

SPECIFICATIONS FOR AGGREGATE FOR GRANULAR BASE COURSE

## 900. 1 SCOPE

These Specifications govern all operations necessary for and pertaining to the production of aggregate for granular base course.

## 900. 3 MATERIALS

## 3.1 Source of Supply

The Contractor shall provide the Engineer with at least six days advance notice of;

- his intention to commence the production of aggregates,
- the source of all aggregates to be used on the project including supplementary granular material.

At the request of the Contractor, the Department will test representative aggregate samples obtained from the source of supply. Each sample shall contain no less than 45kg and the Contractor shall assume all costs incurred in obtaining and transporting the samples to the Department's Testing Laboratory.

Test results for gradation and physical properties will be provided but will not constitute acceptance of material in the source of supply.

Prior to the production of aggregates, the source of supply shall be cleared, grubbed and stripped of overburden to an extent and in a manner satisfactory to the Engineer.

## 3.2 Aggregate Requirements

Aggregate and supplementary granular material shall consist of sound durable particles of crushed rock, gravel, stone, sand and fines free from sod, roots and organic material.

The crush count is the percentage by weight of aggregate particles retained on a 4.75mm sieve which are not shale or ironstone and which have at least one freshly fractured face.

The Los Angeles Abrasion Loss on granular base course aggregate will be based on the total sample submitted.

Shale Content is the percent by weight of the particles retained on a 4.75mm sieve that are shale particles.

Clay balls are the percent by weight of particles retained on a 12.5mm sieve that are clay particles.

The aggregate shall be well-graded and shall not vary from maximum to minimum of the specification ranges for consecutive tests.

For Class "A" gravel base course, the field tests taken during any crushing shift shall yield an average of 65% or lower passing the 4.75mm sieve.

For Quarried Limestone, a maximum of 7% clean fine sand or any quantity of limestone fines may be added to achieve the required gradation.

900 3.2 Aggregate Requirements

The requirements for each Class will be as follows:

Granular Base Course					
Passing Standard Sieves	Class "A"		Class "B"	Class "C"	
	Gravel	Limestone	Gravel or Limestone	Gravel	Limestone
37.5mm sieve	100%	100%	100%	100%	100%
25mm sieve	80 – 100%			85 – 100%	
19mm sieve					
16mm sieve	40 – 70%	35 – 70%	30 – 75%	25 – 80%	25 – 80%
4.75mm sieve	25 – 55%		25 – 65%		
2mm sieve	15 – 30%	10 – 30%	15 – 35%	15 – 40%	
425um sieve	8 – 15%	8 – 17%	8 – 18%	8 – 18%	8 – 20%
75um sieve					
Minimum Crush Count	35%	100%	25%	15%	100%
Maximum					
a) Los Angeles Abrasion Loss	35%	35%	35%	40%	40%
b) Shale Content	12%		12%	20%	
c) Clay Balls	10%		10%		

On testing Class "A" and Class "B" granular base course, oversize retained on the upper sieve will be permitted to a maximum of 3% of the sample, but only if 100% of the oversize will pass a sieve having openings 3mm larger than the upper sieve.

3.3 Binder Material

Binder material is any approved material which has 100% passing a 100mm sieve, a minimum of 75% passing the 425um sieve, a liquid limit not greater than 50 and a plasticity index not less than 10.

3.4 Mix Design

At least five working days prior to producing any clay stabilized Class "A" or Class "B" gravel base course aggregate, the Contractor shall provide:

- Five samples of the additive from each source which is to be used as binder clay or a supplementary material,
- A 75kg sample of crushed aggregate from the proposed aggregate source. The maximum size of screen to be used on the crusher shall be 25mm.

The Department will provide a mix design to ensure that the base course aggregate will meet plasticity and grain size requirements.

The mix design will be field adjusted and will determine;

- The percentage of additive to be used,
- The minimum percentage of the combined product passing the 75um sieve,
- The dust ratio range of the combined product. The dust ratio is the percentage passing the 75um sieve divided by the percentage passing the 425um sieve.

### 900. 3.5 Plasticity Index and Grain Size Requirements

When Binder Material is a bid item, the following requirements shall apply to Class "A" and Class "B" gravel base course;

- Shall have a grain size.
- Plasticity index shall not exceed 6.

Grain size is defined as a clay bound base course having a clay content exceeding 2.8% and a clay to fine sand ratio between .25 and .65.

When the mix design indicates that the crushed aggregate sample submitted has the required gradation and grain size, the addition of binder clay will not be required.

### 3.6 Emulsified Asphalt as a Binder

Procedures for the use of emulsified asphalt and the quantity to be added shall be as set out in the Specifications for Granular Base Course.

### 3.7 Conditions of Payment

The Contractor will be paid for Binder Material and Binder Material Haul providing the following conditions are met;

- the binder material meets the requirements of Section 3.3.
- The binder material is hauled by truck.
- The gravel base course meets the requirements of Section 3.2, 3.5.

Where the Contractor can supply a supplementary material with a P.I. greater than 2 and less than 10, which when added to the raw aggregate results in a base course satisfying the requirements of sections 3.2 and 3.5 of this specification and it is mutually beneficial, the Contractor will be paid for binder material haul on that supplementary material. The supplementary material will not be paid for.

## 900. 5 PRODUCTION METHODS

### 5.1 General

Granular base course aggregate shall be produced by crushing.

Binder material and supplementary granular material shall, when necessary, be supplied by the Contractor and incorporated in to the base course aggregate during processing.

### 5.2 Adding Binder Material

The Contractor shall stockpile binder material separately and have a waterproof covering to protect the material. The binder material shall be added uniformly to the pit material by means of a belt type conveyor immediately prior to entering the crusher.

The Engineer may allow binder material to be premixed with rock or granular material prior to being fed by belt into the crusher.

### 5.3 Adding Supplementary Granular Material

Supplementary granular material for use in Class "A" and Class "B" granular base course shall be stockpiled separately and added uniformly to the pit material by means of a belt type conveyor immediately prior to entering the crusher.

**900 5.3 Adding Supplementary Granular Material**

Where supplementary granular material is too coarse to be fed by belt it shall be added to the pit material in such a manner that the processed material is within the specified gradation. Mixing coarse supplementary granular material with the pit material may be necessary to ensure uniformity.

The supply and addition of supplementary granular material will be considered as an incidental operation to "Granular Base Course".

**5.4 Adding Combined Material**

The mix design may indicate that both a supplementary material passing a 425um sieve and a binder material are required. In this case, the Contractor will be permitted to blend the two aggregates together using a loader or other approved equipment providing a uniform product is achieved. The combined material shall be added uniformly to the pit material by means of a belt type conveyor immediately prior to entering the crusher.

**5.5 Winter Crushing**

The Contractor may elect to crush base course aggregate during the winter. Any product of winter crushing not meeting the requirements for the specified type of material shall be re-processed when conditions permit. Binder, supplementary granular or combined material shall be added uniformly to the winter crushed aggregate, by means of a belt type conveyor, immediately prior to entering a pugmill or other approved mixing unit.

**900. 6 STOCKPILING**

The Specifications for Stockpiling Aggregate will be applicable in the stockpiling of granular base course aggregate.

**900. 8 TESTING**

Granular base course aggregate will be subject to testing by the Engineer at the time the material is being produced and after being laid on the road. Before hauling, the Contractor shall place the processed aggregate in a stockpile, until satisfactory production tests have been completed. Rejected material shall be immediately moved to the vicinity of the feed end of the crusher for re-processing or to an area completely removed from any approved aggregate. When tests taken during two regular crushing shifts indicate consistently uniform aggregate that is within gradation limits, direct hauling of Class "C" granular base course from the crusher to the road or direct hauling of any base course to stockpiles will be permitted.

**8.1 Testing Previously Prepared Aggregate**

The Engineer may approve previously prepared base course aggregate. The Contractor shall, unless otherwise permitted, pass material uniformly over a belt to provide representative samples for testing. On the basis of the tests, the Engineer may permit the Contractor to use the aggregate.

**8.2 Sampling Device**

**Crushers shall be equipped with an approved mechanical sampling device for obtaining samples off the main delivery belt. Crushers operating secondary delivery belts require a second approved mechanical sampling device.**

900. 9 METHOD OF MEASUREMENT

9.1 Binder Material

Binder Material used in the mix will be measured in tonnes, or if approved by the Engineer, may be calculated by volume conversion to weight from truck box measurements.

9.2 Binder Material Haul

There will be a free haul distance of 2km for binder material haul.

The quantity of Binder Material Haul in tonne kilometres will be the quantity of Binder Material in tonnes, multiplied by the distance in kilometres from the source of supply to within 2km of the location of the crusher or mixing plant where the binder material is added to the base course material.

Distances will be measured to the nearest 0.1 kilometre and will be based on the shortest possible route as determined by the Engineer, using Provincial Roads and Provincial Trunk Highways where practical.

9.3 Unused or Rejected Binder Material

The weight and haul of any unused or rejected binder material will be determined to the satisfaction of the Engineer and the quantities will not be included in the final payment.

900. 11 BASIS OF PAYMENT

11.1 Binder Material

The unit price per tonne for "Binder Material" will be payment in full for supply, free haul, and the addition of binder material, and for performing those operations necessary or incidental thereto.

11.2 Binder Material Haul

The Contractor will be partially compensated for binder material haul beyond the free haul distance at the following rates:

- \$0.06 per tonne per kilometer for hauls up to 20km.
- \$0.055 per tonne per kilometer for any portion of the hauls from 20 to 40kms.
- \$0.045 per tonne per kilometer for any portion of the haul over 40kms.