

NZTA M01: 2022 NOTES

NOTES TO THE SPECIFICATION FOR BITUMEN

1 BACKGROUND

The Waka Kotahi NZ Transport Agency M01 specification has set the standard for bitumen used in road and industrial pavements for many years. It has, and continues to use a range of empirical criteria to describe bitumens that have been found to work in practice.

The specification has criteria for five bitumen grades, which fall into two broad classes: grades that are used for chip sealing and grades that are normally used as asphalt binders.

In 2016 NZTA M01-A specification was developed. This specification uses performance-related criteria to specify asphalt binders. These performance-related binders are not necessarily bitumens compliant with M01 Table 6.1, but could be intermediate blends of bitumen, or modified materials.

The three grades generally used for chip sealing in New Zealand, 180/200, 130/150, 80/100 grades, are still specified using the empirical criteria of M01 Table 6.1. Research is currently progressing to develop a performance-related binder for chip seals but at the time of writing these notes, a performance-related chip seal binder specification had not been developed.

Following the announcement by Refining New Zealand in October 2020 of their intention to cease bitumen manufacture, a review of NZTA M01 specification was undertaken. The intent of the review was to ensure that M01 specification was aligned with an importation model for bitumen supply, safeguarding the quality of bitumen used in road pavements while removing unnecessary real or perceived barriers to supply.

2 UPDATES IN THE 2020 AND 2022 VERSIONS

Following the review, NZTA M01 specification was amended in 2020 as follows. The changes include:

- (a) Separating the minimum requirements for a bitumen suitable for importation (M01 Table 5.1) from the requirements for bitumen used in pavements (M01 Table 6.1);
- (b) Adding an explicit requirement that imported bitumens must be able to be supplied, blended or otherwise processed to make bitumens compliant with M01 Table 6.1 or M01-A specifications;
- (c) Some changes to M01 Table 6.1 Requirements for Bitumen, which include:
 - (i) A requirement to report the bitumen density;
 - (ii) Limits placed on the Mass Change experienced by the bitumen in the Rolling Thin-Film Oven test. This addition is intended to make sure that volatile distillate is not used to adjust the grade of the bitumen, and;
 - (iii) The T13 Durability test requirement for asphalt mix binders has been amended to “report only”. Asphalt binder durability is covered by the Rolling Thin Film Oven test and Retained Penetration, and the durability criteria contained within M01-A specification.

Waka Kotahi developed and published NZTA Q05 specification in 2022. This specifies the processes required for managing bitumen quality across the supply chain. M01 specification was editorially updated as the 2022 version to align with Q05.

3 BITUMEN APPROVAL PROCESS

The bitumen approval process is now covered by NZTA Q05 specification. The reasons for retaining this process is the need to have provenance records for the bitumen imported into New Zealand. Formerly New Zealand bitumen users have had the benefit of a very stable supply from one refiner, who processed a limited range of crude oils into bitumen. This has meant very predictable performance from New Zealand bitumens. Since on-shore refining of crude oil into bitumen has ceased, experience with bitumen, particularly for asphalt-grade binders, has shown that different refiners processing different crude oil feedstock gives bitumen with less predictable performance. This lack of predictability led to the development and publication of NZTA M01-A specification for asphalt binders.

The continuing empirical nature of the criteria of M01 for chip seal binders means that the performance of binders becomes less predictable. Therefore, it is necessary to maintain the approval process so that if a

bitumen is imported and found to perform poorly, appropriate steps can be taken to identify the source and composition of the bitumen and withdraw approval.

Approval is given by the Lead Advisor Pavements following a recommendation by the Principal Surfacing Engineer. Such a recommendation is based on compliance with the list of requirements in M01 section 5, plus any performance track record for the bitumen.

Approval is given, for a period of 5 years, on the condition that full scale production batches or imported shipments of the bitumen have been derived from essentially the same crude oil blend, production route and refinery or production plant as that of the sample used for approval purposes.