Transportation test procedures

ATT-25 / 2023 – Part II, Pit Run Contamination, -5,000 µm Sieve Analysis

Alberta

Contents

1.0 SCOPE 4

2.0 EQUIPMENT 4

3.0 PROCEDURE 4

1.0 SCOPE

This method describes the procedure for determining the percentage of - 5,000 µm aggregate in screened pit run aggregate prior to crushing.

2.0 EQUIPMENT

Sieves: 40,000 µm, 16,000 µm and 5,000 µm
Electronic Balance
Assorted mixing pans or metal pails
Large drying pan

Data Sheet: Pit Run Aggregate Contamination Sieve Analysis, MAT 6-93

3.0 PROCEDURE

3.1 Sampling

The required minimum sample size is 100 kg. However, a smaller sample weight may be used if the criterion for acceptance or rejection of the material is based on a day's average results of several samples. In this case, the total weight of the averaged samples must be greater than 100 kg, and the minimum frequency must be maintained. Sample size is restricted, as shown in Table 1.

AGGREGATE TOPSIZE (mm)	MINIMUM SAMPLE SIZE (kg)
< 80 mm	35
> 80 mm and < 150 mm	50
> 150 mm	100

TABLE 1

1. Tare as many pails or large mixing pans as required to obtain an aggregate sample of at least 100 kg. Record this in “Total Weight of Tares”, on line "B" of the data sheet, as shown in Figure 1.

2. After all screening operations have taken place to remove the -5,000 µm material from the pit run, obtain a representative sample of pit run aggregate from the conveyor belt carrying the screened material. Sample as directed in ATT-38, SAMPLING, Gravel and Sand, Section 3.4, Conveyors.

3.2 Unwashed Sieve Analysis

1. Weigh the material in each tared container. Calculate the “Total Weight of Wet Sample + Tares” and record it in line "A".

2. Calculate the “Total Weight of Wet Sample” and record in line "C".

3. Remove any visually large rocks (+ 50,000 µm) and place them into the container reserved for the + 40,000 µm material.

4. Separate the rest of the material on the 40,000, 16,000 and the 5,000 µm sieves, and place each size into its respective container. Place the – 5,000 µm material in a tared container (line "E").

Alberta Transportation

MAT 6-93/13

PIT RUN AGGREGATE CONTAMINATION
Minus 5000 µm Sieve Analysis
Field Test Procedure ATT-25 Part II

DATE	CONTRACT NO.	PROJECT NO.			PIT NAME	PIT LOCATION
January 1, 2013	12354	Hwy 1:22	FROM	E. of Jct. Hwy. 415	Rockbuster	NE 10-012-04-04
			TO	E. of Irvine		

UNWASHED SAMPLE WEIGHTS

A	TOTAL WEIGHT OF WET SAMPLE + TARE(S)	112,569	g
B	TARE(S)	10,456	g
C	TOTAL WEIGHT OF WET SAMPLE (A-B)	*102,113*	g
D	WET WEIGHT PASSING 5 000 µm + TARE	6,226	g
E	TARE	2,813	g
F	WET WEIGHT PASSING 5 000 µm (D-E)	*3,413*	g
G	UNWASHED WEIGHT RETAINED ON 5 000 µm (C-F)	*98,700*	g

WASHED SAMPLE WEIGHTS

H	TOTAL DRY WEIGHT RETAINED ON 5 000 µm + TARE(S)	108,178	g
I	TARE(S)	10,456	g
J	TOTAL DRY WEIGHT RETAINED ON 5 000 µm	*97,722*	g

NOTE: LINE 'G' WEIGHT IS ASSUMED TO BE DRY

WEIGHT CALCULATIONS

Total Tares (Line 'B')	Total Sample Wt. Line 'A'	Total Wt (+5000 µm) Line 'H'
2,813	28,142	27,889
2,762	26,579	26,352
2,631	29,111	29,111
2,250	28,737	24,826
10,456	112,569	108,178

MOISTURE CONTENT - 5 000 µm AGGREGATE

K	WEIGHT OF WET SAMPLE + PAN	1,877.6	g
L	WEIGHT OF DRY SAMPLE + PAN	1,813.4	g
M	WEIGHT OF WATER (K-L)	64.2	g
N	WEIGHT OF PAN	1,132.4	g
O	WEIGHT OF DRY SAMPLE (L-N)	681.0	g
P	MOISTURE CONTENT (100M/O)	*9.4*	%

UNWASHED DRY PERCENT CONTAMINATION

Q	UNWASHED DRY WEIGHT PASSING 5 000 µm (100F/100+P)	3,119	g
R	TOTAL UNWASHED DRY WEIGHT (G+O)	101,819	g
S	UNWASHED DRY PERCENT PASSING 5 000 µm (100Q/R)	*3.1*	%

WASHED DRY PERCENT CONTAMINATION

T	TOTAL WET WEIGHT PASSING 5 000 µm (C-J)	4,391	g
U	TOTAL DRY WEIGHT PASSING 5 000 µm (100T/100+P)	4,013	g
V	TOTAL DRY WEIGHT OF SAMPLE (J+U)	101,735	g
W	TOTAL DRY PERCENT PASSING 5 000 µm (100U/V)	*3.9*	%

PERCENT DIFFERENCE BETWEEN WASHED AND UNWASHED SAMPLE

X	PERCENT DIFFERENCE (W-S)	*0.8*	%

VISUAL APPEARANCE	TECHNOLOGIST	REMARKS
☑ CLAY LUMPS	B. Good	
☑ FINES COATING ROCKS		
☐ FROZEN LUMPS		

FIGURE 1

5. Visually inspect the + 5,000 µm samples for lumps of material that would normally pass the 5,000 µm sieve if broken up, and for the amount of 5,000 µm material clinging to the rock. If the sample appears to have a significant amount of this type of contamination, a washed sieve analysis is required.

   NOTE: The sieving action should have shaken off most of the fines clinging to the rocks, and any left on the rocks should not be significant.

6. Weigh the - 5,000 µm material and container and record it in line "D".

7. Calculate the “Wet Weight Passing the 5,000 µm sieve” and record it in line "F".

8. Calculate the “Unwashed Weight Retained on 5,000 µm sieve” and record it in line "G".

9. Take a moisture content sample from the - 5,000 µm material, and process the sample, recording the weights and calculated values on lines "K" to "P".

10. Calculate the “Unwashed Dry Percent Contamination” as directed in lines "Q" to "S".

11. If the Percent Contamination is over 3%, the + 5,000 µm material should be washed as directed in Section 3.3 below.

3.3 Washed Sieve Analysis

1. Remove any large rock which by visual inspection does not have any material coating the rock. Large rocks which have some coating, may be brushed to remove the material. Place these rocks in a container so that later they are weighed with the washed rock.

   Progressively place each of the separated rock sizes into a metal pail and wash the aggregate until all lumps are broken down and no material remains clinging to the rocks.

2. Pour the wash water through a 5,000 µm sieve and remove the large rock.

3. Continue washing the smaller + 5,000 µm material until the wash water is clear and no material passes the 5,000 µm sieve.

4. Once all the + 5,000 µm material has been washed, place the material in tared container(s) (line "I").1.
   Manually sieve all the -80,000 µm aggregate through the 16,000 µm sieve.

5. Dry the washed aggregate. Weigh, and record as “Total Dry Weight Retained on 5,000 µm + Tare(s)” in line "H".

6. Calculate the “Total Dry Weight Retained on the 5,000 µm sieve” and record in line "J".

7. Calculate the “Total Wet Weight of material passing the 5,000 µm sieve” and record in line "T".

8. Calculate the “Total Washed Dry Aggregate Percent Contamination” as directed in lines "U" to "W".

9. Calculate the “Percent Difference” in line "X", between the washed sample (line "W") and the unwashed sample (line "S").

   NOTE: The washed sieve analysis must be performed for the first few sieves until sufficient washed and unwashed contamination percentages are obtained.

   The average difference between the unwashed and washed percentages can be used as a guide on future sieve analysis to determine if washing may be necessary.

   For example, if the % difference averages less than 2%, and the total dry washed percent passing averages less than 5%, then washing may not be necessary.

   When making this judgement, ensure that the screening process has not changed, and is consistent.