SPOORNET

S406 (1998)

SPECIFICATION FOR THE SUPPLY OF STONE

CONTENTS

1. GENERAL

1.1 Stone for road pavement layers, concrete and ballast shall comply with SABS 1083 (latest revision). In addition, concrete and ballast stone shall comply with the requirements specified hereinafter. Acceptance of the stone shall also depend on a full petrographic analysis to identify any microfissuring, weaknesses and/or the presence of undesirable minerals that could lead to early degradation.

2. CONCRETE STONE

2.1 In the soundness test described in Appendix A, the loss in mass shall not exceed 5% after 10 cycles of the tests.

2.2 The Los Angeles abrasion value, determined in accordance with ASTM C 131 89 grading B, shall not exceed 30% for concrete subject to abrasion and 35% for any other concrete.

2.3 The relative density shall not be less than 2.5 or more than 3.1.

3. BALLAST STONE

3.1 In the soundness test described in *Appendix A*, the loss in mass shall not exceed 5% after 20 cycles of the test.

3.2 No doleritic stone shall be found to be broken when conducting the durability test described in *Appendix B*.

3.3 The Los Angeles abrasion value determined in accordance with ASTM C 131 - 89 grading B, shall not exceed 22%.

3.4 The plasticity index on the fines developed from the Los Angeles abrasion test shall be less than 6.

3.5 Flakiness index, measured in accordance with SABS 1083 (latest revision) shall not exceed 30%.

3.6 Voids measured in accordance with SABS 1083 (latest revision) shall not be less than 40%.

3.7 The relative density shall not be less than 2.5.

3.8 Grading shall comply with the following:

For ordinary lines (N1, N2& N3)

Nominal aperture size of sieve mm	% by mass passing
63.0	100
53.0	90-100
37.5	40-70
26.5	10-30
19.0	0-5
13.2	0-1

For heavy axle lines (S1,)

Nominal aperture size of sieve mm	% by mass passing
73.0	100
63.0	90-100
53.0	40-70
37.5	10-30
26.5	0-5
19.0	0-1
13.2	0

3.9 The Mill Abrasion value, determined according to test procedure described in *Appendix C*, shall not exceed 7%.

TRANSNET LIMITED

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SPECIFICATION FOR STONE

APPENDIX A

TEST FOR SOUNDNESS OF STONE (SODIUM SULPHATE METHOD)

A1 TEST SOLUTION

Prepare a saturated solution of anhydrous Na SO or crystalline Na SO. 10H 0 is distilled or demineralised water between 33 °C and 35 °C. Use sufficient of the salt to give excess crystals after thorough stirring. Cool to between 22 °C and 24 °C and keep at this temperature for at least 16 h. Stir thoroughly before use.

A2 PREPARATION OF TEST SPECIMEN

From a representative sample of stone take a random specimen of at least 500 g passing a 19 mm and retained on a 13,2 mm sieve. Wash the specimen to remove all adhering material. Dry at 105 °C in a well ventilated oven and determine the mass after cooling. Continue drying until the decrease in mass after each of 2 successive drying periods of 4 h does not exceed 0,1 % of the total mass. Let this mass be M1.

A3 PROCEDURE

A3.1 Place the specimen in a porcelain dish and cover fully with test solution between 20 °C and 25 °C for 7 h. Decant the solution taking care that no stone is lost.

A3.2 Dry the specimen for 15 h at 105 °C. Allow the specimen to cool for 2 h. This completes one cycle of the soundness test.

A2.3 Repeat the cycle described in A3.1 and A3.2 as often as specified. After every fifth cycle, wash the specimen on a 1,70 mm sieve with hot water until no crystalline sodium sulphate is visible and continue the test with material retained on a 1,70 mm sieve.

A3.4 After completion of the final cycle, wash the specimen in hot water until the washings are free of sodium sulphate. Dry the specimen to constant mass and screen on a 1,70 mm sieve. Let the mass retained on the sieve be M2.

A4. LOSS

Calculate the percentage loss in mass from the formula.

$$\frac{(M1 - M2) \times 100\%}{M1}$$

APPENDIX B

DURABILITY TEST FOR BALLAST STONE

B1. Preparation of test specimens

From a representative sample of ballast stone take at random 100 stones passing a 53.0 mm and retained on a 26.5 mm sieve. Wash the stones to remove all adhering material. Dry the stones at 105°C in a well ventilated oven and determine the mass after cooling. Continue drying until the decrease in mass after each of 2 successive drying periods of 4 h does not exceed 0.1% of the total mass.

B2. Procedure

Place the 100 stones in a suitable container and cover with ethylene glycol between 18° and 25°C for 20 days. Determine the number of stones that have broken, or can be broken by hand.

APPENDIX C

Mill abrasion test

1. Test method

1.1 Prepare a test sample of the ballast under test, consisting of 1.5 kg each of the following two particle sizes:

<37.5 mm >26.5 mm and <26.5 mm >19 mm.

The particles shall be washed and oven-dried to a constant weight before it is weighed and tested.

(Wo = the total weight of sample)

1.2 Place the sample in the porcelain mill pot and add 3 litres of distilled water. Ensure that the cork washer is correctly in position before tightening the lid securely.

1.3 The mill pot is placed in a horizontal position on the two rollers of the test apparatus with the lid on the side of the electric motor in order that the counter's sensor is activated with each revolution of the mill pot.

1.4 The mill pot shall be rotated at 33 r.p.m. for a total of 10 000 revolutions.

1.5 The sample shall then be wash-sieved through a 9.5 mm sieve placed on top of a 0.075 mm sieve and then oven-dried to a constant weight.

1.6 Record the dry mass of the material on the sieves:

W1 = mass of material on 9.5 mm sieve.

W2 = mass of material on 0.075 mm sieve

2. Evaluation method

Calculate the following abrasion value:

$$MA = \frac{Wo - W1 - W2}{W0} * 100 = \text{Mill Abrasion value.}$$