

1010 MUNI **MATERIAL SPECIFICATION FOR AGGREGATE - BASE, SUBBASE, SELECT SUBGRADE AND BACKFILL MATERIAL**

1010.03 **Definitions**

Add in the following:

Delivery Sample means a random sample taken at the point of loading or discharge from delivery vehicles.

Production Property means an attribute or feature of an aggregate or soil material, including gradation that is introduced through the manufacturing process (i.e.: crushing, screening, blending etc.). Tests are carried out to measure the affects of the process on the material.

Add in the following section:

1010.04 **Design and Submission Requirement**

As requested by the Owner, the Contractor shall supply the Owner QC testing records, including but not limited to sieve analysis and Proctor Maximum Dry Density data for the aggregates to be used in the work.

1010.05.03.09 **Sand Bedding, Winter Sand, Mortar Sand, 6.35 mm Screenings, and 19 mm Stone**

These aggregates shall be composed of clean, hard, durable un-coated particles obtained from deposits of gravel or sand, talus rock, quarried rock, iron-blast furnace or blended nickel slag, clinkers, or other suitable granular materials.

They shall all conform to the same Gradation Requirements as outlined in Table 2A in GSSS 1010.

1010.08 **Quality Assurance**

1010.08.01 **General**

Delete the first paragraph in its entirety and replace with the following:

QA testing shall be carried out by the Owner for the purposes of ensuring that the aggregates used in the work are according to the requirements of the Contract Documents. Individual test results may be forwarded to the Contractor as they become available.

1010.08.03 **Sampling**

Delete in its entirety and replace with the following:

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1010.08.03.01**General**

The Contractor shall be responsible for obtaining duplicate aggregate samples in the presence of the Owner's representative and according to LS-625. For production property requirements, the sampling shall be delivery samples obtained from the work. For physical property requirements, the sampling shall be either delivery samples or pit source samples. When required, the Contractor shall provide a front-end loader to obtain the materials.

In the event that the Contractor is unavailable to take a sample, no further materials shall be placed in the work until the duplicates samples have been taken.

The owner shall invoke Table B-1, Sampling and Testing Frequency for Physical Properties. One set of duplicates samples of each aggregate to be used in the work shall be randomly sampled from lots up to 5,000 tonnes.

The sampling and testing for production properties shall be based on the lots established for the aggregate types in accordance with Table 4 in GSSS 1010. When more than one aggregate source is used, separate lots shall be established for each source. When aggregates are produced with blended or reclaimed materials or both, QA testing shall be performed on the final product.

The mass of each sample shall meet the requirement shown in Table 3. When more than 30 kg is required, the total samples shall be recombined prior to testing.

The samples shall be identified on both the inside and outside of the sample container. Data to be included with the samples shall be according to the Aggregate Sample Data Sheet in GSSS 1010.

The Owner shall deliver the duplicate samples to the appropriate laboratory in a condition that is suitable for testing.

Table 4 – Lot Schedule for Sampling and Testing for Production Properties

Quantity for Each Source or Process (tonnes)	Granular A and O	Granular B and Select Subgrade
< 250	At the Owner's discretion	
250 – 1,000	One Sample	
1,000 – 5,000	One Lot	
>5,000	5,000 tonne lots up to 20,000 tonnes, & 10,000 tonne lots thereafter	10,000 tonne lots up to 20,000 tonnes and 20,000 tonne lots thereafter
<p>Note 1: When the quantity of granular material is less between 250 – 1,000 tonnes, one sample shall be collected and analyzed for gradation and SPMDD. Where the sample does not meet gradation requirements, the material shall be rejectable.</p> <p>Note 2: When the quantity of granular material is insufficient for a complete lot and is:</p> <ul style="list-style-type: none"> a) Less than one-half the quantity of a complete lot, that quantity shall then be added to the previous lot; or b) Greater than or equal to one-half the quantity of a complete lot, then that quantity shall form its own lot. <p>Note 3: One lot shall be divided into 4 equal sublots.</p>		

1010.08.05 Acceptance

Delete in its entirety and replace with the following:

1010.08.05.01 Acceptance of Physical Properties

QA test results shall be used for acceptance purposes, except when referee testing has been carried out.

A lot shall be deemed to be acceptable for physical properties if all off the test results for the samples of aggregates representing that lot meet the requirements shown in Table 1.

The Owner shall invoke Appendix 1010-C where if a tested sample of aggregates shows that the aggregates do not meet the requirements of this specification, the aggregates represented by the test result, including material in existing stockpiles or in this work shall not be accepted. The Contractor may request a reduced price in lieu of removal provided the applicable test results:

- a) Do not exceed the requirement for LS-614 by more than 25% of the specified value.
- b) Do not exceed the requirement for LS-618 by more than 10% of the specified value.
- c) Do not identify a plasticity index within the material when determined according to LS-703/704 and the requirement for LS-602 on the 75 µm is met.
- d) Meet all other requirements of this specification.

Should the test results for any sample of aggregates representing a lot not meet the requirements listed above, then all the aggregates within that lot shall be considered rejectable and if used in the work shall be removed at no cost to the Owner.

If the lot is not rejectable, the reduced price payment shall be 20% of the applicable aggregate tender price for that lot for physical properties.

The reduced price payment for the lot given above shall be in addition to any payment reduction determined according to Acceptance clause for production properties.

Irrespective of a reduced price payment, the warranty provisions of the Contract Documents shall apply.

The Owner shall invoke the test data form in Appendix 1010-D.

1010.08.05.02 Acceptance of Production Properties

Where applicable, test results from each subplot within a lot shall be combined to determine the mean of the lot for each test result.

When QA test results show that the Granular A and/or Granular B aggregates do not meet the requirements of this specification, the Contract Administrator shall notify the Contractor that the aggregates represented by the test results may be accepted with a payment adjustment according to the following payment adjustment method:

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Payment adjustment shall be calculated based on QA results using the following formula:

$$\text{Payment Adjustment} = \text{Lot Size (t)} \times \text{Unit Rate (\$/t)} \times \text{Payment Adjustment Factor}$$

The payment adjustment factor, in percent, shall be equal to the sum of the adjustment points determined as follows:

- a) Adjustment points shall be applied for each 0.1% that the mean gradation falls outside the gradation specification limits for each sieve. See **Table 5 in GSSS 1010**.
- b) If the payment adjustment is greater than 12.5%, the material shall be rejected.

Table 5. Adjustment Points for Granular Materials

SIEVE SIZE	ADJUSTMENT POINTS PER 0.1% DEVIATION FROM SPECIFIED LIMIT		
	GRANULAR A		GRANULAR B TYPE I / II / III
150 mm	-	-	0.1 (Type I & III only)
100 mm	-		0.1 (Type II only)
75 mm	-	-	-
63 mm	-		-
26.5 mm	0.1		0.1
22.4 mm	0.1		-
19.0 mm	0.1	-	-
9.5 mm	0.1	-	0.1 (Type III only)
4.75 mm	Excess Passing 0.5/Insufficient Passing 0.2		
1.18 mm	0.1		0.1
300 µm	0.1		0.1
75 µm	1.0		1.0

The owner shall invoke the test data form in Appendix 1010-E.

1010.08.06 Referee Testing

Delete the first paragraph and replace with the following:

When the QA test results show that the aggregates do not meet the requirements of this specification, the Contractor may request, in writing, that the referee sample be analyzed by an independent third party firm within 5 business days of receipt of initial results. The results of the referee testing shall be used to determine acceptance of material and/or payment reduction factors.

If the referee sample results in a change to the payment factor of more than 1%, the Owner shall pay the costs of the referee testing. Otherwise, the Contractor shall pay all referee testing costs.

City of Greater Sudbury
TABLE 2A
GRADATION REQUIREMENTS

SIEVE SIZE	PERCENTAGE PASSING BY MASS				
	SAND BEDDING	19 MM (3/4") CLEAR STONE	6.35 MM (1/4") SCREENING	WINTER SAND	MORTAR SAND
150 mm					
106 mm					
100 mm	–	–	–	–	–
75 mm					
63 mm	–	–	–	–	–
37.5 mm	–	–	–	–	–
26.5 mm	–	–	–	–	–
25.0 mm	–	–	–	–	–
22.4 mm	100	100	–	–	–
19.0 mm	–	90 - 100	–	–	–
16.0 mm	75 - 100	65 - 90	–	–	–
13.2 mm	–	–	–	–	–
9.5 mm	–	20 - 55	–	–	–
6.35 mm	–	–	97	–	–
4.75 mm	25 - 100	0 - 10	25 - 100	100	–
2.36 mm	–	0 - 5	–	65 - 95	100
1.18 mm	10 - 85	–	10 - 85	40 - 90	–
600 um	–	–	–	20 - 70	–
300 um	5 - 40	–	5 - 40	5 - 35	15 - 40
150 um	1 - 22	–	1 - 22	0 - 15	0 - 10
75 um	0 - 8	–	0 - 8	0 - 5	0 - 5

Note: um = 1 micrometre = $\frac{1}{1000}$ millimetre, mm

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