

QUEENSLAND

CONSTRUCTION
SPECIFICATION

C243

BITUMINOUS COLD MIX

DEVELOPMENT CONSTRUCTION SPECIFICATION

SPECIFICATION C243 – BITUMINOUS COLD MIX
TABLE OF CONTENTS

CLAUSE	PAGE
GENERAL	
C243.01 SCOPE	4
C243.02 REFERENCE DOCUMENTS	4
C243.03 CONTROL OF TRAFFIC	4
MATERIALS	
C243.04 SAMPLING & TESTING OF MATERIALS	5
C243.05 AGGREGATES	5
C243.06 MINERAL FILLER	6
C243.07 BINDER	6
C243.08 FLUXOIL AND CUTTER OIL	7
C243.09 BITUMEN ADHESION AGENT	7
MIX DESIGN	
C243.10 NOMINATED MIX	7
C243.11 APPROVED MIX	8
C243.12 REQUIREMENTS OF PRODUCTION MIX	9
C243.13 NON-COMPLYING PRODUCTION COLD MIX	9
C243.14 MIXING PROCEDURE	9
C243.15 SAMPLING AND TESTING OF PRODUCTION MIX	10
C243.16 PERFORMANCE PROPERTIES OF THE MIX	10
C243.17 TRANSPORT	10
C243.18 DELIVERY	11
MEASUREMENT AND PAYMENT	
243.19 PAY ITEMS	11

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

SPECIFICATION C243 : BITUMINOUS COLD MIX

GENERAL

C243.01 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 14 mm.
2. Requirements for quality control and testing, including maximum lot sizes and minimum test frequencies, are cited in the Specification Part for Quality Requirements.

C243.02 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) Council Specifications

C201-Control of Traffic

(b) Australian Standards

AS 1141	-	Methods for Sampling & Testing Aggregates
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 1160	-	Bituminous emulsion for the construction and maintenance of pavements.
AS 2008	-	Residual bitumen for pavements.
AS 2250	-	Hot Mix Asphalt – A Guide to Good Practice
AS 2758	-	Aggregates and Rock for Engineering purposes
AS 2758.2	-	Aggregate for sprayed bituminous surfacing.
AS 2758.5	-	Asphalt AggregateS
AS 2891	-	Methods of Sampling & Testing Asphalt
AS 2891.3.1	-	Bitumen Content and Aggregate Grading – Reflux Method
AS 3568	-	Oils for reducing the viscosity of bitumen for pavements.
AS 4283	-	Cold Mix Asphalt for Maintenance Patching

C243.03 CONTROL OF TRAFFIC

1. The Contractor shall provide for the control of traffic in accordance with the requirements of the Specification for CONTROL OF TRAFFIC while undertaking the work and shall take all necessary precautions to protect the work from damage until such time as the new seal coat has developed sufficient strength to carry normal traffic without disturbance of the aggregate.
2. Where early use of the new seal is required to facilitate the movement of traffic, vehicles may be allowed to run on the work after initial rolling has taken place provided that vehicles are controlled to such slow speeds that no lateral displacement of aggregate occurs. Where necessary, the Contractor shall use patrol vehicles to ensure that traffic travels at an acceptable speed.
3. The Contractor shall take all necessary steps to avoid or minimise delays and inconvenience to

road users during the course of the work. Where adequate detours or side tracks are included in the Contract or are otherwise available, traffic shall be temporarily diverted while the work is in progress.

4. If facilities for the diversion of traffic are not available, the Contractor may spray part width of the pavement in the one operation and make available to traffic the adjacent strip of roadway, except during the actual spraying operation when all traffic movement through the work shall cease. Traffic shall not be permitted to encroach upon the edge of the sprayed bituminous material until such time as it is covered with aggregate.

MATERIALS

C243.04 SAMPLING AND TESTING OF MATERIALS

Sampling and testing of materials shall be arranged by the Contractor and carried out by a laboratory with appropriate NATA registration in accordance with the relevant material specifications cited in this Specification.

C243.05 AGGREGATES

Uniformity

Aggregates shall be of uniform quality and grading. Aggregates complying with the requirements, when combined with the mineral filler shall be capable of achieving the properties required by this work section.

Coarse Aggregate

Quality: Coarse aggregate comprises all mineral matter retained on the 4.75 mm 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. AS coarse aggregate shall comply with AS 2758.5.

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

NATA Reports: 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'.

Test Requirements: If the Contractor proposes to blend two or more coarse aggregates to provide the Proposed Grading then test reports of 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:

- Wet Strength – AS 1141.22
- Shall be not less than 100 Kn for any source except the wet strength required for any fraction of open graded asphalt shall not be less than 150 Kn.
- Wet/Dry strength variation – AS 1141.22
- Shall not exceed 35 per cent for any fraction of constituent.
- Flakiness Index – AS 1141.15
- The flakiness index of the aggregate shall not exceed 35.
- Fractured faces – AS 1141.18
- The fraction of aggregate retained on a 4.75 mm A5 sieve shall comprise at least 75% by weight of particles with at least two fractured faces.

Fine Aggregate

Quality: Fine aggregate comprises all mineral matter (other than filler) passing the 4.75 mm 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.

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

NATA Reports: 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'.

Test Requirements: 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.

C243.06 MINERAL FILLER**Constituents**

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.

Voids

The mineral filler shall comply in all other respects with the requirements of AS 2150.

243.07 BINDER

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.

The bitumen used in the works shall comply with AS 2008.

Subsequent to the introduction of fluxing oil or cutting oil all cutback bitumen shall comply with the requirements of AS 2157.

C243.08 FLUX OIL AND CUTTER OIL

The flux oil and cutter oil to be used for reducing the viscosity of the binder and retaining the sold mix in a workable condition shall conform to AS 3568 in addition to the following requirements:

It shall be clean and free from water.

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

C243.09 BITUMEN ADHESION AGENT

Use and Test Requirements

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 **Nominated Mix**.

The bitumen adhesion agent shall be used in a manner compatible with the manufacturer's recommendations

MIX DESIGN

C243.10 NOMINATED MIX

Design limits

The Contractor shall design the mix, henceforth called the 'nominated mix', within the limits shown in Table C244.1 unless otherwise approved by the Superintendent.

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 phases of any particular test must be performed at one laboratory unless otherwise approved by the Superintendent.

All relevant test results shall accompany the Certificate. The Certificate shall confirm that the required testing has been carried out within the twelve months period before the date of submission to the Superintendent.

Mix Details

Details of the nominated mix shall be submitted to the Superintendent at least twenty-one (21) 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.

Revised Mix

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 **Design limits** shall be borne by the Contractor.

Table C244.1 Limits for design of nominated mix

Property	Requirement for nominal mix size			Test method
	Aggregate % by mass passing			
	7 mm	10 mm	14 mm	
AS Sieve grading:				AS 1141.11
19.0 mm	100	100	100	
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	
Binder content (% by mass of total mix)*	4.5–6.0	4.0–5.5	4.0–5.0	AS 2891.3.1
Medium flux oil (%) in binder	10–20	10–20	10–20	

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

C243.11 APPROVED MIX**Approval**

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 (**Prior approval**) constituted a HOLD POINT for use of those mixes/

The Superintendent will recognise AS 4283 as a reference in determining approval of the nominated mix.

Changes to Approved Mixes

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 **Nominated Mix**.

Prior Approval

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:

- the Contractor produced 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;

- the constituent materials and their quality remain unchanged from that previously approved; and
- 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 or samples by the contractor at a NATA registered laboratory, but may require samples to be tested in accordance with **Mix design** at any time during the course of the contract.

Cold mix to comply with all requirements of the specification

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.

C243.12 REQUIREMENTS OF PRODUCTION MIX

Name

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

Fluxing

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.

Grading Variations

The grading of the total mineral aggregate in the mix produced shall not vary from the approved mix design figures by more than the amounts given I Table C243.2.

Binder Variation

The binder content shall not vary from the approved mix by more than $\pm 0.3\%$.

Table C244.2 Permissible grading variations table

Sieve size	Allowable variation from nominated mix gradings (% passing)
4.75 mm and larger	$\pm 7\%$
1.18 mm and 2.36 mm	$\pm 5\%$
0.600 and 0.300 mm	$\pm 4\%$
Other sizes	$\pm 2.5\%$

C243.13 NON COMPLYING PRODUCTION COLD M IX

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

C243.14 MIXING PROCEDURE.

Plant

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.

Mixing time and temperature

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

Storage of Mix

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.

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

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.

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

C243.15 SAMPLING AND TESTING OF PRODUCTION MIX**Responsibility for sampling**

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.

Frequency of Sampling

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.

Testing of mix

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.

C243.16 PERFORMANCE PROPERTIES OF THE MIX

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.

C243.17 TRANSPORT**Haulage Trucks**

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

loading.

Load measurement

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.

C243.18 DELIVERY**Times**

Unless otherwise specially requested, deliveries shall reach the site of the work between the hours of 7.30 am and 3.30 pm 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 10.00 am on the day preceding the delivery.

The Contractor shall comply with all reasonable delivery instructions meeting these guidelines.

Cancellation of deliveries by Principal

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

MEASUREMENT AND PAYMENT**C243.19 PAY ITEMS****1. MEASUREMENT**

Payment shall be made for all activities associated with completing the work detailed in this worksection in accordance with Pay Items C243(A) and C243(B) inclusive.

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 C243(a) SUPPLY OF COLD MIX (EX BINS)

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

PAY ITEM C243(b) SUPPLY AND DELIVER COLD MIX TO NOMINATED LOCATION

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