DEPARTMENT *of* INFRASTRUCTURE, ENERGY *and* RESOURCES, TASMANIA

BRIDGEWORKS SPECIFICATION

B44 - BITUMASTIC JOINTS

April 2003

Includes previous B43 and B44

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B44.1 SCOPE

This Specification sets out the requirements for hot or cold applied mastic joints in asphalt road surfacing at bridge movement joints.

B44.2 GENERAL

Mastic joint seals for use in bridge deck joints shall be either

- of cold application mastic, single or multi-component types with a polysulphide or synthetic rubber base. They shall have performance properties specified below and shall be placed in accordance with the manufacturer's instructions or
- in horizontal or nearly horizontal joints in the bridge deck the joint seals shall be of hot poured elastic type made from a synthetic rubber. They shall have performance properties specified below and shall be placed in accordance with the manufacturer's instructions.

All contact surfaces shall be cleaned and prepared strictly in accordance with the manufacturer's instructions.

The colour of the sealing compound may be any colour provided it does not adversely affect the specified performance.

B44.3 REFERENCES

The Test Methods referred to in this Specification are the Roads and Traffic Authority, NSW Test Methods: T1103, T1170, T1171, T1172, T1173, T1175, T1176, T1177, T1178, and T506

B44.4 MATERIALS

B44.4.1 Cold Applied

As supplied to the user, the sealing compound shall consist of either one substance or two or more substances that are to be mixed prior to application. The compounds shall be stable separately and shall be of such a character that a homogeneous preparation can readily be obtained by combining the separate components by mechanical or manual stirring without heating above 38^{o}C.

The sealing compound after curing shall be a resilient and adhesive material that is capable of sealing joints effectively against the infiltration of moisture and of meeting the specified requirements.

The sealing compound shall be supplied in the following types as specified:

(i) Class 1 - Self-Levelling

A compound which when properly mixed has sufficient flow to give a smooth level surface when applied in a horizontal joint between the temperatures of 5^{o}C and 40^{o}C.

(ii) Class 2 - Non-Sag

A compound which when properly mixed permits application in vertical joints without sagging at ambient temperatures between 5^{o}C and 40^{o}C.

B44.4.2 Hot Applied

The joint sealer shall be composed of a mixture of materials that will form a resilient and adhesive compound capable of effectively sealing joints in concrete and asphalt against the infiltration of water and foreign matter throughout variations in weather conditions and will not flow from the joint or be picked up by tyres at summer temperatures.

The material shall be capable of being brought to a uniform pouring consistency for completely filling the joints without the inclusion of air holes or discontinuity and without damage to the material.

B44.5 COLD APPLICATION MATERIAL PROPERTIES

B44.5.1 Application Life

A properly mixed compound shall be suitable for satisfactory application for at least four hours after mixing when maintained at a temperature of 25 ± 1°C and 50 ± 5 percent relative humidity. The maximum application life shall be determined as described in Test Method T1175.

B44.5.2 Rheological Properties

Class 1 - Self-Levelling Compounds

The flow of a properly mixed compound shall be such that when tested in accordance with Test Method T1176 for Class A materials it shall exhibit a smooth level surface.

Class 2 - Non-Sag

The flow of a properly mixed compound shall be such that when tested in accordance with Test Method T1176 for Class B materials it shall not sag more than 6 mm in vertical displacement.

B44.5.3 Hardness

When tested according to Test Method T1177, a properly mixed compound after 14 days cure shall show a hardness reading of not less than 15 and not more than 50 when tested for Shore A hardness (Test Method T1103).

B44.5.4 Adhesive Strength in Tension

The compound shall be tested against the material with which it is proposed to be used, ie Portland cement and mortar or asphalt.

In each of the following tests at least two out of the three test specimens shall meet the specified requirements. Failure shall be considered to occur when there is either cohesive or adhesive separation exceeding 2.5 mm in depth measured with a 1.625 mm wire probe held perpendicular to the face of the sealant.

B44.5.5 Initial Adhesion Strength

When tested in accordance with Test Method T1178 the compound in the test joint shall be capable of being extended by 50 percent of its original width without failure and maintained at this extension for a period of 24 hours at a temperature of 25 ± 1°C without failing. The pressure required to obtain this extension shall be not less than 70 kPa.

B44.5 6. Adhesive Strength after Water Immersion

When the test pieces have been prepared according to Test Method T1178 and immersed in water at 25 ± 1°C for a period of four days the compound in the test joint shall be capable of being extended by 50 percent of its original width without failure and maintained at this extension for 24 hours at a temperature of 25 ± 1°C without failure. The pressure required to obtain this extension shall be not less than 70 kPa.

B44.5.7 Adhesive Strength after Heat Ageing

When the test pieces have been prepared according to Test Method T1178 and have been heat aged for 96 hours in a circulating hot air oven at 70 ± 1°C followed by conditioning for not less than four hours at 25 ± 1°C the compound in the test joint shall be capable of being extended by 100 percent of its original length without failure and maintained at this extension for 24 hours at 25 ± 1°C without failing.

B44.6 HOT POURED MATERIAL PROPERTIES

B44.6.1 Flow

Flow at 60°C shall not exceed 15 percent when tested in accordance with Test Method T1171.

B44.6.2 Adhesion and Extensibility

The joint sealing compound shall withstand any movement of the concrete as a result of thermal and other changes without either parting from the substrate or fracturing within itself. The adhesion to concrete and the extensibility of the joint sealing compound shall be measured by the procedure for the extension test described in Test Method T1172 and when tested by this method shall meet the following requirements:

(i) Three specimens shall be tested.

(ii) No specimen shall develop any crack, separation or other opening in the area of the sealing compound or area between the sealing compound and the substrate that averages over 6.5 mm separation measured perpendicularly and around the side of the sealing compound in the area showing the effect.

Where the manufacturers of sealing compounds issue recommendations for the heating and application of a sealing compound (including the use of a primer) those recommendations shall be followed except where they conflict with the test procedure described for heating the material for the preparation of test samples (Test Method T1170). Where a primer is required, the time between the application of the primer and the application of the sealing compound shall not exceed 2 hours.

B44.6.3 Penetration

When tested at 25^{o}C in accordance with Test Method T506, the penetration shall not exceed 130 using a penetration cone of mass 150 gram held for 5 seconds instead of the standard penetration test needle.

B44.6.4 Resistance to Heat Degradation

The joint sealing compound when submitted to prolonged heating in accordance with Test Method T1173 shall still comply with the requirements of this Specification.

B44.7 TESTS

B44.7.1 General

Physical property tests on the seal material shall be performed on samples supplied by the manufacture and shall be undertaken at a NATA registered laboratory at the Contractor's expense.

B44.7.2 Sampling

Samples for testing shall consist of sufficient quantities of each component to provide 0.5 litre of seal material. The manufacturer shall furnish the necessary components of the seal material from the same batches as those that will be supplied to the Contractor.

When a particular primer is specified or recommended by the manufacturer of the joint sealing compound, a single sample of one litre shall be taken at random from the manufacturer's stock or from bulk supplies on site as appropriate and used in accordance with the manufacturer's printed directions, for the extension and adhesion tests.

The cost of furnishing the samples shall be borne by the Contractor.

B44.7.3 Failure to Pass Tests

Should the sample fail to satisfy any of the physical property test requirements specified the batch represented by the sample shall be rejected.

B44.7.4 Test Certificate

Prior to the placement of the joint sealing compound, a copy of the test certificate shall be submitted to the Superintendent.

The test certificate for the joint sealing compound shall show the results of the physical property tests as specified.

B44.8 PAYMENT

Payment for supply and installation of joint sealing compound shall be based on the tendered rate per linear metre quoted in the Bill of Quantities.

B44.9 HOLDPOINTS

The following holdpoints have been identified in this Specification

- Receipt of test certificates prior to installation. (B44.7.4)

B44.10 CONTRACT MANAGEMENT PLAN

The following details have been identified as relevant to the Contract Management Plan.

- Type of jointing material (B44.4)
- Manufacturer (B44.4)
- Handling and installation procedures. (B44.5, 6)