

SPECIFICATION FOR SEALING CHIP

1. SCOPE

This specification sets out the material requirements for five grades of sealing chip suitable for use on New Zealand roads.

2. RELATED DOCUMENTS

- 2.1 AS 1141.32 Methods for sampling and testing aggregates – Weak particles (including clay lumps, soft and friable particles) in coarse aggregates.
- 2.2 BS EN 1097 Tests for mechanical and physical properties of aggregates.
- 2.3 Civil Contractors New Zealand BPG 05 Quality Assurance of Aggregates for Roads.
- 2.4 NZS 4407 Methods of Sampling and Testing Road Aggregates.
- 2.5 NZS ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories.

3. QUALITY ASSURANCE

Manufacturers of sealing chip shall have a quality plan that is compliant with *Civil Contractors New Zealand BPG 05 Best Practice Guideline – Quality Assurance of Aggregates for Roads*, or better.

Sampling and testing shall be performed by a laboratory that is accredited to NZS ISO/IEC 17025. The sampling and testing shall also be carried out in accordance with the relevant methods detailed in AS 1141, NZS 4407 and BS EN 1097, as appropriate.

The frequency of testing for source and production properties must comply with the requirements of clauses 4 and 5 of this document.

4. SOURCE PROPERTIES

4.1 Sample Preparation

Source properties are related to source rock quality and changes in extraction location.

Sealing chip shall be crushed from quarried rock, alluvial deposits or Glenbrook Melter Aggregate (GMA). Sealing chip shall consist of hard, sound material of uniform quality and free from soft, weathered or disintegrated rock or other deleterious material.

Samples shall be drawn for rock source property testing. Frequency of sampling and testing shall be:

- One sample for every 10,000 m³ of sealing chip produced, or;
- If less than 10,000 m³ of chip is produced per annum, annually.

All source property testing shall be carried out on a composite bulk test sample consisting of approximately equal proportions by weight of Grade 2 (if available), Grade 3, Grade 4, Grade 5 and Grade 6 sealing chip individually sampled as per NZS 4407. Polished Stone Value, Weathering Quality Index and Crushing Resistance tests shall be carried out on sub-samples drawn from the composite bulk test sample.

Individual sealing chip grades shall be sampled from the same production run and must accurately represent rock source and quarry crushing and screening processes. The individual samples will be combined by laboratory staff to produce a composite bulk test sample used for source property testing. Test reports should indicate that the source property test samples were prepared this way and that testing was carried out on a composite bulk sample.

The composite bulk test sample for source property testing shall be used to produce the following specimens for testing:

Table 1: Source Property Sample Size Testing Requirements

Source Property Test	Fraction Size Range (mm)	Mass of Aggregate Required (kg)
Polished Stone Value	10.0 – 7.2 Flake Sorting Sieve	20
Crushing Resistance	13.2 – 9.5	10
Weathering Quality Index	19.0 – 9.5	5
	9.5 – 4.75	6

4.2 Crushing Resistance

When naturally occurring aggregates are tested in accordance with *NZS 4407 Test 3.10 – The Crushing Resistance of Coarse Aggregate Under a Specified Load*, a maximum of 10% fines shall be produced under a load of 230kN.

When GMA is tested in accordance with *NZS 4407 Test 3.10 – The Crushing Resistance of Coarse Aggregate Under a Specified Load*, a maximum of 13% fines shall be produced under a load of 230kN.

4.3 Weathering Resistance

Sealing chip shall have a quality index of AA or BA when tested in accordance with *NZS 4407 Test 3.11 – The Weathering Quality Index of Coarse Aggregate*.

4.4 Weak Particles Test

The Weak Particles test is only required if source properties are disputed. When testing is required and carried out, sealing chip shall have a maximum of 1% of unsound materials when tested in accordance with *AS 1141.32 – The Weak Particles Test*.

4.5 Skid Resistance

Sealing chip must comply with the requirements of *NZTA T10 Specification for State Highway Skid Resistance Management*, or as detailed in the specific contract requirements. The preferred method is the Aggregate Performance method; however, if sufficient information is not available, the Polished Stone Value method may be approved for use by the NZ Transport Agency's Regional Operations Manager or their nominee within the Agency.

If the Polished Stone Value method is used, the sealing chip shall have a minimum Polished Stone Value as required by *NZTA T10 Specification for State Highway Skid Resistance Management*, or as detailed in the specific contract requirements.

All Polished Stone Value testing shall be carried out in conjunction with the other source properties as detailed in clause 4.

All tests from the named source must be identified, and the request for testing and all results retained. The quarry source name shall be the same as that listed in the NZ Transport Agency's RAMM database for that quarry. At least two results must be reported, one of which must be less than 12 months old. Both test results must be less than two years old. Where

only two results exist the lower of these two will be the source Polished Stone Value. If three or more tests are reported, the median will be the source Polished Stone Value.

New sources are required to initially have at least two Polished Stone Value, Weathering Quality Index and Crushing Resistance testing series completed and available for review and verification.

4.6 Polished Stone Value Testing

The Polished Stone Value is to be measured in accordance with BS EN 1097-8, with the following amendments:

- (i) Substitute BS EN 1097-8 clause 6.4 NOTE 1 with:

NOTE 1: At present there are two recognized sources of PSV control stone:

- Quartz dolerite aggregate controlled by Transport Research Laboratory (TRL), Old Wokingham Road, Crowthorne, Berkshire RG11 6AU, United Kingdom.
- Canterbury greywacke aggregate from Miners Road quarry, controlled by Fulton Hogan Ltd, 24 Miners Road, Christchurch 7676, on behalf of the NZ Transport Agency.

- (ii) Substitute BS EN 1097-8 clause 8.4 NOTE with:

NOTE: The surface texture of the particles which are to be exposed to the polishing action of the rubber-tyred wheel must be representative of the average surface texture of broken faces within the aggregate sample. Particles of differing appearance should be distributed randomly between the four specimens. Poorly selected specimens will give unrepresentative results. Alluvial and melter slag aggregates, in particular, may contain natural, unbroken, flat faces. These must not be included in the test and control stone plates (i.e. exposed to the tyre).

- (iii) To BS EN 1097-8 clause 8.8 add:

Photograph the completed plates (as a group or individually) before testing, ensuring that the packing and surfaces of the aggregates are clearly shown and distinct.

- (iv) To BS EN 1097-8 clause 12 add:

The specified range of the Miners Road control stone is 51.7 to 57.7

When using the TRL control stone, calculate the PSV to the nearest whole number from:

$$PSV = S + 52.5 - C$$

When using the Miners Road control stone, calculate the PSV to the nearest whole number from:

$$PSV = S + 54.7 - C$$

- (v) To BS EN 1097-8 clause 13 add:

(e) A copy of the control stone and test plate photographs, annotated to identify the aggregates used.

All Polished Stone Value testing shall be carried out in conjunction with the other source properties, as detailed in clause 4.

5. PRODUCTION PROPERTIES

Production properties are related to manufacturing systems and handling. Production property testing shall be carried out on each individual sealing chip grade as specified in Table 2, Table 3 and Table 4 below, as appropriate, at a rate of at least one sample for every 500m³ of that particular sealing chip grade produced.

5.1 Cleanness

When tested in accordance with *NZS 4407 Test 3.9 the Cleanness Value of Coarse Aggregate*, chip must have a cleanness value not less than the value detailed in Table 2 below.

Table 2: Minimum Cleanness Values

Chip Grade	Minimum Cleanness Value
2	89
3	87
4	85
5	Report only
6	Report only

Grades 5 and 6 chip shall be tested for Cleanness Value. The whole aggregate size range shall be tested. Any reported value is for advisory purposes only.

5.2 Size and Shape

When tested in accordance with *NZS 4407 Test 3.13 – The Size and Shape of Aggregate Particles*, and *NZS 4407 Test 3.14 – The Broken Faces Content of Aggregate*, the chip shall comply with the requirements detailed in Table 3 for the grade specified.

Sealing chip produced from alluvial sources and GMA shall be tested for Broken Faces Content in accordance with *NZS 4407 Test 3.14*.

Table 3: Size Shape and Broken Faces of Grades 2, 3, 4 and 5 Sealing Chip

Grade of Chip	ALD (mm)	% of Least Dimensions Within 2.5mm of ALD	AGD/ALD Ratio	% Passing 4.75mm Sieve	% With at Least Two Broken Faces
2	9.5 – 12.0	65 min.	2.25 max.	1.1 max.	98 min.
3	7.5 – 10.0	70 min.	2.25 max.	1.1 max.	98 min.
4	5.5 – 8.0	75 min.	2.25 max.	1.1 max.	98 min.
5	Report	Report	Report	Report	Report

Notes:

1. Sealing chip produced from a natural hard rock (i.e. non-alluvial) quarry does not need to be tested for Broken Faces unless disputed.
2. In addition to the reported criteria above, Grade 5 chip must also comply with the requirements of Table 4.
3. Conduct the Size and Shape testing for Grade 5 chip on the sample portion retained on the 4.75mm test sieve. Reported values are for advisory purposes only.

5.3 Particle Size Distribution for Grades 5 and 6 Sealing Chip

When tested in accordance with *NZS 4407 Test 3.8.2 – The Particle Size Distribution*, sealing chip shall comply with the requirements of Table 4 below.

Table 4: Particle Size Distribution of Grades 5 and 6 Chip

Sieve Size (mm)	Percentage Passing Sieve	
	Grade 5	Grade 6
13.2	100	-
9.5	95 - 100	100
6.7	-	95 - 100
4.75	0 - 8	-
2.36	0 - 2	0 - 15
0.300	0	0 - 8

6. COMPLIANCE

Before commencement of supply, the aggregate producer must submit proof of compliance.

Documentation must be provided in accordance with clauses 4 and 5, in addition to the producers' quality plan. Source rock must comply with the requirements of clause 4, and production properties must comply with the appropriate requirements of clause 5 at all times.