

INSUL/notes

PRODUCT NEWS

Armstrong CONTRACTING AND SUPPLY CORPORATION

**PLAINTIFF'S
EXHIBIT**

ACS-206

December 27, 1967

ARMASPRAY 16 - NEW SALES TOOLS - MORE PROGRESS

The favorable economics of Armaspray are further substantiated with the completion of each new job, and any early reservations on the part of our construction personnel pertaining to excessive dust or its ability to stick are quickly and surely disappearing as greater experience is gained with the new and improved equipment. Armaspray 16 is proving itself to be a truly superior spray-on high temperature insulation. Here is further news of this new product that will improve your position to promote and sell Armaspray 16.

- **NEW PROMOTION FILM AVAILABLE** - A copy of the new Armaspray film has been forwarded to each district office and is now available for use in the MPO Desk Top Projector. This is the third film for this projector, the others being the Corporate Capability film and the Alply film. A fourth, on Armaflex, will be available within the next few weeks.

The Armaspray film is a professionally produced colored movie. The narration, accompanied by many interesting application scenes, tells the Armaspray story in the most concise way possible. In approximately ten minutes, the viewer is acquainted with the end use of Armaspray - how it is made - its physical properties - the equipment used to apply it - the application specifications - and the lease program, finally summarizing why Armaspray is the best product for his high temperature insulation requirements.

- **A NEW MEETING GUIDE** - A comprehensive Meeting Guide is being sent to each district and branch office for reference by the manager in acquainting all AC&S personnel with Armaspray 16. This same Guide is readily adaptable and available for use by all others in setting up and conducting Armaspray meetings with customers. Using the new film as the focal point of the meeting, an overall meeting outline, as well as other important subject matters to be covered, are readily referenced in this Guide. In addition, the Guide includes reference to all available sources of related Armaspray information in the various Manuals, information on competitive materials and a current list of Armaspray installations already in service.
- **RAIL FREIGHT REDUCED** - 70,000 lb. rail carload rates have been added to the recently revised freight rates included in your Sales Manual. In most cases, this rate is approximately one-half the original maximum carload rate for 40,000 lbs., providing further attractive savings where this increased quantity can be justified.
- **ACCEPTED BY MAJOR TURBINE MANUFACTURERS** - Although most high temperature spray-on insulations have been used with varying degrees of success in the turbine field, as the result of questionable performances in some instances, at least one major manufacturer recently conducted extensive tests and found Armaspray completely acceptable and superior to all other materials from the standpoint of thermal efficiency and freedom from any fire hazard. More details concerning this important development are available from the General Office on request.

Prepare now to spread the Armaspray story with the use of this new film. Good prospects are engineering and specifying firms; owners; as well as purchasing, plant maintenance, and technical management personnel. In fact, the film presents an excellent reason to call on all customers, new and old, requiring high temperature insulation. Don't overlook the fact that while much of the information may be "old hat" to you, it will prove new and exciting to most of your customers.

EXHIBIT

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CONTRACT APPROVAL - TECHNICAL CHECK LIST

As a further step towards assuring complete customer acceptance of our contract service, a Technical Check List has been compiled and is being added to the Contract Approval Check List already in Section D-411 of the Procedure Manual. A copy of this Technical Check List is attached for your personal review and possible future reference.

ARMAFLEX - A RECORD OF SUCCESS

The following is quoted from a memorandum recently received in the General Office.

"We have had considerable success in cost reduction and customer satisfaction in the use of Armaflex - both on piping and equipment - on Navy ships in lieu of Foamglas and polystyrene specified. The big savings comes in prefabrication of fittings and the elimination of field applied vapor barrier, which the Navy requires on polystyrene and polyurethane, as well as Foamglas."

"Another interesting installation is the use of Armaflex on brine pumps operating at minus 12° where they previously had used Foamglas, Corkboard and many other products. The customer acceptance here has been very good."

"Everyone in this office has had a hand in expanding the use of Armaflex on board these Navy ships and this includes the mechanics in the field having a great deal of interest in making these applications work."

While unfortunately all offices do not have this opportunity to highlight the advantages of Armaflex over the more elaborate "government type" specifications involving other insulating materials, the principle involved here applies across the board; i.e., cost reductions can be enjoyed with Armaflex when all factors, including the in-place efficiency and application labor are considered. The Navy, in this instance, accepted this. In fact, the new Military Standard (MIL. STD. 769B) clearly requires less Armaflex thickness than other materials for specific operating conditions. Take a tip from this and increase your profit margins by using Armaflex in lieu of other materials requiring vapor barriers.

PUBLICATIONS - NEW LITERATURE & PRODUCT DATA SHEETS

- **NEW LITERATURE** - Your copy of ACCO's new "Sweet's Catalog Insert" is attached. It is important to recognize that these Insulation Products are, in effect, our products and in this connection we are about to receive a considerably expanded coverage in 1968 as a result of this publication being included in Sweet's Architectural Catalog File as well as in Sweet's Construction File and the Mechanical Product Catalog. This change should be especially helpful in the promotion of Armaflex, Prefinished Insulation, and our Adhesives, Coatings, and Sealers. Extra copies are available from your local ACCO Marketing Representative.
- **PRODUCT DATA PAGE DELETIONS INCLUDE:** Armabestos Insulation (Form 203, 4/64), HT Fitting Insulation (Form 231, 12/64), and Armafil Underground Insulation (Form 229, 9/64). As these products have been or shortly will be deleted from our Line, any copies of these Data Pages in stock should be destroyed and the individual pages removed from any stock of Red Books already compiled.
- **PRODUCT DATA PAGE ADDITIONS AND REVISIONS INCLUDE:** Armstrong Insulations (Form 200, 11/67), Expandofoam NB Grey Insulation (Form 235, 9/67), and Expandofoam NB Green Insulation (Form 235-a, 9/67). Copies of the latter pages are attached and extras may be obtained through normal channels.

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EXPANDOFOAM - NEW DEVELOPMENTS

Here are more reasons for expanding the use of our Urethane products:

- **COSTS OF EXPANDOFOAM PIPE COVERING REDUCED** - Reduced prices of this commodity from all sources as covered in recent Sales Manual revisions will result in savings in the order of 10-20% depending on the size and thickness of the pipe covering. On an equivalent thickness basis, this lends even greater strength to our old story that there is little or no justification for using either Styrofoam or Foamglas since Expandofoam possesses essentially all the desirable characteristics of these products at a more attractive price.
- **ACCO ANNOUNCES NEW EXPANDOFOAM BOARD** - This new product consists of a core of rigid urethane insulation faced on both sides with 58 pound grey rock lath paper. This unique combination of strong, extremely efficient insulation and durable, practical facings results in a final product with high strength, improved dimensional stability, lower water vapor transmission, low "k" factor, excellent handleability and a wide range of uses. In addition to cold storage applications, Expandofoam Board is ideally suited to plaster base applications because of the opportunity to reduce thicknesses and the excellent base the rock lath facing provides for plaster finishes. Attached is a copy of the product literature and pricing information is being mailed under separate cover for inclusion in your Sales Manual. Consult your ACCO Marketing Representative for further details concerning this new product.

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I. TECHNICAL CHECK LIST

A. Pipe, Duct and Vessel Insulations

1. Extremes in size and/or operating temperature invariably result in excessive thermal movement causing cracks and sometimes structural failures of the insulation system. Are adequate provisions in the form of expansion and contraction joints made to accommodate this movement?
2. Structurally unsound and/or unclean surfaces against which the insulation is to be applied usually lead to premature failures in the insulation system as a result of excessive vibration or poor initial adhesion. Is the insulation adequately structurally supported?
3. High elevations, winter-time application, high winds, and cramped working conditions - the environment during application has an important bearing on the satisfactory installation and ultimate performance of certain sprayed-on insulation systems as well as adhesives and finishes. Have provisions been made to accommodate these conditions?
4. Recommended temperature range - use of all products within these limits is of utmost importance from the standpoint of excessive dimensional change and ultimate physical breakdown. Do the products in question conform to the customer's specifications and the manufacturer's published limits?
5. Protective finish - the ultimate performance of insulation in many cases is entirely dependent on the finish. If low temperature, a "vapor seal" is required. If high temperature, a "breather" is required. In addition, the product must withstand the local climatic environment. Will the finish in question meet these requirements plus produce an attractive appearance?
6. Prevention of condensation - failure of the insulation to perform where prevention of condensation is the criteria is most readily visible and usually costly to overcome. Are the environmental conditions known and clearly identified in your proposal?

B. Refrigerated Room and Building Insulations

1. Preparation

- a. Structural Supports are adequate.
- b. Walls and Partitions over 14' 0" high are properly supported.
- c. Sub-Slab Ventilation or Heating is adequate.
- d. Door Bucks and Lintels are properly sized and installed.
- e. Ventilation of adjacent spaces to refrigerated areas is adequate to prevent condensation.

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2. Materials and Application

- a. Compatible and odor-free materials are used.
- b. Application Specifications are approved by materials manufacturer.
- c. Temperature Limitations recommended by materials manufacturer are observed during and after construction.
- d. Vapor Barrier is adequate and practical to install.
- e. Expansion and Contraction of the vapor barrier at the wall-roof juncture is adequately designed.
- f. "Perimeter Compression" of insulation applied to roof areas is employed where applicable.
- g. Finish complies with requirements of proposed product to be stored.
- h. Finish is protected in front and above ceiling mounted refrigeration coils.
- i. Built-up roof specification is compatible with roof insulation.

3. Accessories (Doors, Air Curtains, Shelving, Tracking, etc.)

- a. Use and installation specification approved by manufacturer.
- b. Operating temperatures will not interfere with proper functioning.
- c. Code compliance such as USDA-MID or local regulations are met.
- d. Necessary power (electrical, air, etc.) requirements are provided for by others.

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Insulation Products

• Armaflex pipe insulation

• Armaflex sheets

• Armalite board insulation

• Prefinished insulation

• Adhesives

• Coatings

• Sealers

Armaflex Insulations product data

Armstrong Armaflex is a foamed plastic insulating material available in flexible and rigid pipe insulation and in flexible sheet and ribbon form. These insulations are used to prevent heat gain, condensation, and frost formation on cold temperature lines. They also prevent heat loss for liquid heating and dual temperature piping. Armaflex Sheet provides the same range of protection on large piping, ducts, tanks, vessels, and equipment of all types.

Armaflex Insulations have a fine, closed cellular structure and are vapor barriers in themselves, so no separately applied vapor barrier is required. The extreme flexibility of Armaflex 22 Pipe Insulation and Sheet Insulation speeds and simplifies their application. Rigid Armaflex has load-bearing properties and can be used at hanger locations and on piping subject to mechanical abuse or compression. All three products are non-shiny black in color, have smooth surfaces, and are exceptionally clean to handle.

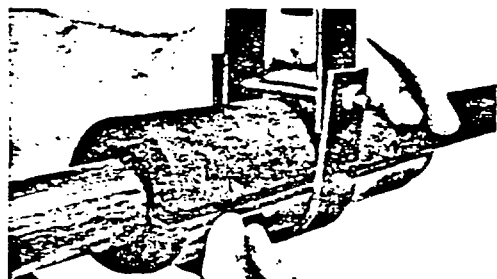
Armaflex Insulations typical physical properties



ARMAFLEX 22 PIPE INSULATION



ARMAFLEX 22 SHEET



RIGID ARMAFLEX PIPE INSULATION

Density, lb/cuft (avg.)	Thermal conductivity, Btu/hr sqft (F/in)		Upper use limit, F (See note 1)	Lower use limit, F (See note 2)	Thermal stability, % shrinkage		
	70F mean temp.	90F mean temp.			28 days, 158F	28 days, 200F	28 days, 220F
5-6	0.26	0.27	220	-40	2.0-4.5	3.5-5.5	5.5-6.5
5-6	0.26	0.27	220	-40	<4	<4.5	<6
7	0.28	0.29	220	-40	<1.5	<3	<5
TEST METHOD (SEE NOTE 4)	ASTM D1622-63	ASTM C177-63	ASTM C177-63		ASTM C548-64T	ASTM C548-64T	ASTM C548-64T

* On the heating cycle, Armaflex Pipe Insulations will withstand temperatures as high as 220F. Where the pipe size is greater than 5" IPS and Armaflex 22 Pre-cut Pipe Insulation and Armaflex 22 Sheet are installed by adhering butt joints and seams only, the upper temperature limit is 220F. 620 Adhesive may be used with pipe insulation applications up to

220F (200F limit when using 520 Adhesive). Armaflex 22 Sheet adhered with complete adhesive coverage on flat or curved metal surfaces may be applied to surfaces that will operate as high as 180F using 620 Adhesive (160F limit when using 520 Adhesive).

Because of high insulating efficiency and vapor resistance, Armaflex Insulations in engineered wall thicknesses will offer the same condensation protection under varying design conditions to the entire range of pipe sizes.

For specific thickness recommendations, see Insulation Thickness chart on page 7.

Water vapor transmission, wet cup, perm-in	Water absorption 28 days immersion, % by volume	ASTM method, % by weight	Ozone resistance	Odor	Flammability	Wall thickness, inches (nominal)	Inside diameter, inches	Sizes		Thickness, inches
								Length of sections, feet (See note 3)	Width and length, inches	
<0.1	1.7	<10	GOOD	NEGLIGIBLE	SELF-EXTINGUISHING BY THIS TEST	½, ¾, 1	¾ to 10½	6		
0.1	<2	<10	GOOD	NEGLIGIBLE	SELF-EXTINGUISHING BY THIS TEST				36 x 48	¾ to 1 (¼" increments)
<0.05	<1.7	<5		NEGLIGIBLE	SELF-EXTINGUISHING BY THIS TEST	½, ¾	¾ to 5½	3		
ASTM C355-64		ASTM D1056-65T			ASTM D1692-59T					

¹At -20F, flexible Armaflex Insulations become hard and, as temperatures drop below -20F, will be increasingly brittle; however, this hardening characteristic does not affect thermal efficiency and resistance to water vapor transmission. Application below -40F is at user's discretion.

²Armaflex 22 in selected wall thickness and inside diameters available in 50' continuous lengths. Pre-cut Pipe Insulation furnished in 4' lengths.

⁴ASTM method, in some cases, may be modified slightly to make results more meaningful for end use application. If details are required, contact Armstrong Cork Company.

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Armaflex 22 Pipe Insulation

Armstrong Armaflex 22 Pipe Insulation is made in three engineered wall thicknesses, each calculated to prevent condensation on cold lines within its individual recommended usage ranges at temperatures down to zero. For temperatures below zero, Armaflex may need to be applied in multiple thicknesses, depending upon air conditions.

Armaflex 22 Pipe Insulation also can be used on heated lines, where it will withstand temperatures up to 220F.

In proper thickness, Armaflex 22 Pipe Insulation meets the requirements of Military Specification MIL-P-15280D, Type II, and Interim Federal Specification HH-I-00573a.

WIDE TEMPERATURE RANGE—Armaflex 22 has a wide usage range from -40F to +220F.

EFFICIENT INSULATION—The closed cellular structure of Armaflex 22 gives it a low "k" value of 0.26 at 70F mean.

IMPERVIOUS TO MOISTURE VAPOR—The uniformly sized, closed cells of Armaflex 22 seal out air and moisture vapor. The result is a water vapor transmission rating of less than 0.1 perm-in.

DIMENSIONALLY STABLE—When Armaflex 22 Pipe Insulation is tested at a soaking heat of 220F for 28 days, average shrinkage is approximately 6%. In application, only the inner surface is exposed to 220F, so shrinkage is considerably less than the test figure.

SELF-EXTINGUISHING—When tested according to ASTM D1692 procedures, Armaflex 22 is considered self-extinguishing by this test.

OZONE RESISTANT—It can be applied to sharp bends and elbows without fissuring or cracking at the stressed area.

SMOOTH SURFACE—Armaflex 22 has an exceptionally smooth, uniform outer surface finish. This results in a neat-looking installation.

FAST AND EASY TO APPLY—The extreme flexibility of Armaflex 22 makes application rapid. It can be applied easily, even in close and crowded quarters. Fittings can be insulated with miter-cut pieces of insulation, assembled on the job using Armstrong 520 Adhesive (620 Adhesive for over 200F). On outdoor installations, excellent protection is provided by Armstrong Armaflex Finish, a vinyl lacquer-type coating. Indoors, Armaflex 22 requires no finish, but for a decorative or protective coating, use Armaflex Finish.

Armaflex 22 Sheet

Armstrong Armaflex 22 Sheet Insulation is a flexible, foamed plastic material. It has a foamed, closed cellular structure with excellent insulating efficiency and high vapor resistance. It is particularly adaptable to insulating of ducts, large tanks of all shapes, irregular vessels, and oversize piping. Armaflex 22 Sheets may be applied with full adhesive coverage to metal surfaces that will operate as high as 180F. When used within recommended usage ranges, Armaflex 22 Sheet thicknesses have been calculated to prevent condensation on cold surfaces. Temperatures below zero may require application of Armaflex 22 Sheet in multiple layers, depending upon air conditions.

When used for pipe insulation, with adhesive at joints only, Armaflex 22 Sheets can be applied to lines operating as high as 220F.

Armaflex Sheet Insulation meets the requirements of Military Specification MIL-P-15280D, Type II, and Interim Federal Specification HH-I-00573a.

EFFICIENT INSULATION—Armaflex 22 Sheets have a low thermal conductivity of 0.26 Btu/hr sqft (F/in) at 70F mean temperature. Because this material resists deterioration, efficiency remains high.

RESISTANT TO WATER VAPOR AND AIR TRANSMISSION—Uniformly sized closed cell structure seals out air and moisture vapor.

FAST AND EASY TO APPLY—Armaflex 22 Sheets can be applied directly to clean, dry metal surfaces with Armstrong 520 or 620 Adhesive. Conventional mechanical supports are unnecessary. High resistance to water vapor and air transmission eliminates the need for a separate vapor barrier, but outdoor installations should be protected with Armstrong Armaflex Finish, a vinyl lacquer-type coating.

SELF-EXTINGUISHING—When tested according to ASTM D1692 procedures, Armaflex 22 Sheet Insulation is considered self-extinguishing by this test.

PHYSICALLY AND CHEMICALLY STABLE—Armaflex is only slightly affected by solvents and, for all practical purposes, is unaffected by oils, common corrosive chemicals, or fungus attack. Ten percent solutions of hydrochloric and sulfuric acids and sodium hydroxide have no adverse effects on Armaflex. Solvents such as toluene, methyl ethyl ketone, and trichloroethylene do not dissolve it, but do cause some swelling.

Rigid Armaflex

Armstrong Rigid Armaflex is a foamed plastic-type pipe insulation developed for use at pipe hanger locations and at other places where pipe insulation may be subjected to compression deformation. Rigid Armaflex is made in nominal ½" and ¾" engineered wall thicknesses. Except for its rigidity, Rigid Armaflex is similar in typical physical properties to the flexible material. Rigid Armaflex has a smooth outer surface finish. The material is manufactured in 3'-long sections and is available in sizes from ¾" ID to 5" IPS. Each section is split lengthwise at the factory, and the matching half sections are held together in shipment, assuring accurate match and fit at joints during application.

SOLVES COMPRESSION PROBLEM—Where Armaflex installations are subjected to compression loads, as at pipe hanger locations, this rigid material in conjunction with metal shields can be used to support the load. It will resist compression, and thus maintain its full insulating efficiency in service.

WIDE TEMPERATURE RANGE—Rigid Armaflex may be used at temperatures from below zero to +220F.

EFFICIENT INSULATION—The closed cellular structure of Rigid Armaflex gives it a low "k" value of 0.28 at 70F mean temperature.

IMPERVIOUS TO MOISTURE VAPOR—The uniformly sized, closed cells seal out air and moisture vapor. Water vapor transmission is less than 0.05 perm-in.

SELF-EXTINGUISHING—When tested according to ASTM D1692 procedures, Rigid Armaflex is considered self-extinguishing by this test.

DIMENSIONALLY STABLE—When Rigid Armaflex is tested at a soaking heat of 220F for 28 days, average linear shrinkage is less than 5%. In actual application to heated lines, the inner surface only is exposed to elevated temperatures, so shrinkage would be considerably less than the test result.

SMOOTH SURFACE—Rigid Armaflex has a smooth, uniform outer surface finish. This results in a neat-looking installation, whether the material is left unfinished or is coated with Armaflex Finish.

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Armaflex Tape

Armaflex Insulation Tape is the same flexible foamed plastic insulating material that is used for Armaflex Pipe Insulation. The tape is supplied in convenient strip form $\frac{1}{8}$ " thick x 2" wide for wrapping around cold or hot pipes and fittings. It is used to retard heat gain on cold lines and to reduce heat loss on hot lines. When properly applied, sweating and dripping are controlled on domestic cold water lines, suction lines for air-conditioning equipment, and chilled water piping.

CARTON CONTENTS—30 feet per roll $\frac{1}{8}$ " thick x 2" wide.

CLOSED CELL STRUCTURE—Seals out air and moisture vapor without need of an additional vapor barrier. Closed cell structure offers high resistance to moisture vapor flow and to water absorption. It stops condensation and sweating on cold pipes when applied in the proper number of wraps for the line temperature, the air temperature and percent relative humidity shown in the table of recommended thickness.

EFFICIENT INSULATION—High insulating efficiency. The low thermal conductivity retards heat flow keeping cold lines cold and hot lines hot. On hot lines, the number of wraps applied is dictated only by the amount of heat loss prevention that is desired. On cold piping, the number of wraps required must be sufficient to keep the outer insulation surface above the dew point of the air or sweating will occur. On dual temperature lines any number of wraps sufficient to stop sweat on the cold cycle will be adequate for the heating cycle.

CONVENIENT AND EASY TO USE—Wrapping is easily accomplished without need of experience. The pressure-sensitive adhesive adheres quickly and firmly to all metals. The easily removed release paper keeps the adhesive fresh, and the insulation begins performing the moment it is applied. There are no bands, wires or additional adhesive required. The greater the number of wraps applied, the better will be the protection obtained.

THICKNESS TO PREVENT SWEATING AND DRIPPING

Air Temperature and Relative Humidity	Pipe Temperature	
	50F	35F
80F & 50% RH	Single Layer*	50% Overlap
85F & 70% RH	50% Overlap Plus	50% Overlap Plus
	Single Layer	50% Overlap

* Dual temperature line must be 50% overlap application.

Armaflex Insulations

application

brief specifications

1. COMBINATION HOT-CHILLED WATER LINES

1. CHILLED WATER LINES

(Specifier shall choose one.)

1.1 All (combination hot-chilled water) (chilled water) primary and secondary supply and return lines, mains, risers, branches, and runouts (3" IPS; 4" IPS; 5" IPS; 8" IPS; 10" IPS) and smaller shall be insulated with nominal $\frac{1}{2}$ " wall thickness flexible foamed plastic, closed cell pipe (and sheet) insulation, Armstrong Armaflex 22 or approved equal. Insulation shall have a "k" factor of not more than 0.26 at 70F mean temperature when tested by ASTM C177-63 and a water vapor transmission rate of 0.1 perm-inch or less when tested by ASTM C355-64 Water Method.

1.2 APPLICATION

1.2.1 Armaflex 22 Insulation shall be slipped on the pipe prior to erection wherever possible, and the butt joints shall be sealed with Armstrong (520 Adhesive) (620 Adhesive). Where the slip-on technique is not possible, the Armaflex 22 Insulation shall be slit and applied to the pipe, and the longitudinal seams and butt joints shall be sealed with (520 Adhesive) (620 Adhesive).

1.2.2 Fitting cover insulation shall be fabricated and installed according to the manufacturer's recommended procedures. Sweat fittings shall be insulated with miter-cut pieces of Armaflex 22 Pipe Insulation the same size as on adjacent piping. Screwed fittings shall be insulated with sleeved fitting covers fabricated from miter-cut pieces of Armaflex 22 Pipe Insulation according to the manufacturer's sleeving size recommendations and shall be overlapped and sealed to the adjacent pipe insulation. As an alternate, screwed and weld iron pipe fittings 2" IPS thru 5" IPS shall be insulated with Armaflex 22 Sheet Insulation conforming to template patterns recommended by the manufacturer. Weld iron pipe fittings 6" IPS thru 10" IPS shall be insulated with Armaflex 22 Sheet Insulation conforming to template patterns recommended by the manufacturer. All valves shall be insulated with Armaflex 22 Pipe and Sheet Insulations. All joints and miter-cut pieces shall be sealed with (520 Adhesive) (620 Adhesive).

1.2.3 At outside carrying hanger locations, nominal $\frac{1}{2}$ " wall thickness Armstrong Rigid Armaflex Pipe Insulation shall be installed and protected with 28-gauge galvanized sheet metal shields for pipe sizes smaller than $1\frac{1}{2}$ " IPS and 26-gauge for pipe sizes $1\frac{1}{2}$ " IPS thru 5" IPS. Hanger spacing and Rigid Armaflex supports and protective metal shield lengths shall be in accord with the manufacturer's recommendations. All joints and seams shall be sealed with two coats of (520 Adhesive) (620 Adhesive).

1.3 FINISH

(Specifier shall specify Armaflex Finish over Armaflex Insulations only.)

1.3.1 All exposed Armaflex 22 Insulation shall be finished with two coats of Armstrong Armaflex Finish or approved equal, color to be selected by the Owner's representative.

2. CONDENSATE DRAIN LINES

2.1 All condensate drain lines shall be insulated with nominal $\frac{3}{8}$ " wall thickness flexible foamed plastic, closed cell pipe (and sheet) insulation, Armstrong Armaflex 22, or approved equal. Insulation shall have a "k" factor of not more than 0.26 at 70F mean temperature when tested by ASTM C177-63 and a water vapor transmission rate of 0.1 perm-inch or less when tested by ASTM C355-64 Water Method.

2.2 APPLICATION

2.2.1 The Armaflex 22 Insulation shall be applied according to the procedures specified for (combination hot-chilled water) (chilled water) lines (Paragraph 1.2).

2.3 FINISH

(Specifier shall specify Armaflex Finish over Armaflex Insulations only.)

2.3.1 All exposed Armaflex 22 Insulation shall be finished with two coats of Armstrong Armaflex Finish or approved equal, color to be selected by the Owner's representative.

3. REFRIGERATION

3.1 All refrigeration suction lines (0F to 35F shall be insulated with nominal $\frac{3}{4}$ " wall thickness) (35F and above shall be insulated with nominal $\frac{1}{2}$ " wall thickness) flexible foamed plastic, closed cell pipe (and sheet) insulation, Armstrong Armaflex 22, or approved equal. Insulation shall have a "k" factor of not more than 0.26 at 70F mean temperature when tested by ASTM C177-63 and a water vapor transmission rate of 0.1 perm-inch or less when tested by ASTM C355-64 Water Method.

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3.2 APPLICATION

3.2.1 The Armaflex 22 Insulation shall be applied according to the procedures specified for (combination hot-chilled water) (chilled water) lines (Paragraph 1.2).

3.3 FINISH

(Specifier shall specify Armaflex Finish over Armaflex Insulations only.)

3.3.1 All exposed Armaflex 22 Insulation shall be finished with two coats of Armstrong Armaflex Finish or approved equal, color to be selected by the Owner's representative.

4. HEATING

4.1 All hot water heating system lines (2" IPS; 3" IPS; 4" IPS; 5" IPS) and smaller operating at a maximum temperature of 220F shall be insulated with (nominal 3/8"; nominal 1/2") wall thickness flexible foamed plastic, closed cell pipe (and sheet) insulation, Armstrong Armaflex 22, or approved equal. Insulation shall have a "k" factor of not more than 0.26 at 70F mean temperature when tested by ASTM C177-63.

4.2 APPLICATION

4.2.1 Armaflex 22 Insulation shall be slipped on the pipe prior to erection wherever possible, and the butt joints shall be sealed with (520 Adhesive) (620 Adhesive). Where the slip-on technique is not possible, the Armaflex 22 Insulation shall be slit and applied to the pipe, and the longitudinal seams and butt joints shall be sealed with (520 Adhesive) (620 Adhesive).

4.2.2 Fitting cover insulation shall be fabricated and installed according to the manufacturer's recommended procedures. Sweat fittings shall be insulated with miter-cut pieces of Armaflex 22 Pipe Insulation the same size as on adjacent piping. Screwed fittings shall be insulated with sleeved fitting covers fabricated from miter-cut pieces of Armaflex 22 Pipe Insulation according to the manufacturer's sleeving size recommendations and shall be overlapped and sealed to the adjacent pipe insulation. As an alternate, screwed and weld iron pipe fittings 2" IPS thru (3" IPS; 4" IPS; 5" IPS) shall be insulated with Armaflex 22 Sheet Insulation conforming to template patterns recommended by the manufacturer. All valves shall be insulated with Armaflex 22 Pipe and Sheet Insulations. All joints and miter-cut pieces shall be sealed with (520 Adhesive) (620 Adhesive).

4.3 FINISH

(Specifier shall specify Armaflex Finish over Armaflex Insulations only.)

4.3.1 All exposed Armaflex 22 Insulation shall be finished with two coats of Armstrong Armaflex Finish or approved equal, color to be selected by the Owner's representative.

5. PLUMBING

5.1 All domestic hot and cold water lines (2" IPS; 3" IPS) and smaller shall be insulated with nominal 3/8" wall thickness flexible foamed plastic, closed cell pipe (and sheet) insulation, Armstrong Armaflex 22, or approved equal. Insulation shall have a "k" factor of not more than 0.26 at 70F mean temperature when tested by ASTM C177-63 and a water vapor transmission rate of 0.1 perm-inch or less when tested by ASTM C355-64 Water Method.

5.2 APPLICATION

5.2.1 Armaflex 22 Insulation shall be slipped on the pipe prior to erection wherever possible, and the butt joints shall be sealed with Armstrong 520 Adhesive. Where the slip-on technique is not possible, the Armaflex 22 Insulation shall be slit and applied to the pipe, and the longitudinal seams and butt joints shall be sealed with 520 Adhesive.

5.2.2 Fitting cover insulation shall be fabricated and installed according to the manufacturer's recommended procedures. Sweat fittings shall be insulated with miter-cut pieces of Armaflex 22 Pipe Insulation the same size as on adjacent piping. Screwed fittings shall be insulated with sleeved fitting covers fabricated from miter-cut pieces of Armaflex 22 Pipe Insulation according to the manufacturer's sleeving size recommendations and shall be overlapped and sealed to the adjacent pipe insulation. As an alternate, screwed and weld iron pipe fittings (2" IPS; 3" IPS) shall be insulated with Armaflex 22 Sheet Insulation conforming to template patterns recommended by the manufacturer. All valves shall be insulated with Armaflex 22 Pipe and Sheet Insulations. All joints and miter-cut pieces shall be sealed with 520 Adhesive.

5.2.3 At outside carrying hanger locations, nominal 1/2" wall thickness Armstrong Rigid Armaflex Pipe Insulation shall be installed and protected with 28-gauge galvanized sheet metal shields for pipe sizes smaller than 1 1/2" IPS and 26-gauge for pipe sizes 1 1/2" IPS thru (2" IPS; 3" IPS). Hanger spacing and Rigid Arma-

Armaflex 22 Sheet Insulation thickness recommendations

Ducts—Tanks—Vessels—Equipment

Metal Surface Temperature	Based on Design Conditions†		
	Normal	Mild	Severe
50F	3/8"	3/8"	3/8"
35F	3/8"	1/4"	1 1/4"
0F	1"	1/2"	1 3/8"

† Armaflex 22 Sheet in thicknesses noted and within the specified temperature ranges will prevent condensation on indoor metal surfaces for NORMAL, MILD and SEVERE design conditions as defined in the table at the top of page 7 for Armaflex Pipe Insulation.

flex support and protective metal shield lengths shall be in accord with the manufacturer's recommendations. All joints and seams shall be sealed with two coats of 520 Adhesive.

5.3 FINISH

(Specifier shall specify Armaflex Finish over Armaflex Insulations only.)

5.3.1 All exposed Armaflex 22 Insulation shall be finished with two coats of Armstrong Armaflex Finish or approved equal, color to be selected by the Owner's representative.

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Armaflex 22 Pipe Insulation

thickness recommendations (based upon available manufactured thicknesses)

Line temperatures	Based on normal design conditions*			Based on mild design conditions**			Based on severe design conditions***	
	Pipe Size ¾" ID thru 3" IPS	Over 3" IPS thru 10" IPS	Over 10" IPS	Pipe Size ¾" ID thru 3" IPS	Over 3" IPS thru 10" IPS	Over 10" IPS	Pipe Size ¾" ID thru 10" IPS	Over 10" IPS
50F	Nom. ¾"	Nom. ½"	¾" Sheet	Nom. ¾"	Nom. ½"	¾" Sheet	Nom. ¾"	¾" Sheet
35F	Nom. ½"	Nom. ½"	¾" Sheet	Nom. ¾"	Nom. ½"	¾" Sheet	Nom. ¾"	1½" Sheet
0F	Nom. ¾"	Nom. ¾"	1" Sheet	Nom. ½"	Nom. ½"	½" Sheet		

* Armaflex in the thicknesses noted and within the specified temperature ranges will prevent condensation on indoor piping under normal design conditions, a maximum severity of 85F and 70% RH. Armstrong research and field experience indicate that indoor conditions anywhere in the United States seldom exceed this degree of severity.

** Armaflex in the thicknesses noted and within the specified temperature ranges will prevent condensation on indoor piping under mild design conditions, a maximum severity of 80F and 50% RH. Typical of these conditions are most air-conditioned spaces and arid climates.

*** Armaflex in the thicknesses noted and within the specified temperature ranges will prevent condensation on indoor piping under severe design conditions, a maximum severity of 90F and 80% RH. Typical of these conditions are indoor areas in which excessive moisture is introduced or in poorly ventilated confined areas where the temperature may be depressed below ambient.

NOTE: Thicknesses for 0F lines available on request.

Armaflex 22

nominal thickness standards and sleeving sizes

Armaflex 22 Insulation Sizes	Copper Tubing		Nominal Iron Pipe Size (in)	Actual Minimum* Wall Thickness (Inches)			Sleeving Sizes†		
	Nominal Size (in)	O.D. Size (in)		Nom. ¾"	Nom. ½"	Nom. ¾"	Nom. ¾" Wall	Nom. ½" Wall	Nom. ¾" Wall
¾" ID	¾	¾	—	0.30	0.36	0.59	1¼" ID	1" IPS	1½" IPS
½" ID	¾	½	¼	0.30	0.38	0.62	1" IPS	1¾" ID	1½" IPS
¾" ID	½	¾	¾	0.30	0.40	0.66	1" IPS	1¾" ID	2¼" ID
¾" ID	¾	¾	—	0.30	0.42	0.68	1¾" ID	1½" IPS	2" IPS
¾" ID	¾	¾	½	0.30	0.43	0.70	1¾" ID	1½" IPS	2" IPS
¾" IPS	—	—	¾	0.30	0.44	0.73	1½" IPS	2¼" ID	2½" IPS
1¼" ID	1	1½	—	0.30	0.45	0.74	1½" IPS	2" IPS	2½" IPS
1" IPS	—	—	1	0.30	0.46	0.76	2¼" ID	2" IPS	3¼" ID
1¾" ID	1¼	1¾	—	0.30	0.46	0.77	2¼" ID	2" IPS	3¼" ID
1¾" ID	1½	1¾	1¼	0.35	0.47	0.79	2" IPS	2½" IPS	3" IPS
1½" IPS	—	—	1½	0.35	0.48	0.82	2½" IPS	3¼" ID	3½" IPS
2¼" ID	2	2¼	—	0.35	0.49	0.83	3¼" ID	3" IPS	3½" IPS
2" IPS	—	—	2	0.35	0.50	0.85	3" IPS	3" IPS	4" IPS
2¼" ID	2½	2¾	—	0.35	0.50	0.86	3" IPS	3¼" IPS	4" IPS
2½" IPS	—	—	2½	0.35	0.51	0.87	**3½" IPS	4¼" ID	-5" IPS
3¼" ID	3	3¼	—	0.35	0.51	0.88	**3½" IPS	4" IPS	-5" IPS
3" IPS	—	—	3	0.35	0.52	0.89	**4" IPS	-5" IPS	5" IPS
3¾" ID	3½	3¾	—	—	0.52	0.90	—	-5" IPS	5" IPS
3½" IPS	—	—	3½	—	0.53	0.91	—	-5" IPS	Sheet
4¼" ID	4	4¼	—	—	0.53	0.92	—	-5" IPS	Sheet
4" IPS	—	—	4	—	0.53	0.93	—	Sheet	Sheet
5" IPS	—	—	5	—	0.54	0.95	—	Sheet	Sheet

* Wall thickness tolerances -0, +¼" except Nom. ¾" thickness ¾" IPS thru 5" IPS is -0, +⅜".

** Available Nom. ½" or Nom. ¾" thickness only.

† Based on average wall thicknesses developed from factory tolerances. *May require cutting.

Rigid Armaflex

table of pipe supports

Rigid Armaflex Sizes	Copper Tubing		Nominal Iron Pipe Size (in)	Recommended Support Length Inches (min)*†	Recommended Pipe Hanger Spacing Feet (max)*
	Nominal Size (in)	O.D. Size (in)			
¾" ID	¾	¾	—	3	7
½" ID	¾	½	¼	4	7
¾" ID	½	¾	¾	4	7
¾" ID	¾	¾	—	4	7
¾" ID	¾	¾	½	4	7
¾" IPS	—	—	¾	6	8
1¼" ID	1	1½	—	6	8
1" IPS	—	—	1	8	9
1¾" ID	1¼	1¾	—	8	9
1¾" ID	1½	1¾	1¼	8	9
1½" IPS	—	—	1½	10	10
2¼" ID	2	2¼	—	8	10
2" IPS	—	—	2	12	11
2¼" ID	2½	2¾	—	12	12
2½" IPS	—	—	2½	18	14
3¼" ID	3	3¼	—	18	14
3" IPS	—	—	3	18	14
3¾" ID	3½	3¾	—	18	14
3½" IPS	—	—	3½	18	14
4¼" ID	4	4¼	—	18	14
4" IPS	—	—	4	18	14
5" IPS	—	—	5	18	14

* Where combination copper tube and iron pipe exists, support length and pipe hanger spacing are based upon iron pipe.

† 28-ga. metal shields (less than 1¼" IPS) and 26-ga. (1½" IPS and larger) the same length as the Rigid Armaflex are to be used at all pipe hanger locations.

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Armstrong

Armalite Insulation product data

SE ARMALITE—Armstrong SE Armalite is a molded-type expanded polystyrene board form material with unusually high insulating efficiency. It is a self-extinguishing product for use at temperatures from -300F to +175F. Developed for insulation of refrigerated rooms and equipment, Armalite also can be used in general building construction as plaster base, perimeter, or cavity wall insulation.

LIGHTWEIGHT, EFFICIENT INSULATION

SE Armalite has an average density of only 1.0 lb per cubic foot, making it one of the lightest insulation boards on the market. This low density, plus a true closed cellular structure, gives Armalite a low "k" of 0.27 at 70F mean temperature.

"U" Factor for Typical Insulated Wall*
(Btu/hr sqft F)

Armalite Thickness	"U" Factor
2"	.102
3"	.075
4"	.058
6"	.040
8"	.030

*Typical unit masonry construction; outdoor surface 15 mph air, cement plaster finish; indoor surface still air; "k" factor based upon mean temperature at recommended end use application.

MOISTURE RESISTANT—SE Armalite absorbs only 2.5% water by volume when tested according to ASTM C272 procedures. This small amount of moisture is confined to the minute spaces between the expanded cellular beads and has little adverse effect on either insulation value or strength.

STRUCTURALLY STABLE—Dimensional change of Armalite at low temperatures is negligible. The boards will contract only 0.00004 inch per inch per degree F. This low contraction results in superior thermal performance.

SELF-EXTINGUISHING—When tested according to ASTM D1692 procedures, SE Armalite is considered self-extinguishing by this test.

STRONG—Even though it is extremely lightweight, SE Armalite possesses excellent strength. It adequately supports poured concrete floors and floor loadings up to 1,150 pounds per square foot with only 5% deflection. In handling, there's no appreciable breakage loss with this durable foamed plastic board.

STRONG KEY FOR FINISHES—Armstrong Monoplast, Armstrong asphalt-emulsion-type finishes, and cement plaster all bond securely to SE Armalite surfaces. A layer of glass mesh membrane embedded in the first coat of Monoplast and asphalt-emulsion-type finishes controls the drying characteristics of these finishes and minimizes the possibility of their cracking. Cement plaster, applied as a finish with the Armalite Mechanical System, needs only the key of the 4"-wide strips of galvanized expanded metal lath on two-foot centers.

ECONOMICAL—SE Armalite is a low-cost board. Application is fast and economical. SE Armalite handles well. It can be worked with ordinary wood-working tools and applied by simple methods. High efficiency and moisture resistance keep the insulation performing at near original installation levels year after year.

Armalite Insulation application

ARMALITE/APPLICATION There are two basic methods of applying Armalite Insulation in cold room construction. One method uses adhesives and mastics while the other is a mechanically supported system which eliminates need for adhesives.

ADHESIVE SYSTEM This system follows long-established principles and methods, using adhesives and mastics to provide a vapor barrier and to secure insulation in place. Detailed specifications and application instructions for erecting Armalite by the adhesive system may be obtained from any Armstrong Office.

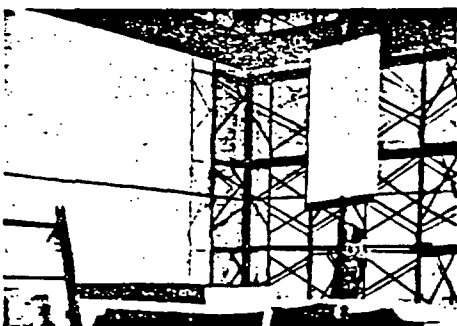
MECHANICAL SYSTEM

1. GENERAL

1.1 In this system, the vapor barrier, insulation, and finish are to be supported by wood framing, usually 2" x 4" kiln-dried lumber. The framing is to be erected against an existing building wall or it can be framing of the building itself. Where the insulation framing also is the building framing, it shall be sized according to accepted building practices. The vapor barrier film shall be applied with a minimum of joints and seams so that it is as airtight and moistureproof as possible.

1.2 The first layer of Armalite is to be erected against the vapor barrier, either between the framing members under compression or over the framing with a minimum of toenailing. The second layer shall be fastened to the first with a minimum of plastic skewers. Strips of metal lath approximately 4" wide or sheet-type insulation finish shall hold the insulation to the framing, using thin shank, large head nails driven through the lath or finish and the insulation into the framing.

Armalite Insulation typical physical properties



SE ARMALITE

TEST METHOD*

Density, lb/cuft	Thermal conductivity, Btu/hr sqft (F/in)		Thermal stability, % shrinkage (7 days @ 158F)	Minimum compressive strength @ 5% compression, psi	Flexural strength, psi (speed 12 in/min)
	40F mean temp.	70F mean temp.			
1	0.25	0.27	0.36	8	23
TEST METHOD*	ASTM D1622-63	ASTM C177-63	ASTM C177-63	ASTM C548-64T	ASTM D1621-64
					ASTM C203-58

*ASTM method, in some cases, may be modified slightly to make results more meaningful for end use application. If details are required, contact Armstrong Cork Company.

1.3 The installed finish shall have a vapor transmission rate of at least 1.0 perm, permitting the flow of moisture vapor. Portland cement plaster, asbestos cement board, metal, and some types of plastic sheets, when installed to allow flow of moisture vapor, are to be considered satisfactory finishes.

2. APPLICATION

2.1 MASONRY WALLS (AIR SPACE)—

The 2" x 4" framing on 24" centers shall be fastened to masonry, using a minimum number of fasteners, and securely fastened to the ceiling framing. Weep holes are to be provided in the masonry wall to allow drainage of building leakage to outside. The vapor barrier shall be applied over the framing, stapled in place at studs, and joints sealed with vapor barrier tape. The vapor barrier is to be started at wall-floor juncture, allowing about 2' to overlap the subfloor, and shall extend 3' beyond the ceiling line. The first layer of Armalite is to be toenailed to the framing. The second layer shall be applied dry and held in place with plastic skewers. For portland cement finish, 4" wide galvanized metal lath shall be located over each framing stud and nailed with large head, thin shank nails driven through lath and insulation into studs. For sheet material finishes, nails shall be driven through metal or boards and insulation into framing, slightly compressing insulation.

2.2 MASONRY WALLS (NO AIR SPACE)

2.2.1 The vapor barrier shall be applied directly against reasonably smooth walls. If the wall is rough, it is to be covered first with 15-lb saturated asphalt felt liner. The liner, if used, and vapor barrier shall be hung from wood lath temporarily nailed to the wall. The material is to extend 3' beyond the ceiling line and 2' onto the subfloor. All seams or breaks in the vapor

barrier shall be sealed with the vapor barrier tape. If the insulated space will be a suspended ceiling, the ceiling vapor barrier shall be carried down the wall before insulating. If ceiling is not suspended, the wall vapor barrier is to be sealed tightly to roofing or ceiling vapor barrier.

2.2.2 Precut framing studs are to be marked for each masonry fastener. At each mark and on face of stud that will be against vapor barrier, 3" to 4" lengths of nonhardening caulking shall be applied in a ribbon ¼" thick and 1½" wide. Studs shall be spaced 24" on centers. Fasteners are to be driven or shot through stud, caulking, and vapor barrier into wall. The first layer of Armalite is to be applied against the vapor barrier and between the studs under slight compression. The second layer shall be applied dry and held in place with plastic skewers. Insulation joints are to be staggered wherever possible. The finish shall be applied as for MASONRY WALLS—AIR SPACE.

2.3 STUDWALLS—Armalite is to be applied either to the surface of the studs or between them. For air space application, 2" x 4" studs are to be placed on 24" centers so the vertical joints in the insulation fall in stud centers. Vapor barrier, insulation, and interior finish application is to be the same as described under MASONRY WALLS—AIR SPACE. When insulation is to be applied between studs, the same procedure shall be followed as described under MASONRY WALLS—NO AIR SPACE, except that the framing shall be 2" x full 4" and the vapor barrier is to be applied over the warm side of the framing after the insulation is in place.

2.4 CEILINGS

2.4.1 FRAMED SUSPENSION—A ceiling grid shall be installed to provide nailing members on 24" centers to support the

insulation. The space between the insulated ceiling and the roof shall be freely vented. The vapor barrier, Armalite and finish are to be installed to the underside of the gridwork as described under MASONRY WALLS—AIR SPACE.

2.4.2 SUSPENDED METAL DECK—

Metal decking shall be suspended from structural steel with the galvanized channels and hanger rods designed to support the ceiling insulation specification and the expected foot traffic. Preferably, galvanized and perforated metal decking is to be used. The space between the insulated ceiling and the roof shall be freely vented. First layer of Armalite is to be laid dry. Second layer is to be applied on top with joints broken and secured with plastic skewers. The vapor barrier shall be installed over the Armalite and all seams are to be sealed. Also, the sidewall vapor barrier is to be sealed allowing enough slack in the film to prevent its tearing in case of building movement. Cement topping, 1" thick, shall be applied over the vapor barrier.

2.4.3 DIRECT APPLICATION—The

building shall be constructed and the insulation installed so that the roofing will act as the ceiling vapor barrier with the wall vapor barrier being sealed to the roofing. Wood sleepers, 24" centers, are to be anchored to the underside of the roof slab. The first layer of Armalite is to be applied dry, under compression, between the sleepers and toenailed to them. The second layer is to be applied dry and held in place with plastic skewers. The installation is to be completed as MASONRY WALLS—NO AIR SPACE.

2.5 FLOORS, COLUMNS, AND BEAMS—

Floors, columns, and beams shall be installed according to adhesive method outlined in the latest edition of "Armstrong Armalite Specifications".

Water absorption, % volume	Water vapor transmission rate, perm-in (wet cup)	Flammability	Linear coefficient of thermal expansion per F (e.g., in/in-F)	Capillarity	Maximum temperature limit for continuous use, F	Standard sizes	
						Board sizes, inches	Thicknesses, inches
2.5	3.5	SELF-EXTINGUISHING BY THIS TEST	0.00004	0	175	22½ x 48 22½ x 96 24 x 48 24 x 96 48 x 96	1 1½ 2 3 4 6
ASTM C272-53	ASTM C355-64	ASTM D1692-59T	ASTM D696-44				

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Armstrong

Prefinished Insulation product data

PREFINISHED INSULATION—Armstrong Prefinished Insulation is a new step forward in interior cold storage design and construction that provides an easier, better way to build a successful cold storage facility.

Armstrong Prefinished Insulation combines all major construction elements—vapor barrier, insulation, and finish—into one product that can be installed by simple, "one-step" methods. Each section of Prefinished Insulation consists of a core of Armstrong Armalite Polystyrene Insulation finished on both sides with an attractive factory-applied vinyl facing. The combination of these elements results in a "one-piece" cold storage system with excellent insulating value and superior water vapor resistance.

Sections of Armstrong Prefinished Insulation are joined by the use of plastic extrusions that fit into factory-cut grooves in all four edges of each unit. The completed system provides a continuous vapor barrier and makes possible the use of Prefinished Insulation for cold storage walls, ceilings, and partitions.

THERMALLY EFFICIENT—The Armstrong Armalite Insulation core is a molded polystyrene with an average thermal conductivity of 0.25 at 40F mean temperature. It is structurally stable, moisture resistant, lightweight, self-extinguishing, clean, strong, and odorless.

SUPERIOR VAPOR BARRIER—The combination of Armalite core insulation and factory-applied vinyl facings produces

superior vapor barrier characteristics. The permeance of a six-inch-thick section of Prefinished Insulation, for example, is less than 0.01 perm.

ATTRACTIVE, WASHABLE FINISH—The vinyl facings used for Prefinished Insulation are durable, washable, and attractive. The plastic extrusions which outline each section of the insulation provide an equally attractive contrasting frame for the vinyl facings.

SIMPLE, QUICK INSTALLATION—Since all major elements of cold storage design are combined in this one material, complete walls, partitions, and ceilings can be erected in less time than that required for conventional "piecemeal" installations.

INTERCHANGEABLE AND REUSABLE—Because of their construction, sections of Armstrong Prefinished Insulation are freely interchangeable and can be disassembled, moved, and reinstalled.

PROVIDES DESIGN FLEXIBILITY—Available in 6-foot widths, in any length up to 30 feet, and in 4-, 6-, and 8-inch thicknesses, Armstrong Prefinished Insulation may be used in a variety of architectural systems.

LIGHTWEIGHT AND STRONG—Ranging from slightly over one pound to one and one-half pounds per square foot, depending on thickness, Prefinished Insulation provides a lightweight, strong insulation system suitable for use as self-supporting ceiling units up to 15 feet in length.

EASY TO FABRICATE—Sections of Prefinished Insulation can be easily fabricated on the job site with regular carpentry tools to provide openings for doors, pipes, and ducts.

Prefinished Insulation application

TYPICAL SPECIFICATION

GENERAL—All walls, partitions, and ceilings shall be insulated with sections of Prefinished Insulation installed in accordance with manufacturer's standard details.

All floors requiring insulation shall be insulated with Armstrong Armalite Insulation installed according to the manufacturer's standard specifications.

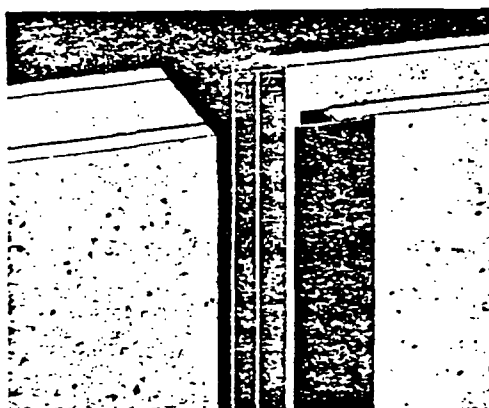
PREFINISHED INSULATION DETAILS

The insulation core of Prefinished Insulation shall be Armstrong Armalite molded polystyrene insulation having an average thermal conductivity of 0.25 at 40F mean temperature. Prefinished Insulation sections shall be finished on both sides with factory-applied vinyl facings which produce superior vapor-barrier characteristics. (Nom. 6" section = 0.01 perm ASTM C355-64)

INSTALLATION ACCESSORIES

Plastic Extrusions—There are four basic extrusions used in various types of Prefinished Insulation systems. These four extrusions are identified and used as follows:

Prefinished Insulation typical physical properties*



TEST METHOD	Thermal stability, % shrinkage (7 days at 175F)	Water absorption (core only), % volume	Water vapor transmission rate (Nom. 6" unit) (wet cup) perm	Linear coefficient of thermal expansion per F (e.g., in/in - F)	Flammability	Maximum temperature limit for continuous use, F
PREFINISHED INSULATION	0.3	2.5	0.01	0.000017"	SELF- EXTINGUISHING BY THIS TEST	175
TEST METHOD	ASTM C548-64T	ASTM C272-53	ASTM C355-64	ASTM D696-44	ASTM D1692-59T	

* Values for typical unit of Prefinished Insulation unless otherwise noted.

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Type	Uses
"H"	To connect wall, partition, and self-supporting ceiling units.
"F"	To secure the base of free-standing partition units or to attach the vapor barrier at the intersection of wall, ceiling, and partition units.
"L"	To cover the interior intersections of wall, ceiling, and partition units.
"Ceiling"	To connect and support ceiling units where required because of span length or special conditions.

Wood Battens—Nominal 1" x 3" surfaced-4-sides clear lumber. Secure with screws 10" on centers.

Metal Battens—18- or 20-gauge x 3"-wide sheet metal (hot-spray prime-coated) with rolled edges or edge break. Secure with screws 12" on centers.

Plywood Splines—Exterior grade plywood ½" x 1½" for securing fascia trim and ½" x 3" for connecting adjoining units.

Fascia Trim—Nominal 1" lumber and ¾"-thick exterior grade plywood. Secure with screws 10" on centers.

Alternate: 16- or 18-gauge sheet metal (hot-spray prime-coated) with slight edge break to assure neat contact.

Acmetite Vapor Barrier—Mylar-foil-mylar laminate manufactured by Acme Backing Company, Stamford, Connecticut. Used as a vapor barrier at intersections of wall, partition, and ceiling units of Prefinished Insulation. Where required, this vapor barrier film may be attached to the vinyl facings of Prefinished Insulation units with Armstrong 520 Adhesive.

Polyethylene Film Vapor Barrier—Black polyethylene film 6 mil (.006") or greater thickness when used in continuous sheets 10 ft or more in width.

Plastic Extrusion Fasteners—

"L" Attach on 8" centers with Molly Jacknuts, #6L-JN, manufactured by Molly Corporation, a Division of United Shoe Machine Company, or other approved equal mechanical fastener.

"F" Attach to concrete subfloor on 18" centers with HILTI, DRIVE-PINS, NK-35DX, or other approved equal mechanical fastener.

Wood Screws—No. 10 or 12 cadmium-plated or other corrosion-resistant finished metal.

Ceiling Extrusion Support Wire—No. 9 galvanized wire on 6'-0" centers.

Door Buck Bolts—¾" diameter nylon.

Door Support Lumber—Redwood or similar rot- and fungus-resistant wood, free from objectionable odor, or pressure treated with water-borne preservatives per Federal Specification TT-W-571g.

Bucks	Nom. 3" x 6"
Jambs	Nom. 2" (with wood bucks) Nom. 3" (with steel bucks)
Jamb Trim	Nom. 2" x 9¼" (with steel bucks)

Door Support Steel—4" x 3" structural angle. Thickness varies with strength requirements of the application. Apply rust-resistant primer. See Door Support Lumber for associated lumber items.

Metal Base Channel—16- to 20-gauge sheet metal (hot-spray prime-coated) 4" high x Prefinished Insulation unit thickness. Attach to concrete subfloor on 24" centers with HILTI, DRIVE-PINS, NK-35DX, or other approved mechanical fasteners.

Galvanized Sheet Metal—Galvanized sheet metal may be substituted for hot-spray prime-coated sheet metal.

Weight per sq. ft.			Nominal thickness	Maximum ceiling spans*	Conductance**	Thermal properties		Recommended usage		Sizes	
Thickness 4"	6"	8"				Interior partition wall "U" factor**	Exterior masonry wall "U" factor**	Application	Operating Temp. F	Width	Length
1.2 lb	1.3 lb	1.5 lb	4"	10'-0"	0.065	0.060	0.057	Cooler	35 to 50	6'-0"	up to
			6"	13'-0"	0.041	0.039	0.038	Holding Freezer	-10 to 34	6'-0"	30' in
			8"	15'-0"	0.030	0.029	0.028	Sharp Freezer	-35 to -11	6'-0"	1" increments

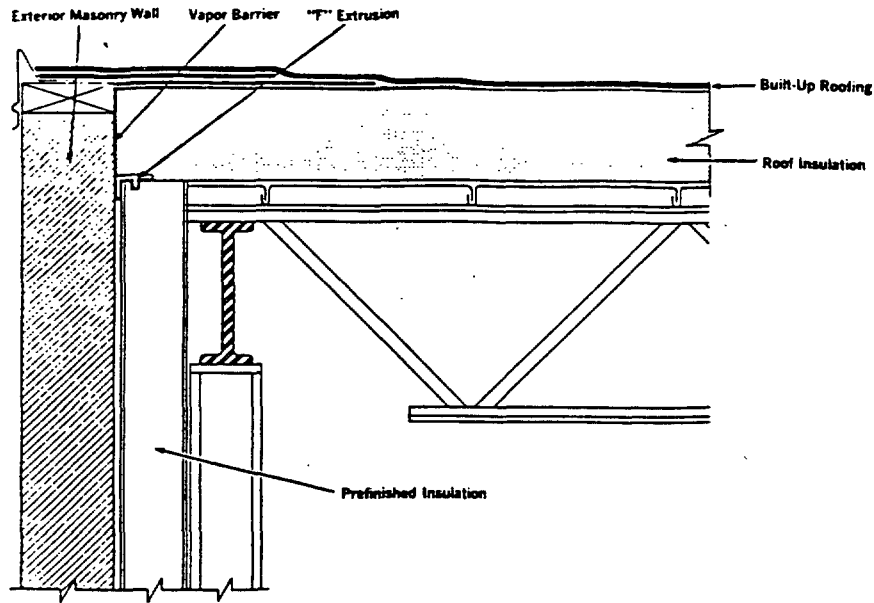
* Maximum allowable span based on unit weight only and maximum deflection of 1/240 of span length.

** Btu/hr sqft, F based upon mean temperature at end-use application. Interior partition, still air both sides. Exterior masonry wall, still air interior and 7.5 mph wind exterior.

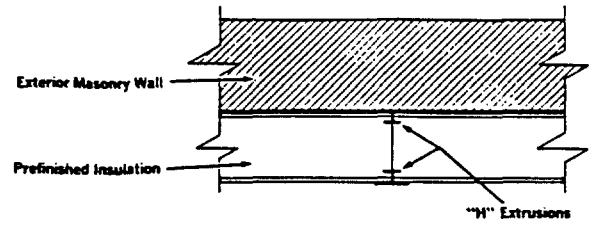
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Armstrong

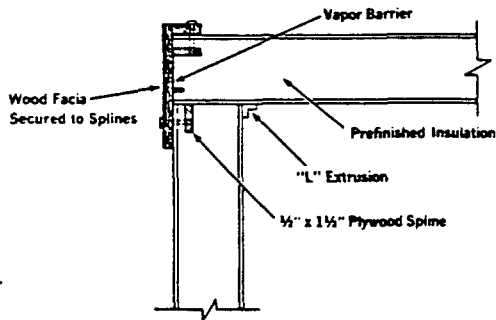
Prefinished Insulation assembly details



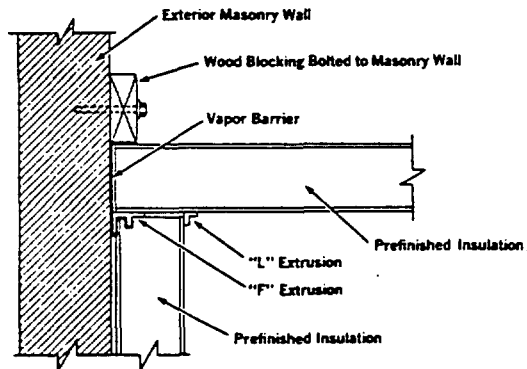
Wall-Roof Section



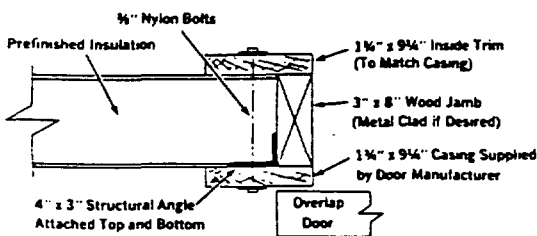
Exterior Wall Section



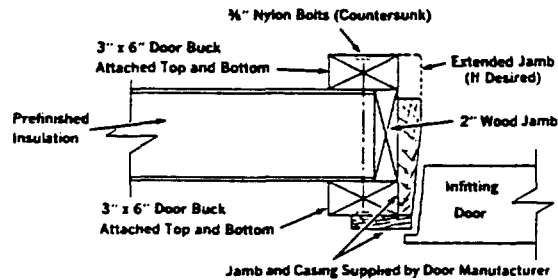
Interior Wall-Ceiling Section or Plan View of Partition Wall Intersection



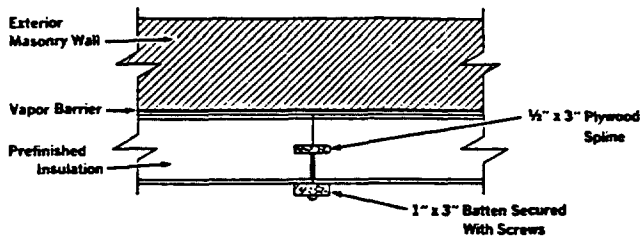
Interior or Exterior Wall-Ceiling Section or Plan View of Interior or Exterior Wall and Interior Partition Intersection



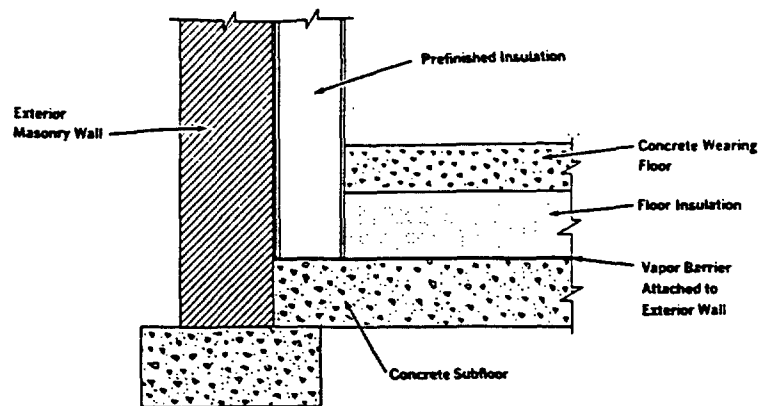
Door Jamb Section



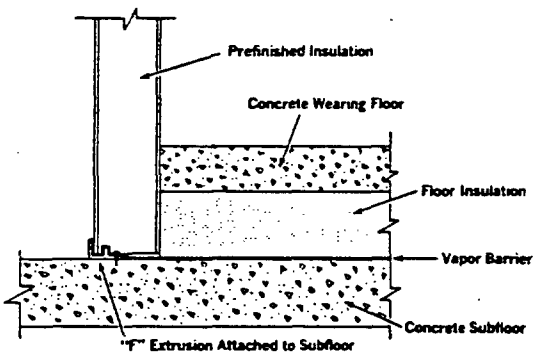
Lightweight Door Jamb Section



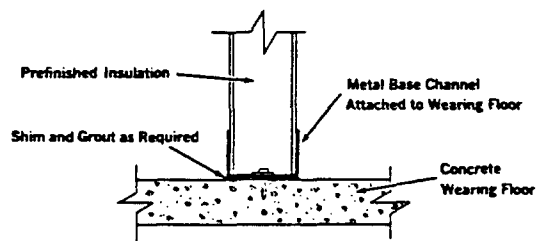
Alternate Exterior Wall Section



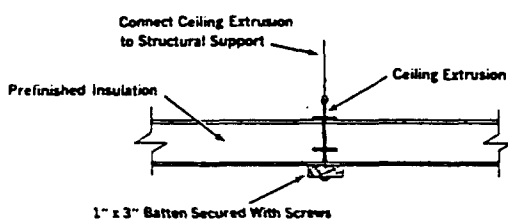
Exterior Wall Section



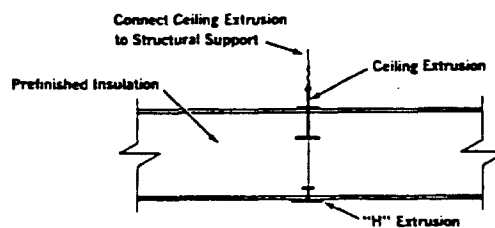
Interior Partition Wall Section



Alternate Interior Partition Wall Section



4" Long-Span Ceiling Section

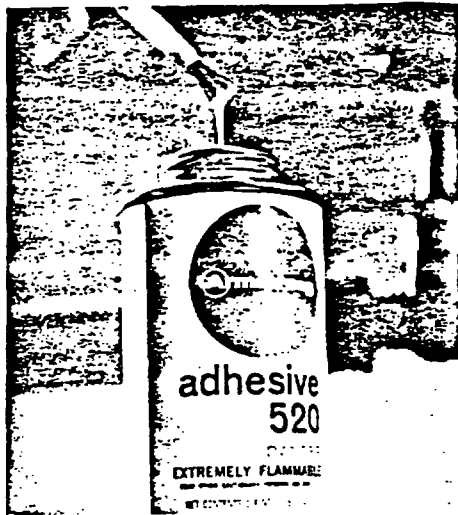


6" and 8" Long-Span Ceiling Section

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Adhesives



LAGGING ADHESIVE—A white, air-drying resin emulsion for adhering canvas, glass fiber cloth, asbestos cloth, and other surfacing fabrics over pipe insulations, insulated fittings, tanks, and equipment. May be used as a sizing for finish coats of oil- or latex-base paints, and may be over-coated with Armstrong Insulcolor. Has quick initial grab and produces moisture-resistant bond with low flame spread characteristics. Used indoors at service temperatures from -50 to $+180^{\circ}\text{F}$, meets GSA fire hazard rating requirements not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed. Coverage, 80 to 100 sqft per gal; packaged in 1-gal cans and 5-gal pails. Net weight, 9.8 lb per gal.

(FIRE-RESISTANT LAGGING ADHESIVE also available. Meets GSA fire hazard rating requirements not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed.)

DUCT-BOND ADHESIVE (CLEAR)—A rapid-setting, rapid-strength light amber adhesive for adhering light-density glass fiber insulation to metal ducts, wood, or concrete surfaces, for cementing laps of vapor barrier jackets and bonding joints of glass fiber fitting covers. Forms a flexible moisture-resistant bond at service temperatures from -20 to $+200^{\circ}\text{F}$. Meets GSA fire hazard rating requirements not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed. Coverage, 200 to 250 sqft per gal; packaged in 1-gal cans and 5-gal pails. Net weight, 6.5 lb per gal.

DUCT INSULATION ADHESIVE—A fast-drying, rapid-strength, red-colored adhesive for adhering light-density glass fiber insulation to metal ducts, wood, or concrete surfaces; for cementing laps of

vapor barrier jackets; and bonding joints of glass fiber fitting covers. It is especially suited to spray application, as well as brush and roller. Forms a flexible, moisture-resistant bond at service temperatures from -20°F to $+250^{\circ}\text{F}$. Coverage, 350 to 400 sqft per gal; packaged in 1-gal cans and 5-gal pails. Net weight, 6.3 lb per gal.

LAP SEAL ADHESIVE (WHITE)—A quick-setting, high-strength white adhesive to adhere and seal lap joints of white vapor barrier jackets. Forms moisture- and vapor-resistant bond on coated surfaces operating from -20 to $+200^{\circ}\text{F}$. Meets GSA fire hazard rating requirements not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed. Coverage, 200 to 250 sqft per gal; packaged in 1-gal cans and 5-gal pails. Net weight, 6.5 lb per gal.

520 ADHESIVE—This all-purpose adhesive is excellent for sealing the laps of vapor barrier jackets on pipe covering. Also, it may be used for bonding rubber or plastic extruded gasket seals to metal, plastic, or wood surfaces. Additional uses include bonding linoleum, leather, or fabric-backed vinyl roll goods to wood, metal, plastic, or composition bases; thin-gauge metal to metal or other rigid bases; fibrous glass, cork, felt, or urethane foam insulation to metal surfaces. On pipes operating to 200°F , 520 Adhesive is used to seal the joints of Armaflex Pipe Insulation. It also may be used to apply Armaflex 22 Sheets on surfaces to 160°F . Meets GSA fire hazard rating requirements not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed. Armstrong 520 Adhesive is available in one-half-pint and pint brush top cans, one-half-pint, pint, quart, and gallon containers. Coverage is 200 sqft per gal depending on the porosity of the surface being bonded. Net weight, 6.9 lb per gal.

620 ADHESIVE—This heat-resistant adhesive was developed primarily for sealing the joints of Armaflex Pipe Insulation when applied over pipes operating in the temperature range of 200°F to 220°F . It is also used to apply Armaflex Sheets on surfaces to 180°F . 620 Adhesive is available in quart containers. Coverage is 50 sqft per qt depending upon the porosity of materials to be bonded. Net weight, 7.1 lb per gal.

536 ADHESIVE—This adhesive is used for application of flexible duct insulation and for other applications where a vapor seal is required. Armstrong 536 Adhesive is available in 1-gal cans and 5-gal pails. Coverage is 130 sqft per gal in full

coverage application. Net weight, 8.7 lb per gal.

340 WATERPROOF CEMENT—Medium-bodied cement for erecting board-type insulation against metal surfaces at temperatures to 150°F . It also adheres tightly to concrete and plaster surfaces. Because of slight residual odor, should not be used to erect insulation inside cold storage rooms. Armstrong 340 Waterproof Cement is supplied in 1-gal cans and 5-gal pails. Net weight, 11 lb per gal. Coverage is 30 sqft per gal, applied with a notched trowel.

Coatings



ARMAFLEX FINISH—A vinyl lacquer-type coating for use over Armaflex Insulations. Provides a tough, high-gloss, weather-resistant film that is flexible enough to deform with Armaflex without cracking. Used both outdoors and indoors without a reinforcing membrane, it possesses the same self-extinguishing properties as Armaflex. Available in white and gray. Shipped in 1-qt and 1-gal cans and 5-gal pails. Coverage, 300 sqft per gal single brush coat. Net weight, 8.8 lb per gal.

INSULATION COATING (FIRE RESISTANT)—An air-drying adhesive coating that produces a high-strength, moisture-resistant bond as an adhesive and a tough, durable, washable surface as a finish. Used as a finish over canvas or asbestos cloth on insulations, as lagging adhesive for applying fibrous glass cloth and tape lagging, and as a size coating under Armstrong Insulcolor, oil- or latex-base paints. May also be used as an isolation barrier with expanded polystyrene insulation prior to application of Armstrong Weatherproof Plastic Finish. Meets GSA fire hazard rating requirements not

to exceed 25 for flame spread and 50 for fuel contributed and smoke developed. Used on surfaces operating from -20 to +180F. Coverage, 40 to 80 sqft per gal as a finish; 80 to 100 sqft per gal as an adhesive. Packaged in 1-gal cans, 5-gal pails. Net weight, 9.7 lb per gal.

INSULCOLOR—A tough, flexible, fire-retardant, protective coating for insulated hot or cold lines, tanks and equipment, cold rooms, and air-conditioning ducts. Made in dark and light blue, dark and light green, yellow, gray, buff, and white, Insulcolor provides color identification as well as a rugged finish for both indoor and outdoor applications where insulation surface temperature does not exceed 160F. Also can be used over cement plaster or asphaltic finishes in low-temperature rooms. Meets GSA fire hazard rating requirements not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed. Diluted with one part water to four parts Insulcolor, it is also used as a lagging adhesive and primer. Coverage, approx. 150 sqft per gal depending on surface; packaged in 3½-gal pails containing 3 gal white. Color tint packaged separately and job mixed. Net weight, 10.3 lb per gal.

MONOPLAST—Monoplast is a troweled-on, hydraulic-setting, two-part, job-mixed white cold storage room finish. It has most of the desirable properties of portland cement plaster, yet is light in weight and requires no metal lath or scoring. Monoplast can be used in ¼" thickness through the entire range of refrigerated room temperatures down to 80F below zero. A layer of glass mesh embedded in the first coat controls drying characteristics and minimizes possibility of the finish cracking when applied over expanded polystyrene insulations. Use in combination with a metal plate above blower units. It is shipped in complete 158-lb units consisting of 28 lb liquid and 130 lb powder. Coverage, 0.7 to 1.25 lb per sqft according to surface covered.

SP EMULSION—Factory-mixed combination of Standard Asphalt Emulsion and asbestos fibers ready for troweling directly to insulation surface in two approximately ⅛" coats when wet. For use as interior cold room finish where a smooth surface is desired. Armstrong SP Emulsion Finish should be applied only at temperatures above 40F. When dry, the finish can be subjected to temperatures as low as minus 25F. A layer of glass mesh embedded in the first coat controls drying characteristics and minimizes possibility of the finish cracking when applied over ex-

panded polystyrene insulations. Use in connection with a metal plate above blower units. Coverage, 9 sqft per gal (two 0.09" coats). Packaged in 5-gal pails and 55-gal drums. Net weight, 8.8 lb per gal.

PLASTIC EMULSION—Factory-mixed combination of Standard Asphalt Emulsion, asbestos fibers, and sand, ready for troweling directly on insulation surface in two approximately ⅛" coats when wet. For use as interior cold room finish where a sand finish surface is desired. Armstrong Plastic Emulsion should be applied only at temperatures above 40F. When dry, Armstrong Plastic Emulsion Finish can be subjected to temperatures as low as minus 25F. A layer of glass mesh embedded in the first coat controls drying characteristics and minimizes possibility of the finish cracking when applied over expanded polystyrene insulations. Use in connection with a metal plate above blower units. A finish similar to Armstrong Plastic Emulsion also can be obtained by job mixing 50 gal Armstrong SP Emulsion with 175 lb dry, screened sand and a small amount of water for tempering. Coverage, 8 sqft per gal (two 0.100" coats); packaged in 5-gal pails and 55-gal drums. Net weight, 10.3 lb per gal.

INSULMASTIC—A factory-mixed combination of Standard Asphalt Emulsion with special fibers and fillers. It is recommended for use where a "breathing" outdoor asphaltic finish is required. Applied in two coats, each approximately ⅛" to ⅜" thick when wet. Insulmastic is an excellent finishing material for high-temperature insulation exposed to the weather. Galvanized wire mesh must be applied over the insulation surface before Insulmastic is troweled on to provide a key for the first coat. Coverage, approximately 5 sqft per gal (two 0.160" coats); packaged in 5-gal pails and 55-gal drums. Net weight, 9.4 lb per gal.

Sealers

WEATHERPROOF PLASTIC—A factory-mixed, fibrated asphalt cutback composed of special asphalts, asbestos fibers, fillers, and a petroleum solvent. It is recommended for use in conjunction with glass mesh membrane where a weather-resistant vapor barrier is required. May not be applied directly to expanded polystyrene insulations. Coverage, approximately 9 sqft per gal (two 0.09" coats); packaged in 5-gal pails and 55-gal drums. Net weight, 8.4 lb per gal.

LT SEALER—A white, fire-resistant, weatherproof vapor barrier used with low-temperature insulations wherever a white vapor barrier is required. It is used where Armaflex must be sealed around metal rods and projections and finished with Armaflex Finish. Shipped in 1-gal cans. Coverage, 35 sqft per gal in approximately ⅛" (0.045") coat. Net weight, 13.2 lb per gal.

CC NAVY SEALER—A specially developed, fire-resistant vapor barrier, used to coat both inner and outer surfaces of cork covering, and as an adhesive at all joints. Shipped in 1-gal cans and 5-gal pails. Coverage, 35 sqft per gal in approximately ⅛" (0.045") coat. Net weight, 12.5 lb per gal.

STANDARD ASPHALT EMULSION—A clay emulsion of finely dispersed, high-grade asphalt. This is the basic ingredient of Armstrong Plastic Emulsion Finish (sand finish), Armstrong SP Emulsion Finish (smooth finish), and Insulmastic (outdoor finish). It may also be used to prepare job-mixed finishes similar to SP and Plastic Emulsions. Standard Asphalt Emulsion is also recommended for sealing seams in refrigerated display cases and equipment. Coverage for this purpose, 1½ to 2½ gal per 100 sqft. Packaged in 5-gal pails and 55-gal drums. Net weight, 8 lb per gal.

NO. 3 ASPHALT PAINT—Specially formulated for priming masonry, concrete, steel, or cement plaster surfaces prior to erecting insulation in hot asphalt. Packaged in 1-gal cans and 5-gal pails. Net weight, 7.5 lb per gal. Coverage is 100 sqft per gal sprayed on in two coats, 75 sqft brushed on in one coat.

Specialties

PLASTIC SKEWERS—Used to secure the second and succeeding layers of Armaflex and corkboard to the preceding layer. Two skewers should be used per square foot for wall insulation, three per square foot for ceilings and self-supporting walls. Available in 3½", 4½", and 5½" lengths which, when driven straight, allow 1½" penetration when applying 2", 3", or 4" insulation. Packaged 1,000 per carton.

GRANULATED ARMAFLEX—Small particles of Armstrong Armaflex foamed plastic insulation ⅜" and smaller, with good insulation value. Resilience offers high resistance to packing down when used to fill irregular spaces. Packed in 75-lb bags.

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Armstrong

INDUSTRY PRODUCTS DIVISION OFFICES

ATLANTA, GEORGIA 30324
1904 Monroe Drive, N.E.

BOSTON, MASS.
40 Washington Street
Wellesley Hills, Mass. 02181

CHARLOTTE, N.C. 28204
1341 E. Morehead Street

CHICAGO, ILL. 60634
6535 W. Irving Park Road

CINCINNATI, OHIO 45237
1057 Meta Drive

CLEVELAND, OHIO 44122
21111 Chagrin Boulevard

DALLAS, TEXAS 75219
2727 Oak Lawn Avenue

DETROIT, MICHIGAN 48226
Free Press Building
321 Lafayette Avenue, West

KANSAS CITY, MO. 64108
500 West 26th Street

LOS ANGELES, CALIF.
9700 Flair Drive
El Monte, Calif. 91731

MILWAUKEE, WIS. 53216
6228 West Capitol Drive

NEW YORK, N.Y. 10020
60 West 49th Street
Rockefeller Center

PHILADELPHIA, PA.
301 City Line Avenue
Bala-Cynwyd, Pa. 19004

ST. LOUIS, MO. 63105
222 South Meramec Avenue

SAN FRANCISCO, CALIF.
1814 Ogden Drive
Burlingame, Calif. 94011

CANADA
6911 Decarie Boulevard
Montreal, Quebec

PUERTO RICO
First Federal Savings Bldg.
1519 Ponce de Leon Avenue, Stop 23
San Juan 00909

HAWAII
King Center Bldg.
1451 South King Street
Honolulu 96814



INDUSTRY PRODUCTS DIVISION, LANCASTER, PA.

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Armstrong INSULATIONS

FOR PIPES

INSULATION	USE RANGE, °F
Polystyrene Pipe Covering (M)	-300 to 160
LT Cork Pipe Covering (M)	-30 to 200
Cork Pipe Covering (M)	-300 to 200
Armaflex Pipe Covering	-100 to 220
Expandofoam Pipe Covering (M)	-300 to 250
Armaglas Pipe Covering	32 to 350
Foamglas Pipe Covering (M)	-200 to 800
Armatemp V-Grooved Pipe Cov.	100 to 1000
Armatemp Type #100 Pipe Cov.	100 to 1200
Armatemp Type #101 Pipe Cov.	100 to 1200
Armatemp Blanket Pipe Covering	100 to 1200
LK Pipe Covering	100 to 1200
Armaspray 16 Spray-On	100 to 1600

(M) Manufactured

FOR HEAT., VENT. & AIR CONDITION. DUCTS

Armalite	0 to 175
Armaflex	0 to 180
Corkboard	0 to 200
Expandofoam Board	0 to 250
Armaglas Insulation Board	50 to 250
Armaglas Flexible Liner	50 to 250
Armaglas Blanket	50 to 425
Armatemp Felt	50 to 450

FOR TANKS, VESSELS & EQUIPMENT

INSULATION	USE RANGE, °F
Armaflex Sheet	-100 to 180
Corkboard	-300 to 200
Expandofoam Board	-300 to 250
Armaglas Insulation Board	50 to 250
Armaglas Blanket	100 to 425
Armatemp Felt	100 to 600
Armatemp 700 Board	100 to 700
Armatemp 750 Board	100 to 750
Armatemp V-Grooved Felt	100 to 1000
Armatemp Blanket	100 to 1200
LK-12 Block	100 to 1200
Armaspray 16 Spray-On	100 to 1600
Armatemp Block	100 to 1800

FOR REFRIGERATED ROOMS

Armalite	-300 to 175
Corkboard	-300 to 200
Expandofoam	-300 to 250
Insulated Panels	-300 to 300
Prefinished Insulation	-300 to 175

FOR MISCELLANEOUS APPLICATIONS

Expandofoam, Foam-In-Place	-30 to 190
Granulated Cork	-300 to 200
Granulated Armaflex	-100 to 220
Armatemp No. 10 Cement	100 to 1000
Armatemp Spun Wool	100 to 1200
Armatemp Granulated Wool	100 to 1200
Armatemp No. 166 Cement	100 to 1800

ADHESIVES, COATINGS & FINISHES

#520 Adhesive	Lagging Adhesive	Monoplast
#620 Adhesive	Duct Insulation Adhesive	LT Sealer
#536 Adhesive	Fire Resistant Lagging Adhesive	CC Navy Sealer
#340 Waterproof Cement	Duct Bond Adhesive (clear)	Weatherproof Plastic
No. 3 Asphalt Paint	Lap Seal Adhesive (white)	Insulmastic
Asphalt Emulsion	SP Asphalt Emulsion	Insulcolor
	Plastic Emulsion	

SPECIALTY PRODUCTS

Machinery Isolation Cork
Premolded Expansion Joint Filler

Armaflex Tape

Flexible Air Duct
Decorator Cork

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Armstrong CONTRACTING AND SUPPLY CORPORATION
LANCASTER, PENNSYLVANIA



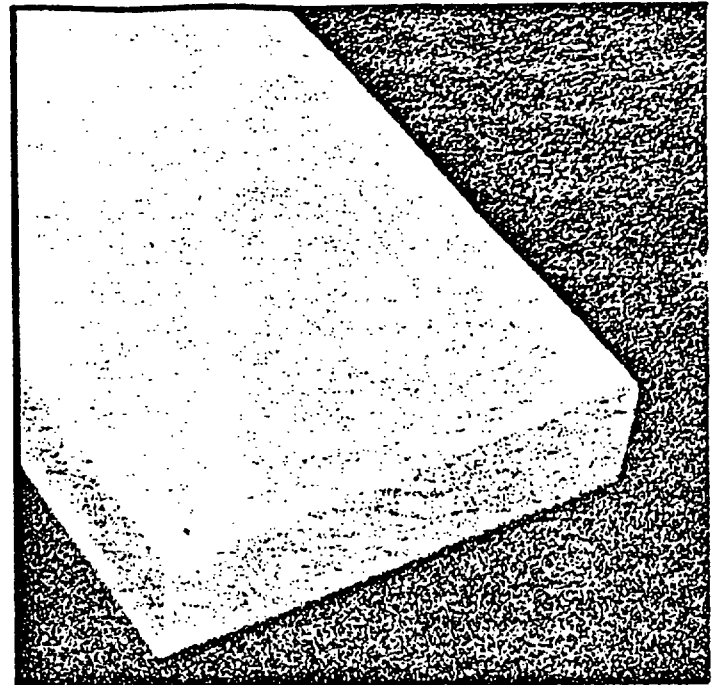
DESCRIPTION

Armstrong Expandofoam NB Gray Insulation is a rigid urethane board form product designed primarily for refrigerated room service (coolers and freezers) but can be used to an advantage over most other grades of urethane anywhere within the broad temperature range of -50°F to $+200^{\circ}\text{F}$.

Its low thermal conductivity and high strength to weight ratio combined with a "non-burning" fire rating, provide a balance of properties that is particularly adaptable to building construction of all types where maximum space utilization and resistance to loads are primary considerations. In addition, with Expandofoam NB Gray Insulation, the fire resistant property is chemically locked in during manufacture, producing a permanently effective high quality product, unlike those with fire retardant additives which tend to produce friability and degradation of other physical properties.

PHYSICAL PROPERTIES

Density, pounds per cu. ft.	1.8 - 1.9
Maximum Operating Temperature, $^{\circ}\text{F}$, continuous	-50°F to $+200^{\circ}\text{F}$
Thermal Conductivity, Btu/hr.sq.ft. ($^{\circ}\text{F}/\text{in.}$), at 50°F mean temp.	0.14
Compressive Yield Strength, psi (ASTM D1621-64)	24
Coeff. of Linear Exp., Average in./in./ $^{\circ}\text{F}$ 75 $^{\circ}\text{F}$ to -10°F	-.00004
75 $^{\circ}\text{F}$ to 200°F	.00007
Moisture Vapor Permeability, Perm - Inches Dry Cup (ASTM C355-64)	0.9
Fire Resistance (ASTM D-1692)	Non-burning



SPECIFICATION COMPLIANCE

Federal Specification

HHI-00530 (GSA-FSS) Type III, Class 2

STANDARD SIZES

Thicknesses $3/4"$ to $6"$ - Widths $12"$, $16"$, $24"$, and $48"$ -
Lengths $36"$, $48"$, $72"$, $96"$, and $144"$.

USES

Expandofoam NB Gray Insulation is the ideal refrigerated room insulation although it provides maximum economy and can be used as well for ducts, vessels and equipment, etc., in the operating range of -50°F to $+200^{\circ}\text{F}$.

ADVANTAGES

RESISTANCE TO SOLVENTS - As most solvents have no effect on Expandofoam NB Gray, it can be used in connection with most commercially available adhesives and coatings.

SPACE SAVING - Its superior insulating quality, almost twice that of conventional insulating materials, provides cost savings either in terms of increased cubic capacity or reduction of building dimensions.

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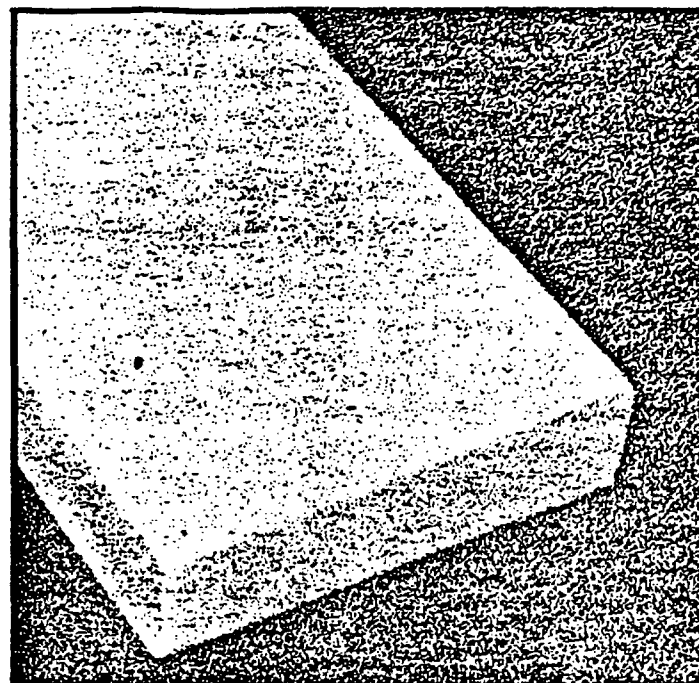
Armstrong CONTRACTING AND SUPPLY CORPORATION

LANCASTER, PENNSYLVANIA

Armstrong

Expandofoam

**NB Green
Insulation**



DESCRIPTION

Armstrong Expandofoam NB Green Insulation is a rigid urethane board form product designed primarily for use on ducts, vessels and equipment, as well as pipe insulation, operating in the cryogenic range of temperatures, down to -420°F , and up to temperatures as high as 300°F . Its excellent dimensional stability over a wide temperature range provides outstanding dual temperature performance in piping and equipment applications.

SPECIFICATION COMPLIANCE

Federal Specification HHI-00530 (GSA-FSS) Type III, Class 2

PHYSICAL PROPERTIES

Density, pounds per cu. ft.	2 - 2.25
Maximum Operating Temperature, $^{\circ}\text{F}$, continuous	-420°F to $+300^{\circ}\text{F}$
Thermal Conductivity, Btu/hr.sq.ft. ($^{\circ}\text{F}/\text{in.}$), at 50°F mean temp.	0.15
Compressive Yield Strength, psi (ASTM D 1621-64)	24
Coeff. of Linear Exp., Average in./in./ $^{\circ}\text{F}$ 75 $^{\circ}\text{F}$ to -10°F	-.00003
75 $^{\circ}\text{F}$ to 200°F	.00005
Moisture Vapor Permeability, Perm - inches Dry Cup (ASTM C-355-64)	1.2
Fire Resistance (ASTM D-1692)	Non-burning

STANDARD SIZES

Thicknesses $3/4"$ to $6"$ - Widths $12"$, $16"$, $24"$, and $48"$ -
Lengths $36"$, $48"$, $72"$, $96"$, and $144"$.

USES

Expandofoam NB Green Insulation, because of its excellent dimensional stability and wide temperature use range, is considered the standard pipe, duct, and vessel insulation.

ADVANTAGES

RESISTANCE TO SOLVENTS - As most solvents have no effect on Expandofoam NB Green, it can be used in combination with most commercially available adhesives and coatings.

DUAL TEMPERATURE SERVICE - Its excellent thermal properties over a broad temperature range places Expandofoam NB Green in a class by itself for dual temperature service.

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