impregnated with a clear melamine-aldehyde resin.

Any commercially available asbestos paper sheeting such, for example, as that available under the proprietary name Novabestos, may be employed in preparing the laminates of this invention.

Sheets of asbestos paper are impregnated with any well known conventional thermosetting phenolic resin prepared by reacting phenol, cresol, or cresylic acid with formaldehyde, paraformaldehyde or other polymers of formaldehyde, ordinarily in the presence of an alkaline catalyst such as ammonia, sodium hydroxide, lime, or barium hydroxide. A volatile solvent such as ethyl alcohol, toluene or xylene is added to the resin to produce an impregnating varnish. The resin solids content of the varnish may be varied from about 20% to 60% by weight.

A suitable resin may be prepared by reacting 1 mol of phenol and from 0.9 to 1.7 mols of formaldehyde in a closed reaction vessel under reflux conditions for at least 1 hour, the reaction being catalyzed by an alkaline catalyst such as ammonia and then vacuum dehydrated at a temperature not exceeding 100° C.

Example 1

The following is an example of the preparation of a partially reacted thermosettable phenolic resin that may be employed in carrying out this invention:

Into a steam heated reaction kettle there are introduced the following:

	Parts by weight
Phenol	110
Formaldehyde (37%)	104
Ammonia (28%)	3.75

These materials are reacted in the steam heated reaction vessel at a temperature of approximately 100° C. under reflux conditions for a period of about 1½ hours. The mixture is then dehydrated under a vacuum of 28 inches of mercury, and the temperature gradually increased to approximately 75° C. during dehydration. Substantially all the water is removed. To the hot reaction product there is added 81.5 parts by weight of 95% ethyl alcohol and the resulting resin varnish is then permitted to cool to room temperature. This resin varnish has a viscosity of from 180 to 400 centipoises at 25° C. and a set time of from 13 to 16.5 minutes at 153.5° C.

Another particularly good resin composition that may be employed in impregnating the sheets of asbestos paper is a dicyandiamide-phenol-formaldehyde resin composition. Such a resinous composition is derived by reacting phenol, dicyandiamide and formaldehyde in the proportions of 1 mol of the phenol, from 0.8 to 2 mols of dicyandiamide and from 0.9 to 1.5 mols of formaldehyde per mol of the combined phenol and dicyandiamide. Water is present, being usually furnished as a part of aqueous formaldehyde solution (37% to 40%), and amounting to at least 10% of the weight of the reactants, and ordinarily should not exceed the weight of the reactants. The mixture is reacted under alkaline conditions for at least ½ hour, and preferably by refluxing from 1 to 2 hours, and then is vacuum dehydrated at a temperature not exceeding 100° C. until substantially all of the water is removed and then a volatile solvent is applied to produce an impregnating varnish.

The resin varnish employed to impregnate the asbestos paper sheets may include a small proportion, of the order of 2% to 10% by weight, of finely divided inorganic solids such as silica, aluminum oxide, antimony oxide and the like refractory solids to impart better flame resistance to the final product.

The following example is illustrative of the method of preparation of a suitable dicyandiamide-phenol-formaldehyde resin for use in this invention.

Example II

Into a steam heated reaction kettle there are introduced the following:

	Parts by weight
Phenol	2750
Dicyandiamide	2100
Formaldehyde (37%)	4620
Ammonia (28%)	166

The ammonia and the formaldehyde are admixed before being introduced into the kettle with the remainder of the ingredients, the mixture having a pH of approximately 8.5. The mixture is slowly heated, and at 80° C. an exothermic reaction takes place that carries the temperature to approximately 95° C. Additional heat is then supplied in order to cause the reaction mixture to reflux. The mixture is refluxed for 90 minutes and then dehydrated under a vacuum of 27 inches of mercury, and the temperature gradually increased to approximately 75° C. during dehydration. Substantially all the water is removed. To the hot reaction product there are added 2000 parts by weight of 95% ethanol, and the resulting thick varnish is cooled to room temperature. The resinous reaction product is then further diluted with a mixture comprising 50% by weight of ethanol and 50% by weight of water to produce an impregnating varnish comprising approximately 53% by weight of resin solids. The viscosity of the composition is approximately 250 centipoises at 25° C.

Particularly good results have been obtained by impregnating sheets of asbestos paper with a mixture of from 2 parts to 4 parts by weight of a conventional phenolic resin and 1 part by weight of a dicyandiamide-phenol-formaldehyde resin dissolved in a suitable solvent such as ethyl alcohol to provide a varnish composition having from 20% to 60% resin solids.

The following example is illustrative of a suitable mixture to be employed in carrying out this invention.

Example III

Three parts by weight of the resinous reaction product of Example I and one part by weight of the resinous reaction product of Example II and 15 parts by weight of 95% ethyl alcohol are thoroughly admixed by agitation to form an impregnating resinous varnish composition. This resin varnish has a viscosity of from 60 to 150 centipoises at 25° C. and a set time of from 13.5 to 17.5 minutes at 153.5° C.

The sheets of asbestos paper may be impregnated with the resin varnish composition of this invention in any conventional manner, for example, as described in the patent to Weltman et al., Patent No. 2,579,637. It is important, for the purposes of this invention to employ a resin ratio of the impregnant within the relatively narrow range of from 1.35 to 1.80. Resin ratio is defined as the ratio of the weight of the untreated fabric plus the weight of the resin that is impregnated in the sheet to the weight of the untreated fabric. In other words, the treated fibrous material carries resin in an amount equal to from 35% to 80% of the fibrous material alone. To achieve the ultimate in fire-resistance the very minimum amount of resin is desired; however, to obtain desired physical properties, such as good moisture resistance, good dimensional stability, good impact strength and the like, a somewhat greater amount of resin content is desired.

Thus, asbestos paper sheeting is dipped in the varnish one or more times until it has picked up resin solids in an amount of from 0.35 to 0.80 times the weight of the dry asbestos paper and the varnish impregnated asbestos paper is passed through an oven or other dryer after each dip to remove the volatile solvent. During drying, it is desirable to heat the asbestos paper treated with the varnish composition at a temperature of from 110° C. to 160° C. in order to remove the solvent therefrom promptly and to advance the cure of the resin well into the "B" stage. The heat treatment of the applied resin at this stage is conducted so that the resulting treated fabric has a "greenness" of from 0.3% to 6%. The greenness is determined by placing a stack of small pieces of the resin treated sheet material in a hot press and pressing it at a temperature of 175° C. and a pressure of 1000 pounds per square inch for 5 minutes, and then measuring the amount of resin that is forced out of the stack, that is, the resin that extends beyond the fibrous sheet material proper, and determining the proportion of this exuded resin to the total weight of the sample.

It is also essential that the greenness be controlled and kept within the above limits. It is important to have adequate greenness so that a homogeneous laminate is obtained. However, if the greenness is too high, a bursting of the asbestos fibers is encountered during laminating process and the resin tends to flow into the decorated layer causing a discoloration of same. Details of the laminating procedure will be set forth hereinafter.

The decorated sheet material and protective overlay, if one is employed, are impregnated with at least 50% of their weight with a clear thermosetting melamine-aldehyde resin. It will be appreciated that in many cases, the melamine-formaldehyde resin have been made in the presence of butanol and that they comprise butylated polymers. The terms "melamine-aldehyde" are intended to apply to such compositions which comprise essentially these reactants as the main ingredients but may contain other ingredients such as sulfonamides, glycols, glucosides and the like which are added to provide special properties such as flexibility, craze-resistance and the like. The manufacture of the melamine-aldehyde resins suitable for the practice of the present invention is well known in the art and need not be detailed herein.

Referring to the single figure of the drawing, there is shown a stack 10 which comprises sheets 12 of absestos paper impregnated with B-stage phenolic resin, decorated sheet 14 and protective overlay sheet 16 both of which are impregnated with B-stage melamine-aldehyde resin.

The stock 10, as shown in the figure of the drawing is introduced into a molding press where the stack is subjected for a specified period of time to a temperature of from about 260° F. to 320° F., while under pressure. Pressures of from 500 p.s.i. to 1500 p.s.i. are satisfactory, while pressures of from 1000 p.s.i. to 1200 p.s.i. give best results. The curing cycle must be closely controlled so that adequate and complete cure of the melamine-aldehyde resin and the phenolic resin will be effected. Adequate curing of the resin components is obtained in about 15 minutes to 25 minutes at a temperature of from about 260° F. to 300° F.

The following examples illustrate the preparation of composite decorated laminate members in accordance with this invention.

Example IV

Eight sheets of asbestos paper (12 inches x 12 inches x 0.010 inch) are impregnated with the phenolic resin varnish of Example I, to a resin ratio of about 1.60 and a greenness of about 1.0% and the solvent removed. One sheet (12 inches x 12 inches x 0.010 inch) of pigmented alpha-cellulose paper is impregnated with melamine-aldehyde resin varnish to provide a resin ratio of about 2.20 and the solvent removed. A stack was prepared by superimposing one sheet of impregnated asbestos paper on the other and the impregnated pigmented sheet placed on the

top of the stacked asbestos sheets. The stack is consolidated or molded into a composite laminated member at a pressure of 1000 p.s.i. and at a temperature of about 280° F. for a period of about 19 minutes. The resulting laminate has good surface characteristics, good physical properties and good fire-resistance.

Example V

Ten sheets of asbestos paper (12 inches x 12 inches x 0.010 inch) are impregnated with the phenolic resin varnish of Example II, to a resin ratio of about 1.60 and a greenness of about 1.0% and the solvent removed. One sheet (12 inches x 12 inches x 0.010 inch) of pigmented alpha-cellulose paper is impregnated with melamine-aldehyde resin varnish to provide a resin ratio of about 2.00 and the solvent removed. In accordance with the method of Example IV a composite decorated laminate member is prepared. This laminate has good surface quality, excellent fire-resistance, and high physical strength.

Example VI

Six sheets of asbestos paper (12 inches x 12 inches x 0.010 inch) were impregnated with the phenolic resin varnish of Example III, to a resin ratio of about 1.60 on a greenness of 1% and the solvent removed. One sheet (12 inches x 12 inches x 0.010 inch) of pigmented alpha-cellulose paper having a design imprinted thereon and one sheet (12 inches x 12 inches x 0.010 inch) of rayon fabric are impregnated with melamine-aldehyde resin varnish and the solvent removed. The sheet of alpha-cellulose paper is provided with a resin ratio of about 1.70 and the rayon sheet with a resin ratio of about 3.00. A stack is assembled by superimposing one sheet of impregnated asbestos paper on the other. The sheet of pigmented alpha-cellulose paper is placed on top of the stack and the rayon sheet is placed on top of the pigmented sheet. In accordance with the method of Example IV a composite decorated laminate member is prepared. This decorated laminate member is adhesively bonded to a one inch thick sheet of Marinite by using a heat resistant adhesive composition to produce a composite member. This composite member was tested using the Underwriters' Laboratories, Inc., test entitled "Tunnel Test for Fire Resistance of Building Materials." The following results were obtained:

Rate of flame spread	15
Fuel contributed	15
Smoke developed	0

It will be understood that the above examples and description and drawing are illustrative and not in limitation of the invention.

We claim as our invention:

1. In the process of preparing a fire-resistant decorated composite laminate member, the steps comprising (1) impregnating asbestos paper sheeting with a solution of a thermosettable resinous composition consisting of (A) from 2 parts to 4 parts by weight of a phenolic resin derived by reacting 1.0 mol of a phenol and from 0.9 mol to 1.7 mols of formaldehyde under reflux conditions for at least one hour, the reaction being catalyzed with an alkaline catalyst, and then vacuum dehydrated at a temperature not exceeding 100° C. and (B) one part by weight of the resinous reaction product derived by reacting one mol of a phenol, from 0.8 mol to 2.0 mols of dicyandiamide, and from 0.9 mol to 1.5 mols of formaldehyde per mol of the combined phenol and dicyandiamide in the presence of water, the mixture being refluxed for at least ½ hour, and then vacuum dehydrated at a temperature not exceeding 100° C., the resin impregnated sheet fibrous material being heated to drive off the solvent and to advance the cure of the resin to a condition where its greenness is from 0.3% to 6%, the asbestos paper sheeting carrying from 0.35 to 0.80 times its weight of the resin after drying, (2) superimposing a plurality of layers of the resin treated asbestos paper sheeting to provide a stack, (3) superimposing a decorated sheet of fibrous material impregnated with a potentially thermosettable clear melamine-aldehyde resin on top of the stack to provide a composite member, and (4) molding the composite member at a pressure of from 500 to 1500 pounds per square inch at temperature of from 135° C. to 165° C.

2. The process of claim 1 wherein a protective overlay sheet of fibrous material impregnated with a potentially thermosettable clear melamine-aldehyde resin is superimposed on top of the impregnated decorated sheet prior to molding.

3. A fire-resistant decorated composite laminate member comprising (A) a surface layer comprising a decorated sheet of fibrous material impregnated with a thermoset melamine-aldehyde resin and (B) a body layer comprising a plurality of sheets of asbestos paper impregnated with a thermoset resin composition comprising from 35% to 80% of the weight of the asbestos paper alone, the thermoset resin composition consisting of (1) from 2 parts to 4 parts by weight of a phenolic resin derived by reacting 1.0 mol of a phenol and from 0.9 mol to 1.7 mols of formaldehyde under reflux conditions for at least 1 hour, the reaction being catalyzed with an alkaline catalyst, and then vacuum dehydrated at a temperature not exceeding 100° C. and (2) one part by weight of the resinous reaction product derived by reacting one mol of a phenol, from 0.8 to 2.0 mols of dicyandiamide, and from 0.9 mol to 1.5 mols of formaldehyde per mol of the combined phenol and dicyandiamide in the presence of water, the mixture being refluxed for at least ½ hour, and then vacuum dehydrated at a temperature not exceeding 100° C., the said decorated sheet and asbestos sheets being consolidated and bonded together into a unitary member.

4. A thermosettable resinous composition consisting of (1) from 2 parts to 4 parts by weight of a phenolic resin derived by reacting 1.0 mol of a phenol and from 0.9 mol to 1.7 mols of formaldehyde under reflux conditions for at least one hour, the reaction being catalyzed with an alkaline catalyst, and then vacuum dehydrated at a temperature not exceeding 100° C., and (2) one part by weight of the resinous reaction product derived by reacting one mol of a phenol, from 0.8 mol to 2.0 mols of dicyandiamide, and from 0.9 mol to 1.5 mols of formaldehyde per mol of the combined phenol and dicyandiamide in the presence of water, the mixture being refluxed for at least ½ hour, and then vacuum dehydrated at a temperature not exceeding 100° C.

5. A resinous impregnating varnish composition consisting of (1) from 2 parts to 4 parts by weight of a phenolic resin derived by reacting one mol of a phenol and from 0.9 mol to 1.7 mols of formaldehyde under reflux conditions for at least 1 hour, the reaction being catalyzed with an alkaline catalyst and then vacuum dehydrated at a temperature not exceeding 100° C. (2) one part by weight of a resinous reaction product derived by reacting 1 mol of a phenol, from 0.8 to 2.0 mols of dicyandiamide, and from 0.9 mol to 1.5 mols of formaldehyde per mol of the combined phenol and dicyandiamide in the presence of water, the mixture being refluxed for at least ½ hour, and then vacuum dehydrated at a temperature not exceeding 100° C., and (3) a solvent therefor.

References Cited in the file of this patent

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ISSUED 10-30-61 MAN

CHANGED

7/15/63	4
12/26/61	5
11/16/64	6

INSULATION - CLASSES & APPLICATION

PH 920.1

(1) THE FOLLOWING DATA RELATIVE TO INSULATION FOR TURBINE PARTS SHOULD BE FOLLOWED UNLESS SPECIFIC CONTRACT REQUIREMENTS MAKE DEVIATION NECESSARY, IN WHICH CASE THE "O" SPEC. WILL SPECIFY IN DETAIL THE TYPE OF INSULATION AND PROCEDURE.

(2) THE METHOD FOR INSULATING TURBINE CYLINDERS, MAIN STEAM PIPING, STEAM CHESTS, VALVES AND IRREGULAR SURFACES IS DIVIDED INTO CLASSES AS LISTED IN TABLE BELOW. "O" SPEC. WILL CALL FOR CLASS TO FOLLOW.

(3) SEE PAGE PH-920.2 FOR NOTES AND FOR INSULATION OF STEAM DRAIN AND GLAND PIPING AND CROSS-OVER OR CROSS-UNDER PIPING.

(4) SEE TABLE ON PAGE PH-920.3 FOR THICKNESSES REQUIRED AND MATERIAL SPECS. - SEE PAGE PH-920.4 AND 920.5 FOR ORDERING INFORMATION.

CLASS NO.	CLASS DESCRIPTION	PART TO BE INSULATED		INSULATION TYPE	APPLIED IN	PROCESS SPEC.	NOTES TO BE PLACED ON APPLICABLE DWGS. (SEE PH-920.2)
1	TURBINES SHIPPED ASSEMBLED - INCLUDING INSULATION. (THIS INCLUDES 166, 246 AND 286 FRAMES AND ALL INDUSTRIAL TURBINES COMING WITHIN THE LIMITS OF SHIPPING DIMENSIONS.)	CYLINDER	BODY	BLOCK	SHOP	600433	
			JOINTS	BLANKETS	SHOP	600359	
		PIPES *	TO 10"	MOLDED	SHOP	600433	
			OVER 10"	BLOCK	SHOP	600433	
		STEAM CHESTS, VALVES & IRREGULAR SURFACES		BLOCK AND BLANKET	SHOP	600433 600359	
		LAGGING **		SPRAYED ASBESTOS	SHOP	600111	
		GAUGE BOARD		ASBESTOS SHEET & FELT	SHOP	600360	
2	TURBINES SHIPPED ASSEMBLED BUT NOT INSULATED. @ ERECTION SERVICE. INSULATION FURNISHED AND APPLIED BY SERVICE DEPT. (EXCEPT FOR EXPORT ORDERS) (INCLUDES NON-COND. TURBS., HP TURBS. OF TANDEM UNITS AND ANY OTHER TURBS. WITH SEPARATE #2 PEDESTALS WHICH ARE LIFTED BY HORIZ. JT. BOLTS).	CYLINDER, STEAM CHEST, VALVES, ETC.		BLOCK - PLASTIC	FIELD	600729	NOTES "B" AND "C" (EXPORT ORDERS SUBSTITUTE NOTES "C" & "E")
		PIPES *	TO 10"	MOLDED	FIELD	600433	
			OVER 10"	BLOCK	FIELD	600433	
		LAGGING		SPRAYED ASBESTOS	SHOP	600111	
		GAUGE BOARD		ASBESTOS SHEET & FELT	SHOP	600360	
3	TURBINES SHIPPED ASSEMBLED BUT NOT INSULATED. @ INSTALLATION SERVICE INSULATION FURNISHED BY WESTINGHOUSE AND APPLIED BY THE PURCHASER. (EXCEPT FOR EXPORT ORDERS) (INCLUDES NON-COND. TURBS., HP TURBS. OF TANDEM UNITS AND ANY OTHER TURBS. WITH SEPARATE #2 PEDESTALS WHICH ARE LIFTED BY HORIZ. JT. BOLTS).	CYLINDER, STEAM CHEST, VALVES, ETC.		BLOCK - PLASTIC	FIELD	600729	NOTES "A" AND "C" (EXPORT ORDERS SUBSTITUTE NOTES "C" & "D")
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			OVER 10"	BLOCK	FIELD	600433	
		LAGGING		SPRAYED ASBESTOS	SHOP	600111	
		GAUGE BOARD		ASBESTOS SHEET & FELT	SHOP	600360	
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		PIPES *	TO 10"	MOLDED	FIELD	600433	
			OVER 10"	BLOCK	FIELD	600433	
		LAGGING		SPRAYED ASBESTOS	SHOP	600111	
		GAUGE BOARD		ASBESTOS SHEET & FELT	SHOP	600360	
	TURBINES SHIPPED DISASSEMBLED WESTINGHOUSE INSTALLATION SERVICE. INSULATION FURNISHED BY WESTINGHOUSE AND APPLIED BY THE PURCHASER. (EXCEPT FOR EXPORT ORDERS)	CYLINDER, STEAM CHEST, VALVES, ETC.		BLOCK - PLASTIC	FIELD	600729	NOTES "A" AND "C" (EXPORT ORDERS SUBSTITUTE NOTES "C" & "D")
		PIPES *	TO 10"	MOLDED	FIELD	600433	
			OVER 10"	BLOCK	FIELD	600433	
		LAGGING		SPRAYED ASBESTOS	SHOP	600111	
		GAUGE BOARD		ASBESTOS SHEET & FELT	SHOP	600360	

* FOR STEAM DRAIN AND GLAND AND CROSS-OVER OR CROSS-UNDER PIPING INSULATION SEE PAGE PH-920.2.

** FOR TEMPERATURES UP THRU 750°F NO LAGGING INSULATION NECESSARY IN THIS CLASS.

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REF.

INSULATION - CLASSES & APPLICATION

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		PIPES *	TO 10"	MOLDED	SHOP	600433	
			OVER 10"	BLOCK	SHOP	600433	
		STEAM CHESTS, VALVES, & IRREGULAR SURFACES		BLOCK AND BLANKET	SHOP	600433 600359	
		LAGGING **		SPRAYED ASBESTOS	SHOP	600111	
		GAUGE BOARD		ASBESTOS SHEET & FELT	SHOP	600360	
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		PIPES *	TO 10"	MOLDED	FIELD	600433	
			OVER 10"	BLOCK	FIELD	600433	
		LAGGING		SPRAYED ASBESTOS	SHOP	600111	
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		PIPES *	TO 10"	MOLDED	FIELD	600433	
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		LAGGING		SPRAYED ASBESTOS	SHOP	600111	
		GAUGE BOARD		ASBESTOS SHEET & FELT	SHOP	600360	
4	TURBINES SHIPPED DISASSEMBLED. WESTINGHOUSE ERECTION SERVICE. INSULATION FURNISHED AND APPLIED BY SERVICE DEPT.	CYLINDER, STEAM CHEST, VALVES, ETC.		BLOCK - PLASTIC	FIELD	600729	NOTES "B" AND "C"
		PIPES *	TO 10"	MOLDED	FIELD	600433	
			OVER 10"	BLOCK	FIELD	600433	
		LAGGING		SPRAYED ASBESTOS	SHOP	600111	
		GAUGE BOARD		ASBESTOS SHEET & FELT	SHOP	600360	
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		PIPES *	TO 10"	MOLDED	FIELD	600433	
			OVER 10"	BLOCK	FIELD	600433	
		LAGGING		SPRAYED ASBESTOS	SHOP	600111	
		GAUGE BOARD		ASBESTOS SHEET & FELT	SHOP	600360	

* FOR STEAM DRAIN AND GLAND AND CROSS OVER OR CROSS-UNDER PIPING INSULATION SEE PAGE PH-920.2.

** FOR TEMPERATURES UP THRU 750°F NO LAGGING INSULATION NECESSARY IN THIS CLASS.

600094

INSULATION - NOTES, GENERAL INFO., ETC.

1	ISSU 10-3
BY - M. DORF MA	

NOTES

NOTE "A" - WESTINGHOUSE INSTALLATION SERVICE:-

THIS INSULATING MATERIAL, INCLUDING WIRE, CEMENT, ETC., IS PURCHASED BY OUR SERVICE DEPARTMENT IN THE FIELD, AND IS TO BE SHIPPED DIRECTLY TO THE CUSTOMER'S PLANT. IT IS TO BE SUPPLIED AND APPLIED IN ACCORDANCE WITH SPECIFIED MATERIAL AND PROCESS SPECS. MATERIAL TO BE APPLIED BY THE INSTALLATION CONTRACTOR.

NOTE "B" - WESTINGHOUSE ERECTION SERVICE -

THIS INSULATING MATERIAL, INCLUDING WIRE, CEMENT, ETC., IS TO BE FURNISHED AND APPLIED BY THE INSTALLATION CONTRACTOR IN THE FIELD. IT IS TO BE SUPPLIED AND APPLIED IN ACCORDANCE WITH SPECIFIED MATERIAL AND PROCESS SPECIFICATIONS.

NOTE "C" - EYE BOLT STUDS, STYLE NO. 270A091H01, REQUIRED FOR INSTALLATION OF INSULATION, ARE TO BE FURNISHED AND INSTALLED BY LESTER WORKS BEFORE SHIPPING TURBINE.

EXPANDED METAL MATERIAL FOR VALVE BONNETS AND FLANGES FURNISHED BY LESTER WORKS AND SHIPPED WITH THE UNIT IS TO BE FORMED IN THE FIELD BY THE INSTALLATION CONTRACTOR IN ACCORDANCE WITH PROCESS SPECIFICATION.

WHEN JOB IS BEING EXPORTED ADD:-

NOTE "D" - THIS INSULATING MATERIAL INCLUDING WIRE, CEMENT, ETC., IS TO BE SUPPLIED BY LESTER WORKS. IT IS TO BE BOXED FOR EXPORT SHIPMENT AND SHIPPED AS INSTRUCTED BY ORDER SERVICE DEPT. IT IS TO BE SUPPLIED AND APPLIED IN ACCORDANCE WITH SPECIFIED MATERIAL AND PROCESS SPECIFICATIONS. MATERIAL TO BE APPLIED BY THE INSTALLATION CONTRACTOR.

GENERAL INFORMATION

FOR TURBINE CYLINDERS, MAIN STEAM PIPING, VALVES, AND IRREGULAR SURFACES, THE FOLLOWING INFORMATION SHOULD BE SHOWN ON THE DETAIL PORTION OF THE DRAWING.

(1) THICKNESS OF INSULATION FOR AREA INDICATED.

(2) LENGTH AND APPROXIMATE AREA TO BE INSULATED (INDICATE INSULATION TO BE APPLIED IN THIS REGION WITH APPROPRIATE BALLOONS, ETC.).

(3) EXPANDED METAL FOR TURBINE JOINT FLANGE, VALVE BONNETS, ETC. TO BE ORDERED IN B/M.

CHANGE	
11	11/14
12	5/19
13	9/27
14	6/15

CROSS-OVER PIPES, CROSS-UNDER PIPES AND STEAM DRAIN & GLAND PIPING

SMALL TURBINES

THESE TURBINES DO NOT REQUIRE INSULATION FOR ANY PART OF THE STEAM DRAIN AND GLAND PIPING.

MEDIUM TURBINES

ALL STEAM DRAIN AND GLAND PIPING WILL BE INSULATED WITH THICKNESSES AND NUMBER OF LAYERS IN ACCORDANCE WITH PAGE PH-920.3 AND ORDERED IN ACCORDANCE WITH PAGE PH-920.4, WITH THE INSULATION FURNISHED BY WESTINGHOUSE AND APPLIED IN THE FIELD BY THE INSTALLATION CONTRACTOR*.

GLAND WATER SUPPLY PIPING TO BE INSULATED WITH CORK AS LISTED ON PAGE PH-920.4.

LARGE TURBINES

ALL STEAM DRAIN AND GLAND PIPING WILL BE INSULATED WITH THICKNESSES AND NUMBER OF LAYERS IN ACCORDANCE WITH PAGE PH-920.3 AND ORDERED IN ACCORDANCE WITH PAGE PH-920.4, WITH THE INSULATION FURNISHED BY WESTINGHOUSE AND APPLIED IN THE FIELD BY THE INSTALLATION CONTRACTOR*.

GLAND WATER SUPPLY PIPING TO BE INSULATED WITH CORK AS LISTED ON PAGE PH-920.4.

CROSS-OVER PIPES WILL BE INSULATED IN THE FIELD WITH SPRAYED ASBESTOS OR BLOCK INSULATION EXCEPT FOR JOINT FLANGES WHICH WILL BE INSULATED WITH BLANKETS MADE AND FITTED AT WESTINGHOUSE. INSULATION WILL BE ORDERED AS SHOWN ON PAGES PH-920.3 AND PH-920.5 FOR BLOCK AND 920.3 AND 920.4 FOR BLANKET.

SHEATHING OF CROSS-UNDER PIPES OR OTHER PIPES INTERNAL TO TURBINE EXHAUST OR CONDENSER INLET ZONE FOR INSULATION PURPOSES SHALL BE DONE IN FIELD BY THE INSTALLATION CONTRACTOR TO PROCESS SPEC. 600790.

600001

* SHOW LENGTH IN DETAIL PORTION OF DWG.

REF.

WESTINGHOUSE ELECTRIC CORPORATION, LESTER, PA., U.S.A.

STEAM DIVISIONS — STANDARDS ENGRG.

INSULATION - NOTES, GENERAL INFO., ETC.

NOTES

NOTE "A" - WESTINGHOUSE INSTALLATION SERVICE:-

THIS INSULATING MATERIAL, INCLUDING WIRE, CEMENT, ETC., IS PURCHASED BY OUR SERVICE DEPARTMENT IN THE FIELD, AND IS TO BE SHIPPED DIRECTLY TO THE CUSTOMER'S PLANT. IT IS TO BE SUPPLIED AND APPLIED IN ACCORDANCE WITH SPECIFIED MATERIAL AND PROCESS SPECS.

MATERIAL TO BE APPLIED BY CUSTOMER.

NOTE "B" - WESTINGHOUSE ERECTION SERVICE:-
INSULATION TO BE FURNISHED AND APPLIED BY OUR SERVICE DEPT. IN THE FIELD.

NOTE "C" - THE FOLLOWING NOTE SHOULD BE ADDED TO DWG.:-
EYE BOLT STUDS, STYLE NO. 270A091H01, REQUIRED FOR INSTALLATION OF INSULATION, ARE TO BE FURNISHED AND INSTALLED BY WESTINGHOUSE BEFORE SHIPPING TURBINE.

EXPANDED METAL SECTIONS FOR VALVE BONNETS AND SPECIAL FLANGES MADE BY WESTINGHOUSE AND SHIPPED WITH THE UNIT.

WHEN JOB IS BEING EXPORTED ADD:-
THIS IS AN EXPORT ORDER. INSULATION MATERIALS ARE TO BE BOXED FOR EXPORT SHIPMENT AND SHIPPED TO THE FIELD BY THE SUPPLIER.

GENERAL INFORMATION

FOR TURBINE CYLINDERS, MAIN STEAM PIPING, VALVES, AND IRREGULAR SURFACES, THE FOLLOWING INFORMATION SHOULD BE SHOWN ON THE DETAIL PORTION OF THE DRAWING.

(1) THICKNESS OF INSULATION FOR AREA INDICATED.

(2) LENGTH AND APPROXIMATE AREA TO BE INSULATED (INDICATE INSULATION TO BE APPLIED IN THIS REGION WITH APPROPRIATE BALLOONS, ETC.).

(3) EXPANDED METAL FOR TURBINE JOINT FLANGE, VALVE BONNETS, ETC. TO BE ORDERED IN B/M.

CHAN

7	
8	

CROSS-OVER PIPES, CROSS-UNDER PIPES AND STEAM DRAIN & GLAND PIPING

SMALL TURBINES

THESE TURBINES DO NOT REQUIRE INSULATION FOR ANY PART OF THE STEAM DRAIN AND GLAND PIPING.

MEDIUM TURBINES

ALL STEAM DRAIN AND GLAND PIPING WILL BE INSULATED WITH THICKNESSES AND NUMBER OF LAYERS IN ACCORDANCE WITH PAGE PH-920.3 AND ORDERED IN ACCORDANCE WITH PAGE PH-920.4, WITH THE INSULATION FURNISHED BY WESTINGHOUSE AND APPLIED IN THE FIELD. *

GLAND WATER SUPPLY PIPING TO BE INSULATED WITH CORK AS LISTED ON PAGE PH-920.4.

LARGE TURBINES

ALL STEAM DRAIN AND GLAND PIPING WILL BE INSULATED WITH THICKNESSES AND NUMBER OF LAYERS IN ACCORDANCE WITH PAGE PH-920.3 AND ORDERED IN ACCORDANCE WITH PAGE PH-920.4, WITH THE INSULATION FURNISHED BY WESTINGHOUSE AND APPLIED IN THE FIELD. *

GLAND WATER SUPPLY PIPING TO BE INSULATED WITH CORK AS LISTED ON PAGE PH-920.4.

CROSS-OVER PIPES ARE COMPLETELY INSULATED AT WESTINGHOUSE WITH MATERIAL ORDERED AS SHOWN ON PAGES PH-920.3 AND PH-920.5. JOINT FLANGE BLANKETS ARE MADE AND FITTED AT WESTINGHOUSE AND INSTALLED AFTER PIPE IS ERECTED IN THE FIELD.

SHEATHING OF CROSS-UNDER PIPES OR OTHER PIPES INTERNAL TO TURBINE EXHAUST OR CONDENSER INLET ZONE FOR INSULATION PURPOSES SHALL BE DONE IN FIELD BY ERECTION OR INSTALLATION SERVICE TO PROCESS SPEC. 600790.

* SHOW LENGTH IN DETAIL PORTION OF DWG.

600051

REF.

INSULATION - NOTES, GENERAL INFO., ETC.

NOTES

NOTE "A" - WESTINGHOUSE INSTALLATION SERVICE:-

THIS INSULATING MATERIAL, INCLUDING WIRE, CEMENT, ETC., IS PURCHASED BY OUR SERVICE DEPARTMENT IN THE FIELD, AND IS TO BE SHIPPED DIRECTLY TO THE CUSTOMER'S PLANT. IT IS TO BE SUPPLIED IN ACCORDANCE WITH SPECIFIED PROCESS SPEC. AND MATERIAL SPEC.

MATERIAL TO BE APPLIED BY CUSTOMER.

NOTE "B" - WESTINGHOUSE ERECTION SERVICE:-
INSULATION TO BE FURNISHED AND APPLIED BY OUR SERVICE DEPT. IN THE FIELD.

NOTE "C" - THE FOLLOWING NOTE SHOULD BE ADDED TO DWG.:-

EYE BOLT STUDS, STYLE NO. 270A091H01, REQUIRED FOR INSTALLATION OF INSULATION, ARE TO BE FURNISHED AND INSTALLED BY SOUTH PHILA. BEFORE SHIPPING TURBINE.

EXPANDED METAL SECTIONS FOR VALVE BONNETS AND SPECIAL FLANGES MADE BY SOUTH PHILA. AND SHIPPED WITH THE UNIT.

WHEN JOB IS BEING EXPORTED ADD:-

THIS IS AN EXPORT ORDER. INSULATION MATERIALS ARE TO BE BOXED FOR EXPORT SHIPMENT, AND SHIPPED TO THE FIELD BY THE SUPPLIER.

GENERAL INFORMATION

FOR TURBINE CYLINDERS, MAIN STEAM PIPING, VALVES, AND IRREGULAR SURFACES, THE FOLLOWING INFORMATION SHOULD BE SHOWN ON THE DETAIL PORTION OF THE DRAWING.

(1) THICKNESS OF INSULATION FOR AREA INDICATED.

(2) LENGTH AND APPROXIMATE AREA TO BE INSULATED INDICATE INSULATION TO BE APPLIED IN THIS REGION WITH APPROPRIATE BALLOONS, ETC.).

(3) EXPANDED METAL FOR TURBINE JOINT FLANGE, VALVE BONNETS, ETC. TO BE ORDERED IN O M

CROSS-OVER PIPES, CROSS-UNDER PIPES AND STEAM DRAIN & GLAND PIPING

SMALL TURBINES

THESE TURBINES DO NOT REQUIRE INSULATION FOR ANY PART OF THE STEAM DRAIN AND GLAND PIPING.

MEDIUM TURBINES

ALL STEAM DRAIN AND GLAND PIPING WILL BE INSULATED WITH THICKNESSES IN ACCORDANCE WITH PAGE PH-920.3 AND ORDERED IN ACCORDANCE WITH PAGE PH-920.4, WITH THE INSULATION FURNISHED BY SOUTH PHILA. AND APPLIED IN THE FIELD.

GLAND WATER SUPPLY PIPING TO BE INSULATED WITH CORK AS LISTED ON PAGE PH-920.4.

LARGE TURBINES

ALL STEAM DRAIN AND GLAND PIPING WILL BE INSULATED WITH THICKNESSES IN ACCORDANCE WITH PAGE PH-920.3 AND ORDERED IN ACCORDANCE WITH PAGE PH-920.4, WITH THE INSULATION FURNISHED BY SOUTH PHILA. AND APPLIED IN THE FIELD.

GLAND WATER SUPPLY PIPING TO BE INSULATED WITH CORK AS LISTED ON PAGE PH-920.4.

CROSS-OVER PIPES ARE COMPLETELY INSULATED AT SOUTH PHILA. WITH MATERIAL ORDERED AS SHOWN ON PAGES PH-920.3 AND PH-920.5. JOINT FLANGE BLANKETS ARE MADE AND FITTED AT SOUTH PHILA. AND INSTALLED AFTER PIPE IS ERECTED IN THE FIELD.

SHEATHING OF CROSS-UNDER PIPES OR OTHER PIPES INTERNAL TO TURBINE EXHAUST OR CONDENSER INLET ZONE FOR INSULATION PURPOSES SHALL BE DONE IN FIELD BY ERECTION OR INSTALLATION SERVICE TO PROCESS SPEC. 600790.

600095

10/50 BY- B.S.

NOTE "A" SUPERVISION ONLY:- THIS INSULATING MATERIAL, INCLUDING WIRE, CEMENT, ETC. AND EXPANDED METAL WHEN ORDERED, IS PURCHASED BY SOUTH PHILA. AND IS TO BE SHIPPED DIRECTLY TO THE CUSTOMER'S PLANT.

IT IS TO BE SUPPLIED IN ACCORDANCE WITH SPECIFIED PROCESS SPEC. AND MATERIAL SPEC.

MATERIAL TO BE APPLIED BY CUSTOMER.

NOTE "B" INSULATION TO BE FURNISHED AND APPLIED BY OUR SERVICE DEPT. IN THE FIELD.

NOTE "C" THE FOLLOWING NOTE SHOULD BE ADDED TO DWG.

"RAILS, STAPLES, RIVETS AND ANY OTHER NECESSARY ATTACHMENTS REQUIRED FOR INSTALLATION OF INSULATION ARE TO BE FURNISHED AND INSTALLED BY SOUTH PHILA. BEFORE SHIPPING TURBINE.

EXPANDED METAL SECTIONS FOR VALVE BONNETS AND SPECIAL FLANGES, MADE BY SOUTH PHILA. AND SHIPPED WITH THE UNIT.

GENERAL INFORMATION

FOR TURBINE CYLINDERS, MAIN STEAM PIPING, VALVES, AND IRREGULAR SURFACES THE FOLLOWING INFORMATION SHOULD BE SHOWN ON THE DETAIL PORTION OF THE DRAWING.

(1) THICKNESS OF INSULATION FOR AREA INDICATED.

(2) LENGTH AND APPROXIMATE AREA TO BE INSULATED (INDICATE INSULATION TO BE APPLIED IN THIS REGION WITH APPROPRIATE FAIRING ETC.).

(3) EXPANDED METAL FOR TURB. JOINT FLANGE, VLV. BONNETS, ETC. TO BE ORDERED IN B/M.

CROSS UNDER-CROSS OVER PIPES
AND
STEAM, DRAIN AND GLAND PIPING

GENERAL PURPOSE AND "K" TURBINES

THESE TURBINES DO NOT REQUIRE INSULATION FOR ANY PORTION OF THE STEAM, DRAIN AND GLAND PIPING.

INDUSTRIAL TURBINES

ALL STEAM PIPING (EXCEPT THE SEALING STEAM PIPING TO THE STEAM GLANDS ON CONDENSING UNITS) WILL BE INSULATED, WITH THICKNESSES IN ACCORDANCE WITH PAGE PH-920.3 AND ORDERED IN ACCORDANCE WITH PAGE PH-920.4.

FOR CLASS #1 UNITS - ALL INSULATION FURNISHED BY SOUTH PHILA. AND APPLIED IN THE FIELD.
OTHER CLASSES AS LISTED ON PAGE PH-920.1.

GLAND WATER SUPPLY PIPING TO BE INSULATED WITH CORK AS LISTED ON PAGE PH-920.4.

CENTRAL STATION TURBINES

ALL STEAM PIPING WILL BE INSULATED, WITH THICKNESSES IN ACCORDANCE WITH PAGE PH-920.3 AND ORDERED IN ACCORDANCE WITH PAGE PH-920.4.

FOR CLASS #1 UNITS - ALL INSULATION FURNISHED BY SOUTH PHILA. AND APPLIED IN THE FIELD.
OTHER CLASSES AS LISTED ON PAGE PH-920.1.

GLAND WATER SUPPLY PIPING TO BE INSULATED WITH CORK AS LISTED ON PAGE PH-920.4.

CROSS OVER PIPES ARE COMPLETELY INSULATED AND SHIPPED WITH BLOCK INSULATION IN PLACE. JOINT FLANGE BLANKETS ARE MADE AND FITTED AT SOUTH PHILA., AND INSTALLED AFTER PIPE IS ERECTED IN THE FIELD.

CROSS OVER PIPES ON OUTDOOR UNITS ARE TO HAVE A FINAL COAT OF WATERPROOFING PAINT (CHEESMAN ELLIOT #3-2 OR EQUAL) APPLIED AS REQUIRED BY CLASS.

CROSS UNDER PIPES AS A RULE ARE INSULATED IN THE FIELD PER 600433 PART I ITEM 7.

ORDER S.S. SHEATHING AS FOLLOWS:

ITEM	DESCRIPTION	MATERIAL
1	S.S. SHEET 36 X REQ. LENGTH X 1/16 THICK	4562-2

THE WAREHOUSE SHEET SIZES AVAILABLE ARE 36 X 96 AND 36 X 120.

FOR DIAPHRAGMS AND IRREGULAR SURFACES ORDER SUFFICIENT WAREHOUSE STOCK SHEETS AS A SEPARATE ITEM.

600013

INSULATION – THICKNESS AND TEMP RANGE

BY REFERRING TO THE TABLES BELOW, THE PROPER THICKNESS AND TYPE OF INSULATION REQUIRED FOR A GIVEN TEMPERATURE CONDITION.

* FOR TEMPERATURES OVER 600°F., SPECIFY DOUBLE LAYER INSULATION. [illegible] SHOW TOTAL THICKNESS.

WHEN SPRAYED ASBESTOS INSULATION SPEC. 600116 IS USED INSTEAD OF [illegible] SAME TOTAL THICKNESS OF INSULATION 542514Q AS THICKNESS SPECIFIED FOR A00433 OR A00729.

PIPE INSULATION (EXCEPT AS NOTED)

INSULATION TYPE	PROCESS SPEC.	PIPE SIZE	MATERIAL		TEMPERATURE °F UP TO 300	301 TO 450	451 TO 600	601 TO 750	751 TO 850	851 TO 950	951 TO 1050	1051 TO 1150	1151 TO 1200
MOLDED	A00433 PART II	.500	*542514H		1.000	1.000	[illegible]	[illegible]	2.000	2.500	2.500	-------	-------
			466018A		-------	-------	-------	-------	-------	-------	-------	1.000	1.000
		.750	*542514H		1.000	1.000	1.500	2.000	2.500	2.500	3.000	-------	-------
			466018A		-------	-------	-------	-------	-------	-------	-------	1.000	1.000
		1.000	*542514H		1.000	1.500	[illegible]	[illegible]	2.500	2.500	3.000	-------	-------
			466018A		-------	-------	-------	-------	-------	-------	-------	1.000	1.000
		1.250	*542514H		1.000	1.500	[illegible]	[illegible]	2.500	3.000	3.000	-------	-------
			466018A		-------	-------	-------	-------	-------	-------	-------	1.000	1.500
		1.500	*542514H		1.000	1.500	[illegible]	[illegible]	2.500	3.000	3.000	-------	-------
			466018A		-------	-------	-------	-------	-------	-------	-------	3.000	3.000
		2.000	*542514H		1.000	1.500	2.000	2.500	3.000	3.000	3.500	-------	-------
			466018A	INNER	-------	-------	-------	-------	-------	-------	-------	1.500	1.500
				OUTER	-------	-------	-------	-------	-------	-------	-------	2.500	2.500
		2.500	*542514H		1.000	1.500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-------	-------
			466018A	INNER	-------	-------	-------	-------	-------	-------	-------	1.500	1.500
				OUTER	-------	-------	-------	-------	-------	-------	-------	2.500	2.500
		3.000	*542514H		1.000	1.500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-------	-------
			466018A	INNER	-------	-------	-------	-------	-------	-------	-------	1.500	2.000
				OUTER	-------	-------	-------	-------	-------	-------	-------	2.500	2.500
		3.500	*542514H		1.000	1.500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-------	-------
			466018A	INNER	-------	-------	-------	-------	-------	-------	-------	1.500	2.000
				OUTER	-------	-------	-------	-------	-------	-------	-------	2.500	2.500
		4.000	*542514H		1.000	2.000	[illegible]	[illegible]	3.500	[illegible]	[illegible]	-------	-------
			466018A	INNER	-------	-------	-------	-------	-------	-------	-------	[illegible]	2.000
				OUTER	-------	-------	-------	-------	-------	-------	-------	[illegible]	2.500
		5.000	*542514H		1.500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-------	-------
			466018A	INNER	-------	-------	-------	-------	-------	-------	-------	2.000	2.000
				OUTER	-------	-------	-------	-------	-------	-------	-------	2.500	2.500
		6.000	*542514H		1.500	2.000	[illegible]	[illegible]	3.500	[illegible]	[illegible]	-------	-------
			466018A	INNER	-------	-------	-------	-------	-------	-------	-------	2.000	2.000
				OUTER	-------	-------	-------	-------	-------	-------	-------	3.000	3.000
		8.000	*542514H		1.500	2.000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-------	-------
			466018A	INNER	-------	-------	-------	-------	-------	-------	-------	2.500	2.500
				OUTER	-------	-------	-------	-------	-------	-------	-------	[illegible]	3.000
		10.000	*542514H		1.500	2.500	[illegible]	[illegible]	4.000	4.500	5.000	-------	-------
			466018A	INNER	-------	-------	-------	-------	-------	-------	-------	2.500	2.500
				OUTER	-------	-------	-------	-------	-------	-------	-------	3.000	3.000
BLOCK	600433 PART I	PIPE OVER 10.000, INDUS. TURB. CYLS. ETC.	*4610288		1.500	2.500	3.000	3.500	4.000	4.500	5.000	-------	-------
			46601AA	INNER	-------	-------	-------	-------	-------	-------	-------	2.500	3.000
			46102RR	OUTER	-------	-------	-------	-------	-------	-------	-------	3.000	3.000

INSULATION (OTHER THAN PIPE)

INSULATION TYPE	PROCESS SPEC.	MATERIAL	TEMPERATURE °F UP TO 300	301 TO 450	451 TO 600	601 TO 750	751 TO 850	851 TO 950	951 TO 1050	1051 TO 1150	1151 TO 1200
BLANKET	600359 PART I	AS REQ'D. BY PROCESS SPECIFICATION	2.000	2.500	[illegible]	-------	-------	-------	-------	-------	-------
	600359 PART IV		-------	-------	-------	3.500	2.000 (INNER) 2.000 (OUTER)	2.000 (INNER) 2.500 (OUTER)	2.500 (INNER) 2.500 (OUTER)	2.500 (INNER) 3.000 (OUTER)	3.000 (INNER) 3.000 (OUTER)
BLOCK AND PLASTIC	600729	46601AB BLOCK	2.000	2.000	[illegible]	2.500	3.000	3.500	3.500	4.000	4.000
		46110BJ PLASTIC	.500	1.000	1.500	2.000	2.000	2.000	2.500	2.500	3.000
BLOCK	600360	4610288	1.000 THICK								
SPRAYED INSUL. COMPOUND	600111 PT. I	542514C	.250 FOR STRAIGHT SIDED OR CLOSE FITTING ENCLOSURES.								
	600111 PT. II		.750 FOR SLOPING WALL OR WIDE CLEARANCE ENCLOSURES.								

ISSUED 1

INSULATION — THICKNESS AND TEMP. RANGE

PH 920.3

BY REFERRING TO THE TABLES BELOW, THE PROPER THICKNESS AND TYPE OF INSULATION MAY BE ORDERED FOR A GIVEN TEMPERATURE CONDITION.

• FOR TEMPERATURES OVER 600°F., SPECIFY "DOUBLE LAYER" IN B/M WHEN ORDERING THESE MATERIALS. FIGURES SHOW TOTAL THICKNESS.

CHANGED

9/5/62	8
11/27/62	9
8/18/64	10

PIPE INSULATION (EXCEPT AS NOTED)

INSULATION TYPE	PROCESS SPEC.	PIPE SIZE	MATERIAL		TEMPERATURE °F UP TO 300	301 TO 450	451 TO 600	601 TO 750	751 TO 850	851 TO 950	951 TO 1050	1051 TO 1150	1151 TO 1200
MOLDED	600433 PART II	1/2	• 54251AH		1	1	1-1/2	2	2	2-1/2	2-1/2	-----	-----
			46601BA		----	----	-----	-----	-----	-----	-----	3	3
		3/4	• 54251AH		1	1	1-1/2	2	2-1/2	2-1/2	3	-----	-----
			46601BA		----	-----	-----	-----	-----	-----	-----	3	3
		1	• 54251AH		1	1-1/2	2	2	2-1/2	2-1/2	3	-----	-----
			46601BA		----	----	-----	-----	-----	-----	-----	3	3
		1-1/4	• 54251AH		1	1-1/2	2	2-1/2	2-1/2	3	3	----	----
			46601BA		----	----	----	----	----	-----	-----	3	3
		1-1/2	• 54251AH		1	1-1/2	2	2-1/2	2-1/2	3	3	----	-----
			46601BA		----	----	----	----	----	----	-----	3	3
		2	• 54251AH		1	1-1/2	2	2-1/2	3	3	3-1/2	----	----
			46601BA	INNER	----	----	----	----	----	----	----	3	1-1/2
				OUTER	----	----	----	----	----	----	----	2-1/2	2-1/2
		2-1/2	• 54251AH		1	1-1/2	2	2-1/2	3	3-1/2	3-1/2	-----	-----
			46601BA	INNER	----	----	----	----	----	----	----	3	1-1/2
				OUTER	----	----	----	----	----	----	----	2-1/2	2-1/2
		3	• 54251AH		1	1-1/2	2	2-1/2	3	3-1/2	4	-----	----
			46601BA	INNER	----	----	----	----	----	----	----	1-1/2	2
				OUTER	----	----	----	----	----	----	----	2-1/2	2-1/2
		3-1/2	• 54251AH		1	1-1/2	2	2-1/2	3	3-1/2	4	-----	-----
			46601BA	INNER	----	----	----	----	----	----	----	1-1/2	2
				OUTER	----	----	----	----	----	----	----	2-1/2	2-1/2
		4	• 54251AH		1	2	2-1/2	3	3-1/2	4	4	-----	-----
			46601BA	INNER	----	----	----	----	----	----	----	2	2
				OUTER	----	----	----	----	----	----	----	2-1/2	2-1/2
		5	• 54251AH		1-1/2	2	2-1/2	3	3-1/2	4	4	----	-----
			46601BA	INNER	----	----	----	----	----	----	----	2	2
				OUTER	----	----	----	----	----	----	----	2-1/2	2-1/2
		6	• 54251AH		1-1/2	2	2-1/2	3	3-1/2	4	4-1/2	-----	-----
			46601BA	INNER	----	----	----	----	----	----	----	2	2
				OUTER	----	----	----	----	----	----	----	3	3
		8	• 54251AH		1-1/2	2	2-1/2	3-1/2	4	4	5	-----	-----
			46601BA	INNER	----	----	----	----	----	----	----	2-1/2	2-1/2
				OUTER	----	----	----	----	----	----	----	3	3
		10	• 54251AH		1-1/2	2-1/2	3	3-1/2	4	4-1/2	5	----	----
			46601BA	INNER	----	----	----	----	----	----	----	2-1/2	2-1/2
				OUTER	----	----	----	----	----	----	----	3	3
BLOCK	600433 PART I	PIPE OVER 10 IN.; INDUS. TURB. CYLS., ETC.	• 4610288		1-1/2	2-1/2	3	3-1/2	4	4-1/2	5	-----	-----
			46601AA	INNER	----	----	----	----	----	----	----	2-1/2	3
			4610288	OUTER	----	----	----	----	----	----	----	3	3

INSULATION (OTHER THAN PIPE)

INSULATION TYPE	PROCESS SPEC.	MATERIAL	TEMPERATURE °F UP TO 300	301 TO 450	451 TO 600	601 TO 750	751 TO 850	851 TO 950	951 TO 1050	1051 TO 1150	1151 TO 1200
BLANKET	600359 PART I	AS REQ'D. BY PROCESS SPECIFICATION	2	2-1/2	3	----	----	----	----	----	----
	600359 PART IV		----	----	----	3-1/2	2 (INNER) 2 (OUTER)	2 (INNER) 2-1/2 (OUTER)	2-1/2 (INNER) 2-1/2 (OUTER)	2-1/2 (INNER) 3 (OUTER)	3 (INNER) 3 (OUTER)
BLOCK AND PLASTIC	600729	46601AB	2	2	2	2-1/2	3	3-1/2	3-1/2	4	4
		46110BJ	1/2	1	1-1/2	2	2	2	2-1/2	2-1/2	3
BLOCK	600360	4610288	1 IN. THICK								
SPRAYED ASBESTOS	600111	54251AC	1/4 IN. THICK								

600054

UNCONTROLLED COPY
NO AUTOMATIC REPLACEMENT

REF.

ISSUED 10-30-63 | 1
BY— M. DORFMAN

CHANGED 9/5/62 | 8

INSULATION — THICKNESS AND TEMP. RANGE

P H 920.3

BY REFERRING TO THE TABLES BELOW, THE PROPER THICKNESS AND TYPE OF INSULATION MAY BE ORDERED FOR A GIVEN TEMPERATURE CONDITION.

FOR TEMPERATURES OVER 600°F., SPECIFY "DOUBLE LAYER" IN B. M WHEN ORDERING THESE MATERIALS.* FIGURES SHOW TOTAL THICKNESS.

PIPE INSULATION (EXCEPT AS NOTED)

INSULATION TYPE	PROCESS SPEC.	PIPE SIZE	MATERIAL		TEMPERATURE °F UP TO 300	301 TO 450	451 TO 600	601 TO 750	751 TO 850	851 TO 950	951 TO 1050	1051 TO 1150	115 120
MOLDED	600433 PART II	1/2	* 54251AH		1	1	1-1/2	2	2	2-1/2	2-1/2	-----	---
			466018A		-----	-----	-----	-----	-----	-----	-----	3	3
		3/4	* 54251AH		1	1	1-1/2	2	2-1/2	2-1/2	3	-----	---
			466018A		-----	-----	-----	-----	-----	-----	-----	3	3
		1	* 54251AH		1	1-1/2	2	2	2-1/2	2-1/2	3	-----	---
			466018A		-----	-----	-----	-----	-----	-----	-----	3	3
		1-1/4	* 54251AH		1	1-1/2	2	2-1/2	2-1/2	3	3	-----	---
			466018A		-----	-----	-----	-----	-----	-----	-----	3	3
		1-1/2	* 54251AH		1	1-1/2	2	2-1/2	2-1/2	3	3	-----	---
			466018A		-----	-----	-----	-----	-----	-----	-----	3	3
		2	* 54251AH		1	1-1/2	2	2-1/2	3	3	3-1/2	-----	---
			466018A	INNER	-----	-----	-----	-----	-----	-----	-----	1	1-1
				OUTER	-----	-----	-----	-----	-----	-----	-----	2-1/2	2-1
		2-1/2	* 54251AH		1	1-1/2	2	2-1/2	3	3-1/2	3-1/2	-----	---
			466018A	INNER	-----	-----	-----	-----	-----	-----	-----	1	1-1
				OUTER	-----	-----	-----	-----	-----	-----	-----	2-1/2	2-1
		3	* 54251AH		1	1-1/2	2	2-1/2	3	3-1/2	4	-----	---
			466018A	INNER	-----	-----	-----	-----	-----	-----	-----	1-1/2	2
				OUTER	-----	-----	-----	-----	-----	-----	-----	2-1/2	2-1
		3-1/2	* 54251AH		1	1-1/2	2	2-1/2	3	3-1/2	4	-----	---
			466018A	INNER	-----	-----	-----	-----	-----	-----	-----	1-1/2	2
				OUTER	-----	-----	-----	-----	-----	-----	-----	2-1/2	2-1
		4	* 54251AH		1	2	2-1/2	3	3-1/2	4	4	-----	---
			466018A	INNER	-----	-----	-----	-----	-----	-----	-----	2	2
				OUTER	-----	-----	-----	-----	-----	-----	-----	2-1/2	2-1
		5	* 54251AH		1-1/2	2	2-1/2	3	3-1/2	4	4	-----	---
			466018A	INNER	-----	-----	-----	-----	-----	-----	-----	2	2
				OUTER	-----	-----	-----	-----	-----	-----	-----	2-1/2	2-1
		6	* 54251AH		1-1/2	2	2-1/2	3	3-1/2	4	4-1/2	-----	---
			466018A	INNER	-----	-----	-----	-----	-----	-----	-----	2	2
				OUTER	-----	-----	-----	-----	-----	-----	-----	3	3
		8	* 54251AH		1-1/2	2	2-1/2	3-1/2	4	4	5	-----	---
			466018A	INNER	-----	-----	-----	-----	-----	-----	-----	2-1/2	2-1
				OUTER	-----	-----	-----	-----	-----	-----	-----	3	3
		10	* 54251AH		1-1/2	2-1/2	3	3-1/2	4	4-1/2	5	-----	---
			466018A	INNER	-----	-----	-----	-----	-----	-----	-----	2-1/2	2-1
				OUTER	-----	-----	-----	-----	-----	-----	-----	3	3
BLOCK	600433 PART I	PIPE OVER 10 IN.; INDUS. TURB. CYLS., ETC.	* 4610288		1-1/2	2-1/2	3	3-1/2	4	4-1/2	5	-----	---
			46601AA	INNER	-----	-----	-----	-----	-----	-----	-----	2-1/2	3
			4601288	OUTER	-----	-----	-----	-----	-----	-----	-----	3	3

INSULATION (OTHER THAN PIPE)

INSULATION TYPE	PROCESS SPEC.	MATERIAL	TEMPERATURE °F UP TO 300	301 TO 450	451 TO 600	601 TO 750	751 TO 850	851 TO 950	951 TO 1050	1051 TO 1150	115 120
BLANKET	600359 PART I	AS REQ'D. BY PROCESS SPECIFICATION	2	2-1/2	3	-----	-----	-----	-----	-----	---
	600359 PART IV		-----	-----	-----	3-1/2	2 (INNER) 2 (OUTER)	2 (INNER) 2-1/2 (OUTER)	2-1/2 (INNER) 2-1/2 (OUTER)	2-1/2 (INNER) 3 (OUTER)	3 (INN. 3 (OU
BLOCK AND PLASTIC	600729	46601AB	2	2	2	2-1/2	3	3-1/2	3-1/2	4	4
		46110BJ	1/2	1	1-1/2	2	2	2	2-1/2	2-1/2	3
BLOCK	600360	4610288	1 IN. THICK								
SPRAYED ASBESTOS	600111	54251AC	1/4 IN. THICK								

REF.

INSULATION - THICKNESS AND TEMP. RANGE

P H 920.3

BY REFERRING TO THE TABLES BELOW, THE PROPER THICKNESS AND TYPE OF INSULATION MAY BE ORDERED FOR A GIVEN TEMPERATURE CONDITION.

PIPE INSULATION (EXCEPT AS NOTED)

INSULATION TYPE	PROCESS SPEC.	PIPE SIZE	MATERIAL		TEMPERATURE °F UP TO 300	301 TO 450	451 TO 600	601 TO 750	751 TO 850	851 TO 950	951 TO 1050	1051 TO 1150	1151 1200
MOLDED	600433 PART II	1/2	5779		1	1	1-1/2	-----	-----	-----	-----	-----	-----
			7310		-----	-----	-----	2	2	2-1/2	2-1/2	3	3
		3/4	5779		1	1	1-1/2	-----	-----	-----	-----	-----	-----
			7310		-----	-----	-----	2	2-1/2	2-1/2	3	3	3
		1	5779		1	1-1/2	2	-----	-----	-----	-----	-----	-----
			7310		-----	-----	-----	2	2-1/2	2-1/2	3	3	3
		1-1/4	5779		1	1-1/2	2	-----	-----	-----	-----	-----	-----
			7310		-----	-----	-----	2-1/2	2-1/2	2-1/2	3	3	3
		1-1/2	5779		1	1-1/2	2	-----	-----	-----	-----	-----	-----
			7310		-----	-----	-----	2-1/2	2-1/2	3	3	3	3
		2	5779		1	1-1/2	2	-----	-----	-----	-----	-----	-----
			7310	INNER	-----	-----	-----	1	1	1	1	1	1-1/2
				OUTER	-----	-----	-----	1-1/2	2	2	2-1/2	2-1/2	2-1/2
		2-1/2	5779		1	1-1/2	2	-----	-----	-----	-----	-----	-----
			7310	INNER	-----	-----	-----	1	1	1	1	1	1-1/2
				OUTER	-----	-----	-----	1-1/2	2	2-1/2	2-1/2	2-1/2	2-1/2
		3	5779		1	1-1/2	2	-----	-----	-----	-----	-----	-----
			7310	INNER	-----	-----	-----	1	1	1	1-1/2	1-1/2	2
				OUTER	-----	-----	-----	1-1/2	2	2-1/2	2-1/2	2-1/2	2-1/2
		3-1/2	5779		1	1-1/2	2	-----	-----	-----	-----	-----	-----
			7310	INNER	-----	-----	-----	1	1	1	1-1/2	1-1/2	2
				OUTER	-----	-----	-----	1-1/2	2	2-1/2	2-1/2	2-1/2	2-1/2
		4	5779		1	2	2-1/2	-----	-----	-----	-----	-----	-----
			7310	INNER	-----	-----	-----	1	1	1-1/2	1-1/2	2	2
				OUTER	-----	-----	-----	2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2
		5	5779		1-1/2	2	2-1/2	-----	-----	-----	-----	-----	-----
			7310	INNER	-----	-----	-----	1	1	1-1/2	1-1/2	2	2
				OUTER	-----	-----	-----	2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2
		6	5779		1-1/2	2	2-1/2	-----	-----	-----	-----	-----	-----
			7310	INNER	-----	-----	-----	1	1	1-1/2	2	2	2
				OUTER	-----	-----	-----	2	2-1/2	2-1/2	2-1/2	3	3
		8	5779		1-1/2	2	2-1/2	-----	-----	-----	-----	-----	-----
			7310	INNER	-----	-----	-----	1-1/2	1-1/2	1-1/2	2	2-1/2	2-1/2
				OUTER	-----	-----	-----	2	2-1/2	2-1/2	3	3	3
		10	5779		1-1/2	2-1/2	3	-----	-----	-----	-----	-----	-----
			7310	INNER	-----	-----	-----	1-1/2	1-1/2	1-1/2	2	2-1/2	2-1/2
				OUTER	-----	-----	-----	2	2-1/2	3	3	3	3
BLOCK	600433 PART I	PIPE OVER 10 IN.; INDUS. TURB. CYLS., ETC	7308		1-1/2	2-1/2	3	-----	-----	-----	-----	-----	-----
			7309-1	INNER	-----	-----	-----	1-1/2	1-1/2	1-1/2	2	2-1/2	3
			7308	OUTER	-----	-----	-----	2	2-1/2	3	3	3	3

INSULATION (OTHER THAN PIPE)

INSULATION TYPE	PROCESS SPEC.	MATERIAL	TEMPERATURE °F UP TO 300	301 TO 450	451 TO 600	601 TO 750	751 TO 850	851 TO 950	951 TO 1050	1051 TO 1150	1151 TO 1200
BLANKET	600359 PART I	AS REQ'D. BY PROCESS SPECIFICATION	2	2-1/2	3	-----	-----	-----	-----	-----	-----
	600359 PART II		-----	-----	-----	3-1/2	-----	-----	-----	-----	-----
	600359 PART III		-----	-----	-----	-----	4	-----	-----	-----	-----
	600359 PART IV		-----	-----	-----	-----	-----	4-1/2	2-1/2 (INNER) 2-1/2 (OUTER)	2-1/2 (INNER) 3 (OUTER)	3 (INNER) 3 (OUTER)
BLOCK AND PLASTIC	600729	7309-2	2	2	2	2-1/2	3	3-1/2	3-1/2	4	4
		8407	1/2	1	1-1/2	2	2	2	2-1/2	2-1/2	3
ASBESTOS FELT AND SHEET	600360	7784 7781	1 IN. THICK								
SPRAYED ASBESTOS	600111	4057-3	1/4 IN. THICK								

600092

INSULATION - THICKNESS & SPECS.

P H 920.

LISTED FOLLOWING ARE THICKNESS AND MATERIAL SPECS. REQUIRED FOR VARIOUS TEMPERATURE CONDITIONS AND SHOULD BE FOLLOWED UNLESS SPECIFIC CONTRACT REQUIREMENTS MAKE DEVIATION NECESSARY. IN WHICH CASE THE "O" SPEC. WILL SPECIFY REQUIREMENTS IN DETAIL.

TABLE "Y"

INSULATION TYPE	PROCESS SPEC.	PIPE SIZE	MTL.		TEMPERATURE CONDITION (°F) UP TO 350	351 TO 500	501 TO 650	651 TO 825	826 TO 950	951 TO 1000	1001 TO 1200
MOLDED	600433 PART II	1/2	5779		1 in.	1 1/2	—	—	—	—	—
			7310		—	—	2	2	2 1/2	2 1/2	2 1/2
		3/4	5779		1 in.	1 1/2	—	—	—	—	—
			7310		—	—	2	2	2 1/2	2 1/2	2 1/2
		1	5779		1 in.	1 1/2	—	—	—	—	—
			7310		—	—	2	2	2 1/2	2 1/2	2 1/2
		1 1/4	5779		1 in.	1 1/2	—	—	—	—	—
			7310		—	—	2	2	2 1/2	2 1/2	2 1/2
		1 1/2	5779		1 in.	1 1/2	—	—	—	—	—
			7310		—	—	2	2	2 1/2	2 1/2	2 1/2
		2	5779		1 in.	2	—	—	—	—	—
			7310	INNER	—	—	1	1	1 1/2	1 1/2	2
				OUTER	—	—	2	2 1/2	2 1/2	2 1/2	2 1/2
		2 1/2	5779		1 in.	2	—	—	—	—	—
			7310	INNER	—	—	1	1	1 1/2	1 1/2	2
				OUTER	—	—	2	2 1/2	2 1/2	2 1/2	2 1/2
		3	5779		1 in.	2	—	—	—	—	—
			7310	INNER	—	—	1 1/2	1 1/2	2	2	2
				OUTER	—	—	2	2 1/2	2 1/2	2 1/2	2 1/2
		3 1/2	5779		1 in.	2	—	—	—	—	—
			7310	INNER	—	—	1 1/2	1 1/2	2	2	2
				OUTER	—	—	2	2 1/2	2 1/2	2 1/2	2 1/2
		4	5779		1 1/2	2 1/2	—	—	—	—	—
			7310	INNER	—	—	1 1/2	1 1/2	2	2	2 1/2
				OUTER	—	—	2	2 1/2	2 1/2	2 1/2	2 1/2
		5	5779		1 1/2	2 1/2	—	—	—	—	—
			7310	INNER	—	—	1 1/2	2	2	2 1/2	3
				OUTER	—	—	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
		6	5779		1 1/2	2 1/2	—	—	—	—	—
			7310	INNER	—	—	1 1/2	2	2	2 1/2	3
				OUTER	—	—	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
		8	5779		2	3	—	—	—	—	—
			7310	INNER	—	—	1 1/2	2	2	2 1/2	3
				OUTER	—	—	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
		10	5779		2	3	—	—	—	—	—
			7310	INNER	—	—	1 1/2	2	2	2 1/2	3
				OUTER	—	—	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
BLOCK	600433 PART I	PIPES OVER 10 in. AND IND TURB CYLS. ETC.	7308		2 1/2	3	—	—	—	—	—
			7309-1 INNER		—	—	1 1/2	2	2 1/2	3	3 1/2
			7308 OUTER		—	—	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
BLANKET	600369 PART I	INDUSTRIAL TURBINE HORIZONTAL JOINT FLANGES ETC.	AS REQUIRED BY PROCESS		2 1/2	3	—	—	—	—	—
	600369 PART II				—	—	4	4 1/2	—	—	—
	600369 PART III				—	—	—	—	5	—	—
PLASTIC	600362	STM. CHESTS & VLV. BODIES	8407		2	3	4	5 1/2	6	6 1/2	7
BLOCK AND PLASTIC	600729	CENT. STA. TURB PARTS, VALVE BONNET AND PIPE FLANGES	7309-2		2	2	2	2	2	3	3
			8407		1/2	1	2	3 1/2	4	4 1/2	5
ASBESTOS FELT AND SHEET	600360	UNDER SIDE OF LAGGING	7789 7791		1 in. THICK REQUIRED FOR UNDERSIDE OF LAGGING WHEN INITIAL TEMP. IS OVER 775° F						

600014

INSULATION – ORDERING INFORMATION

ISSUED 10/30/53 90 F 1
BY- M. DORFMAN

EXAMPLES FOR ORDERING PIPE*, BLOCK AND BLANKET INSULATION

ITEM		MTL.	REQ.
1	MOLDED INSULATION 2.500 PIPE 2.00 THK. - PROC. 600433 PT. II	54251AH	1 SET
2	MOLDED INSULATION (DOUBLE LAYER) 2.500 PIPE 3.00 THK. - PROC. 600433 PART II	54251AH	1 SET
3	MOLDED INSULATION 2.500 PIPE INNER 1.50 THK. OUTER 1.50 THK. PROC. 600433 PART II	46601BA	1 SET
4	BLOCK INSULATION 2.50 THK. - INNER - PROC. 600433 PART I	46601AA	1 SET
5	BLOCK INSULATION 3.00 THK. - OUTER - PROC. 600433 PART I	46102BB	1 SET
6	BLANKET INSULATION 3.50 THK. PROC. 600357 PART IV	-------	1 SET
7 **	PIPE SHEATHING INSULATION PROC. 600790	-------	1 SET

* FOR CROSS-OVER PIPES AND PIPES OVER 20.000 SEE PAGE PH 920.5.
** FOR CROSS-UNDER OR OTHER PIPING INTERNAL TO TURBINE EXHAUST OR CONDENSER INLET.

EXAMPLES FOR ORDERING BLOCK AND PLASTIC INSULATION

ITEM	DESCRIPTION --	MTL.	REQ.
1	BLOCK INSULATION 3.00 THK. PLASTIC INSULATION 2.00 THK. - PROC. 600729	-------	1 SET
2	EXPANDED METAL 48.000 x 96.000 x .070 THK. - PROC. 600729	10144AB	4 SHEETS

EXAMPLE FOR ORDERING SPRAYED ASBESTOS INSULATION

ITEM	DESCRIPTION --	MTL.	REQ.
1	SPRAYED ASBESTOS INSULATION 3.00 THK. - PROC. 600916	54251AQ	950 SQ. FT.

EXAMPLES FOR ORDERING ENCLOSURE, GAUGE BOARD AND GLAND WATER SUPPLY PIPING INSULATION

ITEM	DESCRIPTION --	MTL.	REQ.
1	SPRAYED INSULATION COMPOUND - PROC. 600111	54251AC	110 GAL.
2	SPRAYED INSULATION COMPOUND PRIMER - PROC. 600111	32230DT	2 GAL.
3	GAUGE BOARD INSULATION 1.00 THK. - PROC. 600360	-------	1 SET
4	INSUL. PAINT - PIPE 1.500 x 100 FT. LG. - FINISH SPEC. 315-F	53314TG	1 PINT
5	CORK INSUL. - PIPE 1.500 x 100 FT. LG. - FINISH SPEC. 315-F	22302ED	4-1 24

GENERAL ORDERING INFORMATION:-

1. WHEN ORDERING BLOCK INSULATION FOR PIPE GIVE PIPE SIZE IN B/M.
2. MATERIAL 54251AC SPRAYED INSULATION:- ONE GALLON COVERS 4.50 SQUARE FEET .25 THICK.
3. MATERIAL 32230DT SPRAYED INSULATION PRIMER:- ONE GALLON COVERS 300 SQUARE FEET.
4. MATERIAL 53314TG BLACK ADHESIVE PAINT:- ONE QUART COVERS 100 SQUARE FEET.
5. MATERIAL 22302ED GRANULATED CORK:- ONE LB. COVERS 10 SQUARE FEET .12 THICK.
6. EVEN THOUGH AMOUNT OF INSULATION MATERIAL IS NOT SHOWN IN B/M FOR SOME ITEMS, THE LENGTH AND APPROXIMATE AREA TO BE COVERED SHOULD BE SHOWN ON DETAIL DRAWING AS NOTED ON PAGE PH 920.2 GENERAL INFORMATION.

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WESTINGHOUSE ELECTRIC CORPORATION, LESTER, PA., U.S.A.
STEAM DIVISIONS — STANDARDS ENGRG.
790 OF 1

EXAMPLES FOR ORDERING PIPE *, BLOCK AND BLANKET INSULATION

ITEM	DESCRIPTION --	MTL.	REQ.
1	MOLDED INSULATION 2-1/2 PIPE 2 IN. THK. PROC. 600433 PT. II	54251AK	1 SET
2	MOLDED INSULATION (DOUBLE LAYER) 2-1/2 PIPE 3 IN. THK. PROC. 600433 PART II	54251AM	1 SET
3	MOLDED INSULATION 2-1/2 PIPE INNER 1-1/2 THK. OUTER 1-1/2 THK. PROC. 600433 PART II	466018A	1 SET
4	BLOCK INSULATION 2-1/2 IN. THK. - INNER - PROC. 600433 PART I	46601AA	1 SET
5	BLOCK INSULATION 3 IN. THK. - OUTER - PROC. 600433 PART I	4610288	1 SET
6	BLANKET INSULATION 3-1/2 IN. THK. PROC. 600359 PART IV	——	1 SET
7 **	PIPE SHEATHING INSULATION PROC. 600790	——	1 SET

* FOR CROSS-OVER PIPES AND PIPES OVER 20 IN. SEE PAGE PH 920.5
** FOR CROSS-UNDER OR OTHER PIPING INTERNAL TO TURBINE EXHAUST OR CONDENSER INLET.

EXAMPLES FOR ORDERING BLOCK & PLASTIC INSULATION

ITEM	DESCRIPTION --	MTL.	REQ.
1	BLOCK INSULATION 3 IN. THK. PLASTIC INSULATION 2 IN. THK. PROC. 600729	——	1 SET
2	EXPANDED METAL 48 x 96 x .070 THK. PROC. 600729	2353-2	4 SHEETS

EXAMPLES FOR ORDERING LAGGING, GAUGE BOARD, AND GLAND WATER SUPPLY PIPING INSULATION

ITEM	DESCRIPTION --	MTL.	REQ.
1	SPRAYED INSULATION PROC. 600111	54251AC	110 GAL.
2	SPRAYED INSULATION PRIMER PROC. 600111	6449	2 GAL.
3	GAUGE BOARD INSULATION 1 IN. THK. PROC. 600360	——	1 SET
4	INSUL. PAINT - PIPE 1-1/2 X 100 FT. LG. FINISH SPEC. 315-F	53314TG	1 PINT
5	CORK INSUL. - PIPE 1-1/2 X 100 FT. LG. FINISH SPEC. 315-F	22302ED	4-1/2#

GENERAL ORDERING INFORMATION:-

1. WHEN ORDERING BLOCK INSULATION FOR PIPE GIVE PIPE SIZE IN B/M.
2. FOR SHEET METAL COVERS FOR STANDARD PIPE FLANGES SEE PAGE PH 777.1. FOR PRESSURES AND SIZES NOT COVERED BY STANDARD COVERS, USE COVERS AS SHOWN ON PROC. SPEC. 600729.
3. MATERIAL 54251AC SPRAYED INSULATION - ONE GALLON COVERS 4.5 SQUARE FEET 1/4 THICK.
4. MATERIAL 6449 SPRAYED INSULATION PRIMER - ONE GALLON COVERS 300 SQUARE FEET.
5. MATERIAL 53314TG BLACK ADHESIVE PAINT - ONE QUART COVERS 100 SQUARE FEET.
6. MATERIAL 22302ED GRANULATED CORK - ONE LB. COVERS 10 SQUARE FEET 1/8 THICK.
7. EVEN THOUGH AMOUNT OF INSULATION MATERIAL IS NOT SHOWN IN B/M FOR SOME ITEMS, THE LENGTH AND APPROXIMATE AREA TO BE COVERED SHOULD BE SHOWN ON DETAIL DRAWING AS NOTED ON PAGE PH 920.2 GENERAL INFORMATION.

600055

INSULATION — ORDERING INFORMATION

ISSL 1 10-3C
BY- M. DORFM

CHANGE
8 9/5/

EXAMPLES FOR ORDERING PIPE *, BLOCK AND BLANKET INSULATION

ITEM	NAME	MTL.	REQ.
1	MOLDED INSULATION 2-1/2 PIPE 2 IN. THK. PROC. 600433 PT. II	54251AH	1 SET
2	MOLDED INSULATION (DOUBLE LAYER) 2-1/2 PIPE 3 IN. THK. PROC. 600433 PART II	54251AH	1 SET
3	MOLDED INSULATION 2-1/2 PIPE INNER 1-1/2 THK. OUTER 1-1/2 THK. PROC. 600433 PART II	46601BA	1 SET
4	BLOCK INSULATION 2-1/2 IN. THK. - INNER - PROC. 600433 PART I	46601AA	1 SET
5	BLOCK INSULATION 3 IN. THK. - OUTER - PROC. 600433 PART I	4610288	1 SET
6	BLANKET INSULATION 3-1/2 IN. THK. PROC. 600359 PART IV	------	1 SET
7 **	PIPE SHEATHING INSULATION PROC. 600790	------	1 SET

* FOR CROSS-OVER PIPES AND PIPES OVER 20 IN. SEE PAGE PH 920.5
** FOR CROSS-UNDER OR OTHER PIPING INTERNAL TO TURBINE EXHAUST OR CONDENSER INLET.

EXAMPLES FOR ORDERING BLOCK & PLASTIC INSULATION

ITEM	NAME	MTL.	REQ.
1	BLOCK INSULATION 3 IN. THK. PLASTIC INSULATION 2 IN. THK. PROC. 600729	------	1 SET
2	EXPANDED METAL 48 x 96 x .070 THK. PROC. 600729	2353-2	4 SHEETS

EXAMPLES FOR ORDERING LAGGING, GAUGE BOARD, AND GLAND WATER SUPPLY PIPING INSULATION

ITEM	NAME	MTL.	REQ.
1	SPRAYED INSULATION PROC. 600111	54251AC	110 GAL.
2	SPRAYED INSULATION PRIMER PROC. 600111	6449	2 GAL.
3	GAUGE BOARD INSULATION 1 IN. THK. PROC. 600360	------	1 SET
4	INSUL. PAINT - PIPE 1-1/2 X 100 FT. LG. FINISH SPEC. 315-F	9327-1	1 PINT
5	CORK INSUL. - PIPE 1-1/2 X 100 FT. LG. FINISH SPEC. 315-F	6329-4	4-1/2#

GENERAL ORDERING INFORMATION:-

1. WHEN ORDERING BLOCK INSULATION FOR PIPE GIVE PIPE SIZE IN B/M.
2. FOR SHEET METAL COVERS FOR STANDARD PIPE FLANGES SEE PAGE PH 777.1. FOR PRESSURES AND SIZES NOT COVERED BY STANDARD COVERS, USE COVERS AS SHOWN ON PROC. SPEC. 600729.
3. MATERIAL 54251AC SPRAYED INSULATION :- ONE GALLON COVERS 4.5 SQUARE FEET 1/4 THICK.
4. MATERIAL 6449 SPRAYED INSULATION PRIMER:- ONE GALLON COVERS 300 SQUARE FEET.
5. MATERIAL 9327-1 BLACK ADHESIVE PAINT:- ONE QUART COVERS 100 SQUARE FEET.
6. MATERIAL 6329-4 GRANULATED CORK:- ONE LB. COVERS 10 SQUARE FEET 1/8 THICK.
7. EVEN THOUGH AMOUNT OF INSULATION MATERIAL IS NOT SHOWN IN B/M FOR SOME ITEMS, THE LENGTH AND APPROXIMATE AREA TO BE COVERED SHOULD BE SHOWN ON DETAIL DRAWING AS NOTED ON PAGE PH 920.2 GENERAL INFORMATION.

600026

REF.

WESTINGHOUSE ELECTRIC CORPORATION, LESTER, PA., U.S.A.

EXAMPLES FOR ORDERING FI... *, BLOCK AND BLANKET INSULATION

ITEM	NAME	MTL.	REQ.
1	MOLDED INSULATION 2-1/2 PIPE 2 IN. THK. PROC. 600433 PART II	5779	1 SET
2	MOLDED INSULATION 2-1/2 PIPE INNER 1-1/4 THK. OUTER 1-1/2 THK. PROC. 600433 PART II	7310	1 SET
3	BLOCK INSULATION 2 IN. THK. - INNER - PROC. 600433 PART I	7309-1	1 SET
4	BLOCK INSULATION 2-1/2 THK. - OUTER - PROC 600433 PART I	7308	1 SET
5	BLANKET INSULATION 4 IN. THK. PROC. 600355 PART II	------	1 SET
6 **	PIPE SHEATHING INSULATION PROC. 600790	------	1 SET

* FOR CROSS-OVER PIPES AND PIPES OVER 20 IN. SEE PAGE PH 920.5
** FOR CROSS-UNDER OR OTHER PIPING INTERNAL TO TURBINE EXHAUST OR CONDENSER INLET.

EXAMPLES FOR ORDERING BLOCK & PLASTIC INSULATION

ITEM	NAME	MTL.	REQ.
1	BLOCK INSULATION 2 IN. THK. PLASTIC INSULATION 3 IN. THK. PROC. 600729	------	1 SET
2	EXPANDED METAL 48 x 96 x .070 THK. PROC. 600729	2353-2	4 SHEETS

EXAMPLES FOR ORDERING LAGGING, GAUGE BOARD, AND GLAND WATER SUPPLY PIPING INSULATION

ITEM	NAME	MTL.	REQ.
1	SPRAYED INSULATION PROC. 600111	4057-3	110 GAL.
2	SPRAYED INSULATION PRIMER PROC. 600111	6449	2 GAL.
3	GAUGE BOARD INSULATION 1 IN. THK. 600360	-----	1 SET
4	INSUL. PAINT - PIPE 1-1/2 X 100 FT. LG. FINISH SPEC. 315-F	9327-1	1 PINT
5	CORK INSUL. - PIPE 1-1/2 X 100 FT. LG. FINISH SPEC. 315-F	6329-4	4-1/2 e...

GENERAL ORDERING INFORMATION:-

1. WHEN ORDERING BLOCK INSULATION FOR PIPE GIVE PIPE SIZE IN B/M.
2. FOR SHEET METAL COVERS FOR STANDARD PIPE FLANGES SEE PAGE PH 777.1. FOR PRESSURES AND SIZES NOT COVERED BY STANDARD COVERS, USE COVERS AS SHOWN ON PROC. SPEC. 600729.
3. MATERIAL 4057-3 SPRAYED INSULATION CEMENT:- ONE GALLON COVERS 4 5 SQUARE FEET 1/4 THICK.
4. MATERIAL 6449 SPRAYED INSULATION PRIMER:- ONE GALLON COVERS 300 SQUARE FEET.
5. MATERIAL 9327-1 BLACK ADHESIVE PAINT:- ONE QUART COVERS 100 SQUARE FEET.
6. MATERIAL 6329-4 GRANULATED CORK:- ONE LB. COVERS 10 SQUARE FEET 1/8 THICK.
7. EVEN THOUGH AMOUNT OF INSULATION MATERIAL IS NOT SHOWN IN B/M FOR SOME ITEMS, THE LENGTH AND APPROXIMATE AREA TO BE COVERED SHOULD BE SHOWN ON DETAIL DRAWING AS NOTED ON PAGE PH 920.2 GENERAL INFORMATION.

600093

INSULATION ORDERING INFORMATION

MOLDED PIPE INSULATION FOR CANVAS

ITEM	NAME	MTL.	REQ.
1	MOLDED INSULATION 2-1/2 PIPE (2 IN. THK.) S.P. PROC. [illegible] PART II	[illegible]	1 SET

MOLDED PIPE INSULATION FOR [illegible]

ITEM	NAME	MTL.	REQ.
1	MOLDED INSULATION 2-1/2 PIPE [illegible] COVER 1-1/2 THK.	[illegible]	[illegible]

FOR CLASS B STEAM DRAIN AND GLAND PIPING REQUIRED QUANTITY OF INSULATION MUST BE SPECIFIED ON DRAWING.
FOR SHEET METAL COVERS FOR STD. PIPE FLGS., REFER TO PH 777.1.
FOR HIGHER PRESS. AND LARGER SIZES, USE 600779 COVERS.

WHEN ORDERING BLOCK INSULATION FOR PIPES, GIVE PIPE SIZE IN B/M.

FOR SHEET METAL COVERS FOR STD. PIPE FLGS., REFER TO PH 777.1. FOR HIGHER PRESS. AND LARGER SIZES, USE 600779 COVERS.

BLOCK INSULATION ONE LAYER

ITEM	NAME	MTL.	REQ.
1	BLOCK INSULATION 2-1/2 IN. THICK S.P. [illegible]	[illegible]	1 SET

BLOCK INSULATION TWO LAYERS

ITEM	NAME	MTL.	REQ.
1	BLOCK INSULATION INNER 2 IN. THK. S.P. [illegible]	7309-1	1 SET
2	BLOCK INSULATION OUTER 2 IN. THK. S.P. [illegible]	7311	1 SET

FOR CROSSOVER PIPES AND PIPES OVER 10 IN. IF CANVAS OTHER THAN 6 OZ. IS REQUIRED, REFER IS B/M OR COVER BY A NOTE ON DRAWING. 7311 ASBESTOS CEMENT IS USED TO SMOOTH OUT JOINTS AND PROVIDE FOR 1/2 IN. FINAL THICK. 100 LBS. OF 7311 COVERS 50 SQ FT 1/2 IN. THICK.

FOR SHEET METAL COVERS FOR STD. PIPE FLGS., REFER TO PH 777.1.

BLANKET INSULATION
FOR TEMPERATURE TO AND INCLUDING 500°F

ITEM	NAME	MTL.	REQ.
1	BLANKET INSULATION 2-1/2 THK. S.P. PROC. 600359 PART I	-	1 SET

FOR TEMPERATURE OVER 500°F TO 825°F INC.

ITEM	NAME	MTL.	REQ.
1	BLANKET INSULATION 4 THK. S.P. PROC. 600359 PART II	-	1 SET

FOR TEMPERATURE OVER 825°F TO 950°F INC.

ITEM	NAME	MTL.	REQ.
1	BLANKET INSULATION 5 THK. S.P. PROC. 600359 PART III	-	1 SET

WHEN METAL COVERS FOR STD. PIPE FLGS. ARE REQUIRED, REFER TO PH 777.1.
FOR HIGHER PRESS. AND LARGER SIZES, USE 600779 COVERS.

PLASTIC INSULATION

ITEM	NAME	MTL.	REQ.
1	PLASTIC INSULATION 5 THK. S.P. PROCESS 600360	-	1 SET

125# (INCLUDES 25% WASTAGE) OF 6407-1 WILL COVER 50 SQ FT 1 IN. THK.

BLOCK AND PLASTIC INSULATION

ITEM	NAME	MTL.	REQ.
1	BLOCK INSULATION 2" THICK) PLASTIC INSULATION 3" THICK) S.P. PROCESS 600729	-	1-SET
* 2	EXPANDED METAL 48 X 96 X .070 THK.	7353-2	SHEETS

* ORDER WHEN REQUIRED.

SHEETING INSULATION FOR TEMPERATURE OVER [illegible]°F

ITEM	NAME	MTL.	REQ.
1	JACKET INSULATION 1 INCH THK. S.P. PROC. 600360	-	1 SET

GLAND WATER SUPPLY PIPING INSULATION

ITEM	NAME	MTL.	REQ.
1	PIPE 1-1/2 X 100 FT.LG. FINISH SPEC. 315-P	7327-1 6329-4	1 PINT 6-1/2

6329-4 GRANULATED CORK:- ONE LB. COVERS 10 SQ FT 1/8 THICK (REQ. TES.)

9327-1 BLACK ADHESIVE PAINT:- ONE QUART COVERS 100 SQ. FT.

600015

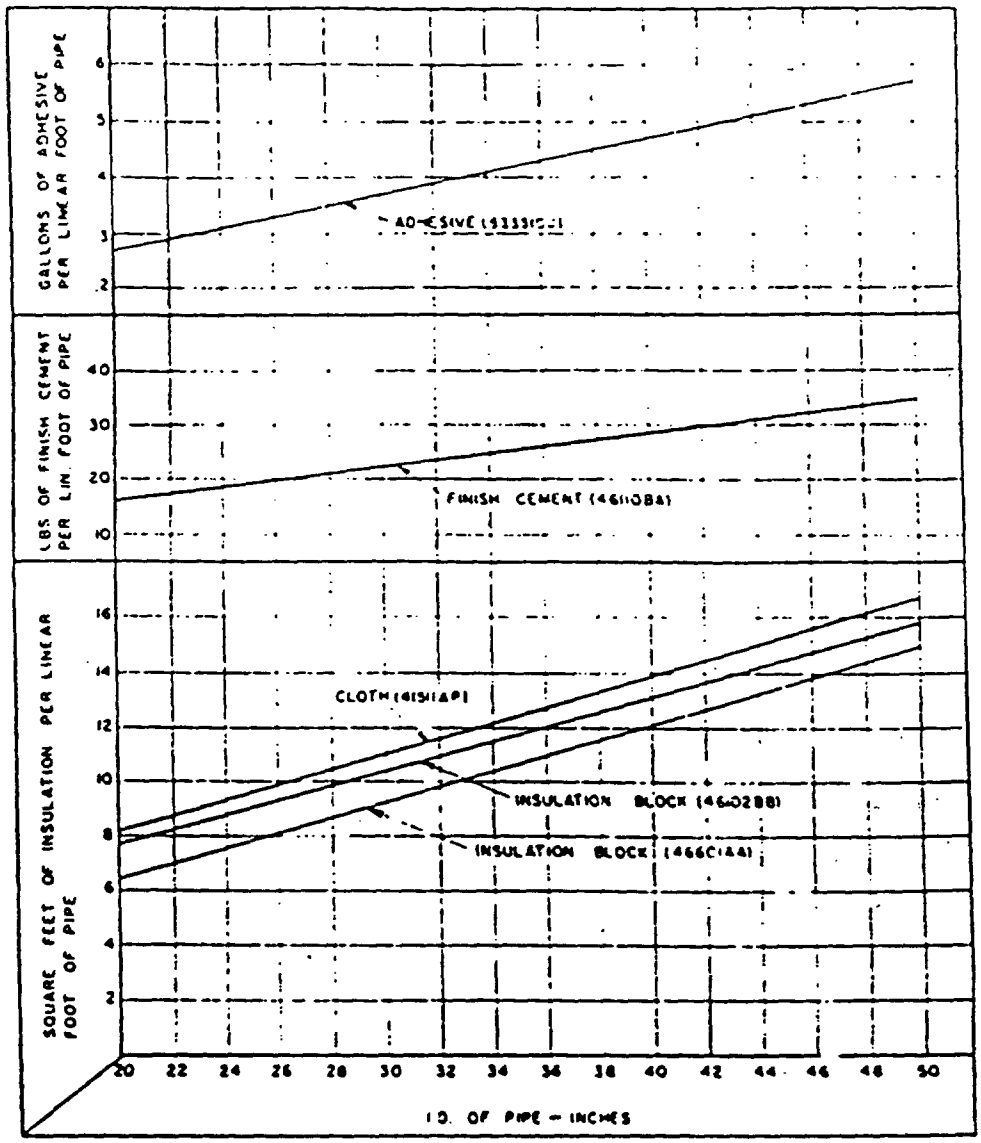
INSULATION - ORDERING INFORMATION FOR LARGE PIPES

PH 920.5

THE CURVES SHOWN BELOW SHOULD BE USED TO DETERMINE THE QUANTITY OF INSULATION MATERIALS TO BE ORDERED ON CROSS-OVER OR OTHER LARGE INSULATED PIPES.

THE AMOUNTS SHOWN INCLUDE AN ADDITIONAL 10 PER CENT FOR WASTAGE, IRREGULAR SHAPES AND FLANGES.

TO ORDER INSULATION MATERIALS DETERMINE TOTAL DEVELOPED LENGTH OF PIPE. FROM CHART BELOW, OVER PROPER PIPE DIAMETER, OBTAIN MATERIAL COVERAGE FIGURE FOR ONE LINEAR FOOT OF PIPE. MULTIPLY THIS FIGURE BY THE LENGTH OF PIPE PREVIOUSLY OBTAINED TO GET TOTAL AREA OF COVERAGE. (SEE EXAMPLE BELOW)



EXAMPLE OF INSULATION MATERIAL ORDERING FOR 30 IN. I.D. PIPE BY 57 FT. DEVELOPED LENGTH AT 700°F. TEMP *

ITEM	NAME	MTL.	REQ.
1	BLOCK INSULATION (DOUBLE LAYER) 3-1/2 TOTAL THK. P.S. 600433 PT. 1	46102BB	740 SQ. FT.
2	ASBESTOS CLOTH	41511AP	770 SQ. FT.
3	INSULATION CEMENT	46110BA	1600 LBS.
4	ADHESIVE	53351DU	26 GAL.

IF SPRAYED ASBESTOS INSULATION IS USED ON CROSS-OVER PIPE ORDER AS SHOWN BELOW.

1	SPRAYED ASBESTOS INSUL. 3-1/2 THK. P.S. 600916	54251AJ	740 SQ. FT.

* NOTE: FOR TEMPERATURE, MATERIALS, THICKNESSES AND NUMBER OF LAYERS SEE PH 920.3; FOR CLASSES, APPLICATION AND ADDITIONAL PIPE INSULATION ORDERING INFO. SEE PH 920.1, 920.2 AND 920.4.

600007

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ISSUED	
1/30/59	1

INSULATION - ORDERING INFORMATION FOR LARGE PIPES

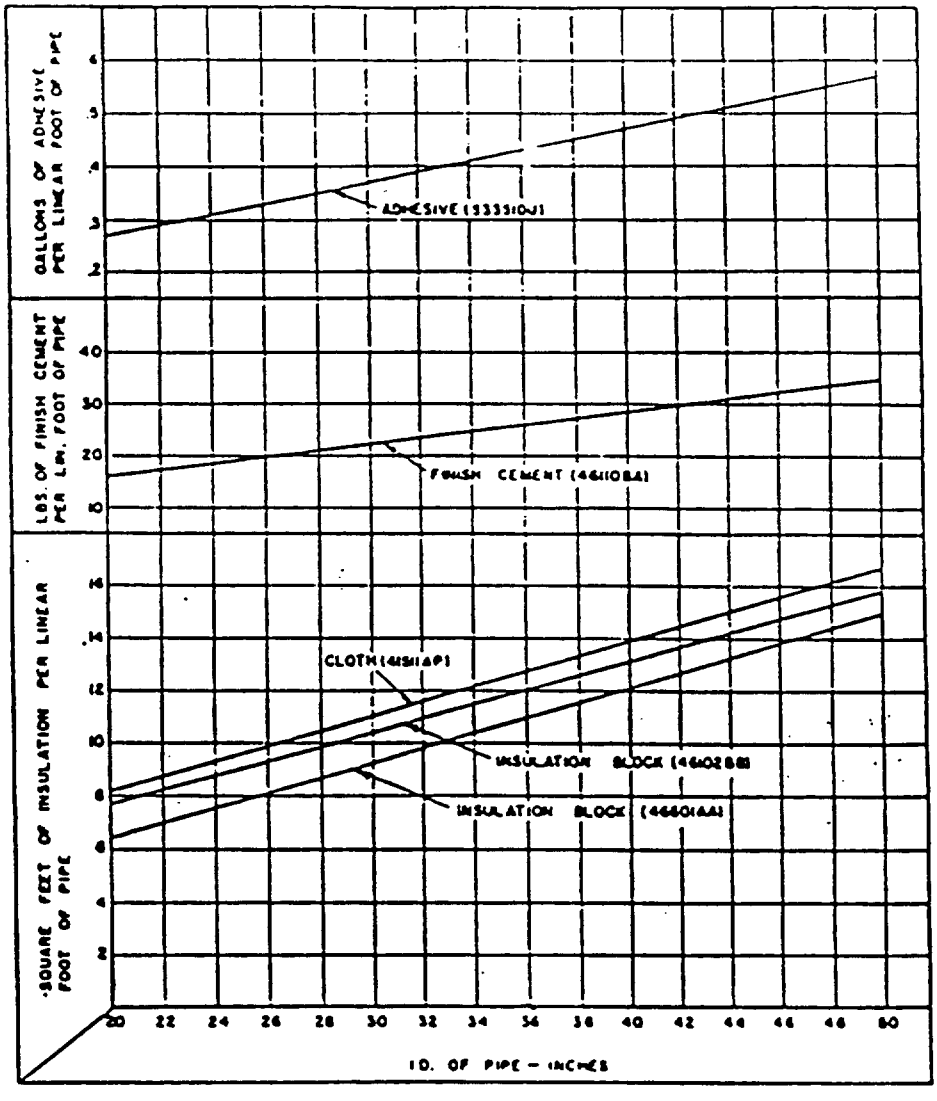
PH 920.5

THE CURVES SHOWN BELOW SHOULD BE USED TO DETERMINE THE QUANTITY OF INSULATION MATERIALS TO BE ORDERED ON CROSS-OVER OR OTHER LARGE INSULATED PIPES.

THE AMOUNTS SHOWN INCLUDE AN ADDITIONAL 10 PER CENT FOR WASTAGE, IRREGULAR SHAPES AND FLANGES.

TO ORDER INSULATION MATERIALS DETERMINE TOTAL DEVELOPED LENGTH OF PIPE. FROM CHART BELOW, OVER PROPER PIPE DIAMETER, OBTAIN MATERIAL COVERAGE FIGURE FOR ONE LINEAR FOOT OF PIPE. MULTIPLY THIS FIGURE BY THE LENGTH OF PIPE PREVIOUSLY OBTAINED TO GET TOTAL AREA OF COVERAGE. (SEE EXAMPLE BELOW)

CHANGED	
7/20/60	2
12/28/61	3
9/5/62	4



EXAMPLE OF INSULATION MATERIAL ORDERING FOR 39 IN. I.D. PIPE BY 57 FT. DEVELOPED LENGTH AT 700°F. TEMP. *

ITEM	NAME	MTL.	REQ.
1	BLOCK INSULATION (DOUBLE LAYER) 3-1/2 TOTAL THK. P.S. 600433 PT. 1	4610288	740 SQ. FT.
2	ASBESTOS CLOTH	41511AP	770 SQ. FT.
3	INSULATION CEMENT	4611088	1600 LBS.
4	ADHESIVE	533510U	26 GAL.

* NOTE: FOR TEMPERATURE, MATERIALS AND THICKNESSES, AND NUMBER OF LAYERS SEE PAGE PH 920.3; FOR CLASSES, APPLICATION AND ADDITIONAL PIPE INSULATION ORDERING INFORMATION SEE PAGES PH 920.1, 920.2 AND 920.4.

600056

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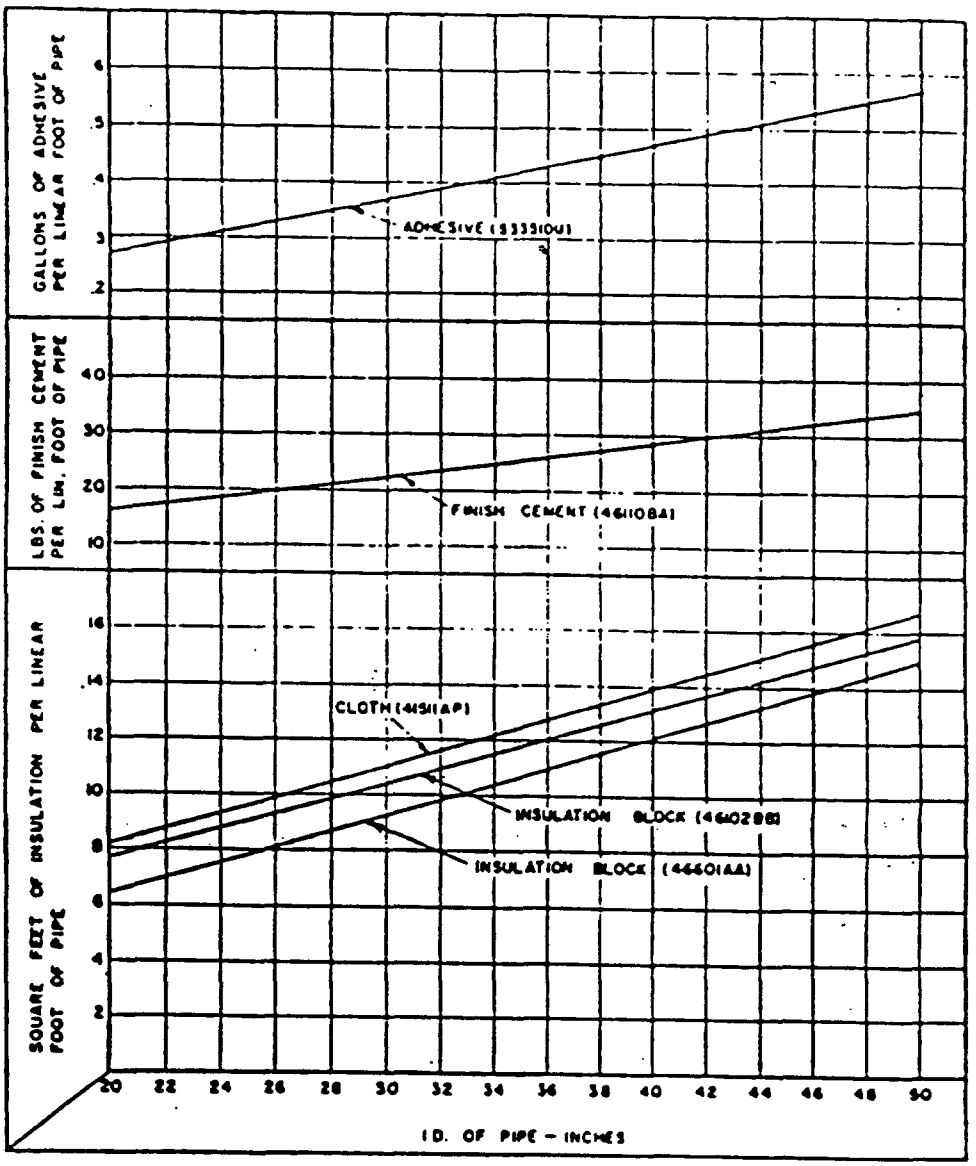
REF.

INSULATION - ORDERING INFORMATION FOR LARGE PIPES

THE CURVES SHOWN BELOW SHOULD BE USED TO DETERMINE THE QUANTITY OF INSULATION MATERIALS TO BE ORDERED ON CROSS-OVER OR OTHER LARGE INSULATED PIPES.

THE AMOUNTS SHOWN INCLUDE AN ADDITIONAL 10 PER CENT FOR WASTAGE, IRREGULAR SHAPES AND FLANGES.

TO ORDER INSULATION MATERIALS DETERMINE TOTAL DEVELOPED LENGTH OF PIPE. FROM CHART BELOW, OVER PROPER PIPE DIAMETER, OBTAIN MATERIAL COVERAGE FIGURE FOR ONE LINEAR FOOT OF PIPE. MULTIPLY THIS FIGURE BY THE LENGTH OF PIPE PREVIOUSLY OBTAINED TO GET TOTAL AREA OF COVERAGE. (SEE EXAMPLE BELOW)



EXAMPLE OF INSULATION MATERIAL ORDERING FOR 39 IN. I.D. PIPE BY 57 FT. DEVELOPED LENGTH AT 700°F. TEMP. *

ITEM	NAME	MTL.	REQ.
1	BLOCK INSULATION (DOUBLE LAYER) 3-1/2 TOTAL THK. P. S. 600433 PT. 1	4610288	740 SQ. FT.
2	ASBESTOS CLOTH	41511AP	770 SQ. FT.
3	INSULATION CEMENT	46110BA	1600 LBS.
4	ADHESIVE	533510U	26 GAL.

* NOTE: FOR TEMPERATURE, MATERIALS AND THICKNESSES, AND NUMBER OF LAYERS SEE PAGE PH 920.3; FOR CLASSES, APPLICATION AND ADDITIONAL PIPE INSULATION ORDERING INFORMATION SEE PAGES PH 920.1, 920.2 AND 920.4.

600090

CHANGED

7/[illegible]/60	2
12/[illegible]/61	3
9/5/62	4

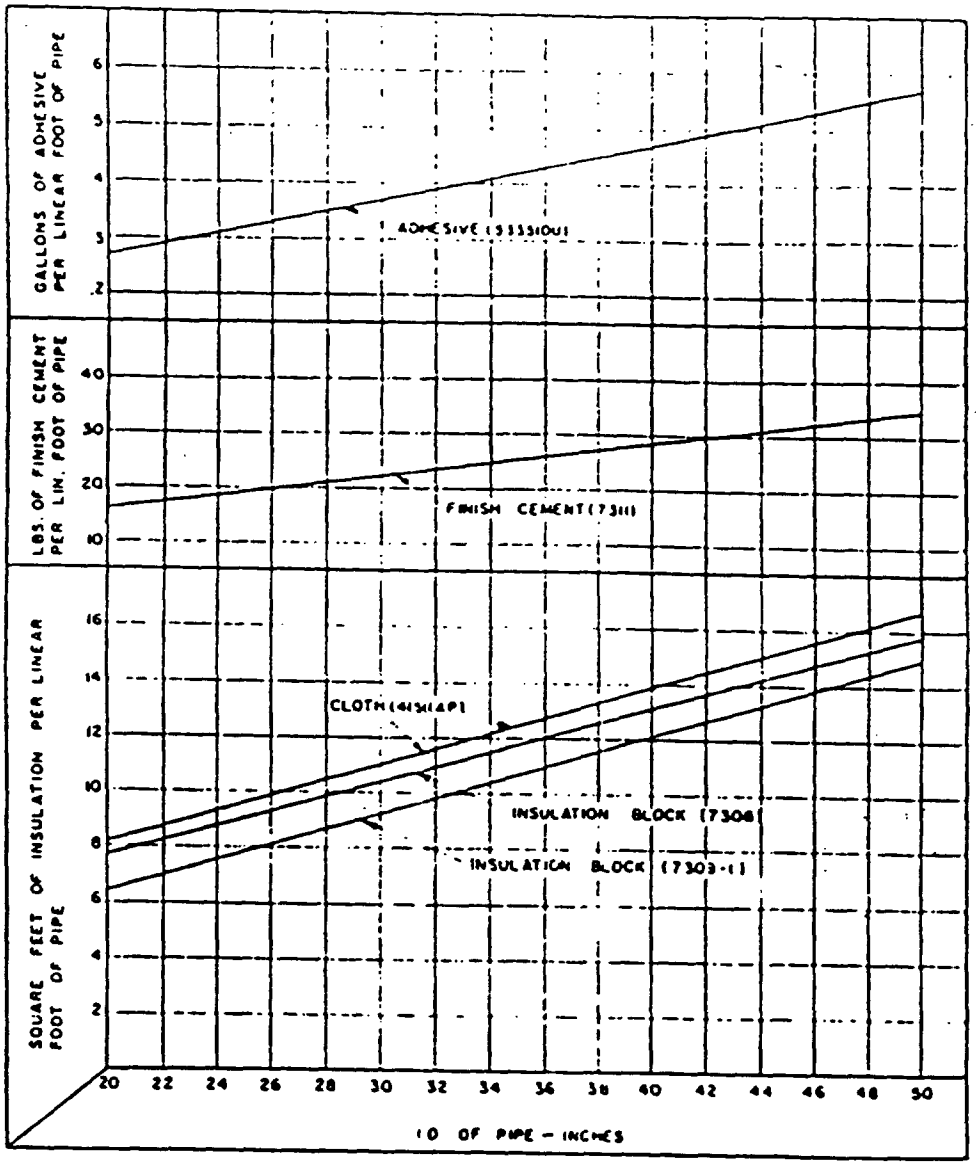
INSULATION - ORDERING INFORMATION FOR LARGE PIPES

PH 920.5

THE CURVES SHOWN BELOW SHOULD BE USED TO DETERMINE THE QUANTITY OF INSULATION MATERIALS TO BE ORDERED ON CROSS-OVER OR OTHER LARGE INSULATED PIPES.

THE AMOUNTS SHOWN INCLUDE AN ADDITIONAL 10 PER CENT FOR WASTAGE, IRREGULAR SHAPES AND FLANGES.

TO ORDER INSULATION MATERIALS DETERMINE TOTAL DEVELOPED LENGTH OF PIPE. FROM CHART BELOW, OVER PROPER PIPE DIAMETER, OBTAIN MATERIAL COVERAGE FIGURE FOR ONE LINEAR FOOT OF PIPE. MULTIPLY THIS FIGURE BY THE LENGTH OF PIPE PREVIOUSLY OBTAINED TO GET TOTAL AREA OF COVERAGE. (SEE EXAMPLE BELOW)



EXAMPLE OF INSULATION MATERIAL ORDERING FOR 39 IN. I.D. PIPE BY 57 FT. DEVELOPED LENGTH.

ITEM	NAME		MTL.	REQ.
1	INSULATION BLOCK - INNER (CURVED)	P.S. 600433 PT. 1	7309-1	690 SQ. FT.
2	INSULATION BLOCK - OUTER (CURVED)		7308	740 SQ. FT.
3	ASBESTOS CLOTH		41511AP	770 SQ. FT.
4	INSULATION CEMENT		7311	1600 LBS.
5	ADHESIVE		533510U	26 GAL.

600016

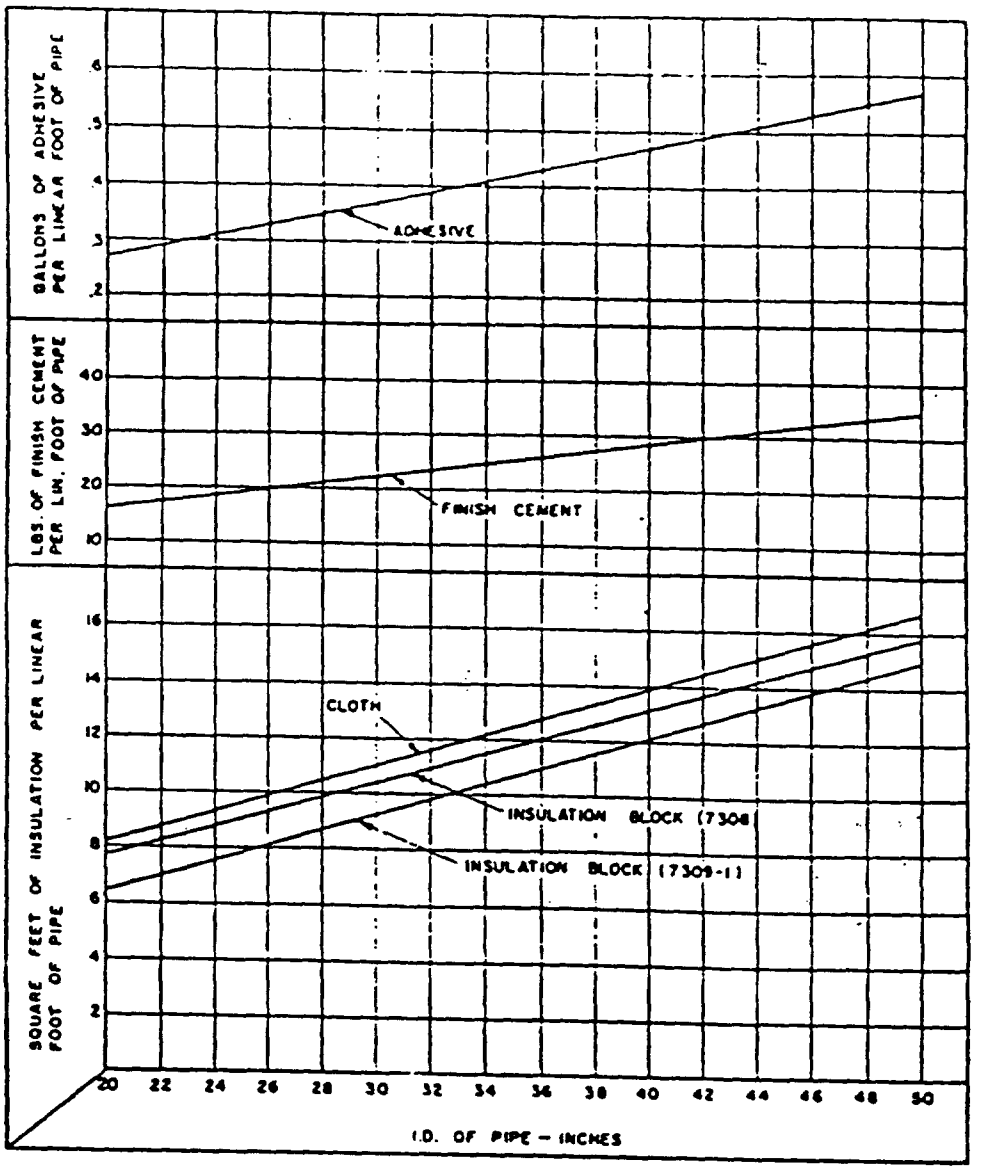
INSULATION - ORDERING INFORMATION FOR LARGE PIPES

P H 920.4

THE CURVES SHOWN BELOW SHOULD BE USED TO DETERMINE THE QUANTITY OF INSULATION MATERIALS TO BE ORDERED ON CROSS-OVER OR OTHER LARGE INSULATED PIPES.

THE AMOUNTS SHOWN INCLUDE AN ADDITIONAL 10 PER CENT FOR WASTAGE, IRREGULAR SHAPES AND FLANGES.

TO ORDER INSULATION MATERIALS DETERMINE TOTAL DEVELOPED LENGTH OF PIPE. FROM CHART BELOW, OVER PROPER PIPE DIAMETER, OBTAIN MATERIAL COVERAGE FIGURE FOR ONE LINEAR FOOT OF PIPE. MULTIPLY THIS FIGURE BY THE LENGTH OF PIPE PREVIOUSLY OBTAINED TO GET TOTAL AREA OF COVERAGE. (SEE EXAMPLE BELOW)



EXAMPLE OF INSULATION MATERIAL ORDERING FOR 39 IN. I.D. PIPE BY 57 FT. DEVELOPED LENGTH.

ITEM	NAME	MTL.	REQ.
1	INSULATION BLOCK (CURVED)	7309-1	690 SQ. FT.
2	INSULATION BLOCK (CURVED)	7308	740 SQ. FT.
3	ASBESTOS CLOTH (12 OZ. UNDERWRITERS GRADE)	41511AP	770 SQ. FT.
4	INSULATION CEMENT	7311	1600 LBS.
5	ADHESIVE	533510U	26 GAL.

600006