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CRN CP 241

Civil

BALLAST

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1. Scope and application

This Specification sets out requirements for the purchase of railway ballast.

It is applicable for ballast material used on the Country Regional Network (CRN) to meet the requirements of CRN Engineering Standard CRN CS 240– Ballast.

2. References

2.1. Australian and International Standards

AS 2758.7	Aggregates and rock for engineering purposes Part 7: Railway ballast
AS 1141	Methods for Sampling and Testing Aggregates
AS 1289.4.4.1	Methods of testing soils for engineering purposes - Soil chemical tests - Determination of the electrical resistivity of a soil - Method for sands and granular materials

Unless otherwise specified, all references relate to the latest standard versions, including amendments and relevant superseding standards.

2.2. CRN documents

CRN CS 240	Ballast
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2.3. Other references

Nil

2.4. Definitions

For the purpose of this document, the definitions in AS 2758.7 apply.

3. Sampling and testing

Unless otherwise specified below sampling and testing shall be carried out in accordance with the requirements of AS 2758.7 and the AS 1141 series of Standards.

The UGL Regional Linx Country Regional Network (UGLRL CRN) Officer or nominated delegate arranging supply of ballast shall obtain certification from suppliers for all new ballast supplied from:

- Quarries not previously used for the supply of Railway Ballast to this specification.
- Existing quarries used for the supply of Railway Ballast to this specification where the material being quarried changes.

An independent party who shall be an approved member of the National Association of Testing Authorities (NATA) shall carry out the sampling and testing. Certification shall include documentation that the ballast has been sampled and tested in accordance with, and meets the requirements of this specification. The test report from the sampling and testing authority shall be submitted to UGLRL CRN, even where this specification is not met. The sample testing shall be obtained from the point of delivery and/or at the source of the supply.

For product approval from new suppliers or material sources:

Sample testing shall be undertaken for all tests specified in Sections 4 and 5.

During normal production

Sample testing shall be obtained from the point of delivery and/or at the source of the supply and shall be undertaken with following frequency:

- For the first 500t, of ballast delivered, carry out the tests specified in Sections 4.1 to 4.9
- Every 5,000t, carry out the tests specified in Sections 4.1 to 4.9
- Every 5,000t distributed to track circuited (signalled) tracks, carry out the tests specified in Section 10
- Every 12 months, carry out a petrographic analysis for deleterious material as specified in Section 5.

UGLRL CRN shall be provided access to inspect ballast production facilities and the source of rock being quarried and may require additional sampling and testing where UGLRL CRN suspects that the material is not to specification.

4. Requirements

The supply of railway ballast shall be in accordance with AS 2758.7 unless otherwise specified in this document.

The following specific requirements shall apply:

4.1. Bulk density

When determined in accordance with AS 1141.4 the compacted bulk density of ballast material shall not be less than 1,400 kg/m³.

4.2. Flakiness index

When determined in accordance with AS 1141.15 the proportion of flaky particles in the ballast material retained on the 6.70 mm test sieve shall not exceed 30%.

4.3. Aggregate crushing value

When determined in accordance with AS 1141.21, the aggregate crushing value of the fraction of ballast material passing the 26.5 mm test sieve and retained on the 19.0 mm test sieve, shall not exceed 25%.

NOTE: The aggregate crushing value test may be conducted on the fraction of material passing the 53 mm sieve and retained on the 37.5 mm sieve. In this case the aggregate crushing value of the ballast material, determined in accordance with AS 1141.21, should not exceed 30%.

4.4. Wet attrition value

When determined in accordance with AS 1141.27, the wet attrition value of the ballast material for the fraction of material passing the 53.0 mm test sieve and retained on the 37.5 mm test sieve shall not exceed 6%.

Material having a wet attrition value in excess of the requirements may be accepted provided the corresponding aggregate crushing value does not exceed the requirement and is endorsed by Principal Track and Civil Engineer

4.5. Los Angeles Value

When tested in accordance with AS1141.23 to an F or G grading, the Los Angeles value shall not exceed 25%.

4.6. Weak particles

The percentage of weak particles, when tested according to the procedure set out in AS 1141.32, shall not be greater than 5%.

4.7. River gravels

River gravel or crushed river gravel shall not be used as railway ballast.

4.8. Material finer than 75µm

The percentage of materials finer than 75µm, when tested according to the procedure set out in AS 1141.12, shall not be greater than 1% (except for Graded Aggregate where the percentage shall not exceed 5%).

4.9. Particle size distribution

The particle size distribution (grading) of ballast aggregates, when determined in accordance with AS 1141.11 and AS 1141.12, shall conform to the requirements set out in CRN CS 240

4.10. Ballast electrical resistivity

To meet electrical resistance requirements necessary for the satisfactory operation of signalling track circuits, ballast shall demonstrate an electrical resistivity greater than 60 ohm.m when tested in accordance with AS 1289.4.4.1.

4.11. Delivery

Graded ballast material shall be handled at the producing plant in such a manner that it is kept clean and free from segregation. Vehicles used for transportation shall be clean and free from rubbish and substances that may foul or damage the ballast.

Discharge from plant, loading of trucks, delivery and building and maintaining stockpiles shall be carried out in a manner which effectively avoids segregation and contamination with other materials. The movement of machinery over the stockpiled ballast shall be limited to minimise degradation.

Any ballast delivered directly from quarry stockpiles shall have been accepted according to the requirements of this specification prior to delivery to railway wagons.

5. Alternative materials

5.1. General

In addition to meeting the requirements of Section 4 of this specification, material from new sources of supply shall be subject to petrographic and petrological analysis in accordance with the requirements of AS 1141.26 to evaluate for deleterious materials.

Igneous or other rock, displaying minerals considered to be harmful to the overall performance of the ballast may be rejected following petrographic analysis or durability testing, even though the rock complies with other sections of the specification.

5.2. Crystalline silica

Exposure to crystalline silica dust can cause serious, long term health effects. Two factors are important in determining the likelihood that this will occur: particle size and the presence of crystalline silica.

In order to provide practical, effective management by UGLRL CRN of potential silica dust exposure of its workers when handling rail ballast, material from new and existing sources of supply shall be subject to the following requirements:

- Percentage of material passing 75 micron sieve shall be less than 1% when tested in accordance with Section 4.7.
- Percentage of SiO₂ in material samples shall be less than 35% when tested in accordance with AS 1141.26.

The ballast supplier shall provide a Safety Data Sheet covering its product for consideration in the UGLRL Activity Method Statement and Task Risk Assessment Briefing for the safe handling of the product.

6. Additional tests

Additional tests for other properties may be specified. These tests may include chemical reactions, electrolytic reactions, electrical conduction and others.

7. Documentation required

Documentation required for each of the required tests listed in this document and in AS 2758.7 shall be provided in accordance with the relevant Australian Standard.

8. Ballast production

UGLRL CRN shall be provided access to inspect ballast production facilities at any unscheduled time during normal working hours for the purpose of:

- Observing sampling and testing procedures.
- Review plant and ballast production facilities.
- Carry out any additional sampling and testing.