

PENGAD-Bayonne, N.J.

PLAINTIFF'S
EXHIBIT
BEA-2

K O P P E R

BUILT-UP ROOFING

• SPECIFICATIONS MANUAL FOR
ARCHITECTS AND ENGINEERS

1964

COAL TAR PITCH ROOFING • WATERPROOFING
DAMPPROOFING • ROOF INSULATION • FLASHINGS



A.I.A. FILE NO. 12-8

For details or installations not covered in these specifications consult Koppers Supplementary Built-Up Roofing Specifications or the nearest Koppers Representative.

NEW CONSTRUCTION

Deck Construction	Slope of Deck	Bond in Years	Type of Surface	No. of Piles	Spec. No.	Page No.
FLAT DECKS						
Wood	0"-2"	25	Gravel or Slag	3	1	5
	0"-2"	15	Gravel or Slag	3	2	5
	0"-2"	10	Gravel or Slag	3	30	5
Poured Concrete, Poured Gypsum	0"-2"	25	Gravel or Slag	4	5	6
	0"-2"	15	Gravel or Slag	3	7	6
Precast Concrete	0"-2"	25	Gravel or Slag	4	10	7
	0"-2"	15	Gravel or Slag	3	11	7
Precast gypsum, poured gypsum, Gypsum metal bound plank	0"-2"	25	Gravel or Slag	5	12	8
	0"-2"	15	Gravel or Slag	4	13	8
Metal with insulation	0"-2"	25	Gravel or Slag	4	17	9
	0"-2"	15	Gravel or Slag	3	18	9
Premade Tile over Poured Concrete	0"-1"	10	Premade Tile	5	20	10
Water Cooled over poured concrete, poured gypsum, or precast concrete slab	0"-1"	25	Gravel or Slag	4	23	11
	0"-1"	15	Gravel or Slag	3	24	11

STEEP DECKS

Aggregate Surface						
Wood, Poured or Precast Gypsum, Gypsum Metal Bound Plank	2"-4"	20	Gravel or Slag	5	300-A	12
	2"-4"	15	Gravel or Slag	4	2380-A	12
Poured and Precast Concrete, and Metal with Insulation	2"-4"	20	Gravel or Slag	4	800-A	12
	2"-4"	15	Gravel or Slag	3	3200-A	12
Mineral Surface						
Wood	3"-9"	15	Mineral	3	31-A	13
	3"-9"	10	Mineral	2	4-A	13
Poured Concrete or Poured Gypsum	3"-9"	15	Mineral	3	33-A	13
	3"-9"	10	Mineral	2	9-A	13
Precast Gypsum, Gypsum Metal Bound Plank, Precast Concrete	3"-9"	15	Mineral	3	34-A	13
	3"-9"	10	Mineral	2	35-A	13

Smooth Surface

See Koppers Supplemental Built-Up Roofing Specifications for bonding and details of Smooth Surface Steep Roofing.

RE-ROOFING

Page No. 14

INSULATION

Deck Construction	Humidity Conditions	Spec. No.	Page No.
Wood, Precast Gypsum, Gypsum Metal Bound Plank	Normal	200	14
	High Humidity	201	14
Poured Concrete, Poured Gypsum and Precast Concrete Slabs	Normal	202	15
	High Humidity	203	15
Metal	High	204	15

FLASHINGS

Type	Bond in Years	Spec. No.	Page No.
Composition Base and Metal Cap	10	101	16-17
Composition Base and Metal Cap	15	106	17
Composition Base and Metal Cap	25	107	17
Metal Cap and Base Flashing	None	100	18-19
For Water-Cooled Roof	15 or 25	110	18-19

Flashing Details

(Vents, Stacks, Expansion Joints, Drains and other Projections)

20-21

Finishing Strips for Eaves and Ridges

21-22

WATERPROOFING AND DAMPPROOFING

Page No.

General Instructions	23
Membrane Waterproofing	24-26
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Koppers Coal Tar built-up roofing

Koppers coal tar, built-up roofing provides one of the most durable roofing membranes known. The advantages are found in the inherent superior characteristics of coal tar pitch, the only time proven waterproofing material for low-slope roofs.

Coal tar pitch has a natural resistance to water, and even air and water vapor penetration. A tight molecular structure enables coal tar pitch to permanently withstand water penetration and further prevents oxidation of the roof surface. Koppers water-cooled roof specifications take advantage of the unique water-resistant characteristics of coal tar pitch to give you maintenance-free roofing.

Another unique feature of Koppers coal tar roofing is its permanent self-healing ability. Alligatoring and hairline cracks, common to most materials, eventually cause damage to the roofing membranes. Coal tar pitch has a property known as "cold-flow," which automatically corrects these conditions before serious damage takes place. This "cold-flow" feature even heals small mechanical fractures at normal temperatures, stopping trouble before it starts.

When you specify a Koppers coal tar roof, you are assuring your building owner-client of long-term roof performance at no extra cost. And you'll be covering your building with nature's finest protective material.



KOPPERS COMPANY, H
TAR PRODUCTS DIVISION
Pittsburgh, Pa. 15219

A Koppers Slag or Gravel Surfaced Roof consists of layers of tarred felt cemented with pitch to form a continuous skin over the entire roof deck. The actual waterproofing agent is the pitch. The number of layers or "plies" of tarred felt required varies from 3 to 5 and depends on the type of deck and the length of service desired. The number of plies used does not affect the impermeability of the roofing, but a greater number does prolong its life. Either slag or gravel provides a satisfactory surface.

GENERAL REQUIREMENTS

This manual contains roofing specifications and procedures which are based on the many years of Koppers experience and generally accepted good roofing practice. They are intended to provide the architect, engineer, general contractor and roofer with the proper information to plan and construct the best built-up roof with the most time-proven materials available today.

The following requirements are part of the detailed specifications contained in the following pages.

Deck

All decks shall be installed in accordance with the deck manufacturer specifications. They shall be properly graded to drain outlets and shall be clean, smooth, completely dry, rigid, and free of debris. Any deck defect shall be corrected before application of roofing.

In approving any deck as satisfactory to receive a Koppers roof, only the deck surface is accepted. It is the responsibility of the building designer and deck manufacturer to provide for expansion and contraction and for support of maximum anticipated loads.

Roof Openings

Curbs extending 8" to 12" above roof surface shall be provided at all openings for skylights, ventilators, expansion joints, etc. to provide for installation of adequate base flashing.

Roof Drains

All roof drains shall be provided with metal roof drain flashing flanges which extend at least 4" beyond drain opening and shall be stripped with felt in accordance with drain detail. All drains should be provided with expansion joint sleeves.

Vapor Barrier

The desirability or necessity for a vapor barrier depends on many variables such as climatic conditions, soil conditions, building occupancy, etc. The proper design and specification of such vapor barrier, or the omission of such vapor barrier, thus becomes the sole responsibility of the designer or owner. Any subsequent failures, due to either the installation or lack of such installation, will not be Koppers' responsibility. This will also apply if it appears desirable to install such vapor barrier to the underside of the entire roofing assembly.

Insulation

All roof insulation shall be dry when installed. It should not be applied over anything but a completely dry substrate nor

should it be applied when subsequent traffic from roofing crews, other trades, and equipment may damage it. A temporary roof should be applied to the deck prior to laying of any insulation or roofing until all danger of damage from these hazards has been eliminated.

Over metal decks all insulation shall be installed perpendicular to the direction of the flues.

Expansion Joints

It is the responsibility of the designer of the building to provide for adequate expansion joints.

For the protection of the roofing system against splits caused by expansion and contraction, Koppers recommends that an expansion joint be installed: 1) on large roof areas at least every 200 feet in each direction, 2) at all places where the structural supports and roof assembly change direction, 3) where type of deck material changes, 4) where control, expansion, or contraction joints are provided in structural steel, deck material, or deck system.

Application of Felts

All roofing is to be built up in place with alternate moppings and layers of felt over the proper preliminary work as specified in this book under the several subheads for various types of deck construction and slope. Application is to be made by experienced workmen only and in the manner hereinafter described. The finished roof is to consist of the number of plies and type of surfacing as specified under the proper subhead in the specifications.

Apply the roofing so that the direction of the flow of water is over and not against laps. Broom or press all plies of felt into the hot pitch and lay without wrinkles, huckles or kinks, so that the finished roof is free from pockets or blisters. Each solid mopping shall completely cover the area to which it is applied. Overlap ends of all connecting plies of felt not less than 10 inches. *End-stripping or taping of these laps is not permitted.*

The widths of felt are laid shingle fashion, not only because this method produces a stronger membrane but because it also makes it possible to construct a roof of any desired number of plies in a single progressive mopping. This is accomplished by varying the widths of the edge laps. Three-ply roofing, for example, is achieved by lapping each width approximately two-thirds over the preceding width; for 4 plies, a lap of approximately three-fourths the width is required.

In all cases the plies of felt must be laid shingle fashion. Application of felts in a method where two plies are laid over two plies, three plies over one ply, or any combination other than all plies together in shingle fashion will not be permitted at any time except as may be specifically provided for in our printed specifications.

Koppers Flat Roofs

ADVANTAGES OF COAL TAR PITCH FOR FLAT ROOFS

Two important questions should be asked about any roofing to be applied on flat decks:

1. Can it resist prolonged contact with water without deteriorating?
2. Does it have the ability to heal itself automatically?

Roofs built with Old Style Pitch® and Approved Tarred Felt DO resist water and they DO heal themselves.

RESISTANCE TO WATER

1. Prolonged contact with water is a condition almost impossible to avoid on flat roofs. Poor drainage, low spots, or settlement of the building may cause it. Service records of over 50 years by coal tar pitch roofs with little or no attention prove the resistance of tar to water. Old Style Pitch is practically insoluble in water, none of its constituents having more than a slight water solubility. Koppers Built-up Roofing is resistant to moisture and sunshine.

THE SELF-HEALING PROPERTY

2. Weathering and rapid changes in atmospheric conditions can cause cracks in the top surfaces of some types of roofing. However the vital consideration is whether these cracks are permanent if they do appear. Old Style Pitch has a property technically known as "cold flow" and even at ordinary temperatures cracks in the surface heal themselves. This can clearly be seen in photomicrographs which show the sides of the cracks moving slowly together until complete fusion takes place and the pitch again forms a continuous layer. Old Style Pitch Roofs readily conform to slight irregularities in the deck and yet remain waterproof.

THE EXTRA HEAVY TOP POURING

Additional protection is given a Koppers Roof by the extra heavy top covering of roofing pitch which is poured on (not mopped).

THE GRAVEL OR SLAG SURFACE

The gravel or slag surface on a Koppers Roof provides an armor against hail, driving rain, sleet and snow. It also provides additional wearing surface which protects the roof against foot traffic. Roofs with gravel or slag surfaces cling to the deck even in severe wind storms.

THE EXTRA SATURATION OF THE FELT

The tarred felt used in Koppers Roofs absorbs one and one-half times its own weight of coal tar during saturation. This large proportion of saturant insures high strength and maximum durability.

PRESERVATIVE AND NON-CORROSIVE ACTION

Old Style Pitch contains coal tar creosote, which is unsurpassed as a preservative for wood, felt or other materials which are used in roofing construction.

Koppers Steep Roofs

In conjunction with flat roofs, Koppers Company, Inc. will bond three types of steep roofs.

Koppers Slag or Gravel Surfaced Steep Roofs for slopes from two (2) inches to four (4) inches per foot are constructed of asphalt saturated felts set in steep asphalt. A top coating of steep asphalt, into which either slag or gravel is imbedded, completes this type construction.

Koppers mineral surface steep roofs are constructed of Koppers Asphalt Felts set in Koppers Steep Asphalt. The surface material is composed of Koppers Selvage Edge Mineral Surface roofing, a heavy asphalt saturated felt thirty-six (36) inches in width, of which nineteen (19) inches is bare and seventeen (17) inches of the top surface is covered with granules. This is embedded in Koppers steep asphalt with each sheet lapping the preceding sheet nineteen (19) inches, thereby presenting to the elements a continuous tough granule surface.

Koppers smooth surface steep roofs are constructed of perforated asbestos felts thoroughly impregnated with specially refined asphalt firmly embedded in Koppers Steep Asphalt. Koppers Perforated Asphalt Saturated Asbestos Felts produce a long lasting weather resistant roof.

For detailed specifications regarding smooth surface steep asbestos roofs refer to Koppers Supplemental Built-Up Roofing Manual.

Koppers Roofing Bonds

Bonds on Koppers Roofing and Flashings are issued by Koppers Company, Inc., and its surety on roofs constructed according to Koppers specifications and when applied by roofing contractors approved in writing by Koppers Company, Inc. The Koppers bond guarantees that, in accordance with the terms of the bond, Koppers will make repairs to the roof which are necessitated by ordinary wear and tear by the elements to keep that roof in watertight condition.

The Koppers bond is not available on roofs over private residences.

It does not cover the installation or replacement of any decking, vapor barrier materials, insulation, or metal work.

The Koppers bond is not intended as a substitute for a common-sense roof-maintenance program by the owner, nor is it an effective instrument in the face of abuse to the roof by excessive foot traffic and abuse from other trades, etc.

NOTE—Koppers Company, Inc., will issue Roofing Bonds in such portions of the United States as are covered by its inspection service.

General Roofing Information

The intent of these specifications is to provide a water tight roof. The quantities of pitch shown are for estimating purposes only. The specified number of plies of approved tarred felt must be used. The methods of construction outlined in these specifications must be followed unless modifications are allowed by Koppers Company, Inc.

KOPPERS TARRED FELT

Koppers Tarred Felts are sold in standard size rolls, 36 inches wide and containing 432 square feet, except when otherwise specified. Koppers Approved Tarred Felt, the highest grade of roofing and waterproofing felt and the grade used in Koppers Bonded Roofs, has an approximate weight of 15 pounds per 108 square feet, or 60 pounds per roll.

Koppers Approved Tarred Felt meets the following specifications:

The Underwriters' Laboratories.
Federal Specifications No. HH-F-201.
A.S.T.M. D-227.

OLD STYLE PITCH®

Complies with the following standard specifications:

Federal Specifications R.P. 381 Type I (Federal Specifications Board)—"Coal Tar Pitch for Built-up Roofing."
A.S.T.M. D-450 Type A.
Underwriters' Laboratories.

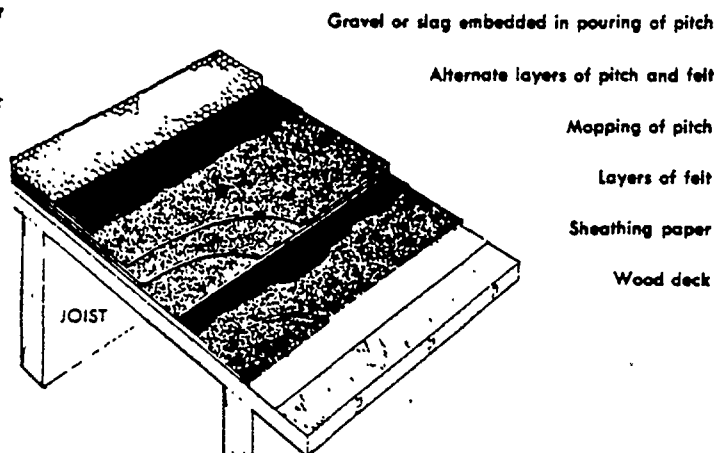
Old Style Pitch is sold in metal containers, 450 to 500 lbs., and in bulk.

UNDERWRITERS' LABORATORIES CLASS A RATING

Roofs constructed according to Koppers specifications, with slag or gravel surfaces, carry the Class A rating of the Underwriters' Laboratories.

deck construction:

WOOD DECKS



SPECIFICATIONS

Select clauses as required. Optional clauses in *italics*.

Condition of Surface to Receive Roofing

Do not apply roofing to any surface which is not reasonably smooth and free from projections or holes which might cause puncture of roofing membrane. Lumber shall be seasoned and dry. Immediately before the application of the roofing, thoroughly clean the surface of dust and all loose material. Roof deck shall be properly graded to outlets.

Application of Roofing Materials

1st. Apply one (1) thickness of twenty-five (25) pound (5 pounds per 100 sq. ft.) sheathing paper over entire surface of deck, lapping each sheet two (2) inch over preceding sheet. Nail in place.

2nd. Spec. No. 1
Spec. No. 2

Apply over the entire surface of the sheathing paper, two (2) dry plies of Koppers Approved Tarred Felt. Lap plies nineteen (19) inches. Nail at lap on twelve (12) inch centers.

2nd. Spec. No. 30

Apply over the sheathing paper, one (1) dry ply of Koppers No. 30 Tarred Felt. Lap ply four (4) inches. Nail at lap on twelve (12) inch centers.

2nd. Shredded Wood Fiber Decks . . . On Shredded Wood Fiber Decks, Koppers Coated Base Sheet lapping each sheet four (4) inches over preceding sheet and nailing with Capped ES Nails at lap no less than nine (9) inches, and down center of each sheet on eighteen (18) inch centers shall be substituted for the two plies of Koppers approved Tarred Felt in Specs. No. 1 and No. 2 and for the one ply of Koppers No. 30 Tarred Felt in Spec. No. 30.

3rd. Mop with Old Style Pitch the entire surface, preceding, the application of additional plies of felt and apply over the entire surface as follows:

incline:

MAXIMUM INCLINE = 2 IN. PER FT.

surface:

25 year — 5 ply — Spec. No. 1
20 year

15 year — 4 ply — Spec. No. 2

10 year — 3 ply — Spec. No. 30

For convenience in estimating
use these material quantities

MATERIALS per 100 sq. ft.	Spec. No. 1	Spec. No. 2	Spec. No. 30
Sheathing Paper	5 lbs.	5 lbs.	5 lbs.
Tarred Felt	75 lbs.	60 lbs.	60 lbs.
Pitch	150 lbs.	125 lbs.	125 lbs.
Gravel OR Slag	400 lbs. OR 300 lbs.	400 lbs. OR 300 lbs.	400 lbs. OR 300 lbs.

4th. Spec. No. 1

Apply three (3) plies of Koppers Approved Tarred Felt, lapping plies twenty-four and two-thirds (24 $\frac{2}{3}$) inches.

4th. Spec. No. 2
Spec. No. 30

Apply two (2) plies of Koppers Approved Tarred Felt, lapping plies nineteen (19) inches.

Mop solidly between plies with Old Style Pitch so that in no space shall felt touch felt.

On slopes exceeding one (1) inch and less than two (2) inches nail each sheet of felt with simplex flat head or one (1) inch barbed roofing nails through flat tin discs, two (2) inches from the back edge on twenty-four inch centers.

5th. Pour over the entire surface of the roofing membrane a uniform coating of approximately seventy-five (75) pounds of Old Style Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. Slag or gravel shall be from one-fourth ($\frac{1}{4}$) to five-eighths ($\frac{5}{8}$) inches in size and shall be clean and dry.

General

Pitch shall not be heated above four hundred (400) degrees F. Tarred felt shall be laid without wrinkles or buckles. Gravel or slag shall be applied within eight (8) days after application of felts. During freezing weather, all exposed felts shall be either immediately graveled or slagged in, or, if this is impossible, exposed felt surfaces shall be glazed with a mopping of pitch.

BRIEF SPECIFICATIONS

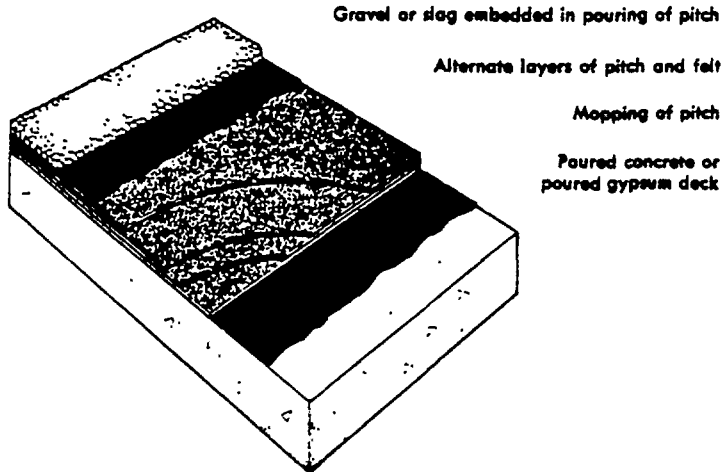
The roofing is to be applied by a roofing contractor approved by Koppers Company, Inc., who shall apply the roofing in strict accordance with Koppers Specifications (No. 1 for 25 years, No. 2 for 15 years, No. 30 for 10 years) and requirements, and subject to Koppers inspection and approval. Upon completion of the work, the contractor is to furnish Koppers Roofing Bond to the owner.

Detail specifications on pages 16 to 22 are a part of this specification where applicable and must be adhered to in order to obtain a Koppers Roofing Bond.

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deck construction:

POURED CONCRETE and POURED GYPSUM DECKS



SPECIFICATIONS

Select clauses as required. *Optional clauses in italic.*

Condition of Surface to Receive Roofing

Do not apply built-up roofing to any surface which is not reasonably smooth and free from projections or holes which might cause puncture of roofing membrane. Surfaces must be dry. Immediately before the application of the roofing, thoroughly clean the surface of dust and loose materials. Roof deck shall be properly graded to outlets. Decks of incline exceeding one (1) inch and less than two (2) inches to the foot shall permit nailing, or creosoted nailing strips must be set in the deck flush with its surface, these strips to be spaced three (3) feet apart and placed up and down and not across the slope of the roof.

Application of Roofing Materials

1st. (A) *Over Poured Concrete:* Mop deck completely with Old Style Pitch.

(B) *Over Poured Gypsum:* Strip mop the deck with moppings of Old Style Pitch spaced approximately six (6) inches apart.

2nd. Spec. No. 5
Apply over the entire surface, four (4) plies of Koppers Approved Tarred Felt, lapping plies twenty-seven and one-half (27½) inches. Mop solidly between each 27½ inch lap with Old Style Pitch so that in no place shall felt touch felt.

2nd. Spec. No. 7
Apply over the entire surface three (3) plies of Koppers Approved Tarred Felt, lapping plies twenty-four and two-thirds (24⅔) inches. Mop solidly between the 24⅔ inch lap with Old Style Pitch so that in no place shall felt touch felt.

incline:

MAXIMUM INCLINE = 2 IN. PER FT.

surface:

25 year — 4 ply — Spec. No. 5
20 year — 3 ply — Spec. No. 7

IF POURED GYPSUM DECK IS NOT THOROUGHLY DRY, APPLY ROOFING ACCORDING TO SPECIFICATION No. 12 FOR 25 YEARS AND No. 13 FOR 15 YEARS.
Also for wood decks where Koppers Insulation Specification No. 291 is used.

For convenience in estimating use these material quantities

MATERIALS per 100 Sq. Ft.	Spec. No. 5	Spec. No. 7
Pitch —		
Poured Concrete	175 lbs.	150 lbs.
Poured Gypsum	165 lbs.	140 lbs.
Felt	40 lbs.	45 lbs.
Gravel or Slag	400 lbs. 300 lbs.	400 lbs. 300 lbs.

Where slope of deck is more than one (1) inch but less than two (2) inches per foot and deck permits nailing, nail along back edge of sheet, nails to be spaced twenty-four (24) inches o.c. Where nailing strips are installed, nail each ply of felt with one (1) inch barbed roofing nails through flat tin discs three (3) inches from upper edge on three (3) foot centers.

3rd. Pour over the entire surface of the roofing membrane a uniform coating of approximately seventy-five (75) pounds of Old Style Pitch, in which, while hot, embed not less than four hundred (400) pounds of one-quarter (¼) to five-eighth (⅝) inch clean dry gravel or three hundred (300) pounds of slag for each one hundred (100) square feet.

Pitch shall not be heated above four hundred (400) degrees F. Tarred felt shall be laid without wrinkles or buckles.

Gravel or slag shall be applied within eight (8) days after application of felts. During freezing weather, all exposed felts shall be either immediately graveled or slagged in, or, if this is impossible, exposed felt surfaces shall be glazed with a mopping of pitch.

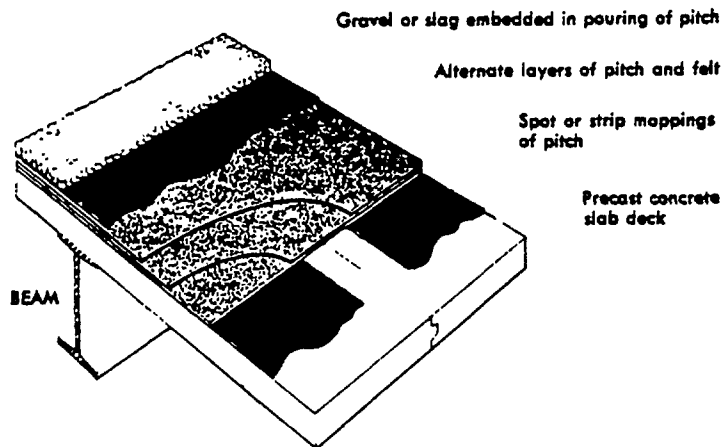
BRIEF SPECIFICATION

The roofing is to be applied by a roofing contractor approved by Koppers Company, Inc., who shall apply the roofing in strict accordance with Koppers Specifications (No. 5 for 25 years, No. 7 for 15 years) and requirements, and subject to Koppers inspection and approval. Upon completion of the work the contractor is to furnish Koppers Roofing Bond to the owner.

Detail specifications on pages 16 to 22 are a part of this specification where applicable and must be adhered to in order to obtain a Koppers Roofing Bond.

deck construction:

PRECAST CONCRETE SLAB DECKS



SPECIFICATIONS

Select clauses as required. *Optional clauses in italic.*

Condition of Surface to Receive Roofing

Do not apply built-up roofing to any surface which is not reasonably smooth and free from projections or holes which might cause puncture of the membrane. Surfaces must be dry. Immediately before the application of the roofing, thoroughly clean the surface of dust and loose material. Decks of inclines exceeding one (1) inch and less than two (2) inches to the foot shall permit nailing, or creosoted nailing strips must be set in the deck flush with the surface, these strips to be spaced three (3) feet apart and placed up and down and not across the slope of the roof. All joints between precast concrete slabs shall be pointed up with plastic cement which shall be troweled so that the top surface is level with the deck. Roof deck shall be properly graded to outlets.

Application of Roofing Materials

1st. Each slab shall be spot or strip mopped with Old Style Pitch, keeping pitch moppings back at least four (4) inches from edge of each slab joint.

2nd. *Spec. No. 10*
Apply over the entire surface four (4) plies of Koppers Approved Tarred Felt, lapping plies twenty-seven and one-half (27½) inches. Mop solidly between each 27½ inch lap with Old Style Pitch so that in no place shall felt touch felt.

2nd. *Spec. No. 11*
Apply over the entire surface three (3) plies of Koppers Approved Tarred Felt lapping plies twenty-four and two-third (24⅔) inches. Mop solidly between the 24⅔ inch lap with Old Style Pitch so that in no place shall felt touch felt.

incline:

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MAXIMUM INCLINE • 2 IN. PER FT.

surface:

25 year — 4 ply — Spec. No. 10
20 year — 4 ply — Spec. No. 10

15 year — 3 ply — Spec. No. 11

For convenience in estimating
use these material quantities

MATERIALS per 100 Sq. Ft.	Spec. No. 10	Spec. No. 11
Pitch	146 lbs.	140 lbs.
Felt	60 lbs.	45 lbs.
Gravel	400 lbs.	400 lbs.
OR	OR	OR
Slag	300 lbs.	300 lbs.

Where slope of deck is more than one (1) inch but less than two (2) inches per foot and deck permits nailing, nail along the back edge of the sheet, nails to be spaced twenty-four (24) inches o.c. Where nailing strips are installed, nail each ply of felt with one (1) inch barbed roofing nails through flat tin discs three (3) inches from upper edge on three (3) foot centers.

3rd. Pour over the entire surface of the roofing membrane a uniform coating of approximately seventy-five (75) pounds of Old Style Pitch, into which, while hot, embed not less than four hundred (400) pounds of one-quarter (¼) to five-eighths (⅝) inch clean dry gravel or three hundred (300) pounds of slag for each one hundred (100) square feet.

General

Pitch shall not be heated above four hundred (400) degrees F. Tarred felt shall be laid without wrinkles or buckles. Gravel or slag shall be applied within eight (8) days after application of felts. During freezing weather, all exposed felts shall be either immediately graveled or slagged in, or, if this is impossible, exposed felt surfaces shall be glazed with a mopping of pitch.

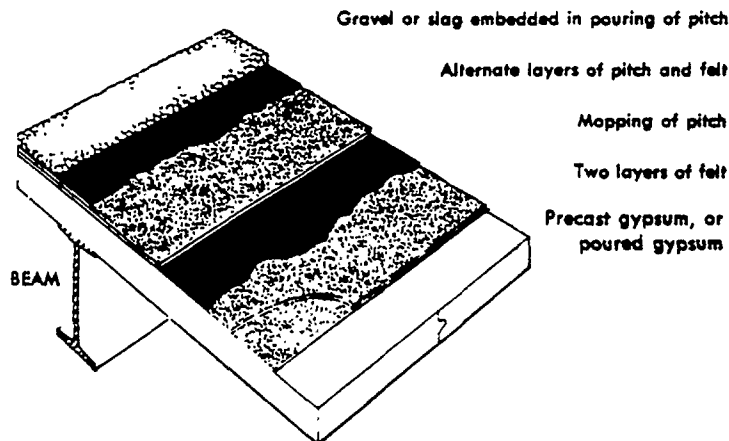
BRIEF SPECIFICATIONS

The roofing is to be applied by roofing contractor approved by Koppers Company, Inc., who shall apply the roofing in strict accordance with Koppers Specifications (No. 10 for 25 years, No. 11 for 15 years) and requirements, and subject to Koppers inspection and approval. Upon completion of the work, contractor is to furnish Koppers Roofing Bond to the owner.

Detail specifications on pages 16 to 22 are a part of this specification where applicable and must be adhered to in order to obtain a Koppers Roofing Bond.

deck construction:

PRECAST or POURED GYPSUM DECKS



SPECIFICATIONS

Select clauses as required. Optional clauses in *italic*.

Condition of Surface to Receive Roofing

Do not apply built-up roofing to any surface which is not reasonably smooth and free from projections or holes which might cause puncture of the membrane. Surfaces must be dry. Immediately before the application of the roofing, thoroughly clean the surface of dust and loose material. All joints between precast gypsum slabs shall be properly grouted; grouting not required on gypsum metal bound plank. Roof deck shall be properly graded to outlets.

Application of Roofing Materials

1st. Apply over the entire surface two (2) dry plies of Koppers Approved Tarred Felt. Lap plies nineteen (19) inches. Nail at lap on twelve (12) inch centers.

ALTERNATE: Apply over entire surface one (1) ply of Koppers Coated Base Sheet, lapping each sheet four (4) inches over preceding sheet and nailing at lap no less than nine (9) inches, and down center of each sheet on eighteen (18) inch centers.

2nd. Mop with Old Style Pitch the entire surface preceding the application of additional plies of felt.

3rd. *Spec. No. 12* — Apply three (3) plies of Koppers Approved Tarred Felt, lapping plies twenty-four and two-thirds (24 $\frac{2}{3}$) inches. Where slope of deck is more than one (1) inch but less than two (2) inches, nail each sheet of felt with one and one-half (1 $\frac{1}{2}$) inch barbed roofing nails through flat tin discs or with staples, six (6) inches from the back edge on twenty-four (24) inch centers. All laps shall be mopped with pitch the full twenty-four and two-thirds (24 $\frac{2}{3}$) inches, so that in no place shall felt touch felt.

incline:

MAXIMUM INCLINE • 2 IN. PER FT.

surface:

25 year
20 year⁵ ply- Spec. No. 12

15 year-4 ply-Spec. No. 13

IF POURED GYPSUM IS THOROUGHLY DRY
SPECIFICATION No. 5 FOR 25 YEAR
AND No. 7 FOR 15 YEAR MAY BE USED.

For convenience in estimating
use these material quantities

MATERIALS per 100 Sq. Ft.	Spec. No. 12	Spec. No. 13
Pitch	150 lbs.	125 lbs.
Tarred Felt	75 lbs.	60 lbs.
Gravel OR Slag	400 lbs. OR 300 lbs.	400 lbs. OR 300 lbs.

3rd. *Spec. No. 13* Apply two (2) plies of Koppers Approved Tarred Felt, lapping plies nineteen (19) inches. Where slope of deck is more than one (1) inch but less than two (2) inches, nail each sheet with one and one-half (1 $\frac{1}{2}$) inch barbed roofing nails through flat tin discs or with staples, six (6) inches from the back edge on twenty-four (24) inch centers. All laps shall be mopped with pitch the full nineteen (19) inches so that in no place shall felt touch felt.

4th. Pour over the entire surface of the roofing membrane a uniform coating of approximately seventy-five (75) pounds of Old Style Pitch, into which, while hot, embed not less than four hundred (400) pounds of one-quarter (1/4) to five-eighths (5/8) inch clean dry gravel or three hundred (300) pounds of slag for each one hundred (100) square feet.

Pitch shall not be heated above four hundred (400) degrees F. Tarred Felt shall be laid without wrinkles or buckles.

On Gypsum decks only bright (non-galvanized) nails or the Felt-Fast ES nail should be used.

Gravel or slag shall be applied within eight (8) days after application of felts. During freezing weather, all exposed felts shall be either immediately graveled or slagged in, or, if this is impossible, exposed felt surfaces shall be glazed with a mopping of pitch.

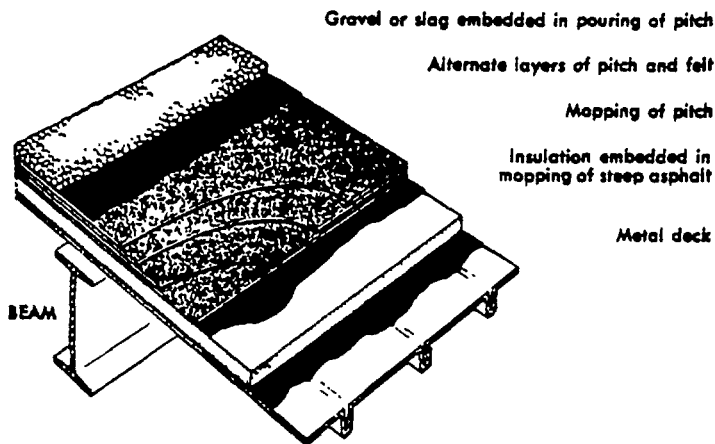
BRIEF SPECIFICATION

The roofing is to be applied by a roofing contractor approved by Koppers Company, Inc., who shall apply the roofing in strict accordance with Koppers Specifications (No. 12 for 25 years, No. 13 for 15 years) and requirements, and subject to Koppers inspection and approval. Upon completion of the work, the contractor is to furnish Koppers Roofing Bond to the owner.

Detail specifications on pages 16 to 22 are a part of this specification where applicable and must be adhered to in order to obtain a Koppers Roofing Bond.

deck construction:

METAL DECK with INSULATION



SPECIFICATIONS

Select clauses as required. Optional clauses in *italic*.

Condition of Surface to Receive Roofing

Metal roof decks shall be dry, clean and free from rust or oily substances. Immediately before the application of the insulation, thoroughly clean the surface of rust and loose material. Roof deck shall be properly graded to outlets.

Application of Insulation and Roofing Materials

1st. All insulation shall be run perpendicular to the direction of the flutes in the metal deck. All layers of insulation shall be parallel to preceding layers.

Insulation shall be secured to the metal deck by a mopping of steep asphalt. Under side of insulation may be mopped when applied over open-rib decks when the opening at the top of the ridges is one (1) inch or more. The insulation must be thoroughly dry and of approved type and, if the roof incline exceeds one (1) inch per foot, must be able to retain nails. When more than one (1) layer of insulation is used, the top surface of each layer shall be coated with Steep Asphalt ~~and which, while hot,~~ embed the succeeding layer. (This is optional because layers may be clipped together with mechanical fasteners.) All joints shall be broken between the layers of insulation. Edges shall be brought closely together and shall not be forced into place. No more insulation shall be installed at any one time than can be protected by pitch and felt in case of sudden weather changes. Cut-offs consisting of two (2) plies of Tarred Felt and moppings of Steep Asphalt extending on to the deck at least six (6) inches and four (4) inches on top of the insulation shall be applied at the end of each day's work over exposed edges of insulation. These cut-offs shall be removed at the start of the next days work. If slope of roof exceeds one (1) inch per foot, in addition to being set in steep asphalt, insulation must be fastened to the deck by means of screws, clips, or cleats which shall be placed at each corner and at the center of each sheet of insulation. When more than one (1) layer of insulation is applied, fasteners shall be driven after top layer of insulation is applied.

2nd. Mop a uniform coating of Old Style Pitch over the insulation preceding the application of roofing membrane.

3rd. Spec. No. 17 Apply over the entire surface, four (4) plies of Koppers Approved Tarred Felt, lapping plies twenty-seven and one-half (27½) inches.

Mop solidly between each 27½ inch lap with Old Style Pitch so that in no place shall felt touch felt.

3rd. Spec. No. 18 Apply over the entire surface, three (3) plies of Koppers Approved Tarred Felt, lapping plies

incline:

MAXIMUM INCLINE • 2 IN. PER FT.

surface:

25 year — 4 ply — Spec. No. 17
20 year — 4 ply — Spec. No. 17
15 year — 3 ply — Spec. No. 18

For convenience in estimating
use these material quantities

MATERIALS per 100 Sq. Ft.	Spec. No. 17	Spec. No. 18
Asphalt	(*) 25 lbs.	(*) 25 lbs.
Felt	60 lbs.	45 lbs.
Pitch	175 lbs.	145 lbs.
Slag OR Gravel	300 lbs. OR 400 lbs.	300 lbs. OR 400 lbs.

(*) When more than one layer of insulation is installed and asphalt is mopped between layers, add 25 pounds per square for each mopping.

twenty-four and two-third (24⅔) inches.

Mop solidly between each 24⅔ inch lap with Old Style Pitch so that in no place shall felt touch felt.

ALTERNATE: 2nd and 3rd. As a substitute for the first ply of tarred felt apply one ply of Koppers Coated Base Sheet in a solid mopping of Steep Asphalt directly over insulation lapping each sheet four (4) inches over preceding sheet. Mop entire surface with uniform coating of Old Style Pitch.

Spec. No. 17. Apply over the base sheet three (3) plies of tarred felt lapping plies twenty-four and two-thirds (24⅔) inches and mopping solidly between each ply with Old Style Pitch.

Spec. No. 18. Apply over the base sheet two (2) plies of tarred felt lapping plies nineteen (19) inches and mopping solidly between each ply with Old Style Pitch.

If slope of roof exceeds one (1) inch per foot, each ply of felt and base sheet shall be nailed through flat tin discs nine and one-half (9½) inches from the back edge and on twelve (12) inch centers. Nails shall be soft nose roofing nails three-quarters (¾) inch longer than thickness of the insulation so that points of nails will turn and clinch on under side of insulation.

4th. Pour over the entire surface of the roofing membrane a uniform coating of approximately seventy-five (75) pounds of Old Style Pitch into which, while hot, embed not less than four hundred (400) pounds of one-quarter (¼) to five-eighth (⅝) inch clean dry gravel or three hundred (300) pounds of slag for each one hundred (100) square feet.

General

Pitch shall not be heated above four hundred (400) degrees F. Tarred Felt shall be laid without wrinkles or buckles.

Gravel or slag shall be applied within eight (8) days after application of felts. During freezing weather, all exposed felts shall be either immediately graveled or slagged in, or, if this is impossible, exposed felt surfaces shall be glazed with a mopping of pitch.

BRIEF SPECIFICATION

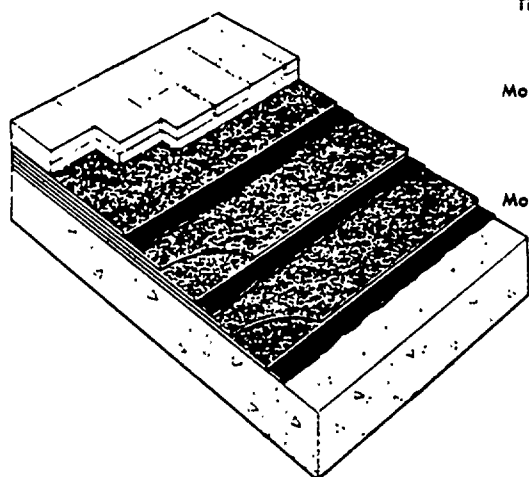
The roofing is to be applied by a roofing contractor approved by Koppers Company, Inc., who shall apply the roofing in strict accordance with Koppers Specifications (No. 17 for 25 years, No. 18 for 15 years) and requirements and subject to Koppers inspection and approval. Upon completion of the work, the contractor is to furnish Koppers Roofing Bond to the owner. Koppers will not be responsible for any damage to or below built-up roofing caused by or as the result of insulation.

Detail specifications on pages 16 to 22 are a part of this specification where applicable and must be adhered to in order to obtain a Koppers Roofing Bond.

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Ko

surface:

PROMENADE TILE SURFACING



Tile set in cement mortar

Layer of felt

Mopping of old style pitch

Alternate layers of old style pitch and felt

Mopping of old style pitch

Poured concrete slab deck

incline:

MAXIMUM INCLINE = 1 IN. PER FT.

deck construction:

10 year — 5 ply — Spec. No. 20

For convenience in estimating use these material quantities

MATERIALS per 100 Sq. Ft.	Spec. No. 20
Old Style Pitch	125 lbs.
Felt	75 lbs.

SPECIFICATIONS

Condition of Surface to Receive Waterproofing

Do not apply built-up roofing to any surface which is not smooth and free from projections and holes which might cause puncture of the membrane. Surfaces must be dry. Immediately before the application of the roofing, thoroughly clean the surface of dust and loose material. Roof deck shall be properly graded to outlets.

Application of Waterproofing Material

1st. Mop deck completely with Old Style Pitch.

2nd. Apply over the entire surface two (2) plies of Koppers Approved Tarred Felt, lapping each ply nineteen (19) inches. Mop Old Style Pitch solidly between each 19 inch lap so that in no place shall felt touch felt.

3rd. Mop the entire surface of the first two plies of felt preceding the application of additional plies with Old Style Pitch.

4th. Apply over the entire surface two (2) plies of Koppers Approved Tarred Felt, lapping plies nineteen (19) inches. Mop Old Style Pitch solidly between each 19 inch lap so that in no place shall felt touch felt.

5th. Before laying the tile, the surface of the roofing shall be thoroughly cleaned and the roofing mopped with Old Style Pitch into which, while hot, embed one (1) layer of tarred felt, lapping each sheet two (2) inches over the preceding sheet. Only part of the roof surface shall be covered with the last ply of felt at one time, the tile then being laid over that portion at once.

6th. The vitrified clay tile shall be set in not less than three-quarters ($\frac{3}{4}$) inch of Portland Cement Mortar (1 to 3 mix). The joints shall be grouted full with Portland Cement Mortar (1 to 2 mix). The tile shall be laid to show three-sixteenths

($\frac{1}{16}$) inch to one-fourth ($\frac{1}{4}$) inch joints. Expansion joints three-quarters ($\frac{3}{4}$) inch wide filled with plastic mixture, which must be approved by the architect, shall be provided between the tile and all flashings. Either metal or mastic expansion joints shall be provided throughout the roof surface as may be necessary. Expansion joints shall extend through to the roofing and shall be spaced not more than twenty (20) feet apart in any direction. They shall also be installed at all walls, skylights, curbs, etc.

General

If insulation is required use rigid board type.

Pitch shall not be heated above four hundred (400) degrees F.

Felt shall be laid without wrinkles or buckles.

All end laps shall be staggered at least six (6) inches.

Tile shall be applied within eight (8) days after application of felts. During freezing weather, exposed felt surfaces shall be glazed with a mopping of pitch.

BRIEF SPECIFICATION

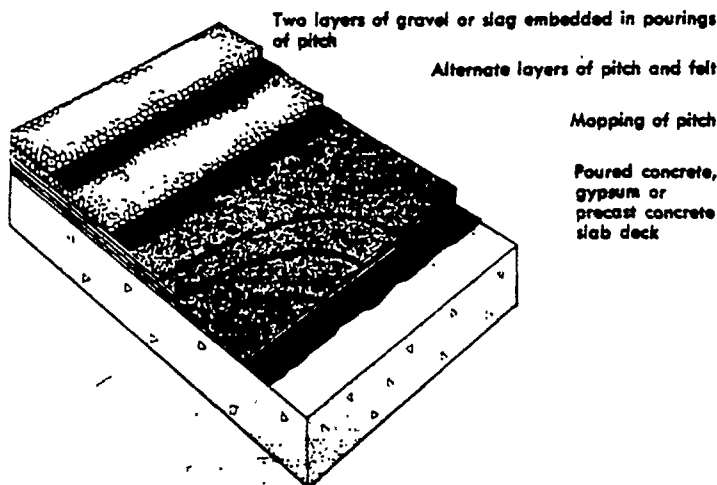
The waterproofing is to be applied by a roofing contractor approved by Koppers Company, Inc., who shall apply the waterproofing in strict accordance with Koppers Specification No. 20, and requirements, and subject to Koppers inspection and approval.

Notice: Koppers Company, Inc., will not be responsible or liable for leaks due to the installation, contraction or expansion of Promenade Tile and will not be responsible for the taking up and replacing of tile in order to locate leaks through the waterproofing.

Detail specifications on pages 16 to 22 are a part of this specification where applicable.

WATER COOLED ROOFS

deck construction:



incline:

$\frac{8a}{Ko}$

MAXIMUM INCLINE = 1 IN. PER FT.

surface:

25 year — 4 ply — Spec. No. 23
20 year

15 year — 3 ply — Spec. No. 24

FOR BONDED FLASHINGS ON WATER COOLED ROOFS — SEE SPECIFICATION No. 110

For convenience in estimating use these material quantities

MATERIALS per 100 Sq. Ft.	Spec. No. 23	Spec. No. 24
Pitch	266 lbs.	233 lbs.
Felt	60 lbs.	45 lbs.
Gravel OR Slag	700 lbs. OR 500 lbs.	700 lbs. OR 500 lbs.

SPECIFICATIONS

Select clauses as required. Optional clauses in *italic*.

Condition of Surface to Receive Roofing

Do not apply built-up roofing to concrete surfaces which are not reasonably smooth and free from projections and holes which might cause puncture of the membrane. Surfaces must be dry. Immediately before the application of the roofing, thoroughly clean the surfaces of dust and loose material.

Application of Built-Up Roofing

1st. Mop deck completely with Old Style Pitch.

2nd. Spec. No. 23

Apply over the entire surface four (4) plies of Koppers Approved Tarred Felt, lapping plies twenty-seven and one-half (27½) inches. Mop solidly between each 27½ inch lap with Old Style Pitch so that in no place shall felt touch felt.

All felt shall be turned up not less than four (4) inches at vertical surfaces.

3rd. Pour over the entire surface of the roofing membrane, a uniform coating of approximately seventy-five (75) pounds of Old Style Pitch, into which, while hot, embed not less than four hundred (400) pounds of clean dry gravel or three hundred (300) pounds of slag for each 100 square feet.

4th. All loose gravel or slag shall be swept from surface and a second uniform pouring of approximately eighty-five (85)

2nd. Spec. No. 24

Apply over the entire surface three (3) plies of Koppers Approved Tarred Felt, lapping plies twenty-four and two-third (24⅔) inches. Mop solidly between each 24⅔ inch lap with Old Style Pitch so that in no place shall felt touch felt.

pounds of Old Style Pitch shall be applied over the gravel or slag, into which, while hot, shall be applied a second layer of three hundred (300) pounds of gravel or two hundred (200) pounds of slag for each 100 square feet.

The entire surface shall then be thoroughly broomed free from all loose gravel or slag. It is advisable to roll the finished surface with a light roller so that aggregate is thoroughly embedded.

General

Pitch shall not be heated above four hundred (400) degrees F. If insulation is required, it must be of the rigid board type.

Tarred felt shall be laid without wrinkles or buckles.

Cant strips are required at all vertical surfaces.

At points where water pressure from the spray is excessive, the roof surface shall be protected with creosoted board platform or other suitable construction to break the force of the water. These platforms shall be laid on top of the roof surface and not fastened to the deck.

BRIEF SPECIFICATION

The roofing is to be applied by a roofing contractor approved by Koppers Company, Inc., who shall apply the roofing in strict accordance with Koppers Specifications (No. 23 for 25 years, No. 24 for 15 years) and requirements, and subject to Koppers inspection and approval. Upon completion of the work, the contractor is to furnish Koppers Roofing Bond to the owner.

Koppers Roofing Bonds furnished where Koppers Inspection Service is available.

Detail specifications on pages 16 to 22 are a part of this specification where applicable and must be adhered to in order to obtain a Koppers Roofing Bond.

incline:

STEEP ROOFS

MAXIMUM INCLINE • 4 IN. PER FT.
MINIMUM INCLINE • 2 IN. PER FT.

deck construction:

surface:

20 year—5 ply—Spec. No. 300A *See paragraphs A-1, B-1, C-1 & D*

15 year—4 ply—Spec. No. 2500A *See paragraphs A-1, B-1, C-2 & D*

20 year—4 ply—Spec. No. 800A *See paragraphs A-2, B-2, C-3 & D*

15 year—3 ply—Spec. No. 3200A *See paragraphs A-2, B-2, C-4 & D*

Estimating Quantities

per 100 sq. ft.

MATERIALS	
Koppers Asphalt Primer (except on metal)	
Koppers No. 15 Asphalt Felt	
Koppers Steep Asphalt	
Roofing Gravel or	
Roofing Slag	

Spec. No. 300A (20 Year)	Spec. No. 2500A (15 Year)	Spec. No. 800A (20 Year)	Spec. No. 3200A (15 Year)
		1 gal.	1 gal.
75 lbs.	60 lbs.	60 lbs.	45 lbs.
125 lbs.	100 lbs.	150 lbs.	125 lbs.
400 lbs.	400 lbs.	400 lbs.	400 lbs.
300 lbs.	300 lbs.	300 lbs.	300 lbs.

SPECIFICATIONS:

Select clauses as required. Optional clauses in *italic*.

Condition of Surface to Receive Roofing:

FOR WOOD DECKS: Same as described under Spec. No. 1.

FOR POURED AND PRECAST GYPSUM: Same as described under Spec. No. 12.

FOR POURED AND PRECAST CONCRETE: Same as described under Spec. No. 5 and Spec. No. 10 respectively except that on decks not permitting nailing, the creosote nailing strips should be spaced not more than twenty-four (24) inches apart.

FOR METAL DECKS: Same as described under Spec. No. 17. (For application of insulation see Spec. No. 17.) The insulation must be a type that can retain nails and must be fastened securely to the deck by means of screws, expanding nuts or cleats which shall be placed at each corner and at the center of each sheet of insulation. When more than one layer of insulation is applied fasteners shall be driven after top layer of insulation is applied.

Application of Roofing Materials:

1st A-1 (Spec. No. 300A and Spec. No. 2500A) *Over the entire surface lay (2) plies Koppers No. 15 Asphalt Felt. Lap each sheet nineteen (19) inches over preceding sheet. Nail in place.*

A-2 (Spec. No. 800A and Spec. No. 3200A) *Over Poured Concrete: Coat entire surface with Koppers Asphalt Primer. Over Precast Concrete: Hold asphalt primer back two (2) inches from all slab joints.*

2nd B-1 (Spec. No. 300A and Spec. No. 2500A) *Mop entire surface with Koppers Steep Asphalt into which, while hot, shall be applied the felts.*

B-2 (Spec. No. 800A and Spec. No. 3200A) *Over Poured Concrete: Mop deck completely with Koppers Steep Asphalt. Over Precast Concrete: Mop deck with Koppers Steep Asphalt holding back two (2) inches from all joints. Over Metal Decks: Mop insulation completely with Koppers Steep Asphalt.*

3rd C-1 (Spec. No. 300A) *Over the entire surface lay three (3) plies of Koppers No. 15 Asphalt Felt lapping each sheet twenty-four and two-thirds (24-2/3) inches over the preceding sheet. Mop the full width under each ply with Koppers Steep Asphalt and nail through flat tin discs two (2) inches from the upper edge on nine (9) inch centers.*

C-2 (Spec. No. 2500A) *Over the entire surface lay two (2) plies Koppers No. 15 Asphalt Felt lapping each sheet nineteen (19) inches over the preceding sheet. Mop the full width under each ply with Koppers Steep Asphalt and nail through flat tin discs two (2) inches from the upper edge on nine (9) inch centers.*

C-3 (Spec. No. 800A) *Over the entire surface lay four (4) plies of Koppers No. 15 Asphalt Felt lapping each sheet twenty-seven and one half (27-1/2) inches over the preceding sheet. Mop the full width solid under each sheet with Koppers Steep Asphalt and nail through flat tin discs on nine (9) inch centers. On precast concrete decks the first mopping is to be held back two (2) inches from all joints.*

C-4 (Spec. No. 3200A) *Over the entire surface lay three (3) plies of Koppers No. 15 Asphalt Felt lapping each sheet twenty-four and two-thirds (24-2/3) inches over the preceding sheet. Mop the full width solid under each sheet with Koppers Steep Asphalt and nail through flat tin discs on nine (9) inch center. On precast concrete decks the first mopping is to be held back two (2) inches from all joints.*

4th D *Over the entire surface apply a uniform coating of Koppers Steep Asphalt into which, while hot, embed not less than 400 lbs. of gravel or 300 lbs. of slag for each one hundred (100) square feet. The surfacing aggregate must be an approved type, range from one-fourth (1/4) to five-eighths (5/8) inches in size and be clean and dry.*

General

Koppers Steep Asphalt shall not be heated above 475°F and shall not be applied to the roof at a temperature of less than 400°F. All felt shall be laid without wrinkles or buckles.

At junction of steep and flat roofing, the roofing on the flat surface shall be carried up the inclined surface not less than twenty-four (24) inches before the steep roofing is applied. Application of steep roofing shall start at the point of junction with the flat roof.

On Gypsum Decks only bright (non-galvanized) nails or the Felt-Fast ES nail should be used.

On Metal Decks the felts over insulation shall be nailed through flat tin discs with soft nose roofing nails three-fourths (3/4) inches longer than the thickness of the insulation so that points of nails will turn and clinch on underside of insulation.

BRIEF SPECIFICATION

The roofing is to be applied by a roofing contractor approved by Koppers Company, Inc. who shall apply the roof in strict accordance with Koppers Specifications (No. 300A and No. 800A for 20 years—No. 2500A and No. 3200A for 15 years) and requirements and subject to Koppers inspection and approval.

Detail specification on pages 14 to 22 are a part of this specification where applicable and must be adhered to in order to obtain a Koppers Bond.

NOTE: Koppers Company, Inc. will issue roofing bond when roofing is applied according to Specifications Nos. 300A, 800A, 2500A and 3200A ONLY when applied in conjunction with Koppers Bonded Flat Roofing. See Koppers Supplemental Built-Up Roofing Specification Manual for smooth surface asbestos steep roofs.

incline:

STEEP ROOFSMAXIMUM INCLINE • 9 IN. PER FT.
MINIMUM INCLINE • 3 IN. PER FT.

deck construction:

surface:

15 year - Spec. No. 31-A	See paragraphs — A-1, B-1 & C
10 year - Spec. No. 4-A	See paragraphs — B-2 & C
15 year - Spec. No. 33-A	See paragraphs — A-2, B-1 & C
10 year - Spec. No. 9-A	See paragraphs — A-2, B-1 & C
15 year - Spec. No. 34-A	See paragraphs — B-1 & C
10 year - Spec. No. 35-A	See paragraphs — B-2 & C

**Estimating Quantities
per 100 sq. ft.**

MATERIAL	Spec. No. 31-A (15 year)	Spec. No. 4-A (10 year)	Spec. No. 33-A (15 year)	Spec. No. 9-A (10 year)	Spec. No. 34-A (15 year)	Spec. No. 35-A (10 year)
Koppers Asphalt Primer			1 gal.			
Red Resin Sheathing	5 lbs.					
Koppers Steep Asphalt	90 lbs.	60 lbs.	120 lbs.	90 lbs.	90 lbs.	60 lbs.
Koppers No. 15 Asphalt Felt	30 lbs.	30 lbs.	30 lbs.	30 lbs.	30 lbs.	30 lbs.
Koppers Selvage-Edge Rfg.	110 lbs.	110 lbs.	110 lbs.	110 lbs.	110 lbs.	110 lbs.

Condition of Surface to Receive Roofing MaterialsWOOD DECKS: Same as described under Spec. Nos. 1, 2 and 30.
POURED CONCRETE AND POURED GYPSUM: Same as described under Specs. Nos. 5 and 7.

PRECAST CONCRETE: Same as described under Specs. Nos. 10 and 11.

PRECAST GYPSUM AND GYPSUM METAL BOUND PLANKS: Same as described under Specs. Nos. 12 and 13.

Application of Roofing Materials**A. Preliminary Procedure**

A-1 (Spec. No. 31-A) Apply at right angles to incline of roof one (1) thickness of twenty-five (25) pound (5 pounds per 100 sq. ft.) sheathing paper over the entire surface of the deck, lapping each sheet one (1) inch over the preceding sheet. Nail to hold in place.

A-2 (Specs. Nos. 33-A and 9-A) Apply to the entire surface of the deck a priming coat of Asphalt Primer and allow to dry for a period of not less than six (6) hours. Then

(a) Over Poured Concrete: Mop deck completely with Koppers Steep Asphalt.

(b) Over Poured Gypsum: Strip mop the deck with six (6) inch wide moppings of Koppers Steep Asphalt.

B. Application of Asphalt Felts

B-1 (Specs. Nos. 31-A, 33-A and 34-A) Apply at right angles to the incline over the entire surface, two (2) plies of Koppers No. 15 Asphalt Felt, lapping plies nineteen (19) inches. Nail each ply of felt two (2) inches from upper edge eighteen (18) inches o.c., with one and one-half (1½) inch barbed roofing nails through flat tin discs (or with staples for gypsum decks). Mop solidly between plies with Koppers Steep Asphalt.

B-2 (Specs. Nos. 4-A and 35-A) Apply at right angles to the incline over the entire surface, one (1) ply of Koppers No. 30 Asphalt Felt, lapping ply four (4) inches. Nail each ply edge on eighteen (18) inch centers with one and one-half (1½) inch barbed roofing nails through flat tin discs (or with staples for gypsum decks.)

B-3 (Spec. No. 9-A) Apply at right angles to the incline over the entire surface, one (1) ply of Koppers No. 30 Asphalt Felt, lapping sheets six (6) inches.

Mop solidly each 6 inch lap with Koppers Steep Asphalt. Nail each ply two (2) inches from lower edge on eighteen (18) inch centers.

When nailing strips are used, the felt shall be secured with three (3) one (1) inch barbed roofing nails through flat tin discs, two (2) inches, ten (10) inches, and eighteen (18) inches respectively from the upper edge at each nailing strip.

C. Application of Mineral Surface Roofing

(Specs. Nos. 4-A, 9-A, 31-A, 33-A, 34-A and 35-A)

Beginning at the low point, thoroughly mop a portion of the asphalt test surface with Koppers Steep Asphalt, into which, while hot, embed a sheet of selvage edge mineral surface roofing, this to run across the slope of the roof. Selvage should be on upper edge. Nail in double staggered course along selvage with one (1) inch barbed roofing nails through flat tin discs, kept two (2) inches from the mineral surfacing and twelve (12) inches o.c. for each course. Mop the selvage of the sheet just laid and the adjacent area of tarred felt surface with steep asphalt and into this, while hot, embed thoroughly the next sheet of mineral surfaced roofing, taking care that the lower edge meets the edge of the mineral surfacing of the sheet below. Nail as described for previous sheet. Repeat the process of laying sheets of mineral surfaced roofing shingle fashion until the entire area has been covered. Lap ends six (6) inches, nailing the underlying sheet with six (6) one (1) inch barbed roofing nails through flat tin discs, starting one (1) inch from the lower edge, spaced five (5) inches o.c. Coat the underside of mineral surfaced roofing at each end lap with Steep Asphalt and firmly embed in the surface of the underlying sheet. Carefully rub down edges.

Where incline exceeds four (4) inches to the foot, roofing may be applied up and down the slope instead of across it.

When nailing strips are installed, sheets shall be nailed along the selvage edge with three (3) inch nails driven through flat tin discs, spaced five (5) inches apart, at each nailing strip and set back two (2) inches from the mineral surface.

General

Mineral surfaced roofing is to be cut in strips not exceeding twenty (20) feet in length prior to using, and is to be stacked flat for a sufficient time to permit these strips to become perfectly flat.

Asphalt Felt and Mineral Surface Roofing shall be laid without wrinkles or buckles.

Steep Asphalt shall not be heated above four hundred seventy-five (475) degrees F.

At junction of steep and flat roofing, the roofing on the flat surface is to be carried up the inclined surface not less than twenty-four (24) inches before steep roofing is applied. Application of steep roofing shall start at the point of junction with the flat roof.

BRIEF SPECIFICATION

NOTE: Koppers Company, Inc. will issue roofing bonds where roofing is applied according to the above specifications ONLY when applied in connection with flat bonded Koppers Roofing.

General

The following specifications for the installation of insulation are recommended so as to provide and insure the owner the maximum effect and life of the insulation.

Should the manner of attachment as specified by the individual insulation manufacturer conflict with the following, the insulation manufacturer's specification shall be followed.

The roofing insulation must be kept dry both before and after application.

Koppers Company, Inc., Guarantee Bond Covering Built-Up Roofing and Flashing does not cover roof insulation nor will Koppers Company, Inc., be responsible for any damage caused by or the result of the use of insulation or its manner of attachment to the substrate.

WOOD NAILING STRIPS

The general contractor shall provide wood nailing strips which shall form a nailing base under all metal flashing aprons and flanges. Strips shall be the full thickness of the insulation and shall extend not less than one (1) inch beyond the apron or flange and shall be securely fastened to the roof deck.

CANT STRIPS

Cant strips on wood decks shall be set on top of the insulation and secured by nailing through the insulation to the deck. On non-combustible decks where the cant is formed with gypsum or concrete, a square shoulder the full thickness of the insulation at the bottom of the cant shall be formed.

NAILS

Nails shall be galvanized roofing nails driven through flat tin discs, or Simplex flat head roofing nails.

Nails for use with insulation shall be of sufficient length to pass through the insulation and penetrate into, but not through, the deck construction, with the exception that on steel decks where nailing is necessary, the nails shall be soft-nosed roofing nails which shall not penetrate the steel deck.

CUT-OFFS

Cut-offs consisting of two (2) plies of tarred felt and moppings of Old Style Pitch or Asphalt extending onto the deck at least six (6) inches and four (4) inches on top of the insulation, shall be applied at the end of each day's work over exposed edges of insulation.

Cut-offs must be removed when work is resumed.

It is recommended that cut-offs be omitted at all edges of insulation adjoining parapet walls, cants, eaves, vertical surfaces, etc. Cut-offs may be installed in one continuous direction to the edges at the option of the architect or engineer.

General Application of Insulation

Insulation must be thoroughly dry and of approved type, and must be able to retain nails, if the slope of the deck exceeds one (1) inch per foot.

No more insulation shall be laid at any one time than can be protected by pitch and felt in case of sudden weather changes. Edges of insulation shall be brought closely together and shall not be forced into place. Where insulation joins vertical surfaces, the insulation shall be cut in a neat manner allowing at least one-half ($\frac{1}{2}$) inch clearance.

When more than one (1) layer of insulation is used, joints between layers shall be broken. All layers shall be parallel to preceding layers.

Over wood, precast gypsum, gypsum metal bound plank decks — for normal conditions

INSULATION SPECIFICATION No. 200

Application of Insulation

The roof deck shall be covered with one (1) layer of red rosin sheathing paper weighing not less than five (5) pounds per one

hundred (100) square feet. Sheathing paper shall be lapped two (2) inches and secured to the deck by nailing. Over Precast Gypsum and Gypsum Metal Bound Plank Decks, sheathing paper may be omitted.

On decks having inclines up to two (2) inches per foot, each sheet of insulation shall be secured to the deck by nails at each of the four corners and on inclines exceeding two (2) inches per foot, nails are to be spaced one (1) foot apart, and stagger nailed through the longitudinal center of each sheet. All nails shall penetrate the deck at least three-fourths ($\frac{3}{4}$) inch.

Nailing of two layers of insulation shall be through the second or top layer only.

Application of Roofing Above Insulation

If more than one layer of insulation is installed and joints broken, or if ship-lap type is used, roofing above insulation shall be constructed according to Koppers Specifications Nos. 5, 7, 8-A, 9, 32-A, 33, 41-A, 800-A or 3200-A, depending upon the slope of the roof.

If only one layer of insulation is installed, or if ship-lap type is not used, the roofing shall be applied according to Koppers Specifications Nos. 1, 2, 3-A, 4, 25-A, 30, 31, 40-A, 300-A or 2500-A on wood decks, with the exception that the red rosin paper may be omitted provided it has been installed below the insulation.

Over wood, poured or precast gypsum and gypsum metal bound plank decks — for high humidity

INSULATION SPECIFICATION No. 201

Application of Membrane Below Insulation

1. The wood roof deck shall be covered with one (1) layer of red rosin sheathing paper weighing not less than five (5) pounds per one hundred (100) square feet. The sheathing paper shall be lapped two (2) inches and secured to the deck by occasional nailing. On poured, precast gypsum or gypsum metal bound plank, sheathing paper may be omitted. If joints are not tongue and grooved, they shall be stripped with felt and plastic cement.

2. Two full thicknesses of Tarred Felt shall be laid over the entire surface, lapping each sheet nineteen (19) inches over the preceding sheet and nailing the sheets in place. On decks having inclines two (2) inches to six (6) inches per foot, use No. 15 Asphalt Felt.

3. Follow (2) in Specification No. 203 for 2-ply vapor barrier.

4. Extend all felts up vertical surfaces not less than eight (8) inches.

After the insulation has been laid, turn these eight (8) inch extensions down over the exposed surface of the insulation and thoroughly mop with Old Style Pitch when installing flat roofs, and steep roofing asphalt when installing steep roofs.

Application of Insulation

1. Mop the entire surface with a uniform coating of Old Style Pitch into which, while hot, firmly embed the insulation. When roofs have an incline of from two (2) inches to six (6) inches per foot, use Steep Roofing Asphalt.

2. On decks having inclines two (2) to six (6) inches per foot, each sheet of insulation shall be secured to the deck by nails at each of the four corners, and on inclines exceeding six (6) inches per foot, nails are to be spaced one (1) foot apart along edges and stagger nailed through the longitudinal center of each sheet. All nails shall penetrate the deck at least three-fourth ($\frac{3}{4}$) inch. Nailing of two layers of insulation shall be through the second or top layer only.

When insulation is laid in two layers, mop the entire surface of the first layer with Old Style Pitch on flat roofs and Steep Asphalt on steep roofs into which, while hot, embed the second layer of insulation. (This is optional as layers may be clipped together with mechanical fasteners.)

Application of Roofing Above Insulation

Roofing shall be applied according to Koppers Specifications Nos. 5, 7, 8-A, 9, 32-A, 33, 41-A, 800-A or 3200-A, depending upon the slope of the roof.

Over poured concrete, poured gypsum and precast concrete slab — for normal conditions

INSULATION SPECIFICATION No. 202 FOR FLAT DECKS

Application of Insulation

1. Apply a uniform coating of Old Style Pitch to the deck. If precast concrete slab or tile deck, strip mop with Old Style Pitch up to four (4) inches from the edge of each joint. While the pitch is hot immediately embed the insulation.
2. If there are two (2) layers of insulation, mop the entire first layer with Old Style Pitch into which, while hot, embed the second layer of insulation.

FOR STEEP DECKS (Incline 2 to 6 inches per foot)

Application of Insulation

1. Apply a uniform coating of Steep Roofing Asphalt to the deck into which, while hot, embed the insulation. On precast tile or slab deck, strip mop with Steep Roofing Asphalt up to four (4) inches from the edge of each joint.
2. If there are two (2) layers of insulation, the entire first layer shall be coated with Steep Roofing Asphalt into which, while hot, embed the second layer of insulation. Each sheet of insulation shall be secured in place by nailing. If two (2) layers of insulation are used nailing shall be through the top layer only. Nails shall be spaced one (1) foot apart and shall penetrate the deck at least three-quarters (¾) of an inch and shall be spaced along the edge and stagger nailed through the longitudinal center of each sheet of insulation. When the deck will not permit nailing (which necessitates nailing strips), insulation shall be secured to each nailing strip with nails spaced approximately one (1) foot apart.

Application of Roofing Above Insulation

The roofing shall be applied according to Koppers Company, Inc.'s Specifications Nos. 5, 7, 8-A, 9, 20, 23, 24, 32-A, 33, 41-A, 800-A or 3200-A, depending upon the slope of the roof.

Over poured concrete and precast concrete slab — for high humidity

INSULATION SPECIFICATION No. 203 FOR FLAT DECKS

Application of Membrane Below Insulation

1. Apply a uniform coating of Old Style Pitch to the deck. On precast concrete slab or tile deck, strip mop with Old Style Pitch up to four (4) inches from the edge of each joint.
2. Lay over the entire surface two (2) full thicknesses of Koppers Approved Tarred Felt, lapping each sheet nineteen (19) inches over the preceding sheet—mopping with Old Style Pitch the full nineteen (19) inches so that in no place shall felt touch felt.
3. Extend all plies of felt up vertical surfaces not less than, eight (8) inches and after insulation has been installed turn this eight (8) inch extension down over the exposed edge of insulation and thoroughly mop with coal tar pitch.

Application of Insulation

Apply a uniform coating of Old Style Pitch over the entire surface into which, while hot, embed the insulation. If there are two (2) layers of insulation mop the entire surface of the first layer with Old Style Pitch into which, while hot, embed the second layer of insulation.

Application of Roofing Above Insulation

The roof shall be applied according to Koppers Company, Inc.'s Specifications Nos. 5, 7, 20, 23 or 24.

FOR STEEP DECKS (Incline 2 to 6 inches per foot)

Application of Membrane Below Insulation

1. Apply a uniform coating of Steep Roofing Asphalt to the deck. On precast concrete or tile, strip mop with Steel Asphalt up to four (4) inches from the edge of each joint.
2. Lay over the entire surface two (2) full thicknesses of Koppers No. 15 Asphalt Felt at right angles to the incline of the roof lapping each sheet nineteen (19) inches over the preceding sheet.

Each sheet shall be nailed with one (1) inch barbed roofing nails through flat tin discs eight (8) inches from the upper edge and nails shall be spaced not more than one (1) foot apart. Where nailing strips are used the felt shall be nailed with two (2) nails through flat tin discs at each nailing strip placed six (6) inches and eight (8) inches respectively from the upper edge of each sheet.

3. Extend all plies of felt up vertical surfaces not less than eight (8) inches and after insulation has been installed turn this eight (8) inch extension down over the exposed edge of insulation and thoroughly mop with Steep Asphalt.

Application of Insulation

Apply a uniform coating of Steep Roofing Asphalt over the entire surface into which, while hot, embed the insulation. Each sheet of insulation shall be secured in place by nailing. Nails shall be spaced approximately one (1) foot apart and shall penetrate the deck at least three-fourths (¾) of an inch and shall be placed along edge and stagger nailed through the longitudinal center of each sheet of insulation.

When the deck will not permit nailing (which necessitates providing nailing strips), insulation shall be secured to each nailing strip with nails spaced approximately one (1) foot apart. Nailing of two layers of insulation shall be through the top layer only. Do not nail the first layer.

Application of Roofing Above Insulation

The roofing shall be applied according to Koppers Company, Inc.'s Specifications Nos. 8-A, 32-A, 41-A, 800-A or 3200-A, depending upon the slope of the roof.

Over metal decks — for high humidity

INSULATION SPECIFICATION No. 204

NOTE: Koppers Company, Inc. will not bond roofing over metal decks unless the metal deck is insulated.

Application of Membrane Below Insulation

1. Mop the metal deck with Steep Asphalt.
2. Lay over the entire surface two (2) full thicknesses of fifteen (15) pound Asphalt Felt, lapping each sheet nineteen (19) inches over the preceding sheet, mopping with Steep Asphalt the full width of the nineteen (19) inch lap. Extend all felts up on vertical surfaces not less than eight (8) inches. After the insulation has been laid turn these eight (8) inch extensions down over the exposed surface of the insulation and thoroughly mop with Old Style Pitch when installing flat roofs, and Steep Asphalt when installing Steep Roofs.

Application of Insulation

Apply a uniform coating of Steep Asphalt into which, while hot, embed the insulation.

When more than one (1) layer of insulation is applied, the top surface of each layer shall be coated with Steep Asphalt into which, while hot, embed the succeeding layer.

When the incline of the roof exceeds one (1) inch per foot, the insulation shall be secured to the deck through the top layer with the proper devices provided by the deck manufacturer.

Application of Roofing Above Insulation

The roofing shall be applied according to Koppers Company, Inc.'s Specifications Nos. 8-A, 17, 18, 32-A, 41-A, 800-A or 3200-A, depending upon the slope of the roof.

Over foamglas or fiberglass insulation

For information as to the application of these insulating materials over metal decks consult your Koppers representative. Application of roofing to be the same as over other types of rigid insulation on flat roofs where nailing is not necessary. We will not bond roofing when nailing of insulation or felts over insulation is required. On wood decks with inclines under one (1) inch per foot use Specification No. 201 on page 14.

Over lightweight masonry insulation

Application of a Koppers Bonded Roof over these types of fills varies considerably according to the characteristics of the masonry fill and the conditions under which the roofing material is to be applied. Contact your Koppers representative for our roofing specifications over the type of masonry insulation to be used. A Koppers representative must inspect and approve the condition of the lightweight fill before roofing is applied.

Due to varying conditions of the roof deck and surface of the old roofing, it will be necessary for a representative of Koppers Company, Inc., to approve the type of specifications for reroofing if a Koppers Roofing Bond is to be issued. No bond will be issued without prior approval from Koppers. However, in general we recommend the following practice and specifications for re-roofing work.

No bond will be issued over any old insulated roof regardless of conditions unless old roofing and insulation are removed to the deck prior to application of new roofing materials.

WHEN OLD ROOFING IS ENTIRELY REMOVED

If the old roofing membrane has disintegrated to the extent that it has little value, or if the deck will not render satisfactory service for the period expected of the new roofing, then all old roofing shall be entirely removed. Deck should then be made smooth and any place where it has disintegrated, or where lumber is defective, must be replaced.

Application of New Roofing

New built-up roofing shall then be applied according to the specification over the respective type of deck described in this Specification Book.

WHEN OLD ROOFING IS NOT TO BE REMOVED

Condition of Surface to Receive Roofing

If the deck is in satisfactory condition and will render service for the period expected of the new roofing, and the old roofing membrane can be made smooth and clean by the removal of slag, gravel, or excess asphalt coatings, it will not be necessary to remove old roofing. On old asphalt roofing repair all buckles and blisters by cutting open, remopping, and applying 2 plies

of felt, new roofing to be installed according to reroofing specifications. Before the application of new roofing, the surface of old roofing shall be made smooth and clean. In places where surface is slightly rough, a flood coat of Coal Tar Pitch (for pitch roofs), Asphalt (for asphalt roofs) may be applied to level the surface. When such procedure does not provide a suitable base for new roofing, apply rigid insulation set in Asphalt (over asphalt roofs or Pitch over pitch roofs) over the entire surface of the area to be re-roofed.

Application of New Roofing

Over Tarred Felt and Pitch Roofing

New roofing shall be applied according to Koppers Specifications for over Poured Concrete Decks with the exception that on Wood Decks, 2 plies of Dry Felt shall be applied at all places where there is a possibility of pitch seepage through the deck before the application of new built-up roofing.

Over Asphalt Roofing on Decks Where Nailing Is Possible

Roofing shall be applied according to Koppers Wood Deck Specifications with the exception that the red rosin paper is to be eliminated. If new insulation is installed, apply roofing according to Koppers Specification for over Poured Concrete Decks, setting insulation in asphalt.

Over Asphalt Roofing on Decks Where Nailing Is Not Possible

Roofing shall be applied according to Koppers Concrete Deck Specifications with the exception that each lower sheet of felt shall be strip mopped to the old roofing, and these strip moppings shall be not less than 6 inches apart. If new insulation is applied, set in mopping of asphalt to old roofing.

Application of New Flashing

All old Built-Up flashing must be removed and new Built-Up composition flashing installed according to Koppers' Specifications.

GENERAL

All metal used in conjunction with the roofing such as flashings, counterflashings, pitch pockets, etc. and all skylights, ventilators, parapet walls, copings, etc. shall be replaced or properly repaired so that they will render the same length of service as the new roofing. NOTE: Koppers Company, Inc., Guarantee Bond does not cover roof insulation or failure of roof deck. The application of a Koppers Bonded Roof over an old roof shall not constitute a waiver of these conditions.

ROOFING AND FLASHING BRIEF SPECIFICATION

Flashing and roofing shall be installed by a roofing contractor approved by Koppers Company, Inc., and he shall apply the roofing and flashing in strict accordance with Koppers Specifications and requirements for 10, 15 or 25 year bonds, and subject to Koppers inspection and approval. Upon completion of the work, the contractor is to furnish Koppers Roofing and Flashing Bond to the owner.

The flashing can be bonded for no longer period than the roof is bonded.

Composition base and metal cap flashings

10 YEAR — SPECIFICATION No. 101

Application

Extend plies of roofing felts and pitch moppings up all walls, parapets and curbs for a distance of not less than six (6) inches above the roof deck.

A rattle of not less than eight (8) inches above the roof deck is to be provided.

Prime all masonry walls from top of roofing felts to rattle with Koppers Asphalt Primer. Allow to dry thoroughly.

Mop on with Koppers Sleep Roofing Asphalt a strip of No. 15 Asphalt Felt extending from a height of not less eight (8) inches on the perpendicular surface to four (4) inches out on

the roof deck. On top of this apply a second strip of Asphalt Felt with moppings of hot steep asphalt, extending the roofing felt onto the roof deck one (1) inch beyond the preceding strip. Mop on with Hot Steep Roofing Asphalt a strip of 90 pound mineral surface roofing felt of sufficient width to extend from the raggle to the surface of the deck. Nail with one and one-half (1½) inch barbed roofing nails through flat tin discs at upper edge approximately ten (10) inches o.c.

(For brick construction, nail into vertical mortar joints. For concrete construction, nail to creosoted wood nailing strips set in flush with the surface.)

Asphalt felts are not to exceed ten feet three inches (10' 3") in length. Ends of connecting strips are to overlap three inches and are to break at least twenty-four (24) inches with end laps of underlying strips. End laps shall be thoroughly mopped with steep asphalt.

The strips of Mineral Surfaced Roofing shall be cut from across the roll so that the ends of each strip shall have a two (2) inch selvage. The two (2) inch selvage shall be coated with Flashing Cement and shall be overlapped by the overlying sheet and be thoroughly pressed into place.

Metal Cap Flashing (Not Bonded)

A metal cap flashing is to be inserted in the raggle immediately upon completion of base flashing. The cap flashing is to extend into the raggle not less than two (2) inches and is to have not less than a four (4) inch exposed apron extending down over the base flashing. Completely fill the raggle with Koppers flashing cement.

15 YEAR—SPECIFICATION No. 106

25 YEAR—SPECIFICATION No. 107

Application

Extend plies of roofing felts and pitch moppings up all walls, parapets and curbs for a distance of two (2) inches above cant strip.

A raggle not less than eight (8) inches above the roof deck is to be provided.

Prime all masonry walls from top of roofing felts to raggle with Koppers Asphalt Primer. Allow to dry thoroughly.

Mop on with Koppers Steep Asphalt a strip of No. 15 Asphalt Felt extending from the raggle to not less than four (4) inches on the roof deck.

On top of this apply a second strip of Asphalt Felt with moppings of hot Steep Asphalt, extending the felt onto the roof deck one (1) inch beyond the preceding strip. Mop on additional strips in a similar fashion until a four-ply 20 year Specification No. 107 or a three-ply 15 year Specification No. 106 reinforcement has been obtained.

Mop on with Koppers Steep Asphalt a strip of 90 pound mineral surface roofing felt of sufficient width to extend from the raggle to the surface of the deck. Nail with one and one-half (1½) inch barbed roofing nails through flat tin discs at upper edge approximately ten (10) inches o.c. (For brick construction, nail into vertical mortar joints. For concrete construction, nail to creosoted wood nailing strips set in flush with the surface.)

Asphalt felts are not to exceed ten feet three inches (10' 3") in length. Ends of connecting strips are to overlap three (3) inches and are to break at least twenty-four (24) inches with end laps of underlying strip. End laps shall be thoroughly mopped with steep asphalt.

The strips of Mineral Surfaced Roofing shall be cut from across the roll so that the end of each strip shall have a two (2) inch selvage. The two (2) inch selvage shall be coated with Flashing Cement and shall be overlapped by the overlying sheet and be thoroughly pressed into place.

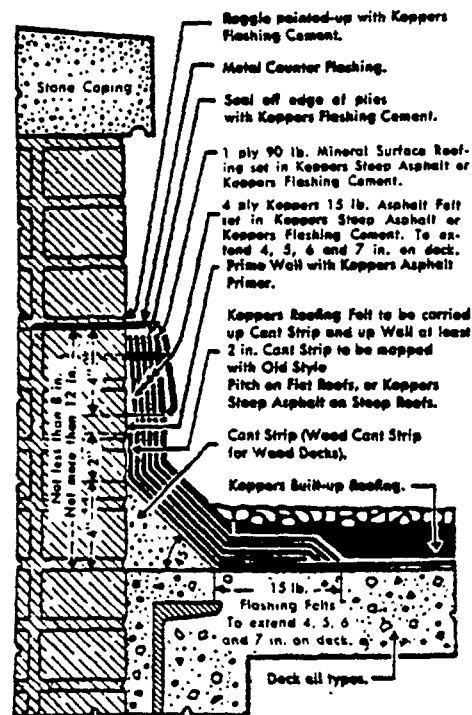
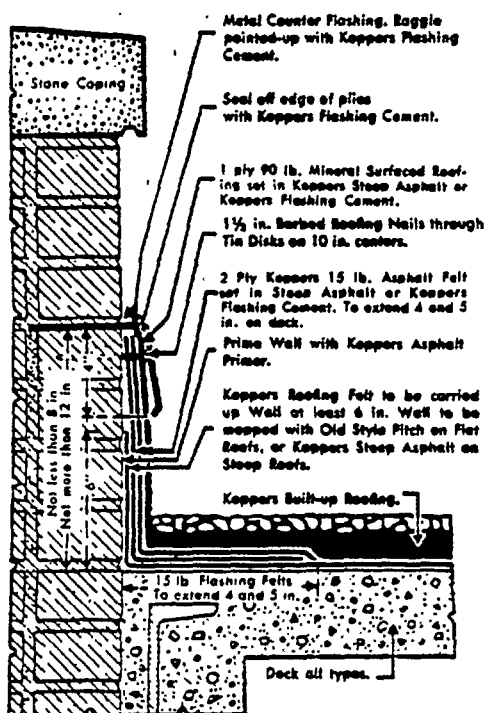
All plies of felt shall be firmly pressed into moppings of steep asphalt so that there will be no wrinkles in the finished surface. As an alternate Koppers flashing cement can be substituted for steep asphalt in the application of the flashing felts.

Metal Cap Flashing (Not Bonded)

Metal cap flashing is to be inserted in the raggle immediately upon completion of base flashings. The cap flashing is to extend into the raggle not less than two (2) inches and is to have not less than a four (4) inch exposed apron extending down over base flashing.

Completely fill raggle groove with Koppers Flashing Cement.

Note: If a Koppers 10, 15 or 25 year Flashing Bond is required, the flashing must be installed in connection with a Koppers Bonded Roof. The flashing can be bonded for no longer period than the roof is bonded.



Maximum Height 12" — Minimum Height 8"

Metal cap and base flashing (not bonded)

SPECIFICATION No. 100

Where a metal base flashing is used felt reinforcement at all wall angles, skylight curbs and other vertical surfaces shall be installed as follows before metal base flashing is installed.

Extend first two (2) plies of dry roofing felt up vertical surfaces for a distance of not less than four (4) inches and cut off the remaining plies at the angle of the roof deck.

Terminate plies of roofing membrane at vertical surfaces.

Mop on with Koppers Steep Asphalt a strip of asphalt felt extending from a distance of not less than six (6) inches (or the height of the raggle) up the perpendicular surface to not less than four (4) inches out on flat roofing membrane. On top of this apply a second strip of asphalt felt set in mopping of steep roofing asphalt, extending not less than one (1) inch beyond edge of preceding strip. If 5 ply flat roofing is installed, a third reinforcing ply of felt set in steep asphalt is to be applied.

Mop the surface of last ply immediately before installing metal base flashings so that metal base flashing is set in hot pitch.

All end joints of reinforcing plies shall break joints and all end laps shall be thoroughly mopped.

Installation of Metal Base and Counter Flashing

A raggle not less than ten (10) inches above the roof deck is to be provided.

The metal base flashing shall extend up the vertical surface not less than ten (10) inches and onto the roof deck not less than four (4) inches. Nail base flashing to the deck with one and one-half (1½) inch barbed roofing nail, one (1) inch from outer edge of metal flange on four (4) inch center. For concrete deck, a nailing strip of creosoted wood shall be set in the concrete flush with the surface.

Over the part of the metal base flashing extending onto the roof, apply two (2) strips of tarred felt with alternate moppings of roofing pitch. The top strip is to extend two (2) inches beyond the lower strip and both are to be not less than double the width of the flange.

Metal cap flashing shall be installed immediately so as to prevent seepage of water behind base flashing.

Metal cap flashing shall extend into the raggle not less than two (2) inches and shall have a four (4) inch exposed apron extending down over the top edge of metal base flashing. After the metal cap flashing has been installed, completely fill the raggle groove with Koppers flashing cement.

Composition base and metal cap flashing for water-cooled roofs

15 YEAR OR 25 YEAR SPECIFICATION No. 110

Application

Cant strips shall be installed at the angle between the roof deck and the parapet wall or any other similar perpendicular surfaces.

Extend plies of roofing felts and pitch moppings up all walls for a distance of two (2) inches above cant strip.

A raggle of not less than ten (10) inches above the roof deck is to be provided.

Set two plies of Koppers Approved Tarred Felt in trowelings of Koppers tar base roof cement or in moppings of Koppers Old Style Pitch. Have plies extending from the bottom of the raggle; the first extending out onto the deck not less than four inches from the bottom of the cant strip, and the second, one inch beyond the first.

Over this apply two layers of tar saturated asbestos felts similarly imbedded in Koppers Tar Base Roof Cement or Old Style Pitch. Each ply extending onto the deck one inch beyond the preceding ply.

Nail with one and one-half (1½) inch barbed roofing nails through flat tin discs at upper edge approximately ten (10) inches o.c. (For brick construction, nail into vertical mortar joints. For concrete construction, nail to creosoted wood nailing strips set in flush with the surface.)

Felts are not to exceed ten feet three inches (10' 3") in length. Ends of connecting strips are to overlap three (3) inches and are to break at least twenty-four (24) inches with laps of underlying strip.

All plies of felt shall be firmly pressed into the trowelings of Koppers Tar Base Roof Cement so that there will be no wrinkles in the finished surface.

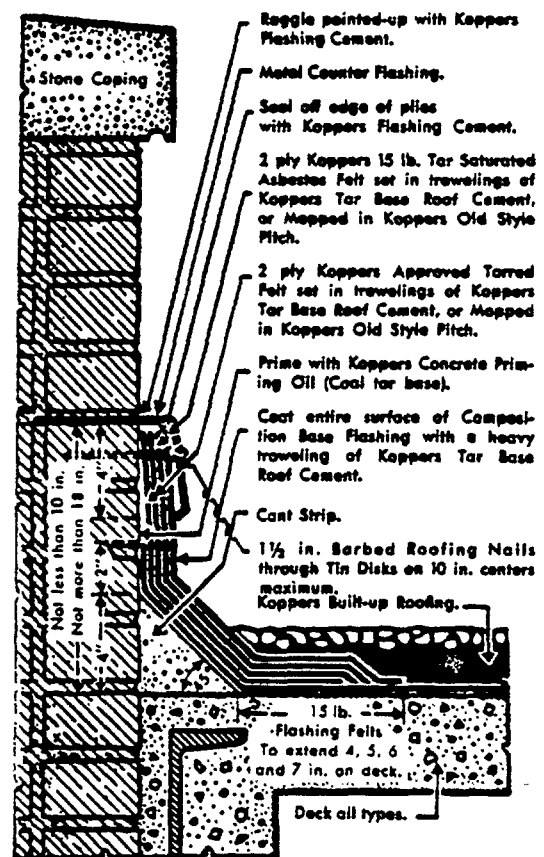
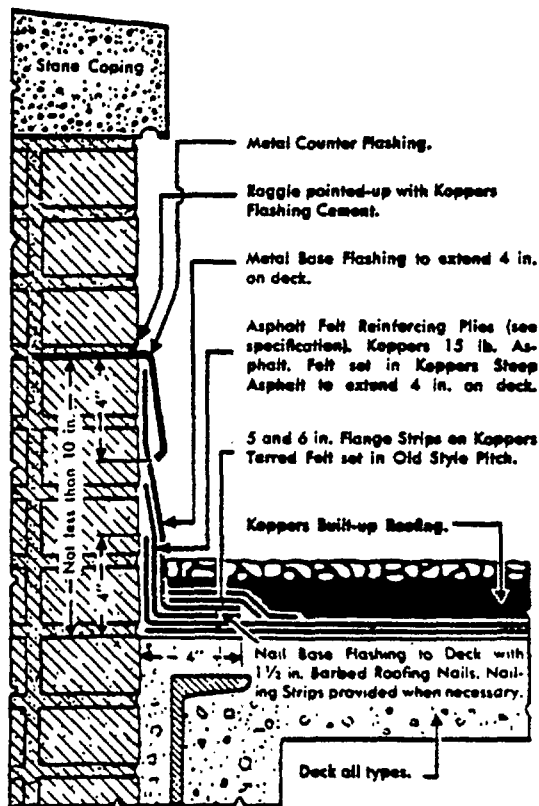
Coat the entire surface of the composition base flashings with a heavy troweling of Koppers Tar Base Roof Cement.

Metal Cap Flashing (Not Bonded)

Metal cap flashing is to be inserted in the raggle immediately upon completion of base flashings. The cap flashing is to extend into the raggle not less than two (2) inches and is to have not less than a four (4) inch exposed apron extending down over base flashing.

Completely fill raggle groove with Koppers Flashing Cement.

Note: If a Koppers 15 or 25 year Flashing Bond is required, the flashing must be installed in connection with a Koppers Bonded Roof. The flashing can be bonded for no longer period than the roof is bonded.



Height Must Not exceed eighteen (18) inches above Roof Deck.

Other flashings

SPECIFICATIONS FOR FLASHINGS ON VENT PIPES, STACKS, FLAGPOLES, & OTHER PROJECTIONS

All vent pipes, stacks, flagpoles, or other projections penetrating the built-up roofing, whether indicated on drawings or not, must have a proper metal sleeve flashing with flange, pan flashing with flange or other flanged flashing installed.

Behind metal sleeve and beneath roofing membrane next to deck install metal pitch dam as shown in detail. The sheet metal flange must be cemented to the surface of the felt with a mopping of hot coal-tar pitch. Over flange apply, with alternate moppings, two (2) reinforcing plies of tarred felt so that the first extends not less than three (3) inches beyond the outer edge of the flange and the second not less than six (6) inches. See detail, opposite page.

SPECIFICATIONS FOR FLASHINGS ON STUB COLUMNS

Exposed surface of all stub column projections must be protected with 3 plies of tarred roofing felt cemented on with a trowel application of Flashing Cement. Felt is to be carried out onto the surface of the roofing felts so that the first extends not less than three (3) inches, the second not less than four (4) inches, and the third not less than five (5) inches.

Trowel over the entire surface of felts just applied, one (1) coat of Flashing Cement.

All stub column projections must have a metal box flashing with flange furnished and installed over the cemented felts.

The flange of the metal box flashing must be cemented to surface of the roofing felts with a mopping of hot coal-tar pitch. Over the flange apply with alternate moppings, two (2) reinforcing plies of tarred felt so that the first extends not less than three (3) inches beyond the outer edge of the flange and the second not less than six (6) inches. See detail, opposite page.

SPECIFICATIONS FOR FLASHINGS ON ROOF DRAINS

The sheet metal flange furnished with the drain must be cemented to the surface of the felt with hot coal-tar pitch or flashing cement. Over the flange apply with alternate moppings or trowelings two (2) reinforcing plies of tarred felt so that the first extends not less than three (3) inches beyond the outer edge of the flange, and the second not less than six (6) inches.

Roof drains must be of a type provided with a wide lead or copper flange. Strainer construction should provide adjustment for meeting variations in roof level or slope. See detail, opposite page.

SPECIFICATIONS FOR FLASHINGS ON PITCH POCKETS FOR FUTURE COLUMNS, SIGN SUPPORTS, AND ANGLE IRONS

At all locations where future columns, sign supports, and angle irons are to penetrate built-up roofing, pitch pockets are to be provided with a flanged metal pan.

The sheet metal flange must be cemented to the surface of the felt with hot coal-tar pitch or flashing cement. Over the flange apply, with alternate moppings, two (2) reinforcing plies of tarred felt so that the first extends not less than three (3) inches beyond the outer edge of the flange and the second not less than six (6) inches.

Fill metal pan with hot coal-tar pitch or flashing cement. Paint exposed sections of all reinforcing rods with dampproofing paint. See detail, opposite page.

SPECIFICATIONS FOR CURB EXPANSION JOINTS

Curb expansion joints are to be flashed in accordance with Koppers specifications for parapet walls and must provide nailing to hold metal cap and flashing membrane in place. Metal cap must be designed to expand so as not to disturb flashing. See detail, opposite page.