SECTION 422 ‑ LIGHT TRAFFIC CRUMB RUBBER ASPHALT‑

## This section cross-references Sections 175 and 407 which must be included in the specification:

422.01 GENERAL

This section is a supplement to Standard Section 407 – Hot Mix Asphalt and provides the requirements for Light Traffic Crumb Rubber Asphalt (LTCRA) that are in addition to or override the requirements of Section 407.

422.02 DESCRIPTION

LTCRA is an asphalt which contains crumb rubber obtained from waste tyres, to be used on light trafficked roads as a surfacing.

422.03 STANDARDS

Section 175 details the relevant references to Australian Standards (AS), Austroads Standards and Codes of Practice referenced in this section. These references are summarised in Table 422.031.

**Table 422.031 Standards, Specifications and Codes of Practice**

|  |  |
| --- | --- |
| **Australian Standards** | |
| AS 2008 | *Bitumen for pavements* |
| **Austroads Documents** | |
| AGPT/T190 | *Specification Framework for Polymer Modified Binders* |
| **VicRoads Codes of Practice** | |
| RC 500.01 | *Registration of Bituminous Mix Designs* |
| RC 500.16 | *Selection of Test Methods for Testing of Materials and Work* |

422.04 DEFINITIONS

The following definitions are in addition to those listed in clause 407.02:

**Dry Mixing Process**

(a) The addition of crumb rubber directly into the aggregates prior to the bitumen being introduced; or

(b) the addition of blended crumb rubber and bitumen into the aggregates direct from the blending plant without storage.

**Wet Mixing Process**

The addition of crumb rubber modified binder into the aggregates direct from a storage facility.

422.05 AGGREGATES

Unless otherwise specified, properties of the aggregates must comply with the requirements for Type N asphalt as specified in clause 407.03.

422.06 FILLER

Unless otherwise specified, the properties of filler must comply with the requirements specified in clause 407.04.

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422.07 BINDER

When a dry mixing process is used, the bitumen shall be Class 170 or 320 complying with the requirements of AS 2008.

When a wet mixing process is used, the binder shall comply with the requirements of either S45R or S15RF, as specified in AGPT/T190.

422.08 CRUMB RUBBER

Crumb rubber must:

(a) comply with the requirements of AGPT/T190; the use of uncured or devulcanized rubber is not permitted: an alternative grading for the crumb rubber will be considered subject to evidence being provided that demonstrates the alternative graded crumb rubber has no adverse impact on asphalt performance

(b) be processed from waste tyres generated in Australia and processed by a Tyre Stewardship Australia accredited supplier

(c) be a uniform material consisting of synthetic rubber or natural rubber from car or truck tyres, or a mixture of both, and shall be free from cord, wire, fluff and other deleterious material.

A certificate of compliance may be requested to demonstrate that all the crumb rubber requirements have been met.

422.09 RECLAIMED ASPHALT PAVEMENT (RAP)

The use of RAP shall comply with the RAP requirements for Type N asphalt as specified in Section 407 and RC 500.01.

422.10 WARM MIX ASPHALT ADDITIVE

Warm Mix Asphalt additive may be included in the asphalt mix to reduce the asphalt manufacturing and placement temperatures or aid compaction.

422.11 MIX DESIGN REQUIREMENTS

(a) Mix design

Unless otherwise specified, the asphalt mix design shall be registered in accordance with clause 407.06. The Contractor shall submit all test information as required in RC 500.01 for Type N asphalt.

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(b) Grading

Unless otherwise specified, the grading of aggregate with added filler after mixing but before compaction shall comply with Table 422.111.

**Table 422.111 Grading of Aggregate with Added Filler**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sieve Size**  **(mm)** | **Percentage Passing (by Mass)** | | |
| **Mix Size 7** | **Mix Size 10** | **Mix Size 14** |
| 19.0 | - | ‑ | 100 |
| 13.2 | - | 100 | 85 - 100 |
| 9.5 | 100 | 90 ‑ 100 | 65 - 84 |
| 6.7 | 80 - 100 | 65 - 86 | 50 - 73 |
| 4.75 | 70 - 88 | 46 - 73 | 38 - 65 |
| 2.36 | 46 - 65 | 32 - 55 | 25 - 48 |
| 1.18 | 29 - 51 | 22 - 44 | 16 - 37 |
| 0.600 | 18 - 40 | 12 - 34 | 11 - 28 |
| 0.300 | 11 - 29 | 8 - 24 | 8 - 21 |
| 0.150 | 7 - 17 | 6 - 16 | 5 - 14 |
| 0.075 | 5 - 8 | 4 - 7 | 4 - 7 |

Note: For purposes of grading, the grading of the aggregates includes added filler and excludes the crumb rubber.

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(c) Volumetric Test Properties

The volumetric test properties shall comply with Table 422.112.

**Table 422.112 Volumetric Test Properties and Other Requirements**

|  |  |  |  |
| --- | --- | --- | --- |
| **Property** | **Mix Size** | | |
| **7 mm** | **10 mm** | **14 mm** |
| Minimum bitumen content – Dry Mixing Process  (% of total mix by mass) | 4.2 | 3.8 | 3.8 |
| Minimum Crumb Rubber - Dry Mixing Process  (% of total mix by mass) | 0.6 | 0.5 | 0.5 |
| Minimum Total Binder Content – including crumb rubber (% of total mix by mass) | 5.0 | 4.5 | 4.5 |
| Air Void Range (%) | 4.5 – 5.3 | | |
| Minimum Voids in Mineral Aggregate (%) | 15 | | |

Notes:

i. For purposes of calculation of Voids in Mineral Aggregate, the crumb rubber is to be considered as part of the binder.

ii. Total binder content includes the crumb rubber and bitumen.

(d) Performance Test Properties

The performance test properties of the asphalt mix shall comply with Table 422.113.

**Table 422.113 Performance Test Properties**

|  |  |  |  |
| --- | --- | --- | --- |
| **Performance Test** | **Mix Size** | | |
| **7 mm** | **10 mm** | **14 mm** |
| Mean Indirect Tensile Modulus @ 25C (MPa) | - | 2,000 - 5,500 | |
| Min Wet Tensile Strength (kPa) | - | To be reported | |
| Min Wet to Dry Tensile Strength (%) | - | 80% | |
| Max Wheel Tracking Depth @ 60C (mm) | - | 8 | 7 |

Notes:

i. All testing shall be undertaken in accordance with RC 500.16.

ii. Modulus test limits apply to gyratory compacted specimens compacted to 5% air voids within a tolerance of ± 0.5% air voids.

iii. Wet tensile strength and tensile strength ratio test specimens shall be prepared using gyratory compaction to 8% air voids ± 1% air voids.

iv. Wheel track test specimens shall be compacted to 5% air voids ± 1% air voids.

422.12 MIXING AND MIXING TEMPERATURES

(a) Dry Mixing Process

The temperature limits shall be in accordance with clause 407.08.

When the addition of crumb rubber is made directly into the aggregates prior to the addition of the bitumen, the required quantity of crumb rubber shall be added and dry mixed for a minimum period of 10 seconds.

Following the addition of the binder, the whole mixture shall be mixed for a minimum of 60 seconds or until the mix is homogeneous and proper digestion of the crumb rubber into the bitumen has occurred.

(b) Wet Mixing Process

The temperature limits shall be in accordance with clause 407.08.

422.13 AMBIENT CONDITIONS FOR PLACING

The asphalt mix shall be shall not be placed when the majority of the area to be paved has a surface temperature less than 15°C.

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