

# ALBERTA TRANSPORTATION

## TECHNICAL STANDARDS BRANCH

B392 - JULY 2000

### SPECIFICATION FOR SEED AGGREGATES USED IN POLYMER MEMBRANES AND OVERLAYS

#### 1.0 GENERAL

#### 1.1 INTRODUCTION

This Specification is for the supply of seed aggregate to be used in "Resurfacing of Bridge Decks with Polymer Membrane and A.C.P. Wearing Surface (B386)", and "Non-Skid Polymer Overlay" (Section 15).

The seed aggregate, when applied to the polymer, shall create a durable polymer-aggregate composite that exhibits thermal compatibility and waterproofing ability. When used with polymer membrane the aggregate shall also provide a bond between the membrane and the asphaltic concrete wearing surface. When used in a non-skid polymer wearing surface the aggregate shall provide acceptable abrasion and skid resistance. The aggregate shall be gap graded, clean and free of deleterious substances and have the properties listed below.

#### 1.2 CLASSIFICATION OF SEED AGGREGATES

Seed aggregates shall be mined and manufactured by crushing hard rock.

#### 2.0 QUALIFYING TESTS

The Manufacturer shall engage an independent engineering testing laboratory for the purpose of sampling the aggregate, and completing the qualifying tests at his own expense. The results of the qualifying tests shall be submitted to the Engineer, for review.

#### 2.1 SAMPLING

The sample of aggregate submitted for testing shall accurately represent the seed aggregate material, and shall comply with ASTM D75 except that the sample size shall be 40 kg.

## 2.2 GRAIN SIZE DISTRIBUTION

Grain size distribution shall be tested in accordance with ASTM C136, "Sieve Analysis of Fine and Coarse Aggregates", and shall meet the gradation requirements shown below.

### GRADATION REQUIREMENTS SIEVES

US Standard Designation	Metric Designation	% Retained
#6	3.35	0 – 3
#8	2.36	70-97*
#10	2.00	
#12	1.70	
#20	0.85	3-20
Passing #20	0.85	0-3

\* Combined #8, #10 and #12

## 2.3 COMPRESSIVE STRENGTH

The compressive strength of the rock, when tested in accordance with ASTM C170 Compressive Strength of Dimension Stone , shall not be less than 200 MPa.

## 2.4 SPECIFIC GRAVITY AND ABSORPTION

The bulk specific gravity shall be greater than 2.6, and absorption shall be less than 1.5% when tested in accordance with ASTM C128, "Specific Gravity and Absorption of Fine Aggregate".

## 2.5 ABRASION

The aggregate loss shall be less than 12% when tested in accordance with ASTM C131, "Standard Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact" in the Los Angeles machine, Grade "D".

## 2.6 SOUNDNESS

The soundness of the aggregate, when tested according to ASTM C88, "Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate", shall be 2.0% maximum loss using Sodium Sulfate.

## **2.7 HARDNESS**

The aggregate shall have a minimum Mohs hardness of 6.0.

## **2.8 VOID SPACE**

The minimum void space produced by the aggregate, when tested in accordance with ASTM C29/C29M, "Standard Method for Unit Weight and Voids in Aggregate", shovelling procedure, shall be 47%.

## **2.9 CHEMICAL ANALYSIS**

The aggregate shall be tested for the percentage of the following chemical compositions:

- X silica ( $\text{SiO}_2$ )
- X aluminum oxide ( $\text{Al}_2\text{O}_3$ )
- X iron oxide ( $\text{Fe}_2\text{O}_3$ )
- X magnesium oxide ( $\text{MgO}$ )
- X calcium oxide ( $\text{CaO}$ )

The aluminum oxide ( $\text{Al}_2\text{O}_3$ ) shall not be less than 10%.

## **2.10 COLOUR TEST**

The colour plate number, when tested in accordance with ASTM C40, "Organic Impurities in Fine Aggregates for Concrete", shall not be greater than 1.

## **2.11 FRACTURE FACE COUNT**

The fracture face count shall be 97% for 2 or more fractured faces when tested in accordance with California Transportation Test Method No. Calif. 205.

## **2.12 MOISTURE CONTENT**

The moisture content shall be less than 0.3% when tested in accordance with ASTM D2216. "Laboratory Determination of Water Content of Soils, Rock, and Soil Aggregate Mixtures".

## **2.14 ABSORBED ENERGY**

Cylindrical specimens (75 mm by 150 mm) shall be made in accordance with ASTM C192 using Flexolith polymer resin at an aggregate to polymer ratio of 2.5 to 1 by volume, and tested in accordance with ASTM C39 at an age of 7 days. The absorbed energy at point of failure obtained from the area under the stress-strain curve shall not be less than 8.0 MPa.

### **3.0 EVALUATION OF AGGREGATE**

To further evaluate the product, the Manufacturer shall provide a list of projects where the material has been in service for at least 5 years, and shall include performance data, traffic volumes, and the clients' names and phone numbers.

The aggregate shall meet or exceed all qualifying tests, and shall perform adequately in the field. The Engineer will continue to evaluate performance over a two-to five-year period. Approval of the aggregate will be conditional only; unsatisfactory performance, whether short term or long term, shall be grounds for withdrawal of the approval.

### **4.0 ADDITIONAL REQUIREMENTS**

#### **4.1 PACKAGING**

Seed aggregate shall be packaged in tear resistant and moisture resistant bags, which filled, do not exceed 50 kg.

#### **4.2 QUALITY CONTROL**

The Manufacturer shall be responsible for quality control of the product. He shall sample and test the aggregate as necessary during production to ensure that all aggregate conforms to these specifications, and is consistent with the sample of material that was tested and approved.

#### **4.3 CONFIRMING AGGREGATE QUALITY**

The Contractor shall engage an approved independent engineering testing laboratory to take aggregate samples from the delivered aggregate, and to provide aggregate analyses of the grain size distribution and moisture content to confirm compliance with these specifications prior to commencement of work. The bagged aggregates will be separated into lots of 800 kilograms each and one properly identified sample shall be taken and analysed from each lot. Failure of the sample to meet the aggregate specifications will result in the entire 800 kilogram lot represented by that sample being rejected. The Engineer may request additional aggregate tests.

### **5.0 RIGHT TO REJECT**

The Department reserves the right to run laboratory tests, reject material, and withdraw approval of the aggregate should it not meet the requirements of the specification.

The material shall meet or exceed all qualifying tests, and shall perform

adequately in the field. Unsatisfactory performance, whether short or long term, shall be grounds for withdrawal of the approval.

## **6.0 LABORATORY TEST REPORT**

The report prepared by the testing laboratory shall include all the results of the qualifying tests.

The test results shall be submitted by the Manufacturer to:

Alberta Transportation  
Technical Standards Branch  
2<sup>nd</sup> Floor, Twin Atria Building  
4999 - 98 Avenue  
Edmonton, Alberta T6B 2X3  
Attention: Dave Besuyen, Bridge Materials Engineer  
Telephone: (780) 415-1037 ; Fax: (780) 422-5426