

TABLE 1
Physical Property Requirements for Clear Stone

MTO Laboratory Test	MTO Test Number	Nominal Maximum Size			
		53 mm	19 mm		16 mm, 13.2 mm, and 9.5 mm
			Type I	Type II	
Wash Pass 75 µm Sieve, Guideline B, % maximum	LS-601	2.0	2.0	2.0	2.0
Percent Crushed Particles, % minimum	LS-607	-	50	60	60
Micro-Deval Abrasion, Coarse Aggregate, % maximum loss	LS-618	25	25	25	25

TABLE 2
Gradation Requirements for Clear Stone

Sieve Size	Gradation (LS-602), Percent Passing					
	Nominal Maximum Size					
	53 mm	19 mm		16 mm	13.2 mm	9.5 mm
Type I		Type II				
63 mm	100	-	-	-	-	-
53 mm	90 - 100	-	-	-	-	-
26.5 mm	-	100	100	-	-	-
19.0 mm	0 - 15	90 - 100	90 - 100	100	-	-
16.0 mm	-	-	65 - 90	96 - 100	100	-
13.2 mm	-	-	-	67 - 86	96 - 100	100
9.5 mm	-	0 - 55	20 - 55	29 - 52	50 - 73	95 - 100
6.7 mm	-	-	-	-	-	20 - 45
4.75 mm	-	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10
75 µm	0 - 2.0	0 - 2.0	0 - 2.0	0 - 2.0	0 - 2.0	0 - 2.0

**TABLE 3
Physical Property Requirements for Granular Sheeting**

MTO Laboratory Test	MTO Test Number	Requirement
Petrographic Requirement, Fine Aggregate, Part A	LS-616	(Note 1)
Micro-Deval Abrasion, Coarse Aggregate, % maximum loss (Note 2)	LS-618	30
Micro-Deval Abrasion, Fine Aggregate, % maximum loss	LS-619	35
Plastic Fines	LS-631	NP
<p>Notes:</p> <p>1. For materials north of the French/Mattawa Rivers only: For materials with > 4.0% passing the 75 µm sieve, the amount of mica passing the 150 µm sieve and retained on the 75 µm sieve shall not exceed 10% of the material on that sieve. Prior data demonstrating compliance with this requirement shall be acceptable provided that such testing has been done within the past 5 years and the Contractor can show to the satisfaction of the Owner that field performance has continued to be acceptable.</p> <p>2. The requirement for the coarse aggregate Micro-Deval abrasion loss test shall be waived if the material has more than 80% passing the 4.75 mm sieve.</p>		

**TABLE 4
Gradation Requirements for Granular Sheeting**

Sieve Size	Gradation (LS-602), Percent Passing
150 mm	100
26.5 mm	50 - 100
13.2 mm	35 - 100
9.5 mm	-
4.75 mm	20 - 80
1.18 mm	10 - 50
300 µm	5 - 25
150 µm	0 - 15
75 µm	0 - 8.0

TABLE 5
Physical Property Requirements for Mortar Sand

MTO Laboratory Test	Test Number	Requirement
Organic Impurities, Organic Plate Number	LS-610	3 (Note 1)
Mortar Strength Test	ASTM C 87/C87M	(Note 2)
<p>Notes:</p> <p>1. When the fine aggregate for use as mortar sand is subjected to this test, it shall not produce a darker colour than the standard solution or Organic Plate Number 3. However, a fine aggregate failing this test may be approved by the Owner, if it meets the requirements of the Mortar Strength Test according to ASTM C 87.</p> <p>2. Mortar specimens comprised of fine aggregate for use as Mortar Sand and hydraulic cement shall develop a compressive strength at the age of 7 Days, of not less than 90% of the strength developed by a mortar prepared in the same manner, with the same cement and with graded Ottawa sand having a fineness modulus of 2.40 ± 0.10.</p>		

TABLE 6
Gradation Requirements for Mortar Sand

Sieve Size	Gradation (LS-602), Percent Passing
4.75 mm	100.0
2.36 mm	95 - 100
1.18 mm	60 - 100
600 µm	35 - 80
300 µm	15 - 50
150 µm	2 - 15
75 µm	0 - 5.0

TABLE 8
Gradation Requirements for Gabion Stone, Rip-Rap and Rock Protection

Mass kg	Approximate Dimension of an Equivalent Cube in cm (Note 1)	Gradation, percent less than mass specified (Note 2)				
		Gabion Stone		Rip-Rap		Rock Protection
		G-3	G-10	R-10	R-50	
330	50.0	-	-	-	-	100
75	30.5	-	-	-	100	Well-Graded ↑ ↓
50	26.5	-	-	-	70 - 90	
25	21.0	-	-	-	40 - 55	
15	18.0	-	100	100	-	
10	15.5	-	90 - 100	70 - 90	-	
5	12.5	100	-	40 - 55	-	
3	10.5	90 - 100	-	-	-	0 - 10
2.5	10.0	-	0 - 5	-	0 - 15	-
0.5	6.0	0 - 5	-	0 - 15	-	-

Notes:

1. These dimensions are for estimating purposes only and are based on material having a specific gravity of 2.65.
2. The gradation shall be determined by individually weighing a minimum of 20 randomly-chosen stone particles from a sample taken from the stockpile representing a lot then comparing the total mass of the stone particles within each fraction with the total mass of all of the stone particles measured in the sample. For pieces of rock with masses that are larger than 25 kg, the approximate dimension of the equivalent cube determined using an average of the three rectilinear measurements of the piece shall be allowed, in lieu of weighing.

TABLE 9
Physical Property Requirements for Truck Arrester Bed Aggregate

MTO Laboratory Test	MTO Test Number	Requirement
Wash Pass 75 µm Sieve, Guideline B, % maximum	LS-601	1.0
Absorption, % maximum	LS-604	2.0
Unconfined Freeze-Thaw, % maximum loss	LS-614	6
Micro-Deval Abrasion, Coarse Aggregate, % maximum loss	LS-618	21

TABLE 10
Gradation Requirements for Truck Arrester Bed Aggregate

Sieve Size Mm	Gradation (LS-602), Percent Passing
37.5	100
26.5	90 - 100
19.0	0 - 10

TABLE 11
Physical Property Requirements for Winter Sand

Laboratory Test	MTO Test Number	Requirement
Micro-Deval Abrasion, fine aggregate, % maximum loss	LS-619	25 (Note 1)
Notes:		
1. When obtained from sources on St. Joseph Island, Manitoulin Island, or areas of Ontario south and west of a boundary delineated by the Severn River, Provincial Highway 12, and Provincial Highway 7 east of Highway 12.		

TABLE 12
Gradation Requirements for Winter Sand

Sieve Size	Gradation (LS-602), Percent Passing
9.5 mm	100.0 (Note 1)
6.7 mm	97 - 100
4.75 mm	90 - 100
2.36 mm	50 - 95
1.18 mm	20 - 90
600 µm	0 - 70
300 µm	0 - 35
150 µm	0 - 15
75 µm	0 - 5.0

Notes:

1. In addition to LS-602, this shall be confirmed by visual inspection of the stockpile.
2. The minimum size of the test sample shall be 5 kg. Following oven drying, the sample shall be sieved on the 9.5 mm, 6.7 mm, and 4.75 mm sieves. Material passing the 4.75 mm sieve shall be split to an appropriate size according to LS-602 for subsequent washing and fine sieving. The final grading shall be calculated according to LS-602 as the percentage of material passing each sieve based on the total mass of the oven dried sample.