how to use oxidized bitumen

Oxidation of the bitumen can achieve a desired softening point, penetration distance, viscosity, or other suitable characteristics. In an embodiment, the oxidation can be performed such that a combination of the bitumen mixture and the catalyst has a softening point of at least approximately 88° C. (190° F.), at least approximately 90° C. (194° F.), or at least approximately 93° C. (200° F.). In another embodiment, the oxidation can be performed such that a combination of the bitumen mixture has a softening point of not greater than approximately 110° C. (230° F.), not greater than approximately 105° C. (221° F.), or not greater than approximately 102° C. (215° F.).

The oxidation may be performed using air, nitrogen, oxygen, carbon dioxide, chlorine, another suitable oxidizing gas, or a combination of these gases at a time and temperature such that any needed or desired characteristic of the bio-source material or the bitumen source material (for example, softening point, penetration distance, viscosity, another suitable parameter, or any combination thereof) is achieved. In one embodiment, the oxidation can be performed in the absence of air. In a particular embodiment, the oxidation may be performed at a temperature in a range of approximately 100° C. (212° F.) to approximately 235° C. (455° F.). In a particular embodiment, the catalyst for oxidation is provided in a liquid form. In another particular embodiment, the oxidation can be performed without the addition of a catalyst. The oxidation can be performed until a needed or desired characteristic of the bitumen for example, softening point, penetration distance, viscosity, another suitable parameter, or any combination thereof is achieved. After reading this specification, skilled artisans will be able to determine the particular conditions used for the oxidation. For the purposes of this specification, an oxidised asphalt material includes a partially oxidized bitumen source, such as partially oxidized petroleum-based bitumen asphalt.

The oxidized grade of bitumen using as

1. Roofing;

Two types of oxidized bitumen coated roofing materials are available; built up roofs, and roofs made of roofing shingles. Built up roofing is the type used on horizontal type roof structures which are typically commercial or apartment type buildings. For the built up roofs, oxidized bitumen is heated to 400°-450° F., and then mopped on. The saturated bitumen felt is then rolled over. The asphalt which acts both as an adhesive as well as a water-proofing coating, is applied as the roof is being layed down. Because the oxidised asphalt for built up roofing must retain adhesive properties, it is less cross linked or mildly oxidized compared to asphalt prepared for roofing shingles. Roofing stone aggregate is spread over the entire built up roof to provide weather resistance to the built up roof. Roofing stone aggregate can be stone or slag. Its purpose is to prevent ultraviolet rays from degrading the roof coating. The stone allows walking over the roof without disturbing the asphalt.

Roofing shingles are another type of roofing material coated with oxidized bitumen. The bitumen is cross linked or oxidized and is coated onto the roofing felt in a manufacturing step. Generally, the asphalt is filled with stone dust. The asphalt is heated to about 400°-450° F. and spread on and pressed into the roofing felt. Roofing granules are then fed onto the saturated asphalt felt and pressed in.

Roofing felt from a continuous roll is coated with the oxidized bitumen formulation at about 400° F. Roofing granules, a colored ceramic stone baked onto stone granules, are pressed into the coating. The shingle color becomes the color of the granules. This coated felt roll is cooled and the shingles, with desired cut-outs, are continuously cut from the continuous shingle roll. Typically, the roll is three feet wide and shingles are one by three feet with cut-outs.

In recent years roofing felt material has been changed from cellulose to glass fibers. The new glass fiber shingle is thinner and more flexible than the old cellulose felt shingle. Therefore, the coating must have better flexibility properties, particularly at cold temperatures. If this is not the case, flexing at cold temperatures causes surface cracking in the shingles. The cracks are failure sites and points for future leaks to develop.

2. Bonding bitumen

For outdoor use and protection and tanking of structural elements.Bonding bitumen is Solvent-based, cold-bonding compound for bonding bitumen roof sheetings to mineral substrates, masonry, wood and existing bitumen sheetings.

Oxidized bitumens processed to
higher softening points are used to make roofing shingles,
roofing membranes and built-up roofing systems. Other
roofing products require bitumens with different physical
properties calling for still other levels of oxidation.
When bitumen is heated above its softening point, bitumen
fumes (aerosols, vapors, gases) are released. Temperature has
a significant impact on fume emission rates. Differences in
crude sources, bitumen manufacturing processes, application
practices, physical properties, and ambient weather
conditions also affect either emission rate
or exposure to the fume. Because bitumens
are made to a wide range of softening
points, they respond much differently
to temperature. It is incorrect, therefore,
to assume that the fume emission rates
of higher-softening-point bitumens are
substantially greater solely because higher
temperatures are needed to reduce their
viscosities to levels suitable for commercial

operations. But while temperature is not a sufficient indicator of the relative fuming potential of bitumens with dissimilar physical properties, there is no doubt that, for any one bitumen, lower temperatures mean less fumes.
Bitumen roofing products and systems can be cold-applied (i.e., put down at ambient temperatures without heating), soft-applied (i.e., heated with torches or hot air welders sufficiently to ensure good adhesion to the substrate), or hot-applied (i.e., by applying hot liquid bitumen as the bonding agent).

3. Bitumen coat

Excellent and permanent adhesion to metal

Low water absorption

Impact resistant

Flexibility

Resistance to soil stress

Resistance to cold stress

High electrical resistibility

Chemically stable