United States Patent Office 2,804,833 Patented Sept. 3, 1957

2,804,833

ASPHALT ROOFING

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No Drawing. Application July 2, 1956, Serial No. 595,130

3 Claims. (Cl. 108—7)

This invention relates to improved asphalt roofing and more particularly to mineral surfaced asphalt roofing without substantial blistering.

For many years mineral surfaced asphalt roofing has been widely used as a roof covering material usually in the form of shingles. These shingles comprise a rag or wood fiber felt saturated with asphalt and coated with a plastic asphalt in which are embedded roofing granules. The material is then cut into any of a number of shapes and laid on roofs in a variety of well known patterns.

One of the difficulties with these shingles is that they sometimes blister. If the blistering is pronounced, i. e., where the blisters are large and burst open or crater, the roof may eventually leak and have to be replaced. The problem of blistering has been very widely investigated for a great number of years but its cure had not previously been established.

It is therefore an object of the present invention to provide improved asphalt mineral surfaced roofing without substantial blistering.

It is a further object of this invention to provide an improved asphalt shingle which can be consistently manufactured without substantial blistering.

These and other objects are attained by the present invention which relates to a roofing shingle wherein the felt base thereof is saturated with an asphalt to which oil has been added to bring the asphalt up to a specified percentage of water white oil.

The analyses of asphalts to determine the content of water white oils is described in The Journal of Research of the National Bureau of Standards, at volume 54, No. 3 of March, 1955, by Lawrence R. Kleinschmidt. This procedure has been modified somewhat by the applicants.

The procedure comprised first dissolving the asphalt in n-pentane. The material insoluble in the n-pentane and separated by filtration is the asphaltene content. The n-pentane solution from a 5 gram sample of asphalt after filtering out asphaltenes was concentrated from about 200 cc. to 50 cc. by heating in a steam bath. An elongated tube was prepared containing a glass wool plug at the bottom thereof and a column of fuller's earth above in the weight ratio of 40:1 of fuller's earth to the amount of the sample soluble in n-pentane (the Kleinschmidt method uses a ratio of 15:1). The fuller's earth was first washed with n-pentane and then the n-pentane containing the soluble portion of the asphalt was eluted through the fuller's earth. The n-pentane solution passing through the fuller's earth was evaporated by placing a beaker thereof approximately 15 inches from a 250 watt infra-red lamp and the sample was thus heated at 105° C. for about 15 minutes until the non-volatile fraction had reached a constant value. When all of the n-pentane had been evaporated, the remaining fraction of the asphalt was a water white oil which has about the same viscosity as a heavy lubricating oil at room temperature.

By the use of this modified Kleinschmidt method a sample of a Gulf Coast asphalt flux was found to have an 8% water white oil content. Gradual additions of bright stock

lubricating oil were mixed with the asphalt, testing after each addition, until a test indicated a water white oil content of 15%. The asphalt flux mixture with oil was then airblown to form a saturating asphalt, i. e., having a softening point of about 150° F. and a penetration of about 60 at 77° F. Roofing felt was saturated in a molten bath of this asphalt and coated with a coating asphalt by the usual method on a roofing machine. Roofing granules were then pressed into the plastic asphalt and the material cut into shingles.

Shingles made in accordance with the invention were tested in the following manner. Cut pieces of shingle 6" x 6" were soaked in water under a vacuum of 27 inches of mercury for 5 minutes. They were then allowed to stand 5 more minutes in the water bath at atmospheric pressure. The samples were then placed in an oven at 220° F. for two hours and examined for blisters. The following scale is used in the blister examination. Shingles giving a reading of "1" contain less than a dozen small blisters, i. e., not over ⅛ inch in diameter and raised not over 1/32 inch above the shingle surface. Shingles rated "2" may contain many small blisters or a few large blisters or a few small open blisters (craters). Shingles rated "3" may contain a large number of large blisters, a large number of small open blisters and may even contain also a few large open blisters. Shingles rated "4" contain a large number of large open blisters.

In addition to this accelerated test shingles are also tested on an exposure rack subjected to atmospheric conditions. Experience indicates that at the end of two years of exposure the degree of blistering will usually have reached a maximum. Shingles which have not shown blistering at the end of two years are not likely to blister on any further exposure. Shingles having a reading of "2" or less are not likely to cause complaints, whereas shingles having a reading greater than "2" may be expected to be the subject of complaints. By the term "without substantial blistering" as used herein is meant that an average reading for a number of samples does not exceed "2" and that there are no large open blisters on any of the samples.

A number of samples of the shingles made in accordance with the example above given accelerated tests averaging 1.3 as compared with shingles made with the same asphalt without the addition of oil which had an average of 2.8.

By "saturating" asphalt as used herein we mean the asphalt commonly used in the roofing industry for saturating roofing felt. This asphalt has a softening point in the range 140–160° F. and 40–80 penetration at 77° F. It is airblown from asphalt flux which is a residue from petroleum distillation having a softening point in the range 60–105° F.

In accordance with the invention the bright stock or crude lubricating oil is added to the asphalt flux before air blowing.

Sufficient bright stock should be added to bring the water white oil content in the range 15–20% by the modified Kleinschmidt method. The amount of additional bright stock may be calculated roughly on the basis of the original modified Kleinschmidt test percentage as compared with the desired water white oil percentage. However, subsequent modified Kleinschmidt tests should be made to determine whether the proper amount of bright stock has been added to yield the water white oil content in accordance with the test.

Exposure tests of about a year and a half confirm the accelerated tests that the asphalt with a modified water white oil content substantially reduces blistering.

We claim:

1. An improved mineral surfaced asphalt roofing comprising roofing felt saturated with saturating asphalt, a layer of coating asphalt on one side thereof, and roofing

granules impressed in the coating asphalt wherein the saturating asphalt is the airblown product of an asphalt flux to which mineral oil has been added in an amount sufficient to obtain a modified Kleinschmidt percentage of water white oil in the range 15–20%.

2. An improved mineral surfaced asphalt roofing comprising roofing felt saturated with saturating asphalt, a layer of coating asphalt on one side thereof and roofing granules impressed in the coating asphalt wherein the saturating asphalt is the airblown product of a Gulf Coast asphalt flux having a modified Kleinschmidt percentage of water white oil of about 8% to which has been added before airblowing sufficient bright stock to obtain a modified Kleinschmidt percentage of water white oil of about 15%.

3. Mineral surfaced asphalt roofing shingles consistently showing freedom from large open blisters comprising roofing felt saturated with saturating asphalt, a layer of coating asphalt on one side thereof, and roofing granules impressed in the coating asphalt wherein the saturating asphalt is the airblown product of an asphalt flux to which mineral oil has been added in an amount sufficient to obtain a modified Kleinschmidt percentage of water white oil in the range 15–20%.

No references cited.