



## INSTALLATION INSTRUCTIONS

### MATRIX 501 ASPHALTIC PLUG BRIDGE JOINT SYSTEM

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#### READ BEFORE USING THIS PRODUCT

**INTRODUCTION** These installation instructions detail requirements and procedures to be followed for proper installation of the Matrix 501 Asphaltic Plug Bridge Joint System. Usage, materials, equipment, preparation, cleaning and construction requirements are covered. Installation consists of constructing the joint blockout, preparing the joint surfaces, installing bridging plates, heating and mixing the mastic, placing the mastic and applying surface dressing aggregate. With proper installation, long lasting durable joints are achieved.

**USAGE** The Matrix Asphaltic 501 Plug Bridge Joint System can be used for both expansion and fixed end joints at abutments or piers in many bridge types including concrete slab, concrete beam, prestressed concrete and steel beam, either simple or multispans and in either new construction or rehabilitation. The Matrix 501 Joint can be used for maximum joint movements of +/- 1 inch (25mm) and maximum expansion gap widths of 6 inches (15 cm) at time of installation. **For expansion gaps between 3 and 6 inches (7.6 to 15cm) contact a Crafco representative for details.** The Matrix 501 Joint can be installed on joints with up to a 45-degree skew. The Matrix 501 Joint can also be used as a pressure relief joint on bridge approach slabs or as a longitudinal joint that is not in traffic lanes. The deck surface must be capable of accepting a minimum depth of 2 inches (5 cm). Maximum joint depth is 8 inches (20 cm). Standard installed width is 20 inches (51 cm), with a maximum width of 24 inches (61cm).

**MATERIALS and QUANTITIES** The following materials are required for installation of the Matrix 501 Asphaltic Plug Bridge Joint System. Specifications for each item are listed in the Crafco Product Data Sheet for the Matrix 501 Asphaltic Plug Bridge Joint System. Quantities shown are for estimating purposes for a standard size 2-inch (5cm) deep by 20-inch (51cm) wide joint with a 1.5 inch (38 mm) expansion gap.

Item	Crafco Part No.	Estimating Quantity
Matrix 501 Mastic	33345	35 lb/ft (52 kg/m)
Matrix 501 Adhesive	33346	1.5 lb/ft (2.2kg/m)
Gray Surfacing Aggregate	33375SA	3.3 lb/ft (5 kg/m)
Bridging Plates	Local Availability	Quantity as needed
Locating Pins	Local Availability	1 per foot (0.3m)
Backer Rod	34609	1 per 6 feet (1.8m)

All materials required and in sufficient quantities should be present on the jobsite prior to beginning joint installation. All materials should be properly stored and protected from the weather prior to use.

**EQUIPMENT** Following is a list of suggested equipment that is needed for proper joint installations.

Item	Quantity	Item	Quantity
CRAFCO Patcher 1, Patcher II w/ ironing wands and scrapers or approved equal	1	12" long handled squeegee	1
Oil Jacketed melter or approved direct fire sealant melter	1	Steel bucket, 3 - 5 gallon	2 to 3
125 CFM air compressor	1	Hand tools:	
Hot compressed air lance or hand-held torch	1 to 2	3 lb. hammer	2
50 ft. air hose	1 to 2	50' chalk line	1
Concrete saw with diamond asphalt cutting blade	1	50' tape measure	2
Asphalt breaker with chisel attachments	2	Wire Brushes	2
100 lb. LPG cylinders with hoses & fittings	3 to 4	2" wide masking/duct tape roll	As needed
Steel cutting torch	1	Box cutter utility knife	3
High pressure air blow pipe	1	Heavy duty work gloves	6
Steel rakes	3 to 4	Heavy duty flash light	4
Flat end steel scraper	2 to 3	Equipped tool box	1
Straight edge utility shovel	2	First Aid kit	1
Heavy-duty push broom	2	Hand held temperature gauge	1

**TEMPERATURE and WEATHER** Pavement temperature during installation of the Matrix 501 Asphaltic Plug Joint System should be a minimum of 40°F (5°C) and weather should be dry with no signs of imminent rain. Blockout, cleaning and preparatory work can be done at lower temperatures.

**BLOCKOUT PREPARATION** The Matrix 501 Joint shall be centered within 1inch (25 mm) over the existing expansion joint gap to the recommended width of 20 inches (50cm). If needed, due to site conditions, joint width can be increased to a maximum of 24 inches (61 cm). Saw cut the pavement transversely at the determined width which is normally 10inches (25cm) on each side of the expansion gap centerline, and parallel to the expansion gap through the surfacing and down to the concrete deck. Remove all material between the saw cuts, including the waterproofing, riser bars, old expansion joint material and loose concrete from the bridge deck. This will form the bridge joint blackout. The blackout must be cut to a minimum depth of 2inches (50mm). In some case, this may require scarifying of the concrete bridge deck with a small scabblar. Abrasive blasting may be required to obtain intact surfaces. The joint expansion gap shall be cleaned of all loose debris. Care should be taken to yield a level joint base. The blackout base should be clean, intact and sound, and should be flat without elevation differences greater than 1/8 inch (3 mm) across the joint expansion gap. If the joint surfaces are not level, the steel plate may not bridge the joint correctly and may rock and displace under traffic loadings causing debonding or cracking of the installed joint. A properly installed and cured rapid setting concrete patch material may be used to level the joint surfaces. Additional substrate material may also be removed to level the joint surfaces. When removing the loosened surfacing, care should be taken to not damage the deck.

**CLEANING, DRYING** The joint blackout shall be further prepared by cleaning and drying all horizontal and vertical surfaces and at least 6 inches (15 cm) of the road surfacing adjacent to the vertical saw cuts with a hot compressed air (HCA) lance. If there is an interruption due to weather or other causes, the cleaning and drying operations are to be repeated prior to continuing with joint installation.

### **SEALING and BRIDGING the JOINT EXPANSION GAP**

**Backer Rod** - Backer rod capable of withstanding elevated temperature of the binder shall be placed into expansion joint gaps that are 1/8 inch (3mm) or wider. Place the backer rod at a minimum depth of ½ inch (12mm) and not exceeding 1 inch (25mm).

**Matrix 501 Adhesive** - Heat Matrix 501 Adhesive in a melter with effective agitation that meets requirements of appendix X1.1 of ASTM D6690 or heat in an approved direct fired machine. Direct fired melters must be small (50 gallons (190L) maximum) and must be bottom fired. The Matrix 501 Adhesive can only be heated to application temperature once when using a direct fire melter. The unit must be capable of safely heating product to 400°F (204°C). CAUTION: Do not agitate when adding product due to splashing. To use, adhesive is heated to between the recommended installation temperature and the maximum (safe) heating temperature of 380 to 400°F (193 to 204°C). Pour heated Matrix 501 Adhesive into the expansion gap, overfilling, and spreading the adhesive on the bottom deck surface of the joint blackout on each side of the expansion gap, at a depth 1/8 inch (3mm) and to extend just beyond the edges of the bridging plates. The Matrix 501 Adhesive forms a flexible adhesive bond between the bridging plate and the bottom surface of the joint blackout.

**Bridging Plates** - Bridging plates are then immediately placed by centering over the expansion gap and butt jointing to cover the entire joint length and then embedded into the hot Matrix 501 Adhesive. Use centering pins placed through the holes in the bridging plates and down into the expansion gap to assure proper centering. Bridging plates shall be cut to the appropriate length to extend the full length of the joint without overlap. For expansion gaps up to 3 inches (7.6 cm) wide, ¼ inch (6.4 mm) thick bridging plates that are 8 inches (20 cm) wide shall be used. For expansion gaps between 3 and 6 inches (7.6 to 15 cm) wide, 3/8-inch (10 mm) thick plates that are 12 inches (30cm) wide shall be used. Plate length shall be between 36 and 60 inches (0.9 to 1.5 m). Plates shall be clean, free from surface rust, oil, or other residues and contaminants when installed.

**TANKING (COATING) the JOINT BLOCKOUT** All prepared exposed horizontal and vertical surfaces of the joint blackout, including the bridging plates, shall be tanked (coated) with hot Matrix 501 Adhesive. Pour Matrix 501 Adhesive into the joint blackout and spread to coat all exposed surfaces. The adhesive coating shall achieve a minimum thickness of 1/32 inch (1mm) and should not exceed 1/8 inch (3mm) throughout. The adhesive application temperature shall be between 380 and 400°F (193 and 204°C).

**MELTING AND HEATING THE MATRIX 501 MASTIC** Matrix 501 Mastic is supplied in solid form in a meltable plastic bag in a cardboard box. The aggregate and polymer modified binder are pre-measured and packaged and are not pre-mixed. To use, the bag of Matrix 501 Mastic is removed from the box and then placed in a Crafcro Patcher I or II melter or other approved melter to heat and mix the product. If inappropriate melters are used, improper material mixing and heating, application difficulties, pump system damage and extreme wear can result. The melter must be equipped with an effective horizontal agitator system that is able to maintain a uniformly mixed product, have a thermostatically controlled hot oil jacketed heating system and have an effective means of dispensing product. During heating, the heat transfer oil should not exceed 525°F (274°C). Agitation should begin as soon as the material is melted sufficiently for the agitator to turn. Additional material can then be added to the melter. Heating and agitation should continue until all added material has been mixed and is between 380 - 400°F (193 - 204°C). Additional material can be added as product is used and the quantity in the melter decreases. When adding additional material, the agitator must be stopped. After the additional material is added, agitation is to be immediately resumed and application shall not resume until required temperatures are reached and all added material has melted, becoming well mixed with no uncoated aggregate. During application and while product is hot, agitation shall be continuous (except when adding additional material) to guard against aggregate settlement. If aggregate settles in melter, it may be difficult to agitate product. For best performance, it is recommended that the melter be emptied or only small amounts of be left in the melter at the end of each work day.

**PLACING MATRIX 501 MASTIC** Strips of masking tape are applied to the pavement surface approximately 1/2 in. (12 mm) from and parallel to the edge of each side of the joint along the entire joint length. The Matrix 501 Mastic will be installed in one or multiple lifts depending on the depth of the joint. For joint depths up to 2 1/2 inches (63 mm), install Matrix 501 Mastic in one layer up to 1/4 inch (6.4mm) above the pavement surface to allow for cooling shrinkage. For joints deeper than 2 1/2 inches (63mm), install the Matrix 501 Mastic in multiple layers. The maximum layer thickness installed shall be 2 1/2 inches (63mm). For joints deeper than 2 1/2 inches (63mm), fill the joint blockout to 3/4 to 1-inch (19 to 25mm) below the pavement surface using successive layers that do not exceed 2 1/2 inch (63mm) thickness. Allow the Matrix 501 Mastic surface to cool to a maximum of 180F (82C) prior to installing the final top layer. The final top layer shall be approximately 1 inch (25mm) thick and installed to 1/4 inch (6.4 mm) above the pavement surface level. Matrix 501 Mastic temperature when installed shall be between 380-400°F (193-204°C). Each layer of the hot Matrix 501 Mastic is placed into the joint blockout and raked to level to the desired thickness. Use hot steel rakes or Patcher ironing wands to spread and level the mixture. Compaction is not required. The masking tape forms straight edges which improve the finished appearance of the joint.

**INSTALLING GRAY SURFACING AGGREGATE** When the surface of the Matrix 501 Mastic cools below 250°F (121°C) remove the masking tape. The Dressing Aggregate must be applied when the surface temperature is between 225 - 250°F (107 - 121°C). When the surface has cooled to 225- 250F (107-121C) as measured by an IR thermometric device, immediately apply Gray Surfacing Aggregate by broadcasting at the rate of approximately 3 lbs. per lineal foot depending on the width of the joint. If needed, the surface of the Matrix 501 Mastic can be gently heated with a torch or heat lance to bring the surface into the proper temperature range. The aggregate must be clean and dry and applied while the binder is hot to achieve proper adhesion. The Matrix 501 Bridge Joint is then allowed to cool and will be ready for traffic approximately 1-2 hours after completion. Joints deeper than 3 inches (7.6 cm) joints will require longer cooling times depending on joint depth and ambient temperature. After cooling, sweep the joint surface with a push broom to remove excess or loose surface aggregate. Clean the job site of packaging, loose aggregate or other debris and open to traffic.

**SAFETY PRECAUTIONS** Since joint installation requires products that 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 MSDS. User should check D.O.T. requirements for transportation of product at elevated temperatures above 212°F (100°C).

**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 mixing and application equipment.
4. Traffic and pedestrian control measures which meet or exceed local 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.

**ADDITIONAL INFORMATION** Additional information regarding the Matrix Asphaltic Plug Bridge Joint System is available by contacting your distributor or Crafcro, Inc. This information includes:

1. Product Data Sheets,
2. Material Safety Data Sheets,
3. Safety Manual