

ALTERNATE PROCEDURES FOR SIEVING OF COARSE AND FINE GRADED SOILS AND AGGREGATES

(An Arizona Method)

SCOPE

1. (a) This test method contains five alternate procedures for sieving and determining the sieve analysis of fine and coarse graded soils and aggregates.

(b) This test method must be used in conjunction with Arizona Test Method 201. In general, the method for sample preparation, sieving, and calculation of the sieve analysis as described in Arizona Test Method 201 will be followed, with the changes and additional information being outlined and described herein for each alternate procedure shown below.

1) Alternate #1 (Section 2) - Fine screening of aggregate which contains a small amount of Plus No. 4 (100% pass 3/8") material, e.g., fine aggregate for concrete.

2) Alternate #2 (Section 3) - Utilizing a No. 8 screen in the coarse sieving, and a fine sieve analysis not being required.

3) Alternate #3 (Section 4) - Subjecting the entire sample to washing, and a minus No. 4 split for fine screening is not required.

4) Alternate #4 (Section 5) - Subjecting the entire sample to washing, and a minus No. 4 split for fine screening is required.

5) Alternate #5 (Section 6) - Washing of coarse aggregate (Plus No. 4) to remove clinging particles and adjusting the fine sieve analysis.

ALTERNATE #1

2. Fine screening of aggregate which contains a small amount of Plus No. 4 (100% pass 3/8") material, e.g., fine aggregate for concrete. An example of this procedure is shown in Figure 1.

ARIZONA DEPARTMENT OF TRANSPORTATION
 SOIL AND AGGREGATE TABULATION

LAB NUMBER: 93-2222 PROJ CODE: 7777 ORG NUMBER: 8888 MATL TYPE: FA+ PURPOSE: A TEST LAB: P SIZE: - SIZE %: +

TEST NO: 18 LOT OR SUFFIX: + SAMPLED BY: A. JONES MO DAY YEAR: 12 08 93 TIME: 11:35 AM PM

SAMPLED FROM: STOCKPILE LIFT NO.: + ROWY: + STATION: + PLUS: +

PROJECT ENGINEER / SUPERVISOR: B. SMITH PROJECT NUMBER: F-099-9(99) TRACS NUMBER: H999901C

ORIGINAL SOURCE: PIT # 5555

REMARKS: EXAMPLE FOR FINE SCREENING WHEN FINE AGGREGATE CONTAINS A SMALL AMOUNT OF PLUS No. 4 MATERIAL - (ALTERNATE # 1)

ARIZ 201 T - AASHTO Tests

% OVERSIZE: +3" +6" -GRADE FACTOR: 177936

WET SAMPLE PREWEIGHT = -
 WET WT. OF #4 = -
 #4 SPLIT WET WT. = -

WEIGHTS RETAINED	% RET.	% PASS	SPECS.	CUMULATIVE % RET. FINENESS MODULUS
3"				
2 1/2"				
2"				
1 1/2"				
1"				
3/4"				
1/2"				
3/8"		100	100	
1/4"		99		
#4		15		
-#4				
Total				

IF TOTAL SAMPLE IS WASHED:
 UNWASHED WT. = 562
 WASHED WT. = 547
 ELUTRIATION = 15

DRY WT. OF #4 SPLIT: +

WEIGHTS RETAINED	% RET.	% PASS	SPECS.
#8	2	94	
#10	8	86	
#16	16	70	45-80
#30	12	58	
#40	22	36	
#50	7	29	0-30
#100	22	7	0-10
#200	4		
-#200			
Total	547		
Elutriation			

FINES FACTOR: -

FINENESS MODULUS = TOTAL CUMULATIVE % RET. / 100

WHITE YELLOW BLUE

12-08-93 RECEIVED DATE Joe Dogood 12-08-93 TEST OPERATOR & DATE Ted Hendman 12-08-93 SUPERVISOR & DATE

FIGURE 1

(a) A representative minimum 500 gram sample is obtained and dried to constant weight. Allow the sample to cool, and record the weight to the nearest gram as the "Unwashed Wt", (562 in the example).

(b) Subject the sample to either mechanical or hand washing.

(c) Dry the sample to constant weight and allow to cool. Record weight to the nearest gram as "Washed Wt" and also as the fine sieve "Total Dry Weight", (547).

(d) Determine and record "Elutriation" by subtracting the "Washed Wt" from the "Unwashed Wt", (562 - 547 = 15).

(e) Additional sieves (Plus No. 4) as required are added to the nest of sieves used in the fine screening.

(f) The sample is subjected to screening and the weight retained on each sieve and in the pan is recorded.

(g) The sum of the individual weights retained for each sieve is compared to the weight of sample prior to sieving (Washed Wt. or fine sieve Total Dry Weight). Adjust or resieve as necessary.

(h) Determine the sieve analysis of the material. The factor for calculating the sieve analysis is determined by dividing 100 by the "Unwashed Wt", ($100/562 = 0.177936$). The calculation of the percent passing each sieve is continuous through the entire sieve analysis.

ALTERNATE #2

3. Utilizing a No. 8 screen in the coarse sieving, and a fine sieve analysis not being required. An example is given in Figure 2.

(a) A representative sample is obtained and the weight recorded as the "Coarse Sieve Total", (14683 in the example).

(b) Subject the sample to coarse sieving using the No. 8 as the smallest sieve. If desired, the material may be screened using a No. 4 as the smallest sieve, and the pass No. 4 material further separated into No. 8 and pass No. 8 fractions.

ARIZONA DEPARTMENT OF TRANSPORTATION
 SOIL AND AGGREGATE TABULATION

LAB NUMBER: 93-3333 PROJ CODE: 7777 ORG NUMBER: 8888 MATL: CA TYPE: 57 PURPOSE: A TEST LAB: P SIZE: - SIZE %: +

TEST NO.: 6 LOT OR SUFFIX: + SAMPLED BY: A. JONES MO: 12 DAY: 02 YEAR: 93 TIME: 2:40 AM/PM: AM PM

SAMPLED FROM: STOCKPILE LIFT NO.: + RDWY: + STATION: + PLUS: +

ORIGINAL SOURCE: PIT # 5555 PROJECT ENGINEER / SUPERVISOR: B. SMITH PROJECT NUMBER: F-099-9(99) TRACS NUMBER: H999901C

REMARKS:
 EXAMPLE FOR USING A No. 8 SIEVE IN THE COARSE SIEVING AND NO FINE SIEVE ANALYSIS REQUIRED - (ALTERNATE #2).

ARIZ 201 T = AASHTO Tests

% OVERSIZE: +3" +6" COARSE FACTOR: 006811

WET SAMPLE PREWEIGHT = _____
 WET WT. OF #4 = _____
 #4 SPLIT WET WT. = _____

SIEVE	WEIGHTS RETAINED	% RET.	% PASS	SPECS.	CUMULATIVE % RET. FINENESS MODULUS
3"					
2 1/2"					
2"					
1 1/2"			100	100	
1"	505	3	97	95-100	
3/4"	2850	20	77		
1/2"	4410	30	47	25-60	
3/8"	2350	16	31		
1/4"	1915	13	18		
#4	1325	9			
#4					9 0-10
Total	14683				

IF TOTAL SAMPLE IS WASHED:
 UNWASHED WT. = _____
 WASHED WT. = _____
 ELUTRIATION = _____

DRY WT. OF #4 SPLIT: _____

FINE FACTOR: _____

SIEVE	WEIGHTS RETAINED	% RET.	% PASS	SPECS.
#8	1255	9	-	
#10	73	-	0	0-5
#16				
#30				
#40				
#60				
#100				
#200				
#200				
Total				0-10

Dry Weight: _____

FINENESS MODULUS = TOTAL CUMULATIVE % RET. / 100

WHITE YELLOW BLUE

12-02-93 Joe Dogood 12-03-93 Ted Headman 12-03-93
 RECEIVED DATE TEST OPERATOR & DATE SUPERVISOR & DATE

FIGURE 2

(c) The weight of material retained on each of the sieves No. 8 and larger, and the weight of pass No. 8 material is recorded on the laboratory sieve analysis card, modifying the card for the pass No. 8 material as shown in the example.

(d) The sum of the individual weights retained for each sieve is compared to the weight of the sample prior to sieving (Coarse Sieve Total). Adjust or resieve as needed.

(e) Determine the sieve analysis of the material. The coarse sieve factor is determined by dividing 100 by the "Coarse Sieve Total", ($100/14683 = 0.006811$). The calculation of the percent passing each sieve is continuous through the entire sieve analysis.

ALTERNATE #3

4. Subjecting the entire sample to washing, and a minus No. 4 split for fine screening is not required. An example of this procedure is given in Figure 3.

(a) A representative sample is be obtained, dried to constant weight, allowed to cool, and the weight recorded as the "Coarse Sieve Total" and also as the "Unwashed Weight", (1137 in the example).

(b) Subject the sample to hand washing.

(c) Dry the sample to constant weight and allow to cool. The weight of the sample is recorded as the "Washed Wt", (1118).

(d) Determine "Elutriation" by subtracting the "Washed Wt" from the "Unwashed Wt", ($1137 - 1118 = 19$).

(e) Subject the sample to coarse screening and record the weight retained on each sieve and in the pan, except the weight of pass No. 4 material is not recorded in the coarse sieve area, but rather as the fine sieve "Total Dry Weight", (468).

(f) Determine and record the weight of pass No. 4 for coarse sieve analysis by adding the "elutriation" and the fine sieve "Total Dry Weight", ($468 + 19 = 487$).

(g) The sum of the individual weights retained for each sieve is compared to the weight of sample prior to sieving (Washed Wt.). Adjust or resieve as necessary.

ARIZONA DEPARTMENT OF TRANSPORTATION
 SOIL AND AGGREGATE TABULATION

LAB NUMBER: 93-5555 PROJ CODE: 7777 ORG NUMBER: 8888 MATL: MA TYPE: FC PUR. POSE: A TEST LAB: P SIZE: - SIZE %: +

TEST NO: 3 LOT OR SUFFIX: + SAMPLED BY: A. JONES MO: 10 DAY: 07 YEAR: 93 TIME: 12:10 AM PM

SAMPLED FROM: COLD FEED LIFT NO: + RDWY: + STATION: + PLUS: +

ORIGINAL SOURCE: PIT # 4444 PROJECT ENGINEER / SUPERVISOR: B. SMITH PROJECT NUMBER: F-099-9(99) TRACS NUMBER: H999901C

REMARKS: EXAMPLE WHEN ENTIRE SAMPLE IS WASHED AND A MINUS No. 4 SPLIT FOR FINE SIEVING IS NOT REQUIRED - (ALTERNATE # 3).

ARIZ 201

% OVERSIZE: +3" +6" COARSE FACTOR: 087951

WET SAMPLE PREWEIGHT = -
 WET WT. OF #4 = -
 #4 SPLIT WET WT. = -

T = AASHTO Tests

Liquid Limit (LL)	T - 69			
Plastic Limit (PL)	T - 90			
Plasticity Index (PI) = LL - PL	T - 90			
Abrasion Method (A,B,C,D)	T - 96			
@ 100 Revolutions				%
@ 500 Revolutions				%
Absorption, H ₂ O	T - 85 ARIZ 211			%
Specific Gravity, SSD	T - 85 ARIZ 211			%
Specific Gravity, OD	T - 85 ARIZ 211			%
Proctor Method				
Optimum Moisture				%
Max. Dry Density				PCF
Sand Equivalent	T - 178 ARIZ 242 (MAFC)			
Fractured Faces Weight (Wf)				
Total Sample Weight (Wa)				
Fractured Faces (FF) = $\frac{Wf}{W_a} \times 100$	ARIZ 212			%
Wet Weight (W)				g
Dry Weight (D)				g
Moisture Content = $\frac{W-D}{D} \times 100$	T - 255 ARIZ 285			%
Flakiness Index	ARIZ 233			%
Carbonates	ARIZ 238			%
pH	ARIZ 236 OR 237			
Resistivity (ohm-cm)	ARIZ 236			
Soluble Salts (PPM)	ARIZ 237			

CUMULATIVE % RET. FINENESS MODULUS

WEIGHTS RETAINED	% RET.	% PASS	SPECS.
3" <input type="checkbox"/>			
2 1/2"			
2"			
1 1/2"			
1"			
3/4"			
1/2"			
3/8"		0	100
1/4"	26	9	24
#4	38	1	33
#4	48	7	43
Total	113	7	33-45

IF TOTAL SAMPLE IS WASHED:
 UNWASHED WT. = 1137
 WASHED WT. = 1118
 ELUTRIATION = 19

DRY WT. OF #4 SPLIT

WEIGHTS RETAINED	% RET.	% PASS	SPECS.
#8	3	4	2
#10		2	3
#16		3	4
#30		1	1
#40		2	2
#50		1	2
#100		1	0
#200		1	3
#200		1	
Total	46	8	
Elutriate		1	9

FINE FACTOR: -

FINENESS MODULUS = TOTAL CUMULATIVE % RET. / 100 = 1.8 0-3.8

WHITE YELLOW BLUE

10-07-93 RECEIVED DATE Joe Dugand 10-07-93 TEST OPERATOR & DATE Ted Headman 10-08-93 SUPERVISOR & DATE

FIGURE 3

(h) Sieve the pass No. 4 material and record the weight retained for each sieve and in the pan.

(i) The sum of the individual weights retained for each sieve is compared to the weight of sample prior to sieving (fine sieve Total Dry Weight). Adjust or resieve as necessary.

(j) Determine the sieve analysis of the material. The coarse sieve factor is determined by dividing 100 by the "Coarse Sieve Total", ($100/1137 = 0.087951$). A fine sieve factor is not determined. The calculation of the percent passing each sieve is continuous through the entire sieve analysis.

ALTERNATE #4

5. Subjecting the entire sample to washing, and a minus No. 4 split for fine screening is required. An example of this procedure is given in Figure 4.

(a) A representative sample is obtained, dried to constant weight, allowed to cool, and the weight recorded as the "Coarse Sieve Total" and also as the "Unwashed Weight", (4893 in the example).

(b) Subject the sample to hand washing.

(c) Dry the sample to constant weight and allow to cool. The weight of the sample is recorded as the "Washed Wt", (4674).

(d) The elutriation of the total sample is determined by subtracting the "Washed Wt" from the "Unwashed Wt", ($4893 - 4674 = 219$).

(e) The sample shall be subjected to coarse screening and the weight retained on each sieve and in the pan is recorded, except the weight of pass No. 4 material is not recorded in the coarse sieve area, but rather as "Wt. of - #4" (2521).

(f) The sum of the individual weights retained for each sieve is compared to the weight of sample prior to sieving (Washed Wt.). Adjust or resieve as necessary.

(g) The passing No. 4 weight for coarse sieve analysis is the combination of the weight of pass No. 4 and the elutriation of the total sample, ($2521 + 219 = 2740$).

(h) The weight of the passing No. 4 material split for fine sieving is recorded as the fine sieve "Total Dry Weight", (665).

ARIZONA DEPARTMENT OF TRANSPORTATION
 SOIL AND AGGREGATE TABULATION

LAB NUMBER: 93-11111 PROJ CODE: 7777 ORG NUMBER: 8888 MATL: TS TYPE: + PUR-POSE: A TEST LAB: P SIZE: - SIZE %: +

TEST NO.: 8 LOT OR SUFFIX: + SAMPLED BY: A. JONES MO: 12 DAY: 28 YEAR: 93 TIME: 9:30 AM PM

SAMPLED FROM: STOCKPILE LIFT NO.: + RDWY: + STATION: + PLUS: +

ORIGINAL SOURCE: PIT # 3333 PROJECT ENGINEER / SUPERVISOR: B. SMITH PROJECT NUMBER: F-099-9(99) TRACS NUMBER: H999901C

REMARKS: EXAMPLE WHEN ENTIRE SAMPLE IS WASHED AND A MINUS No. 4 SPLIT FOR FINE SIEVING IS REQUIRED - (ALTERNATE # 4).

ARIZ 201

% OVERSIZE: +3" +6" COARSE FACTOR: 020437

WET SAMPLE PREWEIGHT = -
 WET WT. OF -#4 = 2521
 -#4 SPLIT WET WT. = -

WEIGHTS RETAINED	% RET.	% PASS	SPECS.
3" <input type="checkbox"/>			
2 1/2"			
2"			100
1 1/2"			
1"			
3/4"			100
1/2"	270	6	94 85-100
3/8"	613	12	82
1/4"	928	19	63
#4	342	7	
-#4	2740	✓ 56	
Total	4893		

IF TOTAL SAMPLE IS WASHED:
 UNWASHED WT. = 4893
 WASHED WT. = 4674
 ELUTRIATION = 219

DRY WT. OF -#4 SPLIT: 723 FINE FACTOR: 077455

WEIGHTS RETAINED	% RET.	% PASS	SPECS.
#8	65	5	51
#10	26	2	49
#16	104	8	41
#30	27	2	39
#40	39	3	36 35-100
#50	181	14	22
#100	117	9	13
#200	103	8	
#200	3	✓ 4.7	
Total	665		
Elutriate	58		

Dry Weight

T = AASHTO Tests

Liquid Limit (LL) T-89
 Plastic Limit (PL) T-90
 Plasticity Index (PI) = LL - PL T-90

Abrasion Method (A,B,C,D) T-96
 @ 100 Revolutions %
 @ 500 Revolutions %

Absorption, H₂O T-85 ARIZ 211
 Specific Gravity, SSD T-85 ARIZ 211
 Specific Gravity, OD T-85 ARIZ 211

Proctor Method
 Optimum Moisture %
 Max. Dry Density PCF

Sand Equivalent T-176 ARIZ 242 (MAFC)

Fractured Faces Weight (Wf)
 Total Sample Weight (Wt)
 Fractured Faces (FF) = $\frac{W_f}{W_t} \times 100$ ARIZ 212 %

Wet Weight (W) g
 Dry Weight (D) g
 Moisture Content = $\frac{W-D}{D} \times 100$ T-255 T-255 %

Flakiness Index ARIZ 233 %

Carbonates ARIZ 236 %

pH ARIZ 236 OR 237
 Resistivity (ohm-cm) ARIZ 236
 Soluble Salts (PPM) ARIZ 237

FINENESS MODULUS = TOTAL CUMULATIVE % RET. / 100

WHITE
 YELLOW
 BLUE

0472 = 612 + 1252

85 = 612 x 599 / 1252

12-28-93 RECEIVED DATE JOE DUGOOD 12-28-93 TEST OPERATOR & DATE TED HEADMAN 12-28-93 SUPERVISOR & DATE

FIGURE 4

- (i) The elutriation value for fine sieve analysis is determined as follows:

$$\text{Elutriation for Fine Sieve Analysis} = \frac{\text{Wt. of Passing No. 4 Material Split for Fine Sieving, (Fine Sieve "Total Dry Weight")}}{\text{Wt. of - \#4}} \times \text{Elutriation of Total Sample}$$

In the example in Figure 4:

$$\begin{aligned} &\text{Elutriation} \\ &\text{for Fine Sieve} = (665/2521) \times 219 = 58 \\ &\text{Analysis} \end{aligned}$$

(j) The "Dry Wt. of Pass #4 Split" is determined by adding the fine sieve total dry weight and the calculated elutriation for fine sieve analysis, (665 + 58 = 723).

(k) The pass No. 4 material is sieved and the weight retained for each sieve and in the pan is recorded.

(l) The sum of the individual weights retained for each sieve is compared to the weight of sample prior to sieving (fine sieve Total Dry Weight). Adjust or resieve as necessary.

(m) Determine the sieve analysis of the material.

ALTERNATE #5

6. Washing of coarse aggregate (Plus No. 4) to remove clinging particles and adjusting the fine sieve analysis. An example of this procedure is shown in Figures 5 and 6.

(a) A representative sample shall be prepared, screened, and the sieve analysis calculated as described in Arizona Test Method 201. (When this alternate procedure is used as a referee method, the sample shall be dried to constant weight prior to sieving.)

ARIZONA DEPARTMENT OF TRANSPORTATION
 SOIL AND AGGREGATE TABULATION

LAB NUMBER 93-9999	PROJ CODE 7777	ORG NUMBER 8888	MATL SB	TYPE +	PURPOSE A	TEST LAB P	SIZE -	SIZE % +
TEST NO. 12	LOT OR SUFFIX +	SAMPLED BY A. JONES	MO 11	DAY 15	YEAR 93	TIME 4:25	<input type="checkbox"/> AM <input checked="" type="checkbox"/> PM	
SAMPLED FROM SITE			LIFT NO. +	RDWY EB	STATION 1152+50	PLUS IF MILEPOST, INPUT DECIMAL		
ORIGINAL SOURCE PIT # 3333	PROJECT ENGINEER / SUPERVISOR B. SMITH	PROJECT NUMBER F-099-9(99)	TRACS NUMBER H999901C		REMARKS EXAMPLE OF WASHING COARSE (PLUS No. 4) AGGREGATE AND ADJUSTING FINE SIEVE ANALYSIS - (ALTERNATE #5).			

ARIZ 201				T = AASHTO Tests				
% OVERSIZE +3" <input type="checkbox"/> +8" <input type="checkbox"/>		COARSE FACTOR 004418		Liquid Limit (LL) T-89		SPEC.		
WET SAMPLE PREWEIGHT = 22960		WET WT. OF #4 = 11400		Plastic Limit (PL) T-90				
#4 SPLIT WET WT. = 558				Plasticity Index (PI) = LL - PL T-90				
WEIGHTS RETAINED		% RET.	% PASS	CUMULATIVE % RET. FINENESS MODULUS	Abrasion Method (A,B,C,D) T-96			
3" <input type="checkbox"/>				100	@ 100 Revolutions		%	
2 1/2"					@ 500 Revolutions		%	
2"	2420	11	89		Absorption, H ₂ O T-85 ARIZ 211		%	
1 1/2"	1380	6	93		Specific Gravity, SSD T-85 ARIZ 211		%	
1"	1020	4	99		Specific Gravity, OD T-85 ARIZ 211		%	
3/4"	2920	13	86	60-100	Proctor Method			
1/2"	1120	5	95		Optimum Moisture		%	
3/8"	440	2	98		Max. Dry Density		PCF	
1/4"	1340	6	94		Sand Equivalent T-178 ARIZ 242 (MAFC)			
#4	920	4	96		Fractured Faces Weight (W)			
#4	11073	✓ 49			Total Sample Weight (W _a)			
Total	22633				Fractured Faces (FF) = $\frac{W_f}{W_a} \times 100$ ARIZ 212		%	
IF TOTAL SAMPLE IS WASHED: UNWASHED WT. = WASHED WT. = ELUTRIATION =				FINE FACTOR 090406		Wet Weight (W)		g
DRY WT. OF #4 SPLIT 542		WEIGHTS RETAINED		% RET.	% PASS	Dry Weight (D)		g
#8	101	9	40	35-80	Moisture Content = $\frac{W-D}{D} \times 100$ T-255		%	
#10	20	2	38		Flakiness Index ARIZ 233		%	
#16	53	5	33		Carbonates ARIZ 238		%	
#30	87	8	25		pH ARIZ 236 OR 237			
#40	46	4	21		Resistivity (ohm-cm) ARIZ 236			
#60	42	4	17		Soluble Salts (PPM) ARIZ 237			
#100	33	3	14		FINENESS MODULUS = $\frac{\text{TOTAL CUMULATIVE \% RET.}}{100}$			
#200	35	2	3		WHITE <input checked="" type="checkbox"/>			
#200	2				YELLOW <input type="checkbox"/>			
Total	419	✓ 11.6	0-12		BLUE <input type="checkbox"/>			
Elutriate	123							

11-15-93
 RECEIVED DATE

Joe David 11-16-93
 TEST OPERATOR & DATE

TEO HEADMAN 11-16-93
 SUPERVISOR & DATE

FIGURE 5

DETERMINATION OF PERCENT MINUS NO. 200 ON COARSE AGGREGATE
 AND TOTAL PERCENT PASS NO. 200 IN SAMPLE

Project No. F-099-9(99) / H999901C Lab. No. 93-9999

Unwashed Weight of Plus No. 4 = <u>4967</u>
Washed Weight of Plus No. 4 = <u>4941</u>

Calculate the "Percent Minus No. 200 on Coarse Aggregate" by the following, and record result to the nearest 0.01%:

$$\begin{aligned} \text{Percent Minus No. 200 on Coarse Aggregate} &= \frac{\text{Unwashed Weight of Plus No. 4} - \text{Washed Weight of Plus No. 4}}{\text{Unwashed Weight of Plus No. 4}} \times 100 \\ &= \frac{(4967) - (4941)}{(4967)} \times 100 \\ \text{Percent Minus No. 200 on Coarse Aggregate} &= \underline{0.52} \end{aligned}$$

Calculate the "Total Percent Pass No. 200 in Sample" by the following, and record result to the nearest 0.1%:

$$\begin{aligned} \text{Total Percent Pass No. 200 in Sample} &= \text{\% Pass No. 200 from Fine Sieving} + \left[\frac{100 - \text{\% Pass No. 4}}{100} \times \text{Percent Minus No. 200 on Coarse Aggregate} \right] \\ &= (11.3) + \left[\frac{[100 - (49)] \times (0.52)}{100} \right] \\ \text{Total Percent Pass No. 200 in Sample} &= \underline{11.6} \end{aligned}$$

FIGURE 6

(b) Either the entire amount, or a representative sample of approximately 5000 grams, whichever is less, of the Plus No. 4 material from screening shall be combined, dried to constant weight, allowed to cool, and the weight recorded as the "Unwashed Weight of Plus No. 4", (4967 in the example in Figure 6).

(c) Subject the sample to hand washing.

(d) Dry the sample to constant weight and allow to cool. Record the weight to at least the nearest gram as the "Washed Weight of Plus No. 4", (4941 in the example in Figure 6).

(e) Utilizing the equations shown in Figure 6, determine and record the "Percent Minus No. 200 on Coarse Aggregate" to the nearest 0.01%, (0.52); and the "Total Percent Pass No. 200 in Sample" to the nearest 0.1%, (11.6).

(f) Compare the percent Pass No. 200 from fine sieving with the "Total Percent Pass No. 200 in Sample". If the difference is less than or equal to 1.0, replace the percent Pass No. 200 from fine sieving with the "Total Percent Pass No. 200 in Sample" and, if necessary, adjust the value for percent retained on the No. 200 sieve. (In the example in Figure 5, the 11.3 percent Pass No. 200 from fine sieving has been replaced with the 11.6 "Total Percent Pass No. 200 in Sample", and the percent retained on the No. 200 sieve has been adjusted from 3 to 2.) If the difference is greater than 1.0, another sample shall be obtained and the entire sample subjected to washing and the gradation determined as specified in Section 4 or 5.

REPORT

7. (a) The sieve analysis shall be reported as shown in Figures 1 through 5 for the particular example which is applicable.

(b) When applicable, the determination of "Percent Minus No. 200 on Coarse Aggregate" and "Total Percent Pass No. 200 in Sample" is reported as shown in the example given in Figure 6.

(c) A blank Soils and Aggregate Tabulation laboratory card is provided in Figure 7.

(d) A blank form for the determination of "Percent Minus No. 200 on Coarse Aggregate" and "Total Percent Pass No. 200 in Sample" is provided in Figure 8.

ARIZONA DEPARTMENT OF TRANSPORTATION
 SOIL AND AGGREGATE TABULATION

LAB NUMBER	PROJ CODE	ORG NUMBER	MATL	TYPE	PUR- POSE	TEST LAB	SIZE	SIZE %
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
TEST NO.	LOT OR SUFFIX	SAMPLED BY		MO	DAY	YEAR	TIME	<input type="checkbox"/> AM <input type="checkbox"/> PM
<input type="text"/>	<input type="text"/>	<input type="text"/>		<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>
SAMPLED FROM				LIFT NO.	ROWY	STATION	PLUS	
<input type="text"/>				<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ORIGINAL SOURCE				PROJECT ENGINEER / SUPERVISOR		PROJECT NUMBER	TRACS NUMBER	
<input type="text"/>				<input type="text"/>		<input type="text"/>	<input type="text"/>	
REMARKS								
<input type="text"/>								
<input type="text"/>								
<input type="text"/>								

ARIZ 201

T = AASHTO Tests

% OVERSIZE

+3" +8" COARSE FACTOR

WET SAMPLE PREWEIGHT =

WET WT. OF #4 =

#4 SPLIT WET WT. =

WEIGHTS RETAINED	% RET.	% PASS	SPECS.	CUMULATIVE % RET. FINENESS MODULUS
3" <input type="checkbox"/>				
2 1/2"				
2"				
1 1/2"				
1"				
3/4"				
1/2"				
3/8"				
1/4"				
#4				
#4				
Total				

IF TOTAL SAMPLE IS WASHED:
 UNWASHED WT. =
 WASHED WT. =
 ELUTRIATION =

DRY WT. OF #4 SPLIT

FINE FACTOR

WEIGHTS RETAINED	% RET.	% PASS	SPECS.
#8			
#10			
#15			
#30			
#40			
#50			
#100			
#200			
#200			
Total			

Dry Weight

Liquid Limit (LL)	T - 89				
Plastic Limit (PL)	T - 90				
Plasticity Index (PI) = LL - PL	T - 90				
Abrasion Method (A,B,C,D)	T - 96				
@ 100 Revolutions					% <input type="text"/>
@ 500 Revolutions					% <input type="text"/>
Absorption, H ₂ O	T - 85 ARIZ 211				% <input type="text"/>
Specific Gravity, SSD	T - 85 ARIZ 211				% <input type="text"/>
Specific Gravity, OD	T - 85 ARIZ 211				% <input type="text"/>
Proctor Method					
Optimum Moisture					% <input type="text"/>
Max. Dry Density					PCF <input type="text"/>
Sand Equivalent	T - 176 ARIZ 242 (MAFC)				<input type="text"/>
Fractured Faces Weight (Wf)					
Total Sample Weight (W _s)					
Fractured Faces (FF) = $\frac{W_f}{W_s} \times 100$	ARIZ 212				% <input type="text"/>
Wet Weight (W)					g <input type="text"/>
Dry Weight (D)					g <input type="text"/>
Moisture Content = $\frac{W-D}{D} \times 100$	T - 255 T - 265				% <input type="text"/>
Flakiness Index	ARIZ 233				% <input type="text"/>
Carbonates	ARIZ 238				% <input type="text"/>
pH	ARIZ 236 OR 237				<input type="text"/>
Resistivity (ohm-cm)	ARIZ 236				<input type="text"/>
Soluble Salts (PPM)	ARIZ 237				<input type="text"/>

SPECS.

A - ARIZ 225
 C - ARIZ 226
 D - ARIZ 228
 AD - ARIZ 245
 AI - ARIZ 232
 ADI - ARIZ 248

WHITE
 YELLOW
 BLUE

FINENESS = $\frac{\text{TOTAL CUMULATIVE \% RET.}}{100}$
 MODULUS

44-0283 Rev 83

RECEIVED DATE _____ TEST OPERATOR & DATE _____ SUPERVISOR & DATE _____

FIGURE 7

**DETERMINATION OF PERCENT MINUS NO. 200 ON COARSE AGGREGATE
 AND TOTAL PERCENT PASS NO. 200 IN SAMPLE**

Project No. _____ Lab. No. _____

Unwashed Weight of Plus No. 4 = _____
 Washed Weight of Plus No. 4 = _____

Calculate the "Percent Minus No. 200 on Coarse Aggregate" by the following, and record result to the nearest 0.01%:

$$\begin{aligned} \text{Percent Minus No. 200 on Coarse Aggregate} &= \frac{\text{Unwashed Weight of Plus No. 4} - \text{Washed Weight of Plus No. 4}}{\text{Unwashed Weight of Plus No. 4}} \times 100 \\ &= \frac{(\quad) - (\quad)}{(\quad)} \times 100 \end{aligned}$$

Percent Minus No. 200 on Coarse Aggregate = _____

Calculate the "Total Percent Pass No. 200 in Sample" by the following, and record result to the nearest 0.1%:

$$\begin{aligned} \text{Total Percent Pass No. 200 in Sample} &= \text{\% Pass No. 200 from Fine Sieving} + \frac{100 - \text{\% Pass No. 4}}{100} \times \text{Percent Minus No. 200 on Coarse Aggregate} \\ &= (\quad) + \frac{100 - (\quad)}{100} \times (\quad) \end{aligned}$$

Total Percent Pass No. 200 in Sample = _____

FIGURE 8