



A Division of Transnet SOC Limited

TTM (TRACK TECHNOLOGY) SPECIFICATION

S406 BALLAST SPECIFICATION

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SUMMARY VERSION CONTROL

VERSION NO.	NATURE OF AMENDMENT	PAGE NO.	DATE REVISED
1.0	New Document		1998
2.0	Additions of scope and references	3	2016
2.0	Addition of Sampling of aggregates and Preparation of test samples of aggregates methods.	4	2016
3.0	Alignment of sieves sizes to SANS method	6	2018
3.0	Alignment of 4 tests to SANS methods (Grading, Flakiness Index, LAA and Durability)	4	2018
4.0	Change on front page	1	2021

1. Scope

This specification covers all the technical requirements that are expected of testing ballast stone. This specification must be used by authorised and competent personnel in order to produce quality results that are satisfactory to all parties involved. Stone for ballast shall comply with the SANS Specifications.

2. References

- SANS 195
- SANS 197
- SANS 3001
- SANS 5847

3. Definitions

3.1. Ballast

A type of stone used in railway construction to provide bedding for the sleepers and rails.

4. Background

Ballast has its own characteristics and are as follows: it must be angular, hard and uniformly graded. Weak ballast breaks easily which as a result compromises all its functions. Table 1 contain tests that are conducted in order to determine all the characteristics of each sample before the ballast can be used on Transnet lines/tracks.

The functions of ballast are:

- To resist track forces
- To provide void storage
- To provide resiliency
- To assist in drainage
- To absorb airborne noise
- To provide electrical resistance between rails

5. Technical Requirements

The following table contains the test methods and the S406 specification requirements:

Table 1: For Ordinary (N1, N2 and N3) and Heavy haul (S1) lines

Parameter	Test Method	Passing criteria
Sampling of aggregates	SANS 195:2006	
Preparation of test samples of aggregates	SANS 197:2006	
Particle size analysis of aggregates by sieving	SANS 3001-AG1:2014 Edition 1.2	Table 1 (N1, N2 & N3) for Ordinary lines Table 2 (S1) for heavy lines
Determination of the flakiness index of coarse aggregate	SANS 3001-AG4:2015 Edition 1.2	<30%
Determination of the ethylene glycol durability index for rock	SANS 3001-AG14:2013 Edition 1	<1.5
Abrasion resistance of coarse aggregates (Los Angeles machine method)	SANS 5846:2006 Edition 2	<22%
Void Content	TQM-BLL-STM 2	>40%
Absorption of Aggregate	TQM-BLL-STM 3	<1%
Mill Abrasion	TQM-BLL-STM 5	<7%
Weathering(Soundness)	TQM-BLL-STM 6	<5%
Relative Density	TQM-BLL-STM 7	>2.5

Particle size analysis of aggregates by sieving shall comply with the following tables:

Table 2: For Ordinary lines (N1, N2 and N3)

Nominal aperture size of sieve (mm)	% by mass passing
63.0	100
50.0	90-100
37.5	40-70
28.0	10-30
20.0	0-5
14.0	0-1

Table 3: For heavy axle lines (S1)

Nominal aperture size of sieve (mm)	% by mass passing
73.0	100
63.0	90-100
50.0	40-70
37.5	10-30
28.0	0-5
20.0	0-1
14.0	0