



WESTERN AUSTRALIA SPECIFICATION

243

BITUMINOUS COLD MIX

Amendment Record for this Specification Part

This Specification is Council's edition of the AUS-SPEC generic specification part and includes Council's primary amendments.

Details are provided below outlining the clauses amended from the Council edition of this AUS-SPEC Specification Part. The clause numbering and context of each clause are preserved. New clauses are added towards the rear of the specification part as special requirements clauses. Project specific additional script is shown in the specification as italic font.

The amendment code indicated below is 'A' for additional script 'M' for modification to script and 'O' for omission of script. An additional code 'P' is included when the amendment is project specific.

Amendment Sequence No.	Key Topic addressed in amendment	Clause No.	Amendment Code	Author Initials	Amendment Date
<i>EXAMPLE 1</i>	<i>Provision for acceptance of nonconformance with deduction in Payment</i>	<i>XYZ.00</i>	<i>AP</i>	<i>KP</i>	<i>2/6/97</i>

SPECIFICATION 243 - BITUMINOUS COLD MIX

CONTENTS

CLAUSE	CONTENTS	PAGE
GENERAL	1
243.01	SCOPE.....	1
243.02	REFERENCE DOCUMENTS.....	1
MATERIALS	1
243.03	AGGREGATES.....	1
243.04	MINERAL FILLER.....	3
243.05	BINDER.....	3
243.06	FLUX OIL AND CUTTER OIL.....	3
243.07	BITUMEN ADHESION AGENT.....	3
MIX DESIGN	3
243.08	NOMINATED MIX.....	3
243.09	APPROVED MIX.....	4
243.10	REQUIREMENTS OF PRODUCTION MIX.....	5
243.11	NON-COMPLYING PRODUCTION COLD MIX.....	6
243.12	MIXING PROCEDURE.....	6
243.13	SAMPLING AND TESTING OF PRODUCTION MIX.....	6
243.14	PERFORMANCE PROPERTIES OF THE MIX.....	7
243.15	TRANSPORT.....	7
243.16	DELIVERY.....	7
SPECIAL REQUIREMENTS	7
243.17	RESERVED.....	7
243.18	RESERVED.....	7
243.19	RESERVED.....	7

MEASUREMENT AND PAYMENT7

243.20 PAY ITEMS7

SPECIFICATION 243 : BITUMINOUS COLD MIX

GENERAL

243.01 SCOPE

1. The work to be executed under this Specification consists of design, production and delivery of "hot mixed - cold laid plant mix" (hereinafter referred to as "cold mix") and includes supply of materials, sampling, testing and any other operations necessary to provide the conforming product. This specification unless amended applies to dense graded cold mix of nominal sizes 7, 10 or 14mm.

2. Requirements for quality control and testing, including maximum lot sizes and minimum test frequencies, are cited in the Specification Part for Quality Requirements.

Quality

243.02 REFERENCE DOCUMENTS

1. Documents referenced in this Specification are listed in full below whilst being cited in the text in the abbreviated form or code indicated.

(a) Australian Standards

AS 1141.11	-	Particle size distribution by sieving.
AS 1141.15	-	Flakiness index.
AS 1141.18	-	Crushed particles in coarse aggregate derived from gravel.
AS 1141.22	-	Wet/dry strength variation.
AS 2008	-	Residual bitumen for pavements.
AS 2157	-	Cutback bitumen.
AS 2357	-	Mineral fillers for asphalt.
AS 2758.5	-	Asphalt aggregates.
AS 2891.3.1	-	Bitumen content and aggregate grading, Reflux method
AS 3568	-	Oil for reducing the viscosity of residual bitumen for pavements.
AS 4283	-	Cold mix asphalt for maintenance patching.

MATERIALS

243.03 AGGREGATES

1. Aggregates shall be of uniform quality and grading. Aggregates complying with the requirements of this Clause when combined with the mineral filler shall be capable of achieving the properties required by this Specification.

Uniformity

(a) Coarse Aggregate

1. Coarse aggregate comprises all mineral matter retained on the 4.75mm AS sieve. Coarse aggregate shall consist of clean, dry, hard, tough and sound crushed rock, metallurgical slag or gravel, be of uniform quality and be free from dust, clay, dirt or other matter deleterious to asphalt. All coarse aggregate shall comply with AS 2758.5.

Quality

2. The grading of the coarse aggregate used in the work shall be determined in accordance with AS 1141.11.

Grading

3. When submitting details of the nominated mix the Contractor shall submit to the Superintendent NATA Certified Laboratory Test Reports on the quality and grading of the coarse aggregate proposed to be used. Such test results shall be less than 12 months old and representative of current aggregate supply. The grading shall be known as the "Proposed Grading". **NATA Reports**

4. If the Contractor proposes to blend two or more coarse aggregates to provide the Proposed Grading then test reports for each constituent material shall be submitted separately and the Superintendent advised of the proportions in which the various sizes and constituents are to be combined. The coarse aggregate from each source shall comply with the following requirements: **Test Requirements**

(a) Wet Strength - AS 1141.22

Shall be not less than 100kN for any source except the wet strength required for any fraction of open graded asphalt shall not be less than 150kN.

(b) Wet/Dry Strength Variation - AS 1141.22

Shall not exceed 35 per cent for any fraction or constituent.

(c) Flakiness Index - AS 1141.15

The flakiness index of the aggregate shall not exceed 35.

(d) Fractured Faces - AS 1141.18

The fraction of aggregate retained on a 4.75mm A5 Sieve shall comprise at least 75% by weight of particles with at least two fractured faces.

(b) Fine Aggregate

1. Fine aggregate comprises all mineral matter (other than filler) passing the 4.75mm AS sieve. It shall consist of clean, hard, tough and sound grains, free of coatings or loose particles of clay, silt or other matter deleterious to asphalt. The fine aggregate shall consist of natural sand or a mixture of natural sand and material derived from the crushing of sound stone or gravel. **Quality**

2. The grading of the fine aggregate used in the work shall be determined in accordance with AS 1141.11. **Grading**

3. When submitting details of the nominated mix the Contractor shall submit to the Superintendent a NATA Certified Laboratory Test Report on the quality and grading of the fine aggregate proposed to be used. Such test results shall be less than 12 months old and representative of current aggregate supply. The grading shall be known as the "Proposed Grading". **NATA Reports**

4. If the Contractor proposes to blend two or more fine aggregates to provide the Proposed Grading then test reports for each constituent material shall be submitted separately and the Superintendent advised of the proportions in which the various sizes and constituents are to be combined. **Test Requirements**

243.04 MINERAL FILLER

- | | |
|--|---------------------|
| <p>1. Mineral filler may consist of hydrated lime, fly ash, portland cement, flue dust from the manufacture of portland cement, asphalt plant baghouse fines or other material approved by the Superintendent.</p> | Constituents |
| <p>2. The mineral filler shall comply in all other respects with the requirements of AS 2357.</p> | Voids |

243.05 BINDER

- | | |
|---|----------------|
| <p>1. The binder shall be Class 170 or Class 320 bitumen. The residual bitumen shall be homogeneous, contain no inorganic mineral matter other than that naturally occurring.</p> | Bitumen |
| <p>2. The bitumen used in the works shall comply with AS 2008.</p> | |
| <p>3. Subsequent to the introduction of fluxing oil or cutting oil all cutback bitumen shall comply with the requirements of AS 2157.</p> | |

243.06 FLUX OIL AND CUTTER OIL

1. The flux oil and cutter oil to be used for reducing the viscosity of the binder and retaining the cold mix in a workable condition shall conform to AS 3568 in addition to the following requirements.
- (a) It shall be clean and free from water.
 - (b) When one part by volume of oil is mixed with four parts by volume of bitumen at a temperature of 177°C the mixture shall be homogeneous and shall not foam.

243.07 BITUMEN ADHESION AGENT

- | | |
|--|----------------------------------|
| <p>1. A bitumen adhesion agent shall be added, if required, to the binder at one per cent by mass when nominated by the Superintendent based on experience with asphalts incorporating aggregates from the same source. Details of the proposed bitumen adhesion agent shall be submitted for the Superintendent's approval in accordance with Clause 243.08. The bitumen adhesion agent shall be used in a manner compatible with the manufacturer's recommendations.</p> | Use and Test Requirements |
|--|----------------------------------|

MIX DESIGN

243.08 NOMINATED MIX

- | | |
|--|----------------------|
| <p>1. The Contractor shall design the mix, henceforth called the "nominated mix", within the limits shown in Table 243.1 unless otherwise approved by the Superintendent.</p> | Nominated Mix |
| <p>2. The Contractor shall provide a Certificate from a laboratory with appropriate NATA registration stating that each nominated mix and its constituents meet the requirements of this Specification. All relevant test results shall accompany the Certificate. All phases of any particular test must be performed at one laboratory unless otherwise approved by the Superintendent. The Certificate shall confirm that the required testing has been carried out within the twelve month period before the date of submission to the Superintendent.</p> | |

3. Details of the nominated mix shall be submitted to the Superintendent at least twenty one days before first delivery of the cold mix. The nominated mix information shall include combined aggregate grading and binder content, proportions of constituent materials used (including adhesion agent), gradings of aggregate and filler, and type and sources of aggregates, filler, binder and adhesion agent.

Details

4. If any revision is necessary, then the costs associated with revision of the nominated mix and testing of the revised nominated mix in accordance with Clause 243.08 shall be borne by the Contractor.

Revised Mix

Property AS Sieve	Requirement for nominal mix size Aggregate % by mass passing			Test Method
	7mm	10mm	14mm	
19.0mm	100	100	100	AS 1141.11
13.2 mm	100	100	95-100	
9.50 mm	100	90-100	70-85	
6.70 mm	90-100	70-85	57-74	
4.75 mm	70-90	55-70	45-65	
2.36 mm	45-60	35-50	28-45	
1.18 mm	26-45	22-38	15-30	
600 µm	15-30	12-27	10-23	
300 µm	10-20	6-16	5-17	
150 µm	4-14	4-11	3-11	
75 µm	3-8	2-6	2-5	
Filler	0.5-1.0	0.5-1.0	0.5-1.0	AS2891.3.1
Binder content (% by mass of total mix)*	4.5-6.0	4.0-5.5	4.0-5.0	
Medium Flux oil (%) in binder	10-20	10-20	10-20	

NOTE: * Some increase beyond these ranges of binder may be permitted for aggregates having unusually high absorption characteristic. Such departures will require Superintendent's approval.

Table 243.1 - Limits for Design of Nominated Mix

243.09 APPROVED MIX

1. When a nominated mix has been approved by the Superintendent it shall be known as the "Approved Mix". Work shall not commence until cold mix design has been approved. Superintendent's approval of specific nominated mixes or previously approved mixes (Clause 243.09 para 3) constitutes a **HOLD POINT** for use of those mixes. The Superintendent will recognise AS 4283 as a reference in determining approval of the nominated mix.

Approval

HP

2. The Contractor shall not make any changes to the Approved Mix, or constituent materials without the prior written approval of the Superintendent. If any such change is proposed, then the Contractor shall provide details of the nominated mix and materials, in accordance with Clause 243.08. **Contractor's Responsibility**

3. If the Contractor's nominated mix has received prior approval under a separate contract with the Principal within twelve months before the proposed date of initial delivery under this contract, then provided that: **Prior Approval**

- (a) the Contractor produces documentary evidence and full details of the previously approved mix supplied under a specification which required the same standard of materials and product as this Specification;
- (b) the constituent materials and their quality remain unchanged from that previously approved; and
- (c) the in-service performance of the asphalt incorporating the nominated mix has proved acceptable to the Principal;

the Superintendent may approve the nominated mix without requiring the prior-testing of samples by the Contractor at a NATA registered laboratory, but may require samples to be tested in accordance with Clause 243.08 at any time during the course of the contract.

4. Notwithstanding any approval given by the Superintendent to a proposed asphalt mix, the Contractor shall be responsible for producing the cold mix which satisfies all requirements of the Specification. **Contractor's Responsibility**

243.10 REQUIREMENTS OF PRODUCTION MIX

1. The cold mix produced in the plant and delivered to the site shall be known as the 'production mix'.

2. Fluxing shall be carried out prior to the addition of the binder to the mix by adding the required amount of cold flux oil and cutter oil to the hot bitumen. **Fluxing**

3. The amount of flux oil and cutter oil added shall be varied according to the season as agreed between the Contractor and the Superintendent based on local experience.. **Flux oil**

4. The grading of the total mineral aggregate in the mix produced shall not vary from the approved mix design figures by more than the following amounts:- **Grading Variations**

Sieve Size	Allowable variation from nominated mix gradings (% Passing)
4.75mm and larger	± 7%
1.18mm and 2.36mm	± 5%
0.600 and 0.300mm	± 4%
Other sizes	± 2.5%

5. The binder content shall not vary from the approved mix by more than ± 0.3%. **Binder Variation**

243.11 NON-COMPLYING PRODUCTION COLD MIX

1. Mixes not complying with this Specification may be rejected. Consideration may be given by the Superintendent to the acceptance of the material at an agreed reduced payment..

243.12 MIXING PROCEDURE

(a) Plant

1. Mixing, shall be undertaken in a suitable plant nominated at tender and approved by the Superintendent, capable of uniformly mixing the coarse and fine aggregate and binder to meet the specified requirements. **Plant**

(b) Mixing Time and Temperature

1. Mixing time and temperature shall be such that all particles of the mineral aggregate are uniformly coated with binder. **Time**

(c) Storage of Mix

1. If stored by the contractor prior to delivery, the mix shall be stored under cover from the weather and on a concrete or asphalt slab. **Storage**

2. The stockpile site shall be in a free draining area not susceptible to ponding of water due to precipitation.

3. Stockpiles shall be constructed in such a manner that no compaction, other than by the weight of the material itself, will result. No equipment of any kind shall be run over the surface of the stockpile. All stockpiles are to remain covered and protected from precipitation and excess evaporation of incorporated oils. **Stockpiling**

4. Storage of the mix by the Contractor prior to delivery is limited to a period of 2 weeks.

243.13 SAMPLING AND TESTING OF PRODUCTION MIX

(a) Responsibility for Sampling

1. The Contractor shall be responsible for taking samples and shall supply all facilities, equipment and labour for that purpose. The costs associated with taking samples of production mix shall be borne by the Contractor. **Contractor's Responsibility**

(b) Frequency of Sampling

1. For the purpose of testing production mix, samples shall be taken at the rate of one sample for each production lot or days production whichever is the lesser. Sampling shall be in accordance with AS 2891.1. **Frequency**

(c) Testing of Mix

1. The Contractor shall maintain and operate a testing laboratory with appropriate NATA registration at, or near, the mixing plant so as to ensure complete control over the mixture produced. Conformance reports shall be provided promptly to the Superintendent, if requested. The cost of testing shall be borne by the Contractor. **Testing Costs**

243.14 PERFORMANCE PROPERTIES OF THE MIX

1. The manufactured material shall be cohesive and capable of being compacted readily into a semi-dense mass which is resistant to the destructive action of traffic. When compacted, visual examination of the compacted material shall indicate good mechanical interlock of particles which are fully coated with binder.

Mix Requirements

243.15 TRANSPORT

1. The bodies of haulage trucks shall be kept clean and coated with a thin film of an approved release agent to prevent asphalt sticking to the body of the truck. Any surplus release agent shall be removed before loading.

Release Agent

2. Unless other means of measurement are approved by the Superintendent, the mass of all truck-loads of cold mix shall be measured on a registered weighbridge.

Weighbridge

243.16 DELIVERY

1. Unless otherwise specially requested, deliveries shall reach the site of the work between the hours of 7.30am and 3.30pm Mondays to Fridays inclusive. As much preliminary notice as possible will be given before the first deliveries are required, and thereafter advice of delivery requirements for particular locations will be given not later than 10.00am on the day preceding the delivery. The Contractor shall comply with all reasonable delivery instructions meeting these guidelines.

Times

2. The Principal reserves the right to cancel deliveries other than loads premixed actually being mixed or in transit.

Cancellation

SPECIAL REQUIREMENTS

243.17 RESERVED

243.18 RESERVED

243.19 RESERVED

MEASUREMENT AND PAYMENT

243.20 PAY ITEMS

1. Payment shall be made for all activities associated with completing the work detailed in this Specification in accordance with Pay Items 243(a) and 243(b) inclusive.

2. The quantities shown in the Schedule of Rates are estimated total requirements and are not to be taken as actual or correct for the period of contract.

Pay Item 243(a) SUPPLY COLD MIX (EX BINS)

1. The unit of measurement shall be the tonne.
2. The quantity shall be determined from weighbridge docketts at the plant, unless an alternative measurement is approved by the Superintendent.

Pay Item 243(b) SUPPLY AND DELIVER COLD MIX

- 243(b)(1) (Depot Site 1)
- 243(b)(2) (Depot Site 2)
- 243(b)(3) _____ (job site)

1. The unit of measurement shall be the tonne.
2. The quantity shall be determined from weighbridge docketts.