PLAINTIFF'S EXHIBIT

BEA-106

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KOPPERS

Built-up Roofing • Waterproofing • ampproofing • Plastipitch Protected Metal

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KOPPERS BUILT-UP ROOFING

ppers Slag or Gravel Surfaced Roof consists of te layers of tarred felt cemented with pitch to continuous skin over the entire roof deck. he actual waterproofing agent is the pitch, the es an elasticity and tensile strength to the me which enables it to bridge cracks and nd to adjust itself to the expansion and con- of the surface to which it is applied.

mber of layers or "plies" of tarred felt required om 3 to 5 depending on the type of deck and gth of service desired. The number of plies es not affect the impermeability of the roofing, reater number does prolong its life.

ch used may be either Koppers Coal-tar Pitch, pers Steep Roofing Pitch, depending on type ne of the surface to which the roofing is . The first is superior for decks of slight because of its self-sealing characteristics; the second is ideal for steep roofs because of its ability to resist any tendency to creep due to gravity.

Either slag or gravel provides a satisfactory surface on decks of slight incline, but where steeper slopes are encountered, slag only should be used since its sharp and irregular surfaces enable it to retain a grip on the pitch, and, therefore, not slide.

Most of the fine old records for long life and freedom from maintenance have been made by built-up roofs of coal tar pitch—records of roofs 20, 30 and even 40 or more years old—roofs that have outlasted the buildings. No other built-up roofing material has such an illustrious record.

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.

KOPPERS FLAT ROOFS

vantages of Coal Tar Pitch for Flat Roofs

portant questions should be asked about any to be applied on flat decks:

it resist prolonged contact with water with- deteriorating?

es it have the ability to heal itself automati- y?

uilt with Koppers Old Style Pitch and Ap- Tarred Felt DO resist water and they DO mselves.



RESISTANCE TO WATER

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 15 to 50 years by coal tar pitch roofs with little or no attention prove the resistance of tar to water. Koppers Old Style Pitch is practically insoluble in water. None of its constituents has more than a slight water solubility. Koppers Old Style Built-up Roofing is resistant to moisture and sunshine.

THE SELF-HEALING PROPERTY

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.

EXTRA HEAVY TOP POURING WITH GRAVEL OR SLAG SURFACE

Additional protection is given a Koppers Roof by the extra heavy top of roofing pitch which is poured on (not mopped). This pouring amounts to approximately 75 pounds of pitch for every 100 square feet of roof 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.



KOPPERS STEEP ROOFS

Advantages of Coal Tar Pitch for Steep Roofs

Koppers Steep Roofing Pitch provides, for steep roofs (slopes of 2 to 5 inches per foot) the same long life, the same resistance to water and weather that have made coal tar pitch and tar-saturated felt the outstanding materials for flat built-up roofs.

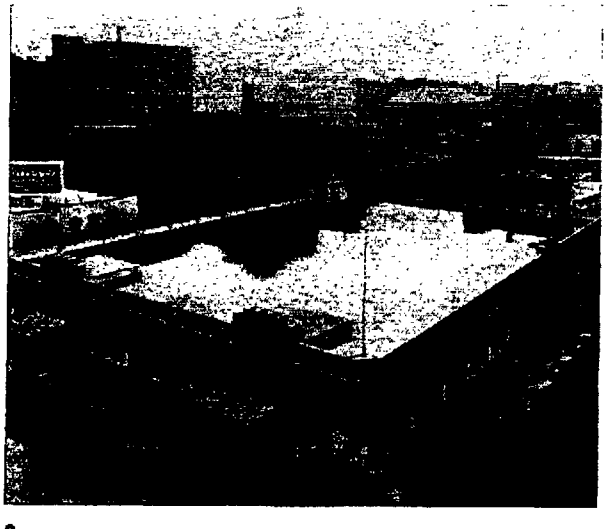
On steep roofs constructed in accordance with Koppers specifications, the upper edge of every ply, laid shingle fashion, is nailed to the deck or the insulation, and thus mechanically anchored. Before the development of steep roofing pitch, it was necessary to apply, on steep slopes, types of roofing which do not have the long service records established by coal tar pitch. This often caused a difficult situation on buildings where both steep and flat roofs were constructed, because bonds could be obtained by the owner on the coal tar pitch roofings on the flat areas, but not on the roofing on the slopes. This difficulty is now eliminated, as roofing bonds can be obtained on Koppers Steep and Flat Built-up Roofings applied by Koppers Approved Roofing Contractors in territories covered by Koppers Roof Inspection Service.

Koppers Steep Roofing Pitch is approximately 30° F. harder than ordinary roofing pitch. It keeps the slag firmly embedded. It complies with the specifications of the Underwriters' laboratories.



KOPPERS WATER-COOLED ROOFS

A roof deck intended for spray pond or water cooling is preferably dead level but may have a slight incline providing that such slope does not exceed 1 inch per foot; this pitch may be exceeded on spray pond roofs.



Water cooled roofs operate on the principle (1) water on the roof deflects the sun's rays thereby cuts down summer heat within the bui (2) the evaporation of the water dissipates heat a rate of 1,000 B.t.u. per pound of water.

Various tests show that water cooled roofs re the peak temperatures on the top floor of any ing by 10° to 20° F. during the summer. A experiment showed that roof cooling would p 90% of the heat due to solar radiation, from p through roof surface into the building.

The water cooled roof may be used alone or junction with air conditioning equipment. Wh an adjunct of an air conditioning system, les eration will be required for cooling of the ai the structure. It should also be noted that i sible to pipe the water required for cooling condenser to the roof, and, if the water is ex or scarce, it is practical to have it recycled to conditioning equipment.

The roof should be kept wet or damp either by of sprays or by allowing water to flow onto face of the roof and be retained to a certain

a "lake." In the warmest weather a spray sys- will require approximately 1/3 gallon of water square foot per day for maximum cooling. On where water is held to a specified height so as completely cover the slag or gravel the cooling ency will be less, due to the fact that the effec- evaporative area has been decreased. Water ed or spray pond roofs are similar in construc- o slag or gravel roofs, with the exception that er layer of coal-tar pitch embedded slag or el is added.

The specifications for Spray Pond roofing do not provide for the expansion due to ice formations in winter, it being assumed that the water will be drained from the roof when cold weather sets in. Provision could be made, however, if necessary, by installing flashings of the proper design to take care of this pressure.

Koppers specifications on the application of Koppers Built-Up Roofing over all types of decks, insulation, and reroofing can be obtained by contacting our nearest office or by referring to Sweet's Architectural Catalog.

KOPPERS WATERPROOFING AND DAMPPROOFING

Why Koppers Waterproofing and Dampproofing materials should be used.

unction of waterproofing and dampproofing is tect masonry or concrete from attacks by water. ost important property that must be possessed waterproofing or dampproofing material is to resist prolonged contact with water. It can- assumed that all materials used for this work ially resistant to water. True water-resistance ned with coal tar pitches. This is proved by ords of 30, 40 or even more years of leak-proof life from coal tar pitch roofs and by the fact l tar pitch on water-cooled roofs is constantly mittently exposed to water for years without

OPPERS MEMBRANE WATERPROOFING

proofing is employed to prevent water under from entering the building or to resist the action of running water. KOPPERS MEM- WATERPROOFING provides a continuous which seals the entire area of the surface d. It consists of a strong and elastic fabric membrane mopped on with coal-tar pitch. It ed to the water side of the construction to be . The water pressure pushes the membrane he walls and floors and thus tends to pre- contact between the membrane and the ion.



PPERS WATERPROOFING PITCH

oal Tar Waterproofing Pitch is manufac- istilling blends of coal tars to the proper for waterproofing work. It is resistant to rmites, is self-healing and self-sealing if occur in the pitch and it possesses a ich permits it to conform to irregularities ed surfaces.

KOPPERS TAR SATURATED FABRIC

The finished fabric is sufficiently porous to permit the moppings of hot waterproofing pitch to seep through during the application of the waterproofing and become firmly anchored in place.

KOPPERS APPROVED TARRED FELT

Felt is sometimes used in alternate layers with fabric, or is used in the first plies and covered with fabric on the outermost ply. Felt, when mopped with pitch, increases the impermeability of membrane waterproofings. Fabric membranes are not superior to felt except in their greater toughness and strength.



KOPPERS DAMPPROOFING

DAMPPROOFING is intended to render the surface of a material impermeable to water intermittently present in small quantities and not amounting to a head of water pressure. It is therefore evident that while waterproofing is also naturally and inherently dampproofing, dampproofing can NOT be waterproofing.

Dampproofing generally consists of a water-repellent surface coating applied by brush, spray or trowel. A good dampproofing will penetrate into and fill the pores of a surface, is sufficiently elastic to conform to expansion and contraction, and is insoluble in and unaffected by acids or alkalis that may come in contact with it either in the water it is intended to repel or the surfaces to which it is applied.

KOPPERS HP PRIMER AND KOPPERS SEAL COAT—DAMPPROOFING

Koppers HP Primer is used with Koppers Seal Coat for protecting cement concrete against the disintegrating action of water. Concrete is permanent only when it is protected from the alkalis and sulphates often found in ground, lake, and sea waters. Continued contact with water also changes the structure of some

of the chemical constituents of cement concrete, thus causing the concrete to lose some of its inherent strength. Koppers HP Primer penetrates the surface of the concrete, making it water-repellent. Koppers Seal Coat seals the surface, thus protecting it from erosion. This treatment is used particularly for dampproofing foundations, bridge abutments, basement and retaining walls, culverts, reservoirs, dams, sumps, pits, vats, tanks, and sewage disposal plants. On reinforced concrete this treatment also gives added protection to the reinforcing steel.

PITCH METHOD DAMPPROOFING

For all brick or concrete foundations and abutments where backfill will be used.

PAINT METHOD DAMPPROOFING

An inexpensive black dampproofing paint for application to concrete or concrete block surfaces which may be applied to green as well as dry concrete; two applications recommended.

SUB-FLOOR DAMPPROOFING

For installation where the ground is damp and it is desired to use a wood finish floor, an effective dampproofing is necessary.

Koppers specifications on the application of Koppers Membrane Waterproofing and Dampproofing can be obtained by contacting our nearest district office.

KOPPERS PLASTIPITCH PROTECTED METAL

Koppers Plastipitch Protected Metal is used for roofing and siding on industrial, railroad and agricultural buildings. Clean uncoated sheets of pre-formed corrugated, flat, or V-crimp steel in various gauges are coated with Koppers Plastipitch Compound in such a manner that the coating adheres to the steel at low as well as at high atmospheric temperatures.

RESISTANCE TO WEATHER AND CORROSION

Steel must be protected against weathering in order to have a long life. Steel protected by the Plastipitch Process has a bituminous coating which thoroughly protects the base against rusting and corrosion, not only from the elements, but also from the effects of chemical fumes present in many areas. It provides an armor against the elements and corrosion after many other types of sheets have lost their usefulness.

Steel coated by the Plastipitch Process is sealed against corrosion and rusting on all sides and edges by the Plastipitch coating system.

DURABILITY

Roofing and siding of any type are expected to keep out moisture, but their value depends upon how long they will give this protection without deteriorating. KOPPERS PLASTIPITCH Protected Metal Sheets are among the most durable and rust-resistant sheets produced.

Through exposure to good weather; bad weather; atmospheric acid fumes, moisture, heat, cold, and salt air spray, KOPPERS PLASTIPITCH Protected Sheets have demonstrated their durability.

ECONOMY

From a long-life viewpoint, Plastipitch Protected Sheets are economical. They do not require further painting and are virtually free from maintenance expense.

USES

KOPPERS PLASTIPITCH Protected Metal has been used by railroads, public utilities, industrial plants and on agricultural buildings because of its additional resistance to atmospheric acid fumes, alkali vapors, salt air corrosion, adverse atmospheric conditions, and extreme temperature changes.

Contact our nearest office for complete information and engineering specification book.

