

SECTION 315

SELECTED GRANULAR BASE COURSE

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315.01 SCOPE

This specification covers the requirements for the supply and placing of Selected Granular Base Course Granular "A", Granular "B", Granular "C" and Maintenance Grades No. 1, No. 2 and No. 3, included as an integral part of these requirements are the provisions of Section 310.

315.02 MATERIALS

315.02.01 Physical and Gradation Requirements

The granular materials shall be composed of clean, hard, uncoated particles and shall be free from organic matter. **Material shall contain no more than 1.0% clay lumps nor 1.0% combined deleterious materials such as shale, slate, ochre and schists.**

Materials shall conform to the gradation requirements given in Table 1 and to the physical requirements given in Table 2. The gradation shall not show marked fluctuations from opposite extremes of the limiting sizes, and the plotted curve shall flow in a manner free from acute changes in direction. Granular "A", Granular "B" and all Maintenance Grades materials shall be processed by crushing and, when necessary to eliminate surplus fines passing the 4.76 millimetre sieve, be screened and washed.

Crushing of Granular "C" materials shall not be required except where the Contractor elects to crush any oversize particles as an alternative to screening.

Materials from deposits acceptable as to the quality of the particles, but deficient in sizes to provide the required gradation, may be accepted if the Contractor furnishes and satisfactorily incorporates into the material supplementary sizes from other sources to produce the required gradation. If the deficiencies occur in Granular "B" or Granular "C" materials, corrections may be attempted by crushing to a smaller maximum particle size. In that event, the Department will furnish special gradation limits based on the actual maximum particle size.

Materials shall be considered unsuitable, even though particle sizes are within the specified gradation limits, if particle shape or any other characteristic precludes satisfactory compaction or fails to provide a roadway suitable for traffic. If, in the opinion of the Owner's Representative, an improved particle shape can be achieved by using a different crushing unit from that proposed by the Contractor, then the Contractor shall supply and use a crushing unit of the type directed by the Owner's Representative.

315.02.02 Recycled Asphalt Pavement (RAP)

The Contractor will be permitted to use RAP in Granular "B". The Recycled Asphalt in the mixture of virgin Granulars plus RAP will be limited to a maximum of 30% under the asphalt and 50% in the granular shoulders. The quality and gradation of the virgin Granulars and the mixture of RAP and virgin materials shall meet the requirements for Granular "B", when tested individually. In areas where only surface course asphalt is to be applied, as an overlay, the Contractor will be permitted to use all RAP (100%) in the

granular shoulders. In this case, the RAP shall not contain material larger than 5 centimetres in diameter.

The Contractor shall provide the Department with a minimum 30 day notice of their intention to use RAP. The Department reserves the right to accept or reject any particular source of RAP, irrespective of its quality.

TABLE 1
Gradation Requirements

Sieve Sizes	Percent Passing By Dry Weight			Maintenance Grades		
	Granular "A"	Granular "B"	Granular "C"	No. 1	No. 2	No. 3
101.6 mm			100			
76.1 mm						
50.8 mm		100	75-100			
25.4 mm		50-100			100	100
19.0 mm	100			100		
15.9 mm						
9.51 mm	50-80			55-80	55-80	55-80
4.76 mm	35-60	20-55	20-55	35-60	35-60	35-60
1.20 mm	15-35	10-35	10-35	15-35	15-35	15-35
300 µm	5-20	5-20	5-20	7-20	5-20	5-20
75 µm	2-6 (Pit Source)	2-6 (Pit Source)	0-12	6-10	3-10	6-10
	2-8 (Rock Source)	2-8 (Rock Source)				

1. 1 µm = 0.001 millimetres
2. If not available, the 80 µm sieve may be substituted for the 75 µm.
3. The percentage of material finer than the 75 µm sieve shall be determined by ASTM C117.
4. Where Granular "A" and Granular "B" materials are produced from natural gravel deposits, a maximum of 6% passing the 75 µm sieve shall be permitted.
5. Where Granular "A" and Granular "B" materials are produced from quarried rock, a maximum of 8% passing the 75 µm sieve shall be permitted.
6. Where 40% or more of other material is blended to a rock source for the production of granular materials, it shall then be treated as a pit source.

TABLE 2
Physical Requirements

Physical Test	Standards Designation	Granular "A"	Granular "B"	Granular "C"	Maintenance Grades		
					No. 1	No. 2	No. 3
Los Angeles Abrasion* (loss % Maximum)	C131 & C535	35	35	40	35	35	35
Percent Crushed (Minimum)**	D5821	50	50	-	50	50	50
Plasticity Index	D4318	0	0	0	0	0	0
Petrographic Number (Max.)	CSA 23.2	150	150	-	150	150	150
Micro-Deval Test for Fine Aggregate (% Maximum) – (EXCLUDING LABRADOR)	D7428	30	30	-	-	-	-
Micro-Deval Test for Fine Aggregate (% Maximum) – (LABRADOR ONLY)	D7428	25	25	-	25	25	25
Micro-Deval Test for Coarse Aggregate (% Max.) (EXCLUDING LABRADOR)	D6928	25	25	-	-	-	-
Micro-Deval Test for Coarse Aggregate (% Max.) (LABRADOR ONLY)	D6928	25	25	-	25	25	25

* For Granular "A", "B" and "C", the rates of the loss after 100 revolutions to the loss after 500 revolutions shall not exceed 0.280. **This physical property is not applicable to projects in Labrador.**

** The percent of crushed particles will be determined by examining the fraction retained on the 4.76 millimetre sieve and dividing the weight of the crushed particles by the total weight contained on the 4.76 millimetre sieve. Only pieces having one or more freshly fractured faces will be considered as crushed material. Pieces with only small chips removed will not be considered as crushed.

315.03 SAMPLING AND APPROVAL

In addition to the requirements for pit and quarry sampling and processed material sampling and approval, as set forth in Section 310, where materials are hauled directly from the source to the roadway, acceptance of the material, or rejection of the material shall be decided based on test results of samples taken from the roadways.

315.04 PREPARATION OF ROAD SURFACE

The Contractor shall prepare the road surface to the satisfaction of the Owner's Representative before commencing placement of any selected granular base course materials. Except for the special cases of preparation on an existing or a proposed shoulder, adjacent to existing pavement, the preparation of the road surface shall be carried out in accordance with Section 204, Section 206 and Section 301.

315.04.01 Preparation of Existing Shoulder When Recapping with Addition of Paved Shoulder

Where it is intended to recap existing pavement and simultaneously add a paved shoulder where a gravel shoulder existed before, then the Contractor shall prepare the existing shoulder prior to the placing of additional Granular "A" and paving. The preparation of the existing shoulder shall involve levelling followed by compaction.

315.04.02 Preparation of Existing Granulars Prior to Providing Gravel Shoulder on Previously Paved Area

Where existing pavement has been removed because it is intended to provide a gravel shoulder, the Contractor shall level off and compact the existing granulars prior to shouldering with additional selected granular base course.

315.04.03 Excavation of Existing Gravel Shoulder Prior to Butt Jointing Additional Pavement

Where it is intended to widen existing pavement by butt jointing new pavement against existing pavement, the existing gravel shoulder material shall be removed so that the new Granular "B" and Granular "A" may be placed in preparation for the new pavement.

The Contractor shall excavate the existing gravel shoulder to the depth needed to place the required thickness of Granular "B" and Granular "A". The excavated shoulder material shall be spread over the adjacent subgrade. The spread excavated shoulder material and the excavated shoulder shall be leveled and compacted.

315.05 PLACING SELECTED GRANULAR BASE COURSE ON ROAD

The Contractor shall place all granular bases in such a manner to prevent contamination by other materials and to prevent segregation. If, in the opinion of the Owner's Representative, the methods and techniques used by the Contractor cannot overcome contamination or segregation, then the Owner's Representative may direct a modification in the methods that may require the use of an approved spreader box or other acceptable device. All granular bases shall be placed in uniform layers such that the thickness of the compacted layer does not exceed 150 millimetres. This requirement may be waived if the Contractor can demonstrate to the complete satisfaction of the Owner's Representative, a method of placing and compacting thicker layers of materials such that the specified density is uniformly attained.

Prior to closing down operations for each working day, all granular materials shall be bladed and compacted to the specified compaction.

The materials shall be sprayed with water when and as directed by the Owner's Representative, either to aid compaction or reduce dust nuisance or both. When water is added to aid compaction, it shall be applied immediately ahead of the compacting unit.

Each layer of granular base shall be bladed, shaped and compacted as necessary to produce the required profile and cross section. The finished surface shall not deviate at any place on a 3 metre straight edge by more than 20 millimetres for Granular "B" and "C" and 10 millimetres for Granular "A". The upper layer shall be maintained to these tolerances and to the specified density upon completion of the contract, or until the surface is paved. This may require keeping the moisture content at the appropriate value during periods of dry weather in addition to regrading and recompacting as frequently as may be deemed necessary by the Owner's Representative.

Calcium chloride shall be applied uniformly by mechanical means when, and as directed by the Owner's Representative.

315.05.01 Special Requirement for Placing Granular Base Course Granular "A" on Paving Contracts

In paving contracts which also include the placing of Granular Base Course Granular "A", the Contractor shall so coordinate their granular base course Granular "A" placing operations and their paving operations such that, at any given time, no more than 3 km of granular base course Granular "A" treated unpaved road is subject to use by public traffic.

On roads used by public traffic where the Granular "B" was produced from a rock source, or if natural gravel source produced Granular "B" gives a rough driving surface, the Contractor shall place at least a portion of the Granular "A" over the Granular "B" to provide a smoother driving surface. The Contractor shall carry out their operations in such a way that no one place on the road has this type of Granular "B" left without a running surface of Granular "A", for more than 3 days.

315.06 SHOULDERING

The placing of granular materials for shoulder construction shall be carried out by means of an approved spreader. Spreaders shall consist of a box to hold shouldering material and a suitable mechanism to control the width and rate of application and to prevent materials getting onto the pavement.

Granular materials for shoulder construction shall be placed directly on the shoulder and any spillage and materials dragged onto the pavement surface shall be immediately removed, without damage to the pavement, and the area so affected shall be thoroughly cleaned by the use of a power broom or other suitable method.

The shoulders shall be sloped to the specified lines, grades and cross section.

Shouldering operations shall not commence along any section of pavement until 24 hours have elapsed from the time of completion of the final pavement course in that section, but the shouldering operations shall be completed within 7 days of the final pavement course on sections that are open to traffic.

315.07 **COMPACTION**

Compaction operations shall be carried out as closely as possible behind the placing and spreading operation. At the end of each working day, all materials placed shall be compacted to the specified density.

Material must be handled and compacted without segregating or adversely breaking down (such that its gradation falls outside the specified grading limits, as determined by sieve analysis on random samples of the compacted in place material). Frozen material shall not be incorporated into the work and material shall not be placed on a frozen roadbed.

Each layer of material shall be graded, compacted and verified prior to placing the next layer.

Water shall be applied as necessary to facilitate compaction in order to achieve the degree of compaction required. However, it shall not be added in such quantities that it seeps into the underlying subgrade or exceeds the optimum moisture content (as determined by ASTM D698 and ASTM D4718, as applicable) by 1.0%.

All Granular "A", Granular "B", Granular "C" and the Maintenance Grades materials placed on the roadway or on shoulders shall be based off the maximum dry density obtained by ASTM D698 and if applicable ASTM D4718 and shall be compacted to not less than 100% of the maximum Standard Proctor Dry Density.

Where necessary to obtain the required compaction, the Contractor shall apply sufficient water by means of an approved water truck with distributor.

315.08 **MEASUREMENT FOR PAYMENT**

Measurement for payment will only be made for those materials accepted for use under this specification.

Measurement for payment for Selected Granular Base Course materials may be by: the weight of material placed in the works, the nominal amount of the material placed in the works, or the amount of material stockpiled.

315.08.01 **Weight Measurement for Payment**

Where the unit of measurement for a particular type of Selected Granular Base Course material is stated in tonnes on the unit price table, then the material shall be weighed on scales. The weight shall be computed in tonnes, rounded to one decimal place.

The weighing of materials shall be in accordance with the requirements of Section 501. Only loads certified by the Department personnel as being placed in the works shall be included in the measurement for payment.

For quantities of Selected Granular Base Course material less than or equal to 1000 tonnes, the Department will measure the material in stockpile by cross sectioning, calculating the number of cubic metres and converting the quantities to tonnes if the Contractor so desires. A standard conversion factor of 2.0 tonnes per cubic metre will be applied for Selected Granular Base Course material measured in stockpile. For quantities of Selected Granular Base Course material greater than 1000 tonnes, the Contractor must provide weigh scales.

315.08.02 Volume Measurement for Payment

Where the unit of measurement for a particular type of Selected Granular Base Course material is stated in cubic metres on the unit price table, then the material shall be assessed for volume in accordance with the specification for stockpiling, select bedding or such other item as the case may be.

315.09 BASIS OF PAYMENT

Payment at the appropriate contract price for the particular type of Selected Granular Base Course shall be full compensation for all labour, materials, equipment-use and any other expenses. This may included expenses to provide a pit or quarry, obtain all required permits and approval, provide and transport pit or quarry samples to the Materials Engineering Division in St. John's, clear, grub and strip the pit or quarry, process pit or quarry materials to the gradation and physical requirements for the required type of material, provide and maintain a field laboratory, provide scales if required and construct and maintain access road to the source of the material. Also incidental is to provide for such prior reconditioning of the surface on which the selected granular base course is to be applied and which is required in accordance with Section 301, but which is not a pay item under that specification, provide all haulage of the material from the source to where the material is to be placed, place, spread, grade and compact the material, provide such watering of the material as is required, maintain the placed material to the required compaction and to the specified cross section and profile tolerances until completion of the contract, pay any royalties for the material, clean up and provide such other restoration to the pit or quarry and the stockpile site as may be required, together with any other work necessary to complete the contract item.

Moreover, where at shoulders minor grading work of the types described in 315.04.01, 315.04.02 and 315.04.03 is required, then payment at the contract unit price for Granular

"A" and Granular "B" shall also include compensation in full for all labour, materials and equipment-use to carry out the shoulder excavation, spreading, leveling and compaction as described.

Where instead of placing the required select granular materials, the Contractor had chosen, of their own choice, to place temporary fill material level with the finish grade, the Contractor shall excavate the fill material to make room for the select granulars, at their own expense. No payment will be made for the work of carrying out this excavation, or re-compacting the underlying materials. An example where this might occur would be in connection with the installation of a culvert across an existing paved road, and the Contractor chose in one operation to place temporary backfill right up the level of the pavement instead of placing backfill only to subgrade, and then placing the required select granulars.