

PLAINTIFF'S  
EXHIBIT

DUP-555

OF DUTY IN THE NO. 1292

FOR

INSULATION, ROOFING, FLASHING, AND SHEET METAL WORK

FOR

INCREASED BRANCHED POLYETHYLENE FACILITIES

AT

VICTORIA PLANT  
VICTORIA, TEXAS

BY

E. I. DU PONT DE NEMOURS & CO., INC.  
Wilmington, Delaware

PROJECT 3210

March 10, 1960

APPROVED BY:

Design Division

Date

DUP 0841003

INSULATION, ROOFING, FLASHING  
AND SHEET METAL WORK

1. GENERAL

1.1 Scope - this specification covers roof insulation under built-up roofing, built-up roofing, and all flashing and sheet metal work related thereto.

1.2 Intent - the intent of these specifications is to set forth the quality and type of materials of construction, and the workmanship required for the performance of the work involved.

1.3 Manufacturers Products are sometimes named for the purpose of describing the material desired, and such naming shall not be construed as preventing the use of materials of other manufacturers of equal kind and quality, unless such other materials are specifically denied acceptance herein. Samples of alternate materials together with complete specifications shall be submitted to du Pont for approval before the incorporation of such materials in the work, unless this requirement is waived by du Pont.

1.4 References -

1.4.1 "Du Pont" refers to the authorized representative of E. I. du Pont de Nemours & Co., Inc.

1.4.2 Reference to bureaus, associations, and institutes shall mean the particular specification and/or method of testing referred to by the designated symbol or code number.

The following is a tabulation of specifications pertinent to this specification and referenced herein. Reference date of these specifications should be noted.

American Society of Testing Materials  
1916 Race Street, Philadelphia Pa.

|               |               |                 |
|---------------|---------------|-----------------|
| ASTM: C343-56 | ASTM: D312-44 | ASTM: D1127-50T |
| C208-57T      | D226-56       | C88-56T         |
| D5-52         | D227-56       | D224-58         |
| D217-52T      | D250-56       | D173-44         |
| D1167-58T     | D450-41       | D517-50         |
|               |               | D1227-52T       |

Federal Specifications - General Services  
Superintendent of Documents  
U.S. Government Printing Office, Washington 25, D.C.

Fed. Spec. S3-C-153

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1. GENERAL (cont'd)

1.4 References (cont'd)

1.4.5 Reference to Standard Engineering Specifications shall be considered as referring to E. I. du Pont de Nemours & Co., Inc., Standard Engineering Specifications.

1.5 Guarantee - all built-up roofing, insulation and flashing shall carry a guarantee as stated herein but shall not be bonded.

1.5.1 The contractor shall furnish a written guarantee protecting du Pont against defective materials and faulty workmanship in the application of insulation, roofing and built-up flashings, for a period of two years following the date of acceptance of the finished roof.

1.5.2 The applicator shall inspect all decks and ascertain that they are in the condition required by this specification. Start of work by the applicator shall imply approval of the deck surfaces, and no claim in this respect will be accepted in case of failure of roofing or insulation during the guarantee period.

1.6 Safety Precautions - kettles shall be located so as to prevent damage to buildings or other property. They shall not be positioned on roof decks. Mops shall be spun or whirled at the end of work period to separate the strands and shall be stored with strands separated to prevent spontaneous combustion. Fire extinguishers shall be provided near kettles for immediate use. The fumes of hot bituminous materials may be toxic to some workmen. Adequate protection shall be provided to prevent burns and skin irritation, in accordance with du Pont safety rules.

1.7 Miscellaneous Requirements -

1.7.1 Roof Traffic. After work of roofing is started no unauthorized traffic will be permitted on roof other than that necessary for roofing application and inspection. Surfacing aggregate, felts, or other materials shall not be piled on the roof to the extent that the design loads are exceeded. Roofing materials shall not be transported over unfinished or finished roofing.

1.7.2 Building Protection. Surfaces of walls, walks, roads, etc., shall be covered as necessary to prevent soiling or other damage resulting from roof application.

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## 1. GENERAL (cont'd)

1.5 Roof Types and Symbols - roofing shall be of the type indicated by the symbols shown on the drawings. Definitions of symbols are as follows:

- SG - Slag or Gravel Surface
- 1 - Slope of deck less than 1/2 inch per foot
- T - Precast Concrete Tile Deck
- P - Prestressed Concrete Slab Deck
- S - Metal Deck
- I - Insulation
- 20 - Twenty-year Roof

### Example:

SG-1SI-20 = Slag or gravel surface; slope less than 1/2 inch, per foot; metal deck; insulated (per drawing); twenty-year roof. "Twenty-year roof" is that which is constructed according to this specification.

## 2. INSULATION

### 2.1 Materials

2.1.1 Insulation shall be of a material and thickness as called for on the drawings, or as specified herein.

2.1.1.1 Cellular Glass roof insulation shall conform to ASTM: C343. Size of units shall be 12 inches by 18 inches or 24 inches by 24 inches.

2.1.1.2 Rigid Insulation shall be vegetable fiberboard conforming to ASTM: C208 and shall be guaranteed by the manufacturer to have a thermal conductivity (k) of not more than 0.38 at 75 degrees F. mean temperature. Insulation shall be either asphalt impregnated or asphalt coated, 6 sides, and shall be chemically treated to resist rot, mold, vermin, etc.

2.1.1.3 Mineral Wool Board shall be "Fesco Board" as manufactured by F. E. Schundler & Co., Inc., 504T Railroad, Joliet, Illinois. Asphalt impregnated board is not acceptable.

2.1.2 Adhesives for applying insulation to roof deck shall be as follows:

2.1.2.1 Pitch Emulsion shall consist of coal-tar pitch and inert mineral fillers dispersed in water to form a stable suspension of the bitumen and filler. No asbestos reinforcement shall be used.

## 2.1 Materials (cont'd)

### 2.1.2.1 Pitch Emulsion (cont'd)

It shall be homogeneous other than the possibility of some water separation which can be overcome readily with moderate stirring. It shall be easily applicable to cleaned concrete surfaces and shall not have a pronounced or unduly objectionable odor. When applied at the rate of 4 gallons per 100 square feet to a vertical surface, it shall not sag and, upon drying, shall not flow at any temperature.

Consistency. The emulsion shall be of such consistency as to be readily applicable either by brush, spray, or serrated squeegee. It shall also be of such consistency that when brushed or otherwise applied over joints between precast roof slabs, it shall not flow or sag more than one inch downward in the joint. An indication of this property may be observed in the laboratory by brushing the emulsion over a joint between two sections of precast concrete roof slabs spaced 1/4 inch.

Composition. When tested in accordance with ASTM: D1167, it shall conform to the following requirements:

|                     |                    |
|---------------------|--------------------|
| Nonvolatiles        | 50 percent minimum |
| Water               | 50 percent maximum |
| Ash in nonvolatiles | 40 percent maximum |

Penetration, at 77 degrees F (ASTM: D5, using cone instead of needle as covered by ASTM: D217, under total weight and time of 150 grams, 5 seconds) after 7 days storage, shall be between 280 and 320. (NOTE: Sample shall be prepared by pouring directly from the batch as manufactured or by transfer from another container into a one-pint paint-type can. After 7 days storage at ambient temperatures, it shall be brought to 77 degrees F by immersion in a water bath for one hour, after which the entire top of the can shall be removed by cutting with a can opener, and immediately followed by testing for penetration.)

Drying Time. When applied to a steel plate at the rate of 150 square feet per gallon (30 grams per square foot), the film shall dry in not more than 3 hours at an approximate temperature of 70 degrees F. and 50 percent relative humidity. When the above film has dried for 24 hours, it shall not flow when the plate is held at an angle of 45 degrees and the back of the plate heated by the flame of a Bunsen burner.

## 2. INSULATION (cont'd)

### 2.1 Materials (cont'd)

#### 2.1.2.1 Pitch Emulsion (cont'd)

Re-emulsification. No re-emulsification of the dried film shall occur when tested in accordance with ASTM: D1167.

Moisture Absorption. The emulsion shall absorb less than 12 percent moisture when tested in accordance with the following procedure:

- a) Prepare 3 copper plates approximately 6 inches square, and weighing 16 ounces per square foot.
- b) Weigh dry clean plates to nearest gram and record. This shall be designated weight A.
- c) Coat one side of the plates with emulsion 1/16 inch thick and allow to set and dry.
- d) Dip coated specimens for an instant in distilled water, wipe gently with a cloth, weigh, and record. This weight shall be designated weight B.
- e) Immerse specimens in distilled water for two weeks.
- f) At the end of this period, remove specimens, wipe gently with a cloth, weigh, and record, as weight C.
- g) Compute moisture content (M) of each sample as follows:

$$M = \frac{(C-B)}{B-A} \cdot 100 \text{ percent}$$

2.1.2.2 Steep Asphalt shall conform to ASTM: D312 and shall be as described in paragraph 4(c) thereof and covered by requirements for "Unsurfaced Steep" roofs in Table I thereof.

### 2.2 Storage of Materials -

2.2.1 Insulation materials shall be delivered to the site undamaged and in a dry condition. Material received which is obviously not dry or is otherwise damaged shall be rejected. Storage in the field must be under roof and upon blocking above the floor, so that when installed it is in the same dry condition as when received.

## 2. INSULATION (cont'd)

### 2.2 Storage of Materials (cont'd)

2.2.2 Emulsions must be stored so as to prevent their freezing. When an emulsion has frozen, it has lost its cohesiveness and thixotropic characteristics. The water and asphalt has separated and stirring will not restore its original smooth, jelly-like consistency.

### 2.3 Application of Insulation -

2.3.1 General. No more insulation shall be applied than can be covered by all overlying plies of built-up roofing during the same work period. Permeable insulation (vegetable fiberboard or mineral wool board) allowed to become wet must be removed and replaced. Decks must be dry, clean and free from snow, ice, dirt, dust, refuse or other foreign materials.

Insulation units shall be laid in an overall coating of pitch emulsion or in steep asphalt as specified in Item 2.3.3.1 hereof. Transverse joints in insulation shall be staggered. Joints shall be nominally tight but insulation shall not be forced into place.

2.3.2 Preparation of Deck Surfaces by Others. Metal decks receiving impermeable insulation shall have flutes filled with lightweight concrete. Placing of concrete is not a part of this specification.

#### 2.3.3 Type of Decks -

2.3.3.1 Metal Deck. Insulation on open fluted metal decks shall be cemented with either pitch emulsion or steep asphalt. When impermeable insulation is laid on metal deck with filled flutes, only steep asphalt shall be used.

2.3.3.2 Precast Concrete Decks. Fiberboard insulation shall be cemented to precast concrete decks with pitch emulsion. Hot adhesives shall not be used.

#### 2.3.4 Spreading of Adhesives -

2.3.4.1 Emulsions shall be squeegeed to the deck surface or to the underside of the insulation in the case of open-fluted metal decks. When surfaces are smooth, it will be necessary to use a serrated squeegee in order to deposit the specified quantity of material. However, no more emulsion shall be applied than is necessary to insure adhesion of the felts. Joints between deck units shall not be filled with emulsion; on the other hand, they need not be avoided. It is desirable to direct the squeegee across the units instead of in a direction parallel to the longitudinal axis. The overlying insulation may be laid into the wet emulsion. Emulsions must not be thinned under any circumstances. Stir only enough to eliminate water accumulation at the top of the container.

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## 2. INSULATION (cont'd)

### 2.3 Application of Insulation (cont'd)

Rate of application for emulsion is 2-1/2 to 3 gallons per 100 square feet of deck area.

2.3.4.2 Steep Asphalt. Asphalt shall not be heated in excess of 450 degrees F. Minimum temperature at point of application shall be 350 degrees F. Receptacles containing bitumen at the point of roofing application shall be kept as full as possible at all times to achieve maximum temperature uniformity. Bitumen temperatures shall be checked regularly to assure compliance with this specification. The mopping into which insulation units are laid shall be uniformly applied.

When insulation is applied to decks with open-flutes, the insulation units shall be coated and then flopped over and shoved into place. Steep asphalt shall be applied at a rate of 15-30 pounds per 100 square feet of deck area, depending upon whether flutes are open or closed.

2.3.5 Edge Seals shall be provided at the exposed edge of insulation at the end of each work period. Such seals shall be applied with hot bitumen and shall be arranged so as to prevent water from entering the insulation. When installed over precast concrete decks, all edge seals must be removed upon resumption of work. Such removal also must include removal of bitumens from the top of the deck slabs. Edge seals shall be formed as shown on Standard BLE.

## 3. ROOFING AND FLASHING

3.1 Materials. All built-up roofing shall be slag or gravel surfaced roofing, constructed over the insulation specified on the drawings, with either

- a) Tar saturated felts and coal tar pitch, or
- b) Asphalt saturated felts and a special asphalt compounded specifically for dead level roofs.

3.1.1 Felts. Either rag or perforated asbestos felts may be used; provided the felt saturant is of the same derivative as that of the hot-applied bitumen. Felts shall be of the weight specified under Item 3.3.3.2 and shall conform to the following:

3.1.1.1 Asphalt-Saturated Rag Felt - ASTM: D226

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### 3. ROOFING AND FLASHING (cont'd)

#### 3.1 Materials (cont'd)

3.1.1.2 Tar-Saturated Rag Felt - ASTM: D227

3.1.1.3 Asphalt-Saturated Asbestos Felt - ASTM: D250

3.1.1.4 Tar-Saturated Asbestos Felt - ASTM: D250, except the saturant shall be coal-tar pitch from which the highly volatile constituents have been removed.

3.1.2 Dead-level Asphalt shall be weather-resistant, water-resistant bitumen containing only materials of petroleum origin. The product shall be homogeneous and free of moisture, uniformly glossy black, and shall conform to the following physical limitations.

|                                     | Min. | Max. |
|-------------------------------------|------|------|
| Melting Point (R&B) °F              | 140  | 150  |
| Penetration at:                     |      |      |
| 32°F, 200 g 60 sec. mm/10           | 7    | 14   |
| 77°F, 100 g 5 sec. mm/10            | 25   | 35   |
| 115°F, 50 g 5 sec. mm/10            | 90   | 150  |
| Flash Point (COC) °F                | 500  |      |
| Ductile at 77°F, 5 cm per min., cm  | 15   |      |
| Specific gravity at 60°F            | 1.01 |      |
| Solubility in CCl <sub>4</sub> , %  | 99.5 |      |
| Loss on heating at 325°F, 50g 5Hr.% |      | 0.5  |

All asphalts proposed for use under the above specification shall be tested by an independent laboratory approved by du Pont before such materials are shipped to the site. Any material not completely conforming to the above will be unacceptable for use. Sampling and testing shall be done in accordance with applicable portions of ASTM: D312.

3.1.3 Coal-tar Pitch shall conform to the requirements for Type A pitch, ASTM: D450.

3.1.4 Slag and Gravel. Gravel shall be natural gravel or crushed stone, dry and free from dirt, and be uniformly graded so as to pass a 5/8" mesh and be retained on a 1/4" mesh. When tested in accordance with ASTM: C88, weight loss shall not exceed 12 percent after subjection to five cycles, when sodium sulphate is used. Crushed, noncrystalline, dolomitic limestone or crushed chat shall not be used. Crushed materials which contain elongated points are not acceptable.

3.1.4.1 Slag shall be crushed blast furnace slag, dry and free from extraneous material, and uniformly graded so as to pass a 5/8" mesh and be retained on 1/4" mesh.

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1. ROOFING AND FLASHING (cont'd)

1.1 Materials (cont'd)

3.1.5 Flashing Nails shall be 1-3/16 inch treated "Riv-nails" with integral steel caps as manufactured by B/C Products, Inc., 9 Addison Street, Larchmont, New York.

3.1.6 Built-up Flashings shall be constructed with asphalt-saturated fabric and plastic roof cement with reinforced asbestos cap sheets.

3.1.6.1 Reinforced Asbestos Base Flashing (for cap sheets) shall generally conform to ASTM: D224, except that an asphalt-saturated cotton fabric shall form the reinforcing medium for an outside layer of heavy asbestos waterproofing felt. The total weight of the material shall be 65 pounds per 108 square feet.

3.1.6.2 Saturated Fabric shall conform to ASTM: D173.

3.1.6.3 Fibrous Asphalt Roof Cement - Federal Specification SS-C-153, Type 1.

3.1.7 Cant Strips shall be "Foamglas", cork, vegetable fiber, wood or any other suitable material. Wood cant strips shall be "CZC" treated except when roofing is applied directly to an untreated wood deck. Size shall be as shown on the drawings.

3.1.8 Asbestos-protected Metal Flashings, Gravel Stops, and facias shall consist of a 24-gage (0.0239 inch) sheet-steel core, protected on both sides with a coating of zinc into which is applied a layer of asbestos felt while zinc is still in a molten state. The asbestos coverings shall be additionally coated with suitable asphalt surface coating, which shall be provided with a comparatively rough finish.

3.1.9 Extruded Aluminum for Gravel Stops and Facias shall be as manufactured by "Aluminum Company of America" or a du Pont approved equal, and as called for on the drawings.

3.1.10 Asphalt Emulsion for Glass Mesh shall be "Addex" Heavy Duty Asphalt Emulsion as manufactured by Labco, Incorporated, Cleveland, Ohio.

3.1.11 Glass Fabric for Concrete Pads. Glass mesh shall be "Addex" Heavy Duty Glass Mesh as manufactured by Labco, Inc., Cleveland, Ohio.

3.2 Storage - felts and similar materials shall be delivered to the site undamaged and in a dry condition. Material received which is obviously not dry or otherwise damaged shall be rejected. Storage in the field must be under cover so that when installed, materials will be in the same dry condition as when received. Rolls of paper, roofing, and felt shall be stacked vertically on their ends.

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## 2. ROOFING AND FLASHING (cont'd)

### 3.3 Application of Roofing

3.3.1 Conditions of Roofing Subsurfaces. All surfaces to which roofing is to be applied shall be dry, clean, and free of snow, frost, ice, dirt, dust, refuse, and other foreign matter.

3.3.2 General Application Requirements. Roofing shall extend to the tops of cant strips at intersecting walls, parapets, curbs, platforms, etc., and be neatly cut at that point; it shall extend under the flanged edge of gravel stops, etc.; under the clamping rings or roof drains and vents, all as shown in applicable Engineering Standards. Each strip of felt shall be thoroughly broomed into place immediately upon application to eliminate voids, wrinkles, fishmouths, etc., and assure full adhesion.

### 3.3.3 Hot Bitumens and Felts

3.3.3.1 General. Asphalt shall be heated to 450 degrees F. maximum. Minimum temperature at point of application shall be 350 degrees F. Maximum kettle temperature of coal-tar pitch shall be 400 degrees F. and minimum temperature at point of application shall be 350 degrees F. Receptacles containing bitumen on the roof shall be kept as full as possible at all times to achieve maximum temperature uniformity. Bitumen temperatures shall be regularly checked to assure compliance with this specification. Hot bitumen shall be mopped to roof surfaces not more than three feet ahead of the felts as they are unrolled into place. Moppings shall be thorough and of uniform thickness so that at no place does felt touch felt. Felts must be applied immediately after application of the bitumen.

All plies of roofing felt shall be applied into overall uniform moppings of hot bitumen. The felt strips shall be laid progressively and simultaneously by lapping each strip  $3/4$  of the strip width plus 1 inch. No more bitumen shall be applied to insulation surfaces than is sufficient for proper adhesion.

3.3.3.2 Quantities of Materials. All built-up roofs shall receive four plies of 15 lb. felts placed with 30 lb. of hot bitumen/100 sq. ft./mopping, except as specified above. A final pouring of hot bitumen at the rate of 80 lb./100 sq. ft. of roof is required to receive slag or gravel. A total of 200 lb. hot bitumen/100 sq. ft. of roof area is required.

3.3.4 Surface Protection. While final pouring of bitumen is still hot, slag or gravel surface coating shall be spread uniformly over the roof area. Slag shall be applied at the rate of 300 lb./100 sq. ft.; gravel shall be applied at the rate of 400 lb./100 sq. ft. of roof area.

## 3. ROOFING AND FLASHING (cont'd)

### 3.3 Application of Roofing (cont'd)

3.3.5 Cant Strips. Prefabricated cant strips such as cork, vegetable fiber, cellular glass, etc., shall be applied in hot bitumen. Wood cant strips applied to other than wood decks shall be cut into 18-inch lengths and be similarly installed.

It is essential that a strip of felt at least 12 inches wide be applied in the corner behind the cant strips as required by applicable Engineering Standards. The felt shall be applied in emulsion.

### 3.3.6 Flashings

3.3.6.1 Built-up Flashings where counterflashings occur shall consist of two plies of asphalt-saturated fabric and one ply reinforced-asbestos base flashing. The face of the masonry wall under built-up flashings shall be primed with asphalt primer which shall be allowed to dry before the first coating of cement is applied. Each ply of the flashing shall be laid into a 1/16" to 1/8" thick coating of plastic roof cement, uniformly applied with a trowel. The plies of flashing shall be stepped at the lower edge on the roof surface, by extending each layer 2 inches beyond the edge of the one below. The first layer shall extend to a line 6 inches beyond the lower edge of the cant. At parapet and wall surfaces, all plies of the flashing shall extend up to the point where the counterflashing enters the wall. When application of the final ply is completed, the upper edge of the built-up flashing shall be fastened to the masonry with "E/S" nails spaced not over 4 inches center to center. After the base flashing is in place, a strip of 15 pound felt, approximately 4 inches wide, shall be applied in plastic roof cement over each vertical joint, and a final overall 1/8 inch thick coat of plastic roof cement shall be troweled on from the lower edge of the cant strip to the top edge of the flashing.

3.3.6.2 Flashing at Reglets. When flashings are installed into reglets, the materials and number of plies shall be as specified above, but they shall extend only to the bottom of the cant strip. See Standard B92G.

3.3.6.3 Built-up Flashings at Existing Walls or Parapets, without Through-wall Metal Counterflashings shall consist of one ply of asphalt-saturated fabric plus one layer of 65-lb. reinforced-asbestos base flashing applied in plastic roof cement with a 4-inch wide strip of 15-lb. asphalt felt over the top edge and vertical joints of the flashing. The fabric shall extend 6 inches onto the deck and the base flashing

## 3. ROOFING AND FLASHING (cont'd)

### 3.3 Application of Roofing (cont'd)

#### 3.3.6.3 Built-up Flashing at Existing Walls, etc. (cont'd)

shall overlap the fabric at least 3 inches. The top of the flashing shall be nailed to the masonry with "E/S" nails spaced 4 inches on centers before the top sealing strip is applied. After the joint sealing strips are applied, the entire surface of the built-up flashing to the bottom of the cant strip shall receive a 1/8" thick troweled-on coat of plastic roof cement. The face of the masonry vertical surface shall be primed with asphalt primer which shall be allowed to dry before the first layer of flashing is applied.

The metal counterflashing shall be installed as shown on Standard B913, sealing the top edge with "Thiokol" calking compound to complete the installation.

3.3.6.4 Flashing around Drains, Pipe, and Vents. Metal flanges of flashing sleeves and lead flashings around drains and vents shall be applied over the built-up roofing as shown on Standard B102G, B103G and B104G. Two additional plies of 15-lb. felt shall be applied over the flange to cover an area of at least 2-1/2 feet by 2-1/2 feet. The plies of the built-up roofing, sheet metal flanges, and overlaying felts shall extend fully into the flanges of roof drains under clamping rings, and clamping rings shall be tightly drawn down over the roofing.

3.3.6.5 Pitch Pockets. Structural supports, handrails, and similar items resting on top of the decks shall be provided with copper pitch pockets in accordance with Standard B101G, or B105 as applicable. The pockets shall be provided with 8 inch wide flanges all around. Installation shall be as specified above for sleeves. When roofing is completed, the pocket shall be completely filled with hot bitumen (same as used for roofing).

3.3.6.6 Covering for Concrete Pads and Foundations shall be provided as follows:

Apply an overall coat of asphalt-emulsion coating at the rate of 50 square feet per gallon.

While coating is wet, embed one ply of glass mesh, lapping all joints 2 inches.

Immediately after embedment of mesh, apply a second coat of emulsion at the rate of 100 square feet per gallon and brush in thoroughly.

When the above is dry, apply a third coat of emulsion at the rate of not more than 50 square feet per gallon.

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## 1. ROOFING AND FLASHINGS (cont'd)

### 3.2 Application of Roofing (cont'd)

#### 3.2.6.6 Covering for Concrete Pads, etc. (cont'd)

Glass mesh and coatings must extend downward over the vertical surfaces of the pad so as to lap the built-up flashings entering the reglets by at least 2 inches.

3.2.6.7 Workmanship. Flashings shall be installed in accordance with the applicable Engineering Standards or detail drawings. They shall be adequately fastened by mechanical methods or cement, as the case may be. Counterflashing shall be bent down tightly over built-up flashings. Flashing shall be a minimum of four inches, except where otherwise specified.

### 3.4 Asphalt Plank Walkways on Built-up Roofs

#### 3.4.1 Material

3.4.1.1 Plank shall be mineral-surfaced asphalt plank conforming to the requirements of ASTM: D517. Size shall be 1" thick, 12 inches wide, and 24 inches or 36 inches long.

3.4.1.2 Application Bitumen shall be the final mopping of roofing asphalt or pitch as specified elsewhere in this specification.

3.4.2 Application. Plank may be laid longitudinally or transversely but the width of the walkway shall be 24 inches, nominally, unless otherwise indicated on the drawings. The roofing surface to which the roofing is to be applied shall be completed, except for the application of the final bituminous mopping and gravel, and must be free of gravel or debris in the walkway area.

Plank shall be laid directly on the roofing in the final mopping of hot bitumen, with joints in line and approximately 1 inch wide, firmly impressing the plank into the hot bitumen. If more than one thickness is required to raise the level above standing water in low spots in the roof, the second layer shall be applied at right angles to the first in a mopping of hot bitumen.

When spreading the slag or gravel surface, the slag or gravel shall be spread over the walkway, and then swept off, allowing the gravel to enter the joints. All gravel which protrudes above the surface of the plank shall be removed.

.. METHOD OF MEASUREMENT - INSULATION, ROOFING & FLASHING

4.1 Metal Flashing shall be measured over the extreme dimensions in each direction in place for figuring pay quantities.

4.2 Insulation shall be measured on the net area of insulation placed, except that no reduction shall be taken for openings of less than 20 square feet.

4.3 Built-up Roofing shall be measured -

- a) From wall to wall including turnup at walls.
- b) From wall to gravel stops and gravel stop to gravel stop including turnup at wall and turndown at gravel stop.

NOTE: Turnup at curbs of openings occurring in roof surface will be added for openings of 20 sq. ft. and over; opening will be deducted. For smaller openings no deduction for hole shall be made and no turnup will be allowed.

4.4 Built-up Flashing shall be measured from the bottom of cant strip to the joint at which through-wall metal flashing enters the wall, or to the top of the built-up flashing where through-wall metal flashing do not occur. Length shall be that of the completely finished built-up flashing only.

4.5 Asphalt Plank measurement for pay quantities under unit prices shall be on a square foot basis for single-and-double-layer thicknesses. The area for payment will be determined by actual measurement of the finished work in place.