Aggregate Optimization Chart

8/29/2023

Production Gradation Report

PLANT #: P-101

Sample Date:

Dates Test Represents:

8/28/23

Contractor:

Concrete Grade: DM, 4500HP 9/4/2023

Coarseness Factor:

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	51.7
26A	71-47	Presque Isle	250	1.53	2.62	8.6
2NS	75-051	Mid Michigan	1150	6.93	2.66	39.7
		Total Wt	2900	17.63		100.0

through

DOT No.:			

Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

	Total Wt	2900	17.63		100.0	< Verify this n	umber is 100%
Sieve	6AA	26A	L	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.	0	100.0	100.0	0.0	0.0
1.5"	100.0	100.	0	100.0	100.0	0.0	0.0
1"	99.4	100.	0	100.0	99.7	0.3	0.3
3/4"	89.0	100.	0	100.0	94.3	5.4	5.7
1/2"	49.0	95.0)	100.0	73.2	21.1	26.8
3/8"	28.6	84.6	3	100.0	61.7	11.4	38.3
#4	3.9	20.4	1	96.1	41.9	19.9	58.1
#8	2.0	5.1		80.1	33.2	8.6	66.8
#16	1.8	2.5		65.1	27.0	6.3	73.0
#30	1.7	1.9		50.1	20.9	6.1	79.1
#50	1.6	1.7		26.5	11.5	9.4	88.5
#100	1.6	1.6		7.1	3.8	7.7	96.2
LBW	1.4	1.4		1.1	1.3	2.5	98.7

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Coarseness Factor:	57	Workability Factor:	33	35.7
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 68, 38 Producfiθn ∰gdation 57, 31	75, 28	
40 45 ActionLimits Boundary =	50	Coarseness Factor (%)	75	80

Work	ability Factor:	35	
Sieve	Cumulative	%	Cumulative
Sieve	% Passing	Retained	% Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	70.5	24.5	29.5
3/8"	60.0	10.5	40.0
#4	44.4	15.6	55.6
#8	35.5	9.0	64.5
#16	28.5	7.0	71.5
#30	21.5	7.0	78.5
#50	10.2	11.3	89.8
#100	3.1	7.1	96.9
LBW	1.3	1.8	98.7

62

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP 8/28/23

Dates Test Represents: 8/29/2023 9/4/2023 through

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1525	9.09	2.69	51.7
26A	58-003	Stoneco	275	1.64	2.69	9.3
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68		100.0

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.6

Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

	i otai wt	2950	17.68		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	6 A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	10	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0
1"	99.9	10	0.0	100.0	99.9	0.1	0.1
3/4"	84.3	10	0.0	100.0	91.9	8.1	8.1
1/2"	45.8	99	9.4	100.0	71.9	20.0	28.1
3/8"	21.5	87	7.6	100.0	58.3	13.7	41.7
#4	3.1	9	.9	97.4	40.5	17.8	59.5
#8	1.4	2	.8	82.3	33.1	7.4	66.9
#16	1.2	2	.1	65.1	26.2	6.9	73.8
#30	1.1	1	.8	46.3	18.8	7.4	81.2
#50	1.1	1.7		23.3	9.8	9.0	90.2
#100	1.1	1	.6	5.9	3.0	6.8	97.0
LBW	1.0	1	.5	1.0	1.0	2.0	99.0

Aggregate Supplier Gradations

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Coarseness Fac	parseness Factor: 62 Workability Factor:		33	
45 45, 44 45, 44 45, 33 45, 33 Operating Bounds	52, 34 56	60,36 roduction Gradation	75, 39	
25 40 45 ActionLimits Boundary =	50 5	Coarseness Factor (%)	75	80

Batch Plant Gradations

Work	ability Factor:	36	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.2	10.1	10.8
1/2"	70.7	18.5	29.3
3/8"	60.7	10.0	39.3
#4	44.4	16.3	55.6
#8	35.9	8.5	64.1
#16	27.3	8.6	72.7
#30	19.1	8.2	80.9
#50	7.4	11.7	92.6
#100	1.9	5.6	98.1
LBW	0.7	1.2	99.3

Sample Date:

Production Gradation

8/28/23 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	8/29/2023	through	9/4/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1525	9.09	2.69	51.7
26A	58-003	Stoneco	275	1.64	2.69	9.3
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68		100.0

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.6

SUPERIOR MATERIALS

Superior Materials, LLC 30701 W. 10 Mile Rd. Suite 500

Farmington Hills, MI 48336

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

•	Total Wt	2950	17.68		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	6A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	10	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0
1"	99.9	10	0.0	100.0	99.9	0.1	0.1
3/4"	84.3	10	0.0	100.0	91.9	8.1	8.1
1/2"	45.8	99	9.4	100.0	71.9	20.0	28.1
3/8"	21.5	87	7.6	100.0	58.3	13.7	41.7
#4	3.1	9	.9	97.4	40.5	17.8	59.5
#8	1.4	2	.8	82.3	33.1	7.4	66.9
#16	1.2	2	.1	65.1	26.2	6.9	73.8
#30	1.1	1	.8	46.3	18.8	7.4	81.2
#50	1.1	1	.7	23.3	9.8	9.0	90.2
#100	1.1	1	.6	5.9	3.0	6.8	97.0
LBW	1.0	1	.5	1.0	1.0	2.0	99.0

Aggregate Supplier Gradations

Coars	oarseness Factor: 62 Workability Factor:		Workability Factor:	: 33	
Workability Factor (%) 92 93 94 95 96 96 97 96 96 97 96 96 96 96	45, 44 45, 33 Operating Zone Boundary	52, 34	60,126 roduction Gradation	JMF Zone 75, 39	
25 -	45 mits Boundary =	50 5 	5 Coarseness Factor (%)	75	80

O Batch Plant Gradations

Work	ability Factor:	36	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.2	10.1	10.8
1/2"	70.7	18.5	29.3
3/8"	60.7	10.0	39.3
#4	44.4	16.3	55.6
#8	35.9	8.5	64.1
#16	27.3	8.6	72.7
#30	19.1	8.2	80.9
#50	7.4	11.7	92.6
#100	1.9	5.6	98.1
LBW	0.7	1.2	99.3

61

PREPARED BY: SM, LLC Technical Service Approved BY:

PLANT #: Contractor:

Sample Date: 8/28/23 Concrete Grade: DM, 4500HP Dates Test Represents: 8/29/2023 9/4/2023 through

Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.7
26A	58-003	Stoneco	360	2.14	2.69	12.2
2NS	19-04	Schlegel	1100	6.60	2.67	37.2
		Total Wt	2060	17 69		100.0

MDOT No.:

Builders Redi-Mix

30701 W. 10 Mile Rd. Suite 500

Farmington Hills, MI 48336

	Total Wt	2960 17.68		100.0	< Verify this n	umber is 100%
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.9	100.0	100.0	99.9	0.1	0.1
3/4"	84.3	100.0	100.0	92.0	7.9	8.0
1/2"	45.8	99.4	100.0	72.5	19.6	27.5
3/8"	21.5	87.6	100.0	58.7	13.7	41.3
#4	3.1	9.9	99.9	39.9	18.8	60.1
#8	1.4	2.8	90.1	34.5	5.4	65.5 r
#16	1.2	2.1	69.4	26.7	7.9	73.3
#30	1.1	1.8	44.5	17.3	9.3	82.7 r
#50	1.1	1.7	14.3	6.1	11.2	93.9
#100	1.1	1.6	2.7	1.8	4.3	98.2 a
LBW	1.0	1.5	0.2	0.8	1.0	99.2

Aggregate Supplier Gradations

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Coarseness Factor:	63	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 40 68, 40 68, 38 Production Gradatio 60, 36PS 68, 32	75, 39	
Boundary 25 40 45 ActionLimits Boundary =	50 5	5 Coarseness Factor (%)	75, 28 75	80

Batch Plant Gradations

Production Gradation

Work	ability Factor:	36	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.0	10.3	11.0
1/2"	70.3	18.7	29.7
3/8"	59.9	10.4	40.1
#4	41.9	18.0	58.1
#8	35.9	6.0	64.1
#16	27.8	8.2	72.2
#30	18.9	8.8	81.1
#50	6.3	12.6	93.7
#100	1.7	4.6	98.3
LBW	1.0	0.7	99.0

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.0

Aggregate Optimization Chart

8/29/2023

PLANT #: 12 Sample Date: 8/28/23

Dates Test Represents:

Concrete Grade: DM, 4500HP

Contractor:

MDOT No.:

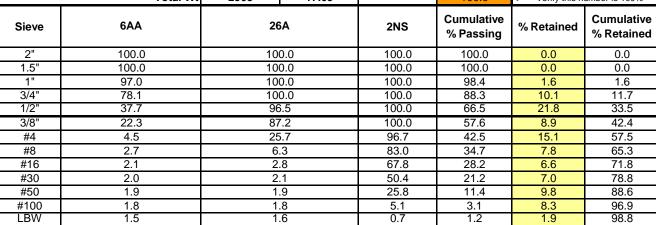
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1550	9.48	2.62	53.4
26A	71-47	Presque Isle	205	1.25	2.62	7.1
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

through

%	
tribution	
53.4	
7.1	
30.6	

---- Verify this number is 100%

Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336



9/4/2023

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation	Batch Plant Gradations	 Aggregate Supplier Gradation 	ons	Adjusted WF	Intial Production	on Sample (IPS)
Coarseness Factor:	65	Workability Factor:	35	37.2	Coars	eness Factor:	
7 45				$\neg \top$	Work	ability Factor:	
45, 44			JMF Zone	711	Sieve	Cumulative	
	52, 41			-	Sieve	% Passing	
40]	57, 40	68, 40		- 11	2"	100.0	
(%	ii	68, 38	75, 39	- 11	1.5"	100.0	
	!	Production Grada	tion	- 11	1"	99.3	
£ _		■ 60, 36PS		- 11	3/4"	89.0	
Factor (%)	35 -					70.3	
1 7	52, 34			- 11	3/8"	59.9	
Operating Zone Boundary	57.22	68 32		- 11	#4	41.9	
\frac{1}{28} 30	,	68, 32 68, 31		- 11	#8	35.9	
Operating Zone			⊸ .	- 11	#16	27.8	
Boundary			75, 28	- 11	#30	18.9	
> 25				 ∥	#50	6.3	
40 45	50 55 _	60 65 70	75	80	#100	1.7	
	Coar	seness Factor (%) ⁷⁰	-		LBW	1.0	
ActionLimits Boundary =							

Workability Factor:		36	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.0	10.3	11.0
1/2"	70.3	18.7	29.7
3/8"	59.9	10.4	40.1
#4	41.9	18.0	58.1
#8	35.9	6.0	64.1
#16	27.8	8.2	72.2
#30	18.9	8.8	81.1
#50	6.3	12.6	93.7
#100	1.7	4.6	98.3
LBW	1.0	0.7	99.0

Aggregate Optimization Chart

Smelter Bay

Total Wt

PLANT #: p11

Pit#

71-47

71-47

95-013

Sample Date:

Agg. Class

6AA

26A

2NS

39.6

2.65

8/28/23 Concrete Grade: DM, 4500HP Dates Test Represents:

1150

2905

0/29/2023	through	9/4/2023		
Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
Presque Isle	1455	8.90	2.62	50.1
Presque Isle	300	1.83	2.62	10.3

6.95

17.69

MDOT No.:

2.3

Contractor:



62

<---- Verify this number is 100%

Sup	eric	or N	/late	rials	s, LL
3070)1 V	۷. 1	0 Mi	le Ro	ł.
Suite	e 50	0			
-					

Farmington Hills, MI 48336

	Total Tre	2000	17100		100.0	< voing tho in	difficor 10 10070
Sieve	6AA	26	6A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	10	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0
1"	97.6	10	0.0	100.0	98.8	1.2	1.2
3/4"	81.8	10	0.0	100.0	90.9	7.9	9.1
1/2"	42.2	96	6.5	100.0	70.7	20.2	29.3
3/8"	24.5	87	7.2	100.0	60.9	9.8	39.1
#4	4.3	25	5.7	96.4	43.0	17.9	57.0
#8	2.0	6	.3	85.0	35.3	7.7	64.7
#16	1.8	2	.8	70.0	28.9	6.4	71.1
#30	1.7	2	.1	50.3	21.0	7.9	79.0
#50	1.6	1	.9	24.1	10.5	10.4	89.5
#100	1.5	1	.8	7.1	3.7	6.8	96.3

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

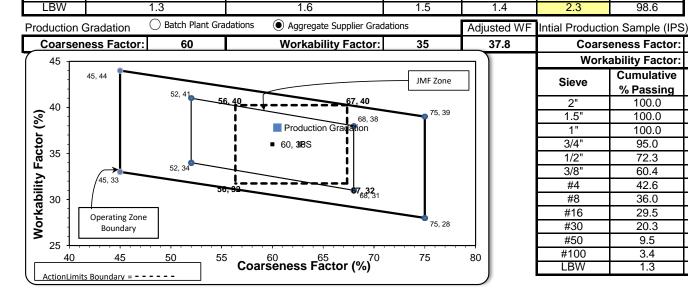
nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.



Work	ability Factor:	36	
Sieve	Cumulative	%	Cumulative
Sieve	% Passing	Retained	% Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	72.3	22.8	27.7
3/8"	60.4	11.8	39.6
#4	42.6	17.8	57.4
#8	36.0	6.6	64.0
#16	29.5	6.5	70.5
#30	20.3	9.2	79.7
#50	9.5	10.8	90.5
#100	3.4	6.1	96.6
LBW	1.3	2.1	98.7

98.6

Coarseness Factor:

Sample Date:

8/28/23 Concrete Grade: DM, 4500HP 9/4/2023

Dates Test F	Represents:	8/29/2023	through	9/4/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1455	8.90	2.62	50.1
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

MDOT No.:

Coarseness Factor:

---- Verify this number is 100%

Contractor:

SUPERIO	R

Superior Materials, LLC 30701 W. 10 Mile Rd. Suite 500 Farmington Hills, MI 48336

1		
1		
1		
1		
1		
1		
1		
1		
1		

62

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

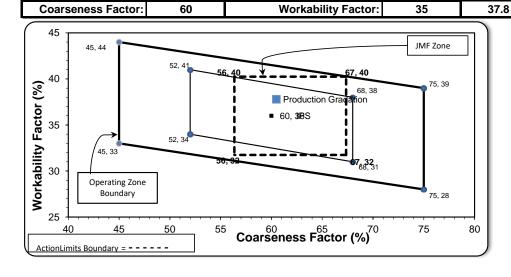
nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

26A 100.0 100.0 100.0	2NS 100.0 100.0 100.0	Cumulative % Passing 100.0 100.0	% Retained	Cumulative % Retained
100.0 100.0	100.0			0.0
100.0		100.0		3.0
	100.0		0.0	0.0
100.0	100.0	98.8	1.2	1.2
100.0	100.0	90.9	7.9	9.1
96.5	100.0	70.7	20.2	29.3
87.2	100.0	60.9	9.8	39.1
25.7	96.4	43.0	17.9	57.0
6.3	85.0	35.3	7.7	64.7
2.8	70.0	28.9	6.4	71.1
2.1	50.3	21.0	7.9	79.0
1.9	24.1	10.5	10.4	89.5
1.8	7.1	3.7	6.8	96.3
1.6	1.5	1.4	2.3	98.6
	1.9 1.8 1.6	1.9 24.1 1.8 7.1 1.6 1.5	1.9 24.1 10.5 1.8 7.1 3.7 1.6 1.5 1.4	1.9 24.1 10.5 10.4 1.8 7.1 3.7 6.8 1.6 1.5 1.4 2.3



Workability Factor:		36	
Sieve	Cumulative	%	Cumulative
0.010	% Passing	Retained	% Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	72.3	22.8	27.7
3/8"	60.4	11.8	39.6
#4	42.6	17.8	57.4
#8	36.0	6.6	64.0
#16	29.5	6.5	70.5
#30	20.3	9.2	79.7
#50	9.5	10.8	90.5
#100	3.4	6.1	96.6
LBW	1.3	2.1	98.7

8/28/23

Batch Plant Gradations

PLANT #: P-35

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP

35.6

Dates Test F	Represents:	8/29/2023	through	9/4/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1525	9.09	2.69	51.7
26A	58-003	Stoneco	275	1.64	2.69	9.3
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

Superior Materials, LLC 30701 W. 10 Mile Rd. Suite 500

Farmington Hills MI 48336

Farmington	HIIIS,	IVII	48336

	Total	Wt 2950	17.68		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	6A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	10	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0
1"	99.9	10	0.0	100.0	99.9	0.1	0.1
3/4"	84.3	10	0.0	100.0	91.9	8.1	8.1
1/2"	45.8	99).4	100.0	71.9	20.0	28.1
3/8"	21.5	87	' .6	100.0	58.3	13.7	41.7
#4	3.1	9	.9	97.4	40.5	17.8	59.5
#8	1.4	2	.8	82.3	33.1	7.4	66.9 r
#16	1.2	2	.1	65.1	26.2	6.9	73.8
#30	1.1	1	.8	46.3	18.8	7.4	81.2 r
#50	1.1	1	.7	23.3	9.8	9.0	90.2
#100	1.1	1	.6	5.9	3.0	6.8	97.0 a
LBW	1.0	1	.5	1.0	1.0	2.0	99.0

Aggregate Supplier Gradations

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

61

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Coarseness Factor:	62	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 56, 52, 34 56,	■ 6011 Production Gradation	75, 39	
\$ 25 40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	80

Work	ability Factor:	36	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.1	10.2	10.9
1/2"	70.5	18.6	29.5
3/8"	60.5	10.0	39.5
#4	44.1	16.4	55.9
#8	35.6	8.5	64.4
#16	27.7	7.9	72.3
#30	20.6	7.1	79.4
#50	8.7	11.8	91.3
#100	1.6	7.1	98.4
LBW	1.1	0.6	98.9

Sample Date:

Production Gradation

8/28/23

Concrete Grade: DM, 4500HP

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.4

Dates Test Represents: 8/29/2023 through 9/4/2023

Batch Plant Gradations

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	51.6
26A	71-47	Presque Isle	255	1.56	2.62	8.8
2NS	63-92	Grange Hall	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

---- Verify this number is 100%

SUPERIOR	

Superior Materials, LLC 30701 W. 10 Mile Rd. Suite 500 Farmington Hills, MI 48336

	i otai vyt	2905 17.09		100.0	< verify this n	umber is 100%
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	97.0	100.0	100.0	98.5	1.5	1.5
3/4"	78.1	100.0	100.0	88.7	9.8	11.3
1/2"	37.7	96.5	100.0	67.5	21.2	32.5
3/8"	22.3	87.2	100.0	58.8	8.8	41.2
#4	4.5	25.7	97.4	43.1	15.6	56.9
#8	2.7	6.3	83.3	34.9	8.2	65.1 r
#16	2.1	2.8	68.5	28.4	6.5	71.6
#30	2.0	2.1	49.2	20.7	7.8	79.3 r
#50	1.9	1.9	20.1	9.1	11.6	90.9
#100	1.8	1.8	3.3	2.4	6.7	97.6 a
LBW	1.5	1.6	0.6	1.2	1.2	98.8

Aggregate Supplier Gradations

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Coars	seness Factor:	63	Workability Factor:	35	
45 -	r]
:	45, 44			JMF Zone	
-		52, 41			
Workability Factor (%)			58, 39 68, 38	75, 39	
jo j]		Production Gradation 60, 36		
2 35 -		52, 34	IPS		
<u> j</u>	45, 33	52, 34			
ig 30 -		7	58, 31 68,31		
o k	Operating Zone Boundary			75, 28	
≯ 25 -		-			
1	45	50 5	5 Coarseness Factor (%)	75	80
ActionLir	mits Boundary =		(70)		

Work	ability Factor:	35	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.1	0.9	0.9
3/4"	90.3	8.8	9.7
1/2"	69.2	21.1	30.8
3/8"	59.1	10.1	40.9
#4	41.8	17.3	58.2
#8	35.1	6.6	64.9
#16	28.5	6.6	71.5
#30	21.2	7.3	78.8
#50	8.7	12.5	91.3
#100	1.8	7.0	98.2
LBW	0.7	1.0	99.3

PREPARED BY: SM, LLC Technical Service Approved By

Concrete Grade: DM, 4500HP 8/28/23 Sample Date: Dates Test Represents: 8/29/2023 9/4/2023 through

MDOT	Nο·
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Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.6

Contractor:

Dates restr	represents.	0/20/2020	unougn	3/4/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1525	9.09	2.69	51.7
26A	58-003	Stoneco	275	1.64	2.69	9.3
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68		100.0

SUPERIOR MATERIALS

Superior Materials, LLC 30701 W. 10 Mile Rd. Suite 500 Farmington Hills, MI 48336

	i otai wt	2950	17.68		100.0	< Verify this n	umber is 100%
Sieve	6AA	26A		2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	0	100.0	100.0	0.0	0.0
1"	99.9	100.0	0	100.0	99.9	0.1	0.1
3/4"	84.3	100.0	0	100.0	91.9	8.1	8.1
1/2"	45.8	99.4		100.0	71.9	20.0	28.1
3/8"	21.5	87.6	;	100.0	58.3	13.7	41.7
#4	3.1	9.9		97.4	40.5	17.8	59.5
#8	1.4	2.8		82.3	33.1	7.4	66.9
#16	1.2	2.1		65.1	26.2	6.9	73.8
#30	1.1	1.8		46.3	18.8	7.4	81.2
#50	1.1	1.7		23.3	9.8	9.0	90.2
#100	1.1	1.6		5.9	3.0	6.8	97.0
LBW	1.0	1.5		1.0	1.0	2.0	99.0
Production Gra	adation O Batch Plant Grada	itions	gate Supplier G	radations	Adjusted WF	Intial Production	on Sample (IPS

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

45 45, 44 JMF Zone 40 40 52, 41 56, 49 68, 38 75, 39 45, 33 56, 31 67, 24 31 Operating Zone Boundary Operating Zone Boundary 75, 28	Coarseness Factor:	62	Workability Factor:	33	
Y Operating Zone	45 45, 44	52, 41	68, 38	JMF Zone	
Boundary 75, 28				75, 28	
40 45 50 55 Coarseness Factor (%) 70 75 ActionLimits Boundary =		50 55	Coarseness Factor (%) ⁷⁰	75	80

Work	ability Factor:	36	
Sieve Cumulative % Passing		% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.1	10.2	10.9
1/2"	70.5	18.6	29.5
3/8"	60.5	10.0	39.5
#4	44.1	16.4	55.9
#8	35.6	8.5	64.4
#16	27.7	7.9	72.3
#30	20.6	7.1	79.4
#50	8.7	11.8	91.3
#100	1.6	7.1	98.4
LBW	1.1	0.6	98.9

61

Sample Date:

Production Gradation

8/28/23 Concrete Grade: DM, 4500HP 9/4/2023

Dates Test F	Represents:	8/29/2023	through	9/4/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1605	9.82	2.62	55.2
26A	71-47	Presque Isle	200	1.22	2.62	6.9
2NS	44-051	Krake Willis Rd	1100	6.65	2.65	37.9
		T-4-1 \A/4	2005	47.00		100.0

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.1

Contractor:



Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

	i otai vyt	2905 17.69		100.0	< Verify this n	umber is 100%	
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained	
2"	100.0	100.0	100.0	100.0	0.0	0.0	l
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	l
1"	99.4	100.0	100.0	99.7	0.3	0.3	l
3/4"	89.0	100.0	100.0	93.9	5.7	6.1	l
1/2"	49.0	95.0	100.0	71.5	22.4	28.5	l
3/8"	28.6	84.6	100.0	59.5	12.0	40.5	
#4	3.9	20.4	99.0	41.0	18.4	59.0	l
#8	2.0	5.1	85.0	33.6	7.4	66.4	n
#16	1.8	2.5	67.9	26.9	6.8	73.1	
#30	1.7	1.9	50.6	20.2	6.6	79.8	n
#50	1.6	1.7	23.1	9.7	10.5	90.3	l
#100	1.6	1.6	5.8	3.2	6.6	96.8	а
LBW	1.4	1.4	1.0	1.2	1.9	98.8	l
Production G	radation O Batch Plant Grad	ations Aggregate Supplier Gr	radations	Adjusted WF	Intial Production	on Sample (IPS)

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Coarseness Factor:	61	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 96, 40 68, 38 68, 38 68, 38 68, 32 68,8 32	JMF Zone 75, 39	
25 +	<u></u>		75, 28	
40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%) ⁷⁰	75	80

Work	ability Factor:	36	
Sieve Cumulative % Passing		% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	89.7	10.3	10.3
1/2"	70.3	19.4	29.7
3/8"	59.1	11.2	40.9
#4	42.8	16.3	57.2
#8	35.5	7.3	64.5
#16	29.0	6.5	71.0
#30	21.2	7.7	78.8
#50	9.8	11.5	90.2
#100	3.7	6.1	96.3
LBW	1.2	2.5	98.8

63

Sample Date:

LBW

Production Gradation

8/28/23 Concrete Grade: DM, 4500HP

8/29/2023 9/4/2023 through

Dates Test F	Represents:	8/29/2023	through	9/4/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1550	9.48	2.62	53.4
26A	71-47	Presque Isle	205	1.25	2.62	7.1
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17 69		100.0

Contractor:

MDOT No.:

1.9

Adjusted WF Intial Production Sample (IPS)

1.2

37.2



---- Verify this number is 100%

Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	97.0	100.0	100.0	98.4	1.6	1.6
3/4"	78.1	100.0	100.0	88.3	10.1	11.7
1/2"	37.7	96.5	100.0	66.5	21.8	33.5
3/8"	22.3	87.2	100.0	57.6	8.9	42.4
#4	4.5	25.7	96.7	42.5	15.1	57.5
#8	2.7	6.3	83.0	34.7	7.8	65.3
#16	2.1	2.8	67.8	28.2	6.6	71.8
#30	2.0	2.1	50.4	21.2	7.0	78.8
#50	1.9	1.9	25.8	11.4	9.8	88.6
#100	1.8	1.8	5.1	3.1	8.3	96.9

1.6

Aggregate SupplierGradations

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

*% Retained must be at least 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Coarseness Factor:	65	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 38 Production Gra 60, 36 IPS		
Boundary 25 40 45 ActionLimits Boundary =	50 58	Coarseness Factor (%)	75, 28	80

Work	ability Factor:	35	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.1	4.9	4.9
1/2"	74.6	20.5	25.4
3/8"	59.3	15.3	40.7
#4	42.1	17.2	57.9
#8	35.1	7.1	64.9
#16	29.2	5.9	70.8
#30	21.9	7.3	78.1
#50	9.6	12.4	90.4
#100	2.4	7.2	97.6
LBW	0.9	1.5	99.1

98.8

Coarseness Factor:

PREPARED BY: SM, LLC Technical Service

1.5

Batch Plant Gradations