

Expansion Joint Systems

Matrix™ 502 Asphaltic Expansion Joint System

Product Description

The Matrix™ 502 Asphaltic Expansion Joint System is a hot-applied field molded and constructed expansion joint system that is primarily composed of a uniquely formulated polymer modified asphalt binder that is mixed with specially selected and processed aggregate. The binder is provided in three temperature grades for use in cold, moderate and hot climates. The Matrix 502 Joint provides a watertight, smooth riding joint that can accommodate up to $\pm 3/4"$ (19mm) of annual joint movement, can be used for expansion joint gaps up to 3" (75mm) wide, and can be installed in joints with up to a 45 degree skew. The joint is installed in cutouts in the deck surfacing that are a minimum of 2 inches deep (5 cm) and typically 20 to 24 inches (51 to 61cm) wide. The Matrix 502 Joint 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 multispan, in both new construction or rehabilitation projects. The joint is placed in the deck surfacing layer of either asphalt concrete or portland cement concrete to a minimum depth of 2" (5cm). Completed joints are black in color. The Matrix 502 Joint can also be used as a pressure relief joint on bridge approach slabs. Compared to conventional anchored bridge joint systems, Matrix 502 Joints are low cost, quick and easy to install and easy to maintain. The Matrix™ 502 Asphaltic Expansion Joint System meets requirements of ASTM D6297, Standard Specification for Asphaltic Plug Joints for Bridges.

Features

The Matrix™ 502 Asphaltic Expansion Joint System is primarily composed of one of three grades of Matrix 502 Binder and two grades of Matrix 502 aggregate. Additional components include backer rod, bridging plates and locating pins. Details and specifications for these components follow.

Matrix 502 Binders, Part Nos. 34528, 34529 and 34530

Matrix 502 binders are specially formulated hot applied polymer modified asphalt products that are mixed with Matrix aggregate forming a bonded, flexible, extensible, compressible and traffic-resistant joint system. Matrix 502 Binder is provided in three climatic temperature grades. Matrix 502 (Part No.34528) is the standard grade used in moderate climates, which also meets the polymer modified asphalt requirements of ASTM D6297. Matrix 502 HD(Part No. 34529) is a stiffer formulation for hotter climates, and Matrix 502 CD (Part No. 34530) is a softer more flexible formulation for colder climates.

Binder Selection

Binder Name	Matrix 502HD	Matrix 502	Matrix 502CD
Part No.	34529	34528	34530
Climate Usage	Hot	Moderate	Cold
High Temperature Usage, °C*			
Low Temperature Usage, °C*	-10, -16°C	-16, -22, -28°C	-28, -34, -40°C

*Note: Climate temperatures are determined using FHWA LTPP Bind V2.1 at 98% reliability at surface level. Additional information on selecting appropriate binder grade is continued in the installation instructions for the Matrix™ 502 Asphaltic Expansion Joint System.

Binder Specifications

Softening Point (ASTM D36), min.	94°C	88°C	83°C
Tensile Adhesion (ASTM D5329), min.	---	700%	---
Ductility, 77°F (25°C) (ASTM D113), min.	400 mm	400 mm	400 mm
Cone Penetration, 77°F (25°C) (ASTM D5329), max.	6.0 mm	7.5 mm	9.0 mm
Low Temperature Cone Penetration 0°F (-18°C) 200g, 60s (ASTM D6297, sec 9.1), min.	0.5 mm	1.0 mm	2.0 mm

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Binder Selections (cont'd.)

Flow 140°F (60°C), 5 hr. (ASTM D5329), max. 3.0 mm 3.0 mm 3.0 mm

Resilience, 77°F (25°C) (ASTM D5329) 40-70% 40-70% 40-70%

Asphalt Compatibility (ASTM D5329) Pass Pass Pass

Recommended Installation Temperature 380°F (193°C) 380°F (193°C) 380°F (193°C)

Maximum Heating Temperature 400°F (204°C) 400°F (204°C) 400°F (204°C)

Bond, 50% extension, 25mm, 3 cycles (ASTM D5329) -10°C -22°C -34°C

Flexibility (ASTM D5329) -16°C -28°C -40°C

Additional properties of Matrix 502 Binders are as follows:

Test	Requirements
Brookfield Viscosity, 400°F (204°C) (ASTM D4402)	4000 cp max
Unit Weight at 60°F (15°C)	9.3 lbs/gal (1.12 kg/l)
VOC	0 g/l

Packaging consists of individual boxes of product which are palletized into shipping units. Boxes contain a nonadherent film which permits easy removal of the sealant. Each pallet contains 72 boxes which are stacked in six layers of 12 boxes per layer. The weight of product in each box does not exceed 40 lbs. (18kg) and pallet weights do not exceed

2,880 lbs. (1310kg). Pallets of product are weighed and product is sold by the net weight of product. Product boxes are manufactured from double wall kraft board producing a minimum bursting test certification of 350 psi (241 N/cm²) and using water-resistant adhesives. Boxes use tape closure and do not contain any staples. Boxes are labeled with the product name, part number, lot number, specification conformance, application temperatures and safety instructions. Palletized units are protected from the weather using a three-mil thick plastic bag, a weather and moisture-resistant cap sheet and a minimum of two layers of six month u.v. protected stretch wrap. Pallets are labeled with the product part number, lot number and net weight.

Matrix 502 Aggregate SBG, Part No. 33033 and Aggregate D, Part No. 33030 Specially selected igneous aggregates are screened to specific gradations, double washed, dried and packaged in 50 lb (22.7 kg) bags. SBG aggregate is mixed with the Matrix 502 Binder to produce the mastic to fill the joint cutout. D aggregate is a finer grade, used as surface dressing for the completed joint. Gradation requirements are as follows.

SBG Aggregate		D Aggregate	
Screen Size %	Passing	Screen Size %	Passing
1"	100%	3/16"	100%
3/4"	90-100%	NO 6	100%
1/2"	20-55%	NO 8	25-40%
3/8"	0-15%	NO 10	0-10%
1/4"	0-5%		

Typical Installation

Figure 1 shows a typical installation of the Matrix™ 502 Asphaltic Expansion Joint System. Locations for each of the components are shown.

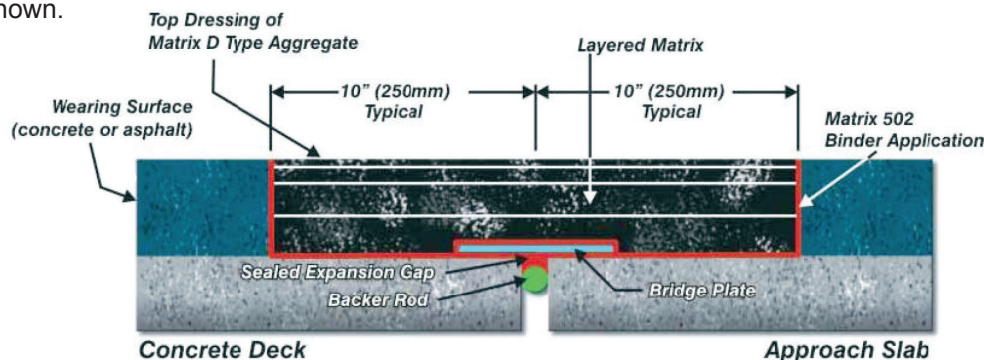


Figure 1. Typical Matrix™ 502 Asphaltic Expansion Joint System



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Bridging Plates Steel Bridging Plates are used to span the expansion joint opening, to function as a bond breaker and to support traffic loads. Bridging plates are 1/8 inch (3 mm) or 1/4 inch (6 mm) thick, 8" (20.3cm) wide and 48" (1.22m) long, and have 3/16" (4.8mm) diameter holes at the centerline of the plate at 1' (30.5cm) intervals for centering over the joint. Plates are cut during installation to the required lengths.

Locating Pins 16D galvanized common nails are placed through the holes in the bridging plates and down into the expansion gap opening to center the plate in the joint.

Backer Rod, Part No. 34609 A closed-cell heat-resistant backer rod is used to provide backup in the expansion joint opening. Backer rod is 2" (5cm) diameter and supplied in 6' (1.8m) lengths, and meets requirements of ASTM D5249, "Standard Specification for Backer Material for Use with Cold and Hot Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints, Type 1". If required, other diameters can be supplied.

Overview of Installation Procedures

Following is an overview of installation procedures for the Matrix 502 Joint. For complete detailed installation procedures, refer to the installation instructions for Matrix™ 502 Asphaltic Expansion Joint System.

1. Transversely saw cut the surfacing layer full depth to the deck surfacing on each side of the joint. Width between cuts is typically 20 to 24 inches (51 to 61 cm) and centered over the joint gap. Minimum sawcut depth is 2" (50 mm).
2. Break out and remove all material between the sawcuts including any waterproofing if present, to the concrete deck surface.
3. Clean the cutout area and thoroughly dry with a hot air lance or a hand-held propane torch.
4. Place backer rod into the expansion gap to the appropriate depth.
5. Fill the expansion gap with the appropriate grade of heated Matrix Binder and overfill onto the deck surface.
6. Place bridging plates into the hot Matrix Binder and center over the expansion gap using centering pins. Butt the plates at ends.
7. Coat all vertical and horizontal surfaces, including the bridging plate with hot Matrix Binder.
8. Heat the Matrix SBG aggregate to 275-375°F (135-190°C) in an appropriate rotating drum mixer. Heat Matrix Binder to 380-410°F (193-210°C) in a double jacketed melter.
9. Add the appropriate quantity of Matrix Binder to the hot aggregate and mix in the mixer to thoroughly coat the aggregate. Mix temperature should be 250-350°F (121-177°C).
10. Place the hot aggregate-binder mixture in the joint cutout in layers between 3/4" and 1 1/2" (19-38mm) thick. Rake the mixture to level in the cutout.
11. If necessary, flood the leveled mixture surface with Matrix Binder to fill voids before placing the next layer.
12. For the last layer, slightly overfill the joint cutout by approximately 1/4" to 1/2" (6 – 12 mm) and compact to surface level.
13. Carefully heat the top surface of the compacted mixture with a heat lance or hand-held propane torch and spread a thin layer of Matrix Binder over the mixture surface.
14. Immediately apply a layer of D aggregate onto the hot binder and compact the aggregate into the surface.
15. Allow the joint to cool, sweep any loose aggregate, clean up the job site and open to traffic.