Protect Environment

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Green

Bitu Bridge Joint*

Asphaltic Plug Expansion joint System

Uses

Bitu Bridge Joint* is a hot applied field molded and constructed expansion joint system, it's a combination of polymer modified asphalt binder, specifically graded aggregate, mild steel plate and heat resistant backer rod, when installed properly, the joint is capable of withstanding up to 50 mm of cumulative movement and provides a watertight, smooth riding joint to protect the bridge deck and sub structure.

Bitu Bridge Joint* can be used for both expansion and fixed end joints at abutments or piers in many bridge types including concrete slab, concrete beam, pre-stressed concrete and steel beam, either simple or multi-span, 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 50 mm, completed joints are black in color.

Bitu Bridge Joint* can also be used as a pressure relief joint on bridge approach slabs, compared to conventional anchored bridge joint system.

Bitu Bridge Joint* are low cost, quick and easy to install and easy to maintain.

Advantages

- Watertight expansion joint
- Smooth drive, no jump, no noise
- Highly durable
- Puncture resistant
- Maintenance free, guaranteed by manufacturer for 3 years.
- No metal armors are use that may come loose and endanger driver safety

Standards Compliance

ASTM D6297-01, Standard Specification for Asphaltic Plug Joints for Bridges.

Description

Bitu Bridge Joint* is an economical bridge expansion joint system, it's a combination of polymer modified asphalt binder, specifically graded aggregate, mild steel plate and a heat resistant backer rod.

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Properties of Bitu Bridge Joint Binder

Appearance	:	Black
Softening °C	:	88
Penetration @ 25 °C	:	7.50 mm
Resilience @ 25 °C	:	50 – 75 %
Asphalt compatibility	:	Pass
Installation Temperature	:	190 – 195 °C
Max. heating temperature	:	205 °C

Installation Procedure

Cutout Preparation

Saw cut the pavement transversely at the determined width which is normally 50 mm on each side of the expansion gap centerline, and parallel to the expansion gap, and then remove all material between the saw cut, including waterproofing, riser bars, old expansion joint material and loose concrete from the bridge deck, this will form a bridge joint cutout.

Remove loose concrete and make sure that saw cut depth is minimum 50 mm, and deck concrete surface is level, sound and strong, if the joint surface is not level, the steel plate may not bridge the joint correctly and may rock and displace under traffic loads to cause de-bonding or cracking on the installed joint, quick setting mortars or concrete may be used to repair un-even surfaces or additional substrate material may be removed to level the joint surface.

Cleaning & Drying

The joint cutout shall be further prepared by cleaning and drying all horizontal and vertical surfaces and at least 150 mm of the road surface adjacent to the vertical saw cut, the use of hot compressed air lance or a hand held torch is recommended, if there is an interruption due ot weather or other causes, the cleaning and drying operation is to be repeated immediately before placing the backer rod, steel plate and asphalt binder.

Placing of Backer Rod / Joint Filler Sheet

Backer Rod or Joint Filler Sheet used to fill the expansion joint gap must be a heat resistant to withstand the elevated temperature of binder, place the backer rod or joint filler sheet at a minimum depth of 12 mm but not exceed 25 mm.

Heating / Melting of Polymer Modified Asphalt Binder

The Polymer Modified Asphalt Binder must be heated in a jacketed double boiler melter with effective agitation, do not use direct-fired or air heated machines, heat transfer oil temperature should not exceed 274 °C, the heating unit must be capable to safely heat the product to 210 °C, do not agitate when adding binder into heater to avoid splashing, safe heating temperature of binder is in between 193 – 210 °C.

Sealing of Expansion Joint Gap

Pour the heated binder into the expansion joint gap, overfilling the joint gap to allow the binder to be spread onto the cutout base at-least 100 mm on each side of the joint gap, the binder will form a bond breaker between the cutout and bridging plates.

Placing of Bridging Steel Plate

The bridging steel plate must be centered over the existing expansion gap and joined together to cover the entire joint length before they are embedded into the hot mix binder, the use of centering pins placed through the holes in the bridging plates and down into the expansion joint gap is to ensure proper centering, bridging plates shall be cut to the appropriate length as required to extend the full length of the joint and shall be joined without overlap.

Sealing the Joint Cutout Surface

All prepared exposed horizontal and vertical surfaces of the cutout joint, including the bridging plates shall be sealed with melted binder, pour the melted binder into the joint cutout and spread to coat all exposed surfaces, the binder shall achieve a minimum thickness of 1 mm and should not exceed 3 mm throughout the joint, the melted binder temperature shall be in between 193 – 210 °C.

Preparation of Hot Mix With Polymer Modified Asphalt Binder

The aggregate shall be heated to 135 – 190 **°C** using the air lance or in a rotating drum mixer to remove dust and all moisture, the temperature of the
aggregate shall be monitored by using a hand-held calibrated digital temperature sensor, than add the melted binder at the temperature of 193 – 210 **°C** to the heated aggregate in the mixer in a ratio of approximate 9 lbs. of Binder with 50 lbs. of aggregate, minor variation in the amount of Binder to the heated aggregate is allowed, make sure that heated aggregate must be completely coated prior to the placement and mixture temperature should be in between 150 – 177 **°C.**

Mixture should be poured from the mixer into the joint opening as quickly as possible, depending on depth of the joint, it may require pouring in two or three stages, mixture is then raked to desired thickness, joint depth is determining factor in how much material is placed, use a roller at least 1 – 1.50 tons going across the joint to compact the mixture and then lengthwise to smooth it.

Surface Dressing

The completed joint surface is carefully heated to dry any water left by the roller with the heat lance or hand held torch without burning.

Place a thin layer of Binder over the surface, extending 25 mm over the pavement, masking tape can be used as a guideline, re-apply binder to any areas where the binder has soaked through to ensure coverage, put the dressing aggregate on top of the binder in a uniform way to completely cover the binder, roll over the joint to embed the dressing aggregate into the binder, in colder weather, it may be necessary to warm the top layer of binder before placing dressing aggregate.

Allow Joint For Traffic

The joint must be allowed to cool prior to allowing traffic, curing time depends on the depth of joint and ambient temperature, normal curing time is in between 1 – 4 hours.

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Important note: