

MARIMIX™

PERFORMANCE PATCHING MATERIAL



DESCRIPTION

MARIMIX™ performance patching material shall be composed of mineral aggregates, mineral fillers and bituminous materials blended with modifiers which may include, anti-stripping agent(s), antioxidant(s), together with select resinous, high flash point aromatic hydrocarbon(s), formulated as determined by the manufacturer. MARIMIX™ must be functional as a permanent repair in a wide temperature range as it may be used as a "cold patch", "warm mix" and/or "hot mix", as required.

COMPOSITION OF MIXTURES

Components of approved mixtures shall be proportioned to produce separate and distinct gradations, as required constituting (at a minimum) an approved dense surface gradation for rural road repairs together with an "open-graded" design to be used on highway applications. All mix compositions, including all modifiers, will not detract from the compatibility of the patching material(s) with the adjacent pavement. MARIMIX™ performance patching materials may be used in conjunction with current "hot box" equipment and can even be "reheated" several times with no detrimental effect on the performance of the material, provided that the material is utilized in accordance with these specifications and manufacturer's guidelines.

Installed patching materials are also warranted to be recyclable b²-in-place with post heat treatment when thermal integration of the patch/pothole is desired. This guarantee is only applicable when the post heat treatment is performed by the Felix A. Marino Co., Inc. to ensure that no division of responsibility for the overall performance of the patching material and/or finished patch will occur.

Material design specifications are limited to reduce energy requirements and environmental impact while diminishing the normal susceptibility to oxidation. As such, all specified materials may be used at ambient temperatures. If for any reason additional heat energy is desired, it will in no way diminish material performance provided that the manufacturer's guidelines are met.

Material samples shall be submitted for evaluation upon request.

JOB-MIX FORMULAS

Consistency of all approved job-mix formulas will be maintained. Vendor will periodically submit physical samples to be obtained from jobsites, stockpiles, or warehouses, when requested.

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- A. **Aggregates:** The mineral aggregate and filler materials shall conform to subsections M3-11-05 and M3-11-06 of the Massachusetts Highway Department (MHD) Standard Specifications. The materials shall be clean, crushed stone, shattered natural rock, free from a detrimental quantity of thin or elongated pieces, and free from dirt or other objectionable materials. The use of residual washed gravel will not be permitted.
- B. **Liquid Bituminous Materials:** The base liquid bituminous material shall be comprised of a suitable highly stable, emulsified liquid asphalt in conformance to the MHD Standard Specifications for Highways and Bridges, subsections M3.03.0 and M3.03.I. The base liquid asphalt shall be approved and modified in conformance to manufacturer's standards. The final liquid formulation to be used in the mixing process, shall result in a composite admixture that when incorporated into the finished patching material(s), shall be completely thermally recyclable (both pre and post installation) and be capable of attaining the specified mix performance characteristics. All finished MARIMIX™ performance patching material will be formulated precisely as recommended by the manufacturer.
- C. **Mixing Procedure:** MARIMIX™ shall be produced in a batch or drum mix plant, in accordance with the following requirements:
 - 1. All aggregates shall be thoroughly dried and heated before entering the mixer. The temperature of the aggregates shall be controlled so that the final temperature of the completed mixture does not exceed the manufacturer's guidelines or established warm mix standards.
 - 2. The mineral aggregate, prepared as prescribed above, shall be combined, and conveyed into the mixer in the proportionate amounts of each aggregate required to meet the job-mix formula. The required quantity of bituminous material(s) shall be measured by weight, or approved metering device. Mineral aggregates and mineral fillers in the amounts required shall be thoroughly mixed. Only then shall the blended bituminous materials be introduced, and the mixing continued for a period of time to produce a homogeneous mixture at substantially reduced temperatures referred to above.

PERFORMANCE OF MARIMIX™ PERFORMANCE PATCHING MATERIAL

- A. All relevant provisions of the current edition of the MHD Standard Specification for the Highway and Bridges shall apply to all the material(s) to be furnished as required by this specification.
- B. Ingredients of all MARIMIX™ shall be combined and heated at a reduced, but sufficient temperature to promote uniform coating of the finished patching material, resulting in a

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non-polymerized, homogeneous state that may be used immediately after initial production, allowed to cool to ambient temperature or reheated under any of the following conditions and/or as provided by the manufacturer.

MARIMIX™ performance patching material is oxidation resistant, recyclable and shall conform to all of the following requirements:

1. Patching material may be applied as a permanent repair at ambient temperatures throughout the year. A minimum depth of 4" is recommended. For best results, CRF® Asphalt Emulsion should be employed as a tack coat for all applications. This material shall be applied liberally on all interfaces together with all surface breaches including the butted joint. Compacted layers must not exceed two (2) inches, installed consistent with the depth of the existing pavement or 4" whenever possible, sealed with CRF® Asphalt Emulsion. (When using CRF® as a surface treatment, a cover material of an appropriate gradation of mineral filler consistent with the application as approved by the manufacturer and must possess a compatible particle charge).
2. Patching material must maintain a useful life in an uncovered stockpile over two complete annual freeze-thaw cycles, or for a minimum period of two years, whichever is greater, and may be used as a high performance "cold patch", "warm mix", or "hot mix, as needed.
3. MARIMIX™ must not experience degradation or oxidation significant enough to result in a condition which will affect flexibility, adhesion, or subsequent performance, when subjected to multiple and/or prolonged applications of natural or mechanically generated heat (not exceeding 350°F).
4. Material may be utilized in a wide temperature range from ambient state to hot mix standards as a permanent patch. Acceptable texture, density and stability must be maintained regardless of application.
5. Material must be 100% recyclable by means of the mechanical heating equipment as approved by the manufacturer and remain compatible with the conventional paving mixtures. All storage sites shall be maintained free of contamination by foreign materials.

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<u>TESTS</u>	<u>ASTM</u>	<u>REQUIREMENTS</u>	
		<u>MIN</u>	<u>MAX</u>
Flash Point, COC, °C	D-445	196	-----
Viscosity @ 60°C, cSt	D-2006-70	100	200
Asphaltenes, %w	D-2006-70	-----	1.00
Maltene Distribution Ratio	D-2006-70	0.30	0.60
<u>PC + A₁</u> ⁽¹⁾			
S + A ₂			
PC/S Ratio ⁽¹⁾	D-2006-70	0.50	-----
Saturate hydrocarbons, S ⁽¹⁾	D-2006-70	21	28

(1) Chemical composition by ASTM Method D-2006-70:

C = Polar Compounds

A₁ = First Acidaffins

A₂ = Second Acidaffins

S = Saturated Hydrocarbons