

**COMBINED CONCRETE AGGREGATE GRADATION**

PROJECT DESCRIPTION				SAMPLE INFORMATION	
Project ID	6723-00-71	POB Job #	16.313	Sampled By:	Ed Olszewski
Highway	CTH M	County	Columbia	Date:	8/4/2016
Description	B-11-156, Waupun plant			Time:	8:30am
Contractor	Lunda Cons			Sample No.	#1

Determination of Combined Aggregate Gradation (% Passing)

Aggregate Batched Proportions:	Course Aggregate #2 (C.A. #2) =	23.3%
	Course Aggregate #1 (C.A. #1) =	35.0%
	Fine Aggregate (F.A.) =	41.7%
		100.0%

Plant Site Aggregate Samples (% Passing)					Calculate Combined Gradation (% Passing)			
Size	C.A. #2	C.A. #1	F.A.		C.A. #2	C.A. #1	F.A.	Combined
2" (50 mm)	100.0%	100.0%	100.0%		23.3%	35.0%	41.7%	100.0%
1 1/2" (37.5 mm)	98.9%	100.0%	100.0%		23.0%	35.0%	41.7%	99.7%
1" (25 mm)	51.4%	100.0%	100.0%		12.0%	35.0%	41.7%	88.7%
3/4" (19 mm)	8.5%	94.4%	100.0%		2.0%	33.0%	41.7%	76.7%
3/8" (9.5 mm)	2.2%	32.8%	100.0%		0.5%	11.5%	41.7%	53.7%
#4 (4.75 mm)	1.9%	4.0%	99.0%		0.4%	1.4%	41.3%	43.1%
#8 (2.36 mm)	1.8%	2.3%	84.4%		0.4%	0.8%	35.2%	36.4%
#16 (1.16 mm)	1.7%	2.1%	70.6%		0.4%	0.7%	29.4%	30.6%
#30 (0.6 mm)	1.7%	2.0%	55.4%		0.4%	0.7%	23.1%	24.2%
#50 (0.3 mm)	1.6%	1.9%	25.4%		0.4%	0.7%	10.6%	11.6%
#100 (0.15 mm)	1.5%	1.9%	3.8%		0.3%	0.7%	1.6%	2.6%
#200 (0.075 mm)	1.20%	1.60%	1.00%		0.28%	0.56%	0.42%	1.26%

Determination of Specification Limits for Combined Aggregate Gradation (% Passing)

Sieve	C.A. #2			C.A. #1			F.A.			Combined	
	Spec.	LCL	UCL	Spec.	LCL	UCL	Spec.	LCL	UCL	LCL	UCL
2"	100.0		23.3	100.0		35.0	100.0		41.7	100.0	
1 1/2"	90.0 - 100.0	21.0	23.3	100.0		35.0	100.0		41.7	97.7	100.0
1"	20.0 - 55.0	4.7	12.8	100.0		35.0	100.0		41.7	81.4	89.5
3/4"	0.0 - 15.0	0.0	3.5	90.0 - 100.0	31.5	35.0	100.0		41.7	73.2	80.2
3/8"	0.0 - 5.0	0.0	1.2	20.0 - 55.0	7.0	19.3	100.0		41.7	48.7	62.1
#4	0.0 - 5.0	0.0	1.2	0.0 - 10.0	0.0	3.5	90.0 - 100.0	37.5	41.7	37.5	46.4
#16	0.0 - 5.0	0.0	1.2	0.0 - 5.0	0.0	1.8	45.0 - 80.0	18.8	33.4	18.8	36.3
#50	0.0 - 5.0	0.0	1.2	0.0 - 5.0	0.0	1.8	10.0 - 30.0	4.2	12.5	4.2	15.4
#100	0.0 - 5.0	0.0	1.2	0.0 - 5.0	0.0	1.8	2.0 - 10.0	0.8	4.2	0.8	7.1
#200	0.00 - 1.50	0.00	0.35	0.00 - 1.50	0.00	0.53	0.00 - 3.50	0.00	1.46	0.00	2.33

SUMMARY OF COMBINED AGGREGATE GRADATION SPECIFICATION LIMITS

Sieve Size	PERCENT PASSING			Combined Gradation	Combined Gradation	Concrete Pavement	Concrete Structure
	Combined	Combined	Combined	% Retained	% Between	QMP Spec	QMP Spec
	LCL	Gradation	UCL	On Sieve	Sieves	% Passing	% Passing
2" (50 mm)	100.0	100.0%	100.0	0.0%		100%	100%
1 1/2" (37.5 mm)	97.7	99.7%	100.0	0.3%	0.3%		
1" (25 mm)	81.4	88.7%	89.5	11.3%	11.1%		< or = 89%
3/4" (19 mm)	73.2	76.7%	80.2	23.3%	12.0%		
3/8" (9.5 mm)	48.7	53.7%	80.2	46.3%	23.0%		
#4 (4.75 mm)	37.5	43.1%	46.4	56.9%	10.6%	< or = 42%*	< or = 42%**
#8 (2.36 mm)		36.4%		63.6%	6.7%		
#16 (1.16 mm)	18.8	30.6%	36.3	69.4%	5.8%		
#30 (0.6 mm)		24.2%		75.8%	6.4%		
#50 (0.3 mm)	4.2	11.6%	15.4	88.4%	12.6%		
#100 (0.15 mm)	0.8	2.6%	7.1	97.4%	9.0%		
#200 (0.075 mm)	0.0	1.26%	2.3	98.74%	1.34%	< or = 2.3%	< or = 2.3%

* 47 % if coarse material is composed completely of crushed stone or recycled concrete.

** 47 % if coarse material is composed completely of crushed stone.

LCL = Lower Control Limit
UCL = Upper Control Limit

here.

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Sieve Analysis for Concrete Aggregate

Project Description				Sample Information	
Project ID	6723-00-71	POB Job #	16.313	Material Source	Carew, Waupun
Highway	CTH M	County	Columbia	Material (Type, Grade, Etc.)	1 1/2" stone
Description	B-11-156, Deck			Sampled By/Date/Time	Ed Olszewski/8-4-16/8:30am
Contractor	Lunda Cons			Sample No.	1

MOISTURE CONTENT:

Wet Weight 15676.3 g
 Dry Weight 15456.4 g

Moisture Loss 219.9 g
 % Moisture 1.4 %

SIEVE ANALYSIS:

☐ Washed ☐ Fine ☒ Coarse #2
☐ Unwashed ☐ Coarse #1

Dry Unwashed Weight, gms: 15456.4 g

				% PASSING SPECIFICATIONS	
SIEVE	Wt. Ret'd gms.	% Ret'd	% Pass	Coarse #2	
2" (50 mm)	0.0	0.0	100.0	100	PASS
1 1/2" (37.5 mm)	162.8	1.1	98.9	90 - 100	PASS
1" (25 mm)	7507.8	48.6	51.4	20 - 55	PASS
3/4" (19 mm)	14142.6	91.5	8.5	0 - 15	PASS
3/8" (9.5 mm)	15111.6	97.8	2.2	0 - 5	PASS
#4 (4.75 mm)	15169.3	98.1	1.9	---	
#8 (2.36 mm)	15185.8	98.2	1.8	---	
#16 (1.16 mm)	15195.3	98.3	1.7	---	
#30 (0.6 mm)	15200.5	98.3	1.7	---	
#50 (0.3 mm)	15206.9	98.4	1.6	---	
#100 (0.15 mm)	15225.6	98.5	1.5	---	
#200 (0.075 mm)	15267.9	98.8	1.2	---	
Wt in Pan =	15280.6				

FINENESS MODULUS (Fine Aggregate):

$$\text{Fineness Modulus} = \frac{\sum \text{total \% Ret'd on: \#4, \#8, \#16, \#30, \#50, \#100}}{100}$$

$$\text{NA} = \frac{\text{\#4} + \text{\#8} + \text{\#16} + \text{\#30} + \text{\#50} + \text{\#100}}{100}$$

Remarks:

Tested By: Ed Olszewski 8-8-16

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Sieve Analysis for Concrete Aggregate

Project Description				Sample Information	
Project ID	6723-00-71	POB Job #	16.313	Material Source	Carew, Waupun
Highway	CTH M	County	Columbia	Material (Type, Grade, Etc.)	3/4" stone
Description	B-11-156, Deck			Sampled By/Date/Time	Ed Olszewski/8-4/16/8:30am
Contractor	Lunda Cons			Sample No.	1

MOISTURE CONTENT:

Wet Weight 6341.8 g
Dry Weight 6198.7 g

Moisture Loss 143.1 g
% Moisture 2.3 %

SIEVE ANALYSIS:☒ Washed☐ Fine☐ Coarse #2☐ Unwashed☒ Coarse #1Dry Unwashed Weight, gms: 6198.7 g

SIEVE	Wt. Ret'd gms.	% Ret'd	% Pass	% PASSING SPECIFICATIONS	
				Coarse #1	
2" (50 mm)				---	
1 1/2" (37.5 mm)				---	
1" (25 mm)	0.0	0.0	100.0	100	PASS
3/4" (19 mm)	345.9	5.6	94.4	90 - 100	PASS
3/8" (9.5 mm)	4167.9	67.2	32.8	20 - 55	PASS
#4 (4.75 mm)	5952.6	96.0	4.0	0 - 10	PASS
#8 (2.36 mm)	6055.5	97.7	2.3	0 - 5	PASS
#16 (1.16 mm)	6071.3	97.9	2.1	---	
#30 (0.6 mm)	6076.9	98.0	2.0	---	
#50 (0.3 mm)	6079.6	98.1	1.9	---	
#100 (0.15 mm)	6082.4	98.1	1.9	---	
#200 (0.075 mm)	6097.3	98.4	1.6	---	
Wt in Pan =	6102.7				

FINENESS MODULUS (Fine Aggregate):

$$\text{Fineness Modulus} = \frac{\sum \text{total \% Ret'd on: \#4, \#8, \#16, \#30, \#50, \#100}}{100}$$

$$\text{NA} = \frac{\begin{matrix} \#4 & \#8 & \#16 & \#30 & \#50 & \#100 \\ + & + & + & + & + \end{matrix}}{100}$$

Remarks:

Tested By: Ed Olszewski 8-8-16

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Sieve Analysis for Concrete Aggregate

Project Description				Sample Information	
Project ID	6723-00-71	POB Job #	16.313	Material Source	Carew, Waupun
Highway	CTH M	County	Columbia	Material (Type, Grade, Etc.)	Sand
Description	B-11-156, Deck			Sampled By/Date/Time	Ed Olszewski/8-4-16/8:30am
Contractor	Lunda Cons			Sample No.	1

MOISTURE CONTENT:

Wet Weight 684.7 g
Dry Weight 665.7 g

Moisture Loss 19.0 g
% Moisture 2.8 %

SIEVE ANALYSIS:

☒ Washed ☒ Fine ☐ Coarse #2

☐ Unwashed

☐ Coarse #1

Dry Unwashed Weight, gms: 665.7 g

SIEVE	Wt. Ret'd gms.	% Ret'd	% Pass	% PASSING SPECIFICATIONS	
				Fine	
2" (50 mm)				---	
1 1/2" (37.5 mm)				---	
1" (25 mm)				---	
3/4" (19 mm)				---	
3/8" (9.5 mm)	0.0	0.0	100.0	100	PASS
#4 (4.75 mm)	6.6	1.0	99.0	90 - 100	PASS
#8 (2.36 mm)	104.1	15.6	84.4	---	
#16 (1.16 mm)	195.4	29.4	70.6	45 - 85	PASS
#30 (0.6 mm)	296.9	44.6	55.4	---	
#50 (0.3 mm)	496.5	74.6	25.4	5 - 30	PASS
#100 (0.15 mm)	640.6	96.2	3.8	0 - 10	PASS
#200 (0.075 mm)	659.0	99.0	1.0	0 - 3.5	PASS
Wt in Pan =	659.8				

FINENESS MODULUS (Fine Aggregate):

$$\text{Fineness Modulus} = \frac{\sum \text{total \% Ret'd on: \#4, \#8, \#16, \#30, \#50, \#100}}{100}$$
$$2.61 = \frac{1.0 + 15.6 + 29.4 + 44.6 + 74.6 + 96.2}{100}$$

Remarks:

Tested By: Ed Olszewski 8-8-16

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WAPUN PLANT



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Sieve Analysis for Concrete Aggregate

Project Description		Sample Information	
Project ID	6723-00-71	POB Job #	6.3/3
Highway	CTH M	County	Columbia
Description	CAMBRIA DECK POIN		Material Source
Contractor	Lunda		Material (Type, Grade, Etc.)
		Sampled By/Date/Time	250/8-4/
		Sample No.	#2 #1

MOISTURE CONTENT:

Wet Weight 15676.3 g
Dry Weight 15456.4 g

Moisture Loss 219.9 g
% Moisture 1.4 %

G-1554.1

SIEVE ANALYSIS:

☒ Washed

☐ Fine

☒ Coarse #2

☐ Unwashed

☐ Coarse #1

Dry Unwashed Weight, gms: 15456.4 g

SIEVE	Wt. Ret'd gms.	% Ret'd	% Pass	% PASSING SPECIFICATIONS	
				Coarse #2	
2" (50 mm)	<u>0</u>	<u>0</u>	<u>100</u>	<u>100</u>	
1 1/2" (37.5 mm)	<u>162.8</u>	<u>1.1</u>	<u>98.9</u>	<u>90 - 100</u>	
1" (25 mm)	<u>7507.8</u>	<u>48.4</u>	<u>51.4</u>	<u>20 - 55</u>	
3/4" (19 mm)	<u>14142.6</u>	<u>91.5</u>	<u>8.5</u>	<u>0 - 15</u>	
3/8" (9.5 mm)	<u>15111.6</u>	<u>97.8</u>	<u>2.2</u>	<u>0 - 5</u>	
#4 (4.75 mm)	<u>15169.3</u>	<u>98.1</u>	<u>1.9</u>		
#8 (2.36 mm)	<u>15185.8</u>	<u>98.2</u>	<u>1.8</u>		
#16 (1.16 mm)	<u>15195.3</u>	<u>98.3</u>	<u>1.7</u>		
#30 (0.6 mm)	<u>15200.5</u>	<u>98.3</u>	<u>1.7</u>		
#50 (0.3 mm)	<u>15206.9</u>	<u>98.4</u>	<u>1.6</u>		
#100 (0.15 mm)	<u>15225.6</u>	<u>98.5</u>	<u>1.5</u>		
#200 (0.075 mm)	<u>15262.9</u>	<u>98.8</u>	<u>1.2</u>		
Wt in Pan =	<u>15280.0</u>				

FINENESS MODULUS (Fine Aggregate):

Fineness Modulus = $\frac{\sum \text{total \% Ret'd on: \#4, \#8, \#16, \#30, \#50, \#100}}{100}$

$$= \frac{\begin{matrix} \#4 & \#8 & \#16 & \#30 & \#50 & \#100 \\ + & + & + & + & + \end{matrix}}{100}$$

Remarks:

Tested By:

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WHUPUN PLANT

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Sieve Analysis for Concrete Aggregate

Project Description		Sample Information	
Project ID	6723-00-71	POB Job #	16.3/3
Highway	CT4W	Material Source	CANW - Whupun
Description	CAMBRIA DECK PAVT	Material (Type, Grade, Etc.)	3/4"
Contractor	Lunda	Sampled By/Date/Time	E5018-4-16/8:30
		Sample No.	#2 #1

MOISTURE CONTENT:

Wet Weight 6341.8 g
 Dry Weight 6198.7 g

Moisture Loss 143.7 g
 % Moisture 2.3 %

B-1495.9

SIEVE ANALYSIS:

☒ Washed ☐ Fine ☐ Coarse #2
☐ Unwashed ☒ Coarse #1 Dry Unwashed Weight, gms: 6198.7 g

SIEVE	Wt. Ret'd gms.	% Ret'd	% Pass	% PASSING SPECIFICATIONS	
				Coarse #1	
2" (50 mm)				---	
1 1/2" (37.5 mm)				---	
1" (25 mm)	<u>0</u>	<u>0</u>	<u>100</u>	<u>100</u>	
3/4" (19 mm)	<u>345.9</u>	<u>5.6</u>	<u>94.4</u>	<u>90 - 100</u>	
3/8" (9.5 mm)	<u>4162.9</u>	<u>67.2</u>	<u>32.8</u>	<u>20 - 55</u>	
#4 (4.75 mm)	<u>5952.4</u>	<u>96.0</u>	<u>4.0</u>	<u>0 - 10</u>	
#8 (2.36 mm)	<u>6055.5</u>	<u>97.7</u>	<u>2.3</u>	<u>0 - 5</u>	
#16 (1.16 mm)	<u>6071.3</u>	<u>97.7</u>	<u>2.1</u>	---	
#30 (0.6 mm)	<u>6076.9</u>	<u>98.0</u>	<u>2.0</u>	---	
#50 (0.3 mm)	<u>6079.4</u>	<u>98.1</u>	<u>1.9</u>	---	
#100 (0.15 mm)	<u>6082.4</u>	<u>98.1</u>	<u>1.9</u>	---	
#200 (0.075 mm)	<u>6097.3</u>	<u>98.4</u>	<u>1.6</u>	---	
Wt in Pan =	<u>6102.7</u>				

FINENESS MODULUS (Fine Aggregate):

Fineness Modulus = $\frac{\sum \text{total \% Ret'd on: \#4, \#8, \#16, \#30, \#50, \#100}}{100}$

$$= \frac{\begin{matrix} \#4 & \#8 & \#16 & \#30 & \#50 & \#100 \\ + & + & + & + & + \end{matrix}}{100}$$

Remarks:

Tested By:

START

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**Sieve Analysis for Concrete Aggregate**

Project Description		Sample Information	
Project ID	6723-00-71	POB Job #	16.313
Highway	CT4M	Material Source	Cedar - Waupun
Description	LAMBDA DECK PAINT	Material (Type, Grade, Etc.)	Sand
Contractor	Lunda	Sampled By/Date/Time	ES018-41 8:30
		Sample No.	#1

MOISTURE CONTENT:

Wet Weight 684.7 g
 Dry Weight 665.7 g

Moisture Loss 19.0 g
 % Moisture 2.8 %

~~GREEN BAY~~ #2-8348

SIEVE ANALYSIS:

☒ Washed ☒ Fine ☐ Coarse #2
☐ Unwashed ☐ Coarse #1

Dry Unwashed Weight, gms: 665.7 g

SIEVE	Wt. Ret'd gms.	% Ret'd	% Pass	% PASSING SPECIFICATIONS	
				Fine	
2" (50 mm)	_____	_____	_____	---	
1 1/2" (37.5 mm)	_____	_____	_____	---	
1" (25 mm)	_____	_____	_____	---	
3/4" (19 mm)	_____	_____	_____	---	
3/8" (9.5 mm)	<u>0</u>	<u>0</u>	<u>100</u>	<u>100</u>	
#4 (4.75 mm)	<u>6.6</u>	<u>1.0</u>	<u>99.0</u>	<u>90 - 100</u>	
#8 (2.36 mm)	<u>104.1</u>	<u>15.6</u>	<u>84.4</u>	---	
#16 (1.16 mm)	<u>195.4</u>	<u>29.4</u>	<u>70.6</u>	<u>45 - 85</u>	
#30 (0.6 mm)	<u>296.9</u>	<u>44.6</u>	<u>55.4</u>	---	
#50 (0.3 mm)	<u>496.5</u>	<u>74.6</u>	<u>25.4</u>	<u>5 - 30</u>	
#100 (0.15 mm)	<u>640.6</u>	<u>96.2</u>	<u>3.8</u>	<u>0 - 10</u>	
#200 (0.075 mm)	<u>659.0</u>	<u>99.0</u>	<u>1.0</u>	<u>0 - 3.5</u>	
Wt in Pan =	<u>659.8</u>				

FINENESS MODULUS (Fine Aggregate):

Fineness Modulus = $\frac{\sum \text{total \% Ret'd on: \#4, \#8, \#16, \#30, \#50, \#100}}{100}$

$$= \frac{\begin{array}{ccccccc} \#4 & \#8 & \#16 & \#30 & \#50 & \#100 \\ + & + & + & + & + & + \end{array}}{100}$$

Remarks:

Tested By:

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