
ASPHALT SURFACING
Explain the properties, selection, and
effects of polymer-modified binders in
hot mix asphalt

level:	5
credit:	8
planned review date:	October 2009
sub-field:	Pavement Surfacing
replacement information:	This unit standard replaced unit standard 17673.
purpose:	<p>This unit standard is for people in the bitumen industry, such as asphalt mix designers, who require advanced technical knowledge of polymer modified binders.</p> <p>People credited with this unit standard are able to explain: the properties of polymer-modified binders used in hot mix asphalt, their selection, and the effects of using them.</p>
entry information:	Open.
accreditation option:	Evaluation of documentation and visit by NZQA and industry.
moderation option:	A centrally established and directed national moderation system has been set up by InfraTrain New Zealand.
special notes:	<p>1 Reference material recommended includes current versions of:</p> <p><i>Austrroads Guidelines for the Selection and Use of Modified Binders</i>, Austrroads Guidelines available at http://www.onlinepublications.austrroads.com.au;</p> <p><i>Chipsealing in New Zealand</i>, Transit New Zealand, available at http://www.transit.govt.nz;</p> <p><i>Code of Practice: Manufacture, Storage and Handling of Polymer Modified Binders</i> (the PMB Code of Practice), Australian Asphalt Pavement Association, available at http://www.aapa.asn.au;</p> <p>material safety data sheets (MSDS).</p>

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- 2 Current versions of the following documents are references for design methods in this unit standard.
MS-2 *Mix Design Methods*, Asphalt Institute, available at <http://www.asphaltinstitute.org/store.asp>, for the Marshall method;
APRG 18 *Selection and Design of Asphalt Mixes*, 2002, available from the Australian Asphalt Pavement Association at http://www.aapa.asn.au/content/aapa/download/publications_list.pdf;
IG8 *Asphalt Mix Design*, Australian Asphalt Pavement Association, available at <http://www.aapa.asn.au>;
Pavement Design: A Guide to the Structural Design of Road Pavements, Austroads, available at <http://www.roadingnz.org.nz>;
Austroads Pavement Design: A Guide to the Structural Design of Road Pavements: New Zealand Supplement, Roothing New Zealand/Transit, available at <http://www.transit.govt.nz>.
- 3 Polymer manufacturer's guidelines and data sheets must be referred to and their recommendations incorporated in the use of polymers.
- 4 Assessment against this unit standard may be based on evidence from workplace and/or provider contexts.
- 5 Definitions
company procedures refers to all documented policies, procedures and methodologies of the candidate's employer at the time of training including but not limited to those relating to health, safety, environment, quality, and operations;
SMA means stone mastic asphalt.

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Elements and Performance Criteria

element 1

Explain the properties of polymer-modified binders in hot mix asphalt.

performance criteria

- 1.1 The properties of polymer modifiers, the forms in which they are supplied, and their effect on the physical properties of bituminous binders, are explained in accordance with *Austrroads Guidelines*.
- Range: modifiers – elastomers, plastomers.
- 1.2 Effects of binders on the physical properties of hot mix asphalt are explained in accordance with *Austrroads Guidelines*.
- Range: effects – upper, lower, and mid-point of modifier addition rates; modifiers – elastomers, plastomers.
- 1.3 Effects of adhesion agents on modified binders are explained in accordance with *Austrroads Guidelines*.
- 1.4 Binder properties required to achieve specified pavement performance are identified and explained in accordance with *Austrroads Guidelines*.

element 2

Explain the selection of polymer-modified binders in hot mix asphalts.

performance criteria

- 2.1 Reasons for using polymer-modified binders are explained in accordance with *Austrroads Guidelines*.
- Range: includes but is not limited to – suitability for purpose; binders modified with – elastomers, plastomers.

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- 2.2 Suitability of polymer-modified binders is explained, taking into account pavement conditions and site requirements, in accordance with *Austroads Guidelines* and company procedures.
- Range: conditions – traffic, texture, cracking, flushing, deflection, pretreatment requirements.
- 2.3 Benefits of binders on types of hot mix asphalt are explained in accordance with *Austroads Guidelines*.
- Range: types – dense-graded, open-graded, SMA.
- 2.4 Binder selection is explained for at least three actual situations in accordance with *Austroads Guidelines* and APRG Rpt 18.
- 2.5 Processes and procedures for maintaining binder properties and quality are explained in accordance with the *PMB Code of Practice*.
- Range: processes include but are not limited to – mixing, pumping, handling, storage temperatures, storage time.

element 3

Explain the effects of using polymer-modified binders in hot mix asphalts.

performance criteria

- 3.1 Effects of modified binder on resilient modulus, dynamic creep, and fatigue are explained in accordance with the *Austroads* design method.
- 3.2 Effects on the Marshall method of mix design are explained in terms of adjustments required and interpretation of results.
- 3.3 Effects on hot mix asphalt mixing, handling, and storage are explained in accordance with the *Austroads Guidelines* and company procedures.
- 3.4 Effects are explained in terms of construction temperatures.
- Range: temperatures – transportation, laying, compaction.

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Comments on this unit standard

Please contact the InfraTrain New Zealand askus@infratrain.co.nz if you wish to suggest changes to the content of this unit standard.

Please Note

Providers must be accredited by the Qualifications Authority or a delegated inter-institutional body before they can register credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be accredited by the Qualifications Authority before they can register credits from assessment against unit standards.

Accredited providers and Industry Training Organisations assessing against unit standards must engage with the moderation system that applies to those standards.

Accreditation requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for providers wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

This unit standard is covered by AMAP 0101 which can be accessed at <http://www.nzqa.govt.nz/site/framework/search.html>.