
READ BEFORE USING THIS PRODUCT

SAFETY PRECAUTIONS

Product covered by this installation instructions are heated to elevated temperatures, it is essential that operations be conducted safely. All personnel need to be aware of hazards of using hot applied materials and safety precautions. Before use, the crew should read and understand product use and safety information on the box and the product SDS. Users should check D.O.T. requirements for transportation of product at elevated temperatures above 212°F (100°C). In the event of rain, snow or other precipitation, the surface of uncovered installed product may be slippery when wet.

HAZARDS ASSOCIATED WITH HOT-APPLIED MATERIALS

Skin contact with hot materials causes burns. Over exposure to fumes may cause respiratory tract irritation, nausea, or headaches. Precautions are to be taken to prevent contact with hot material and to avoid inhalation of fumes for everyone in the vicinity. Safety precautions should include:

1. Protective clothing to prevent skin contact with hot material.
2. Care when adding product to melters to reduce splashing.
3. Careful operation of wands or pour pots that apply product.
4. Traffic and pedestrian control measures which meet or exceed Manual on Uniform Traffic Control Devices (MUTCD) requirements to prevent access to work areas while product is in a molten state.
5. Avoidance of material fumes.
6. Proper application configurations with a minimum amount of material excess.
7. Appropriate cleanup of excessive applications or product spills.

TRAFFIC CONTROLS

Place traffic controls in accordance with Part 6, Temporary Controls, of the FHWA Manual on Uniform Traffic Control devices (MUTCD) to protect the work site for the duration of the repairs.

GENERAL

Crafco VRAM is a hot-applied, single component polymer modified products supplied in solid form used for longitudinal construction joints in hot mix asphalt pavement. To use packaged materials, product is removed from the package, heated in a melter and applied to the pavement. Details on product specifications and usage suitability are contained in Product Data Sheets.

EQUIPMENT

Melt and heat Crafco VRAM in a jacketed double boiler melter with effective gentle agitation. Dispense through a pressure feed with an applicator shoe or spray bar. Check the application equipment to ensure that it has a horizontal or vertical agitating auger.

PREPARATION

The existing surface of the area designated for application must be clean and free of dirt, dust, and any debris, and free of moisture. Do not apply over temporary traffic control tape; ensure that tape is removed prior to placement. Ensure that any depressions, potholes, wide cracks, etc. have been addressed with prep work through patching or sealing. Prep work is usually needed for the area of application to be painted with marking paint as a guideline for the applicator to follow.

Milled surfaces may require the use of compressed air or vacuum sweeper to remove dust and fine materials from the area where VRAM will be applied. Final cleaning will be within 24 hours of the placement of VRAM.

APPLICATION

1. Check the application rate in a staging area prior to performing on the project using an approved application rate method. The rate will be checked by weight per foot. A suitable paper or pan shall be placed at a random location in the path of the placement for the VRAM. After application of the VRAM, the paper or pan shall be picked up and weighed. The weight per foot will be calculated. The tolerance for the Plan target weight per foot from the VRAM Application Rate Table shall be $\pm 10\%$.
2. Melt and heat Crafcro VRAM in a jacketed double boiler melter with effective gentle agitation.
3. Apply Crafcro VRAM between 295 °F and 320 °F. Never exceed 330°F.
4. Application rate is based on overlay thickness and pavement type. Pavement Type is Coarse-Graded, Fine Graded and Stone Matrix (SMA). Fine and coarse-graded are defined in the table below:

Mixture NMAS	Coarse-Graded	Fine Graded
3/4" NMAS	< 35% Passing #8	$\geq 35\%$ Passing #8
1/2" NMAS	< 40% Passing #8	$\geq 40\%$ Passing #8
3/8" NMAS	< 45% Passing #8	$\geq 45\%$ Passing #8

5. Follow the VRAM Application Table Below based on pavement type and overlay thickness:

VRAM Application Table		
Coarse-Graded HMA Mixtures		
Overlay Thickness, in.	VRAM Width, in.	Application Rate, lb/ft
1	18	1.15
1 ¼	18	1.31
1 ½	18	1.47
1 ¾	18	1.63
≥ 2	18	1.80
Fine-Graded HMA Mixtures		
Overlay Thickness, in.	VRAM Width, in.	Application Rate, lb/ft
1	18	0.80
1 ¼	18	0.88
$\geq 1 ½$	18	0.95
SMA Mixtures/SuperPave 5 Mixtures		
Overlay Thickness, in.	VRAM Width, in.	Application Rate, lb/ft
1 ½	18	1.26
1 ¾	18	1.38
≥ 2	18	1.51

- a. Each application rate has a surface demand for liquid included. Taking a given rate and factoring it up to another thickness will overestimate the required amount of VRAM.
 - b. In the event of a joint between two different mixtures, the lower application rate will be used.
6. Check the application rate within the first 1,000 feet of placement, then every 12,000 feet thereafter.
 7. The center of the VRAM application width shall be within 2" of the project established centerline or established lane edge. A stringline or paint mark shall be used as a guide for application in order to maintain a uniform edge alignment.
 8. Ensure the application width is within the acceptable parameters and the initial placement of the material does not flow more than 2" from that initial application.
 9. VRAM shall be applied at a width of not less than or greater than or greater than 1.5" of the width specified.
 10. When only one-half of the joint is exposed, such as a mill and inlay project, the application shall be applied at one-half the prescribed width and rate and shall be adjacent to the center of the joint, and the vertical face of the cold joint left in place shall also be coated.
 11. The VRAM shall be applied to the existing surface prior to or following any or all tack coat applications. **Tack must be thoroughly cured if applied before the LJS/VRAM.** If tack is applied after the LJS/VRAM, it should overlap the LJS/VRAM to ensure full coverage of the surface adjacent to the LJS/VRAM. Should the tack coat application supersede placement of the VRAM, the tack coat shall be fully cured.

12. Check for pickup or tracking of material by driving a piece of construction equipment across the material within 30 minutes of initial application.
13. Public and construction vehicles may cross over the VRAM band once it has cooled to 130F or less. Do not permit public and construction vehicles to stop on or drive longitudinally directly on top of the VRAM band width.
14. When sampling, use the sampling valve. Do not obtain the sample from the spray bar to minimize contamination.
15. It is suggested that sampling be done at the time of the first required field rate check. It is recommended that the applicator should retain a sister sample of the material at the same time an agency sample is provided.

PAVING

1. Align the asphalt paver screed edge end plate (aka: door, wing, end gate, slide plate) to split the finished application of VRAM so the new longitudinal joint will meet halfway across the finished application of material.
2. Ensure the paver end plate (aka: door, wing, end gate, slide plate) is raised slightly above the finished VRAM so as not to drag on or through the material.
3. If using grade skis during the asphalt mix installment, ensure they do not run on top of the finished VRAM application.
4. In hot weather and when trucks pull away from the paver and cross the VRAM, the VRAM may be susceptible to peeling due to tack coat on the tires. A light mist of water on the surface of the VRAM is usually an adequate bond breaker to prevent this.
5. Use the rolling pattern designed for the project. Rollers should not sit in any one area in vibratory mode; this may cause over migration of the VRAM and create a "flushed" area on the asphalt mix surface.
6. When rolling the asphalt mix over the VRAM, allow for the edge of the drum to overhang a few inches beyond the edge of the asphalt mat. Avoid placing the edge of the drum directly over the asphalt mix on the inside edge of the VRAM.
7. Newly compacted asphalt mix directly above the VRAM placement may feel soft or spongy to walk on for several minutes. This indicates that the VRAM is hot and migrating upward into the mix. After a short period of time this area will start to cool and stiffen.
8. Do not use pneumatic rollers on asphalt mix directly over the VRAM. Density requirements are waived on the asphalt mix within one foot on either side of the joint placed over the VRAM.
9. If conditions warrant to leave VRAM open to traffic or hot surface temperature is expected, primarily on the milled surface, an application of natural or crushed sand, or lime may be applied onto the VRAM at a rate of 1 +/- 0.5 lb/SY with a spreading device (i.e.: push drop spreader), or by hand. Sanding should also be considered if rain is likely.

RUMBLE STRIPS AND RAISED PAVEMENT MARKERS

When installing Rumble Strips and/or Raised Pavement Markers over top of area with VRAM under the mat and surface temperature is over 120°F prior to cutting, water designated area with a water truck or a pump assisted device to cool down the work area. Clean debris out of Rumble Strips as soon as possible with a power broom directly behind the milling machine before millings can bind together.

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CLEAN OUT

If melters require clean out, follow manufacturer's instructions.

STORAGE

Pallets of product are protected with a weather resistant covering. During storage, this covering must be intact to prevent packages from getting wet. If wet, packages may lose strength. Rips in the pallet covering should be repaired to maintain packaging integrity. Pallets should be stored on a dry, level surface with good drainage. Pallets should not be stacked because crushing of bottom boxes may occur. Product properties are not affected by packaging deterioration.

ADDITIONAL INFORMATION

Additional information regarding these products is available by visiting crafcoc.com. This information includes:

1. Product Data Sheets
2. Safety Data Sheet
3. Safety Manual