AS 3554—1988

Australian Standard®

ADHESIVES—EPOXY—FOR RAISED PAVEMENT MARKER INSTALLATION

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The following interests are represented on Committee CH/17:

Adhesives and Sealants Manufacturers Association of Australia
Australian Chemical Industry Council
Australian Council of Furniture Manufacturers
Australian Federation of Consumer Organizations
Confederation of Australian Industry
CSIRO, Division of Building Research
Department of Productivity
Footwear Manufacturers Federal Executive Council
Plastics Institute of Australia Incorporated
Plywood Association of Australia Ltd
Printing and Allied Trades Employers Federation of Australia
Railways of Australia Committee
Society of Automotive Engineers, Australasia
Telecom Australia

Additional interests participating in preparation of Standard:

Commercial interests
Road Construction Authority, Vic.
Department of Main Roads, N.S.W.
Highways Department, S.A.
National Association of Australian State Road Authorities

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PREFACE

This Standard was prepared by the Association's Committee on Adhesives, under the direction of the Chemical Standards Board, following a request by the National Association of Australian State Road Authorities and the SAA Committee concerned with retroflective devices. There are several problems relating to adhesion of pavement markers, e.g. marker losses, particularly on main roads which carry a considerable volume of fast traffic.

This Standard reflects the common usage of epoxy adhesives for raised pavement markers. This Standard, however, does not preclude the use of adhesive formulations other than epoxy resin types. It should be noted that marker losses may occur due to reasons other than loss of bond between the marker and the epoxy adhesive. The use of this Standard will ensure satisfactory adhesive bonding of a marker to the pavement and adequate bond strength in the adhesive itself. An impact test has been included to give a measure of the performance of the adhesive under this form of stress.

Particular attention must be paid to surface preparation in any test methods using metal adherends. Detailed methods of surface preparation, as specified in the relevant appendices, should be carefully followed.

In the preparation of this Standard, reference was made to the following documents: C.R.B. (Now R.C.A.(Vic.)) draft, *Epoxy Adhesive for Raised Pavement Marker Installation,* American Concrete Institute ANSI/ACI Standard 503.1-79, *Standard specification for bonding hardened concrete, steel, wood, brick and other materials to hardened concrete with a multi-component epoxy adhesive,* ASTM D 2730, *Sag flow of highly viscous resins,* and ASTM D 2471, *Gel time and peak exothermic temperature of reacting thermosetting resins.*

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1 SCOPE. The Standard specifies requirements for two-part epoxy adhesives for use in bonding raised pavement markers to bituminous and concrete road surfaces.

NOTE: Special precautions during mixing and application are necessary for most epoxy adhesives. Appendix A gives some guidance on the safe use and application of these epoxy adhesives. For more detailed guidance, reference should be made to the publication titled 'Epoxy Resins—Instructions for use, handling and disposal', issued by the Australian Chemical Industry Council.

2 APPLICATION. This Standard is applicable to three types of epoxy adhesives, with curing rates as follows:

(a) *Slow set adhesives*—suitable for hand or machine mixing and dispensing, and for application where the ambient or road surface temperature is not below 15°C (preferably above 20°C) and for use where markers are not laid under traffic or where means of protecting markers from traffic are to be employed.

(b) *Standard set adhesives*—suitable for hand or machine mixing and dispensing, and for application at ambient or road surface temperatures not below 10°C (preferably above 15°C) and for use where markers are to be laid under traffic or where means of protecting markers from traffic are employed.

(c) *Rapid set adhesives*—normally suited for machine mixing and dispensing only, and for application at ambient or road surface temperatures as low as 0°C, and appropriate where markers are to be laid under traffic.

3 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS

1321 Methods for the sampling and testing of adhesives
- Part 1: Sampling (AS 1321.1)
- Part 3: Bond strength of cured wood-to-wood adhesives in shear (AS 1321.3)
- Part 10: Determination of non-volatile matter (solids content) of adhesives (AS 1321.10)

1478 Chemical admixtures for use in concrete

1627 Code of practice for preparation and pretreatment of metal surfaces prior to protective coating
- Part 10: Cleaning and preparation of metal surfaces using acid solution (non-immersion) (AS 1627.10)

1663 Method for dropweight test for nil-ductility transition temperature of ferritic steels

1734 Wrought aluminium and aluminium alloy flat-sheet, coiled sheet and plate for general engineering purposes

1906 Retroreflective materials and devices for road traffic control purposes
- Part 3: Raised pavement markers (retro-reflective and non-retroreflective) (AS 1906.3)

2193 Methods for calibration and grading of force measuring systems of testing machines

Epoxy Resins—Instructions for use, handling and disposal (Australian Chemical Industry Council, Australian Paint Manufacturers Federation and Adhesives and Sealants Association).

4 TEST CONDITIONS AND SAMPLING. Unless otherwise specified, all tests shall be conducted at a temperature of 23 ±2°C and 50 ± 5 percent relative humidity.

The adhesive sample for testing shall be selected in accordance with AS 1321.1.

The adhesive shall be mixed and used exactly as prescribed by the supplier.

5 MATERIAL REQUIREMENTS.

5.1 General. Two-part epoxy adhesives shall consist of a white 'A' resin and a black 'B' curing agent which shall be mixed in approximately equal parts by volume within tolerances allowed by the manufacturer. When test quantities of adhesive components are mixed together by hand in accordance with Appendix B, for a period not exceeding 120 s, the resultant adhesive shall be of a uniform grey colour without black or white streaks. There shall be no evidence of hard setting of any fillers, and any settled components shall be capable of being readily dispersed by hand mixing.

5.2 Stability. The adhesive produced by mixing matched batch components which have been stored in sealed containers for 14 days at a temperature between 40°C and 45°C, shall still be in compliance with either consistency properties or gelation time requirements when compared to the adhesive produced by mixing components from the same batch which have been subjected to storage conditions as recommended by the manufacturer.

5.3 Shelf life. When stored at the manufacturer's recommended storage conditions for at least 12 months from the date of delivery for a slow set type or at least 6 months for a rapid set type, each adhesive component shall be capable of being mixed in equal parts by volume with the other adhesive component to produce an adhesive which complies with the requirements of this Standard.

5.4 Non-volatile content. When determined in accordance with AS 1321.10, the non-volatile content of each adhesive component shall be not less than 95 percent by mass.