Aggregate Optimization Chart

Batch Plant Gradations

Production Gradation Report

PLANT #: P-101 Contractor:

Sample Date: 5/29/23 Concrete Grade: DM, 4500HP **Dates Test Represents:** 5/30/2023 6/5/2023 through

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

MDOT No.:

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

% Retained	Cumulative % Retained	<u>Superior Materials, LLC</u> 30701 W. 10 Mile Rd.
0.0	0.0	Suite 500
0.0	0.0	Farmington Hills, MI 48336
2.3	2.3	

Coarseness Factor:

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

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

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

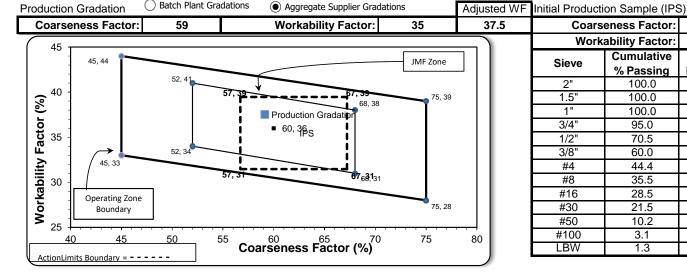
*% Retained must be at least 4% for each sieve except max.,

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

*% Retained must be at least 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

Total Wt		2900	17.63		100.0	umber is 100%	
Sieve	6AA	26	A	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"	95.6	100	0.0	100.0	97.7	2.3	2.3
3/4"	79.1	100	0.0	100.0	89.2	8.5	10.8
1/2"	43.0	94	.7	100.0	70.1	19.1	29.9
3/8"	28.2	85	.2	100.0	61.6	8.5	38.4
#4	6.2	20	.8	97.3	43.6	18.0	56.4
#8	2.5	5.	8	83.8	35.0	8.6	65.0
#16	2.0	3.	4	69.8	29.0	6.0	71.0
#30	1.9	2.	9	52.5	22.1	7.0	77.9
#50	1.8	2.7		22.6	10.1	11.9	89.9
#100	1.8	2.5		5.0	3.1	7.0	96.9
LBW	1.6	2.	2	0.8	1.3	1.8	98.7



Work	ability Factor:	35	
Sieve	Cumulative	%	Cumulative
	% 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

Approved By:

Sample Date:

Production Gradation

5/29/23 Concrete Grade: DM, 4500HP

Dates Test Represents:		5/30/2023	through	6/5/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific	%
Agg. Olass		oouroc	rreight (665)		Gravity	Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	200	1.19	2.69	6.8
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.7



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

Total Wt	2950	17.68		100.0	< Verify this n	umber is 100%
6AA	26	6A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
100.0	10	0.0	100.0	100.0	0.0	0.0
100.0	10	0.0	100.0	100.0	0.0	0.0
99.4	10	0.0	100.0	99.7	0.3	0.3
85.3	10	0.0	100.0	92.0	7.6	8.0
44.0	99	9.8	100.0	69.6	22.4	30.4
21.1	86	6.7	100.0	56.3	13.3	43.7
2.9	13	3.8	99.4	41.3	15.0	58.7
1.2	4.	.2	85.3	34.2	7.1	65.8
1.0	2	.4	66.3	26.6	7.6	73.4
0.9	1.	.9	45.5	18.4	8.2	81.6
0.8	1.	.8	21.3	8.9	9.5	91.1
0.7	1.	.7	5.4	2.6	6.3	97.4
0.6	1.	.5	0.9	0.8	1.8	99.2
	100.0 100.0 99.4 85.3 44.0 21.1 2.9 1.2 1.0 0.9 0.8	6AA 26 100.0 10 100.0 10 99.4 10 85.3 10 44.0 99 21.1 86 2.9 13 1.2 4 1.0 2 0.9 1 0.8 1 0.7 1	6AA 26A 100.0 100.0 100.0 100.0 99.4 100.0 85.3 100.0 44.0 99.8 21.1 86.7 2.9 13.8 1.2 4.2 1.0 2.4 0.9 1.9 0.8 1.8 0.7 1.7	6AA 26A 2NS 100.0 100.0 100.0 100.0 100.0 100.0 99.4 100.0 100.0 85.3 100.0 100.0 44.0 99.8 100.0 21.1 86.7 100.0 2.9 13.8 99.4 1.2 4.2 85.3 1.0 2.4 66.3 0.9 1.9 45.5 0.8 1.8 21.3 0.7 1.7 5.4	6AA 26A 2NS Cumulative % Passing 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 99.4 100.0 100.0 99.7 85.3 100.0 100.0 92.0 44.0 99.8 100.0 69.6 21.1 86.7 100.0 56.3 2.9 13.8 99.4 41.3 1.2 4.2 85.3 34.2 1.0 2.4 66.3 26.6 0.9 1.9 45.5 18.4 0.8 1.8 21.3 8.9 0.7 1.7 5.4 2.6	6AA 26A 2NS Cumulative % Passing % Retained 100.0 100.0 100.0 100.0 0.0 100.0 100.0 100.0 100.0 0.0 99.4 100.0 100.0 99.7 0.3 85.3 100.0 100.0 92.0 7.6 44.0 99.8 100.0 69.6 22.4 21.1 86.7 100.0 56.3 13.3 2.9 13.8 99.4 41.3 15.0 1.2 4.2 85.3 34.2 7.1 1.0 2.4 66.3 26.6 7.6 0.9 1.9 45.5 18.4 8.2 0.8 1.8 21.3 8.9 9.5 0.7 1.7 5.4 2.6 6.3

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 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

Coarseness Factor:	66	Workability Factor:	34	
45 45, 44 45, 44 45, 33 45, 33 Operating Zone Boundary	52, 34	68, 38 Production 68, 38 Froduction 68, 38	JMF Zone 75, 39 Gradation 75, 28	
25 40 45 ActionLimits Boundary =	50	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:

Concrete Grade: DM, 4500HP 5/29/23

Dates Test Represents:		5/30/2023	through	6/5/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	200	1.19	2.69	6.8
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68		100.0

MDOT No.:

Contractor:

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 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

	Total Wt	2950	17.68		100.0	< Verify this n	this number is 100%	
Sieve	Sieve 6AA		26A		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"	99.4	10	0.0	100.0	99.7	0.3	0.3	
3/4"	85.3	10	0.0	100.0	92.0	7.6	8.0	
1/2"	44.0	99	9.8	100.0	69.6	22.4	30.4	
3/8"	21.1	86	6.7	100.0	56.3	13.3	43.7	
#4	2.9	13	3.8	99.4	41.3	15.0	58.7	
#8	1.2	4	.2	85.3	34.2	7.1	65.8	
#16	1.0	2	.4	66.3	26.6	7.6	73.4	
#30	0.9	1	.9	45.5	18.4	8.2	81.6	
#50	0.8	1.8		21.3	8.9	9.5	91.1	
#100	0.7	1.7		5.4	2.6	6.3	97.4	
LBW	0.6	1	.5	0.9	0.8	1.8	99.2	
Production Grad	dation O Batch Plant Grada	tions	regate Supplier Gr	adations	Adjusted WF	Intial Production	on Sample (IPS	

Production Gradation	Batch Plant Gradations	 Aggregate Supplier Grad 	dations	Adjusted WF	Intial Producti	on Sample (IPS	3)
Coarseness Factor:	66	Workability Factor:	34	36.7	Coars	eness Factor:	
45					Work	ability Factor:	
45, 44			JMF Zone		Sieve	Cumulative % Passing	F
	52, 41 56, 40	67.40			2"	100.0	
% ⁴⁰	00,7		75, 39		1.5"	100.0	
&		68, 38	Ĭ		1"	99.3	
5	i	■ 60188 Production	Gradation		3/4"	89.2	
Factor 1 35	!	- 00169			1/2"	70.7	
12	52, 34	!			3/8"	60.7	
45, 33					#4	44.4	
 30	56, 32	67, 32 , 31			#8	35.9	
Operating Zone					#16	27.3	
45, 33 Operating Zone Boundary			75, 28		#30	19.1	

55

Coarseness Factor (%) 60

75

80

Work	Workability Factor:		
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

45

ActionLimits Boundary = - - -

Approved BY:

PLANT #: Contractor:

Sample Date: 5/29/23 Concrete Grade: DM, 4500HP **Dates Test Represents:** 5/30/2023 6/5/2023 through MDOT No.:

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.1
26A	58-003	Stoneco	260	1.55	2.69	8.8
2NS	19-04	Schlegel	1100	6.60	2.67	37.2
		Total Wt	2960	17.68		100.0

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.0

Finish First With Builders'
Builders Redi-Mix
30701 W. 10 Mile Rd.
Suite 500

Farmington Hills, MI 48336

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

*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 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

	Total Wt	2960	17.68		100.0	< Verify this number is 100%	
Sieve	6AA	26	A	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"	99.4	100	0.0	100.0	99.7	0.3	0.3
3/4"	85.3	100	0.0	100.0	92.1	7.6	7.9
1/2"	44.0	99	.8	100.0	69.7	22.3	30.3
3/8"	21.1	86	86.7		56.2	13.5	43.8
#4	2.9	13	.8	99.9	39.9	16.3	60.1
#8	1.2	4.	2	90.1	34.5	5.4	65.5
#16	1.0	2.	4	69.4	26.5	8.0	73.5
#30	0.9	1.	9	44.5	17.2	9.4	82.8
#50	0.8	1.	8	14.3	5.9	11.3	94.1
#100	0.7	1.	7	2.7	1.5	4.4	98.5
LBW	0.6	1.	5	0.2	0.5	1.0	99.5

Aggregate Supplier Gradations

Coarseness Factor: 67 **Workability Factor:** 35 45 45, 44 JMF Zone 52, 4 Workability Factor (%) 68, 38 roduction Gradation ■ 60,36PS 52, 34 45, 33 Operating Zone Boundary 75, 28 25 45 50 55 Coarseness Factor (%)⁷⁰ 75 80 ActionLimits Boundary = - - - - -

Batch Plant Gradations

Production Gradation

Work	Workability Factor:		
Sieve	Sieve Cumulative % Passing		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

PLANT #: 12

63-115

Ray Rd

Sample Date:

2NS

5/29/23 Concrete Grade: DM, 4500HP

6.95

2.65

Dates Test Represents: 5/30/2023 6/5/2023 through Specific % ft³ Agg. Class Pit# Source Weight (SSD) Gravity Contribution 6AA 71-47 Presque Isle 1655 10.12 2.62 57.0 26A 71-47 Presque Isle 100 0.61 2.62 3.4

1150

Contractor:

MDOT No.:

39.6

Coarseness Factor:

•	SUP	ERI	OR
N	ATE	RI	ALS

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 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

-	Total Wt	2905	17.69		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	iA.	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"	98.6	100	0.0	100.0	99.2	0.8	0.8
3/4"	84.1	100	0.0	100.0	90.9	8.3	9.1
1/2"	46.4	95	5.6	100.0	69.3	21.6	30.7
3/8"	28.1	86	5.8	100.0	58.6	10.7	41.4
#4	5.7	18	18.5		42.1	16.5	57.9
#8	2.4	4.	.6	81.2	33.7	8.5	66.3
#16	2.0	2.	.1	66.4	27.5	6.2	72.5
#30	1.8	1.	5	50.6	21.1	6.4	78.9
#50	1.8	1.	.3	25.2	11.0	10.1	89.0
#100	1.7	1.	.2	4.1	2.6	8.4	97.4
LBW	1.2	1.	.0	0.5	0.9	1.7	99.1
Production (Gradation O Batch Plant Grada	ations	regate Supplier Gra	adations	Adjusted WF	Intial Production	on Sample (IPS

 Aggregate Supplier Gradations Batch Plant Gradations **Production Gradation** Coarseness Factor: **Workability Factor:** 34 36.2 62 JMF Zone 75. 39 Workability Factor (%) ■ 60,36 reduction fradation 52, 34 Operating Zone 75, 28 Boundary 45 50 Coarseness Factor (%) 70 75 80 ActionLimits Boundary = - - - - -

Work	ability Factor:	36	
Sieve	Sieve Cumulative % Passing		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

PLANT #: p11

Sample Date:

#100

LBW

5/29/23 Concrete Grade: DM, 4500HP 6/5/2023

Dates Test F	Represents:	5/30/2023	through	6/5/2023		
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	2005	17 60		100.0

MDOT No.:

96.7

99.0

---- Verify this number is 100%

Contractor:

6.3

2.3

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

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	l
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	ı
1"	96.7	100.0	100.0	98.3	1.7	1.7	ı
3/4"	78.5	100.0	100.0	89.2	9.1	10.8	l
1/2"	37.1	95.6	100.0	68.0	21.2	32.0	l
3/8"	15.5	86.8	100.0	56.3	11.7	43.7	l
#4	1.3	18.5	96.4	40.7	15.6	59.3	l
#8	1.0	4.6	84.2	34.3	6.4	65.7	n
#16	0.9	2.1	68.3	27.7	6.6	72.3	l
#30	0.9	1.5	48.1	19.6	8.1	80.4	n
#50	0.9	1.3	22.7	9.6	10.1	90.4	l

6.8

1.4

3.3

1.0

1.2

1.0

*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 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation	Batch Plant Gradations	Aggregate Supplier Gradations	Adjusted WF	Intial Product	ion Sample (IPS	;)
Coarseness Factor:	67	Workability Factor: 34	36.8	Coars	seness Factor:	Γ
45			$\neg \neg$	Worl	kability Factor:	
45, 44		JMF Zo	one	Sieve	Cumulative	Г
1 1	52, 41			Sieve	% Passing	
40 1	56, 40	67, 40		2"	100.0	ſ
(%) ⁴⁰]	i	68, 38	39	1.5"	100.0	Г
	!	■ Production Gradation		1"	100.0	Г
0		■ 60, 3BS		3/4"	95.0	Г
Factor 35	↓ i	il		1/2"	72.3	Г
· · ·	52, 34	i		3/8"	60.4	Г
≦ ∫ /45, 33	50.92	27 32		#4	42.6	Г
30	00,02	67 _{68,31}		#8	36.0	Г
Norway 30 - 45, 33 Operating Zone Boundary				#16	29.5	Г
Boundary		75,	28	#30	20.3	
>				#50	9.5	Г
40 45	50 55 _	60 _6570 75	80	#100	3.4	
	Co	arseness Factor (%)	**	LBW	1.3	Г
ActionLimits Boundary = -						

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

PREPARED BY: SM, LLC Technical Service

0.9

0.7

Sample Date:

Production Gradation

5/29/23

Concrete Grade: DM, 4500HP 6/5/2023

Dates Test F	Represents:	5/30/2023	through	6/5/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific	%
Ayy. Class	FIL#	Source	weight (SSD)	IL	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

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

36.8

Coarseness Factor:



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

	i otai vvt	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	
1.5"	100.0	100.0)	100.0	100.0	0.0	0.0	
1"	96.7	100.0)	100.0	98.3	1.7	1.7	
3/4"	78.5	100.0	1	100.0	89.2	9.1	10.8	
1/2"	37.1	95.6		100.0	68.0	21.2	32.0	
3/8"	15.5	86.8		100.0	56.3	11.7	43.7	
#4	1.3	18.5		96.4	40.7	15.6	59.3	
#8	1.0	4.6		84.2	34.3	6.4	65.7	n
#16	0.9	2.1		68.3	27.7	6.6	72.3	1
#30	0.9	1.5		48.1	19.6	8.1	80.4	n
#50	0.9	1.3		22.7	9.6	10.1	90.4	1
#100	0.9	1.2		6.8	3.3	6.3	96.7	а
LBW	0.7	1.0		1.4	1.0	2.3	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 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

Coarseness Factor:	67	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 68, 38 60, 38S	75, 39 radation	
40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%) ⁷⁰	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"	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

62

58-003

58-003

81-019

Sample Date:

6AA

26A

2NS

Concrete Grade: DM, 4500HP

2.65

39.0

5/30/2023 **Dates Test Represents:** through Agg. Class Pit#

5/29/23

Pleasant Lake

5/30/2023	through	6/5/2023		
Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
Stoneco	1600	9.53	2.69	54.2
Stoneco	200	1.19	2.69	6.8

6.95

MDOT No.:

Contractor:

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

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 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") 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"	99.4	10	0.0	100.0	99.7	0.3	0.3
3/4"	85.3	10	0.0	100.0	92.0	7.6	8.0
1/2"	44.0	99	9.8	100.0	69.6	22.4	30.4
3/8"	21.1	86	6.7	100.0	56.3	13.3	43.7
#4	2.9	13	3.8	99.4	41.3	15.0	58.7
#8	1.2	4	.2	85.3	34.2	7.1	65.8
#16	1.0	2	.4	66.3	26.6	7.6	73.4
#30	0.9	1	.9	45.5	18.4	8.2	81.6
#50	0.8	1	.8	21.3	8.9	9.5	91.1
#100	0.7		.7	5.4	2.6	6.3	97.4
LBW	0.6	1	.5	0.9	0.8	1.8	99.2

 Batch Plant Gradations Aggregate Supplier Gradations **Production Gradation Coarseness Factor:** 66 **Workability Factor:** 34 36.7

1150

Adjusted WF Intial Production Sample (IPS) **Coarseness Factor:** 61 **Workability Factor:**

Workability Factor (%)	52, 34 ■ Pro 60,136 ■ Pro 60,136	JMF Zone 75, 39 oduction Gradation 75, 28
25 - 4	40 45 50 55 60 65 Coarseness Factor (

Sieve	Cumulative	%	Cumulative
Sieve	% Passing	Retained	% 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

5/29/23

PLANT #: P-36

Sample Date:

Production Gradation

Coarseness Factor:

Concrete Grade: DM, 4500HP

Dates Test F	Represents:	5/30/2023	through	6/5/2023		
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	150	0.92	2.62	5.2
2NS	63-92	Grange Hall	1150	6.95	2.65	39.6
		Total Wt	2905	17 69		100.0

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

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.

63

*% Retained must be at least 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

	Total Wt	2905	17.69		100.0	< Verify this number is 100%		
Sieve	6AA	26	5A	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"	98.6	10	0.0	100.0	99.2	0.8	0.8	
3/4"	84.1	10	0.0	100.0	91.2	8.0	8.8	
1/2"	46.4	95	5.6	100.0	70.2	21.1	29.8	
3/8"	28.1	86	6.8	100.0	59.6	10.6	40.4	
#4	5.7	18	3.5	98.2	43.0	16.6	57.0	
#8	2.4	4	.6	87.3	36.1	6.9	63.9	
#16	2.0	2	.1	71.8	29.6	6.5	70.4	
#30	1.8	1	.5	47.3	19.8	9.8	80.2	
#50	1.8	1	.3	21.3	9.5	10.3	90.5	
#100	1.7	1	.2	4.7	2.9	6.6	97.1	
LBW	1.2	1	.0	0.7	1.0	1.9	99.0	

Aggregate Supplier Gradations

36

38.6

Workability Factor:

45 JMF Zone 45, 44 Workability Factor (%) ජීෑස්ජීation ■ 60, 36 IPS 52, 34 45, 33 Operating Zone Boundary 25 Coarseness Factor (%) 70 45 50 55 75 80 ActionLimits Boundary = - - - - -

Batch Plant Gradations

63

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

Sample Date:

5/29/23

Contractor:

Concrete Grade: DM, 4500HP

Dates Test Represents:		5/30/2023	through	6/5/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	200	1.19	2.69	6.8
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		T-4-1 \A/4	2050	17.60		100.0

MDOT No.:

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 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

98.9

	Total 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	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"	99.4	100	0.0	100.0	99.7	0.3	0.3
3/4"	85.3	100	0.0	100.0	92.0	7.6	8.0
1/2"	44.0	99	9.8	100.0	69.6	22.4	30.4
3/8"	21.1	86	6.7	100.0	56.3	13.3	43.7
#4	2.9	13	3.8	99.4	41.3	15.0	58.7
#8	1.2	4.	.2	85.3	34.2	7.1	65.8
#16	1.0	2.	.4	66.3	26.6	7.6	73.4
#30	0.9	1.	.9	45.5	18.4	8.2	81.6
#50	0.8	1.	.8	21.3	8.9	9.5	91.1
#100	0.7	1.	.7	5.4	2.6	6.3	97.4
LBW	0.6	1.	.5	0.9	0.8	1.8	99.2

 Batch Plant Gradations Aggregate Supplier Gradations **Production Gradation** Adjusted WF Intial Production Sample (IPS) Coarseness Factor: 66 Workability Factor: 34 36.7

Workability Factor: % Cumulative Cumulative Sieve % Passing Retained % 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" 29.5 70.5 18.6 3/8' 10.0 39.5 60.5 #4 55.9 44.1 16.4 #8 35.6 8.5 64.4 #16 27.7 7.9 72.3 79.4 #30 20.6 7.1 #50 91.3 8.7 11.8 #100 1.6 7.1 98.4

1.1

61 36

Coarseness Factor:

LBW

	⁴⁵ [JMF Zone
Workability Factor (%)	35	45, 44 52 45, 33 Operating Zone Boundary	4 56, 49 ■ 60 ₁ β€ 34	75, 39 68, 38 Production Gradation 67, 34 31
	25 40	45 50	55 Coarseness Fac	tor (%) ⁷⁰ 75 80

Sample Date:

Production Gradation

5/29/23

Batch Plant Gradations

Contractor:

Concrete Grade: DM, 4500HP

MDOT No.:

Dates Test Represents:		5/30/2023	through	6/5/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1555	9.51	2.62	53.5
26A	71-47	Presque Isle	250	1.53	2.62	8.6
2NS	44-051	Krake Willis Rd	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

<---- Verify this number is 100%

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.3

SUPERIO	R
MATERIAL	S
Superior Materials, I	<u>LLC</u>
30701 W. 10 Mile Rd.	

	10tai vvt 2903 17.09			100.0	< verily trils if	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"	95.6	100.0	100.0	97.6	2.4	2.4
3/4"	79.1	100.0	100.0	88.8	8.8	11.2
1/2"	43.0	94.7	100.0	69.0	19.8	31.0
3/8"	28.2	85.2	100.0	60.3	8.7	39.7
#4	6.2	20.8	95.7	41.3	18.9	58.7
#8	2.5	5.8	81.9	32.8	8.5	67.2 r
#16	2.0	3.4	66.9	26.7	6.2	73.3
#30	1.9	2.9	50.2	20.3	6.4	79.7 r
#50	1.8	2.7	25.0	10.7	9.6	89.3
#100	1.8	2.5	7.5	4.0	6.6	96.0 a
LBW	1.6	2.2	1.3	1.5	2.5	98.5

Aggregate Supplier Gradations

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 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

Coarseness Factor:	59	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 60, 36 Production Seadation 58, 32	75, 39	
40 45 ActionLimits Boundary =	50	55 Coarseness Factor (%)	75	80

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"	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

PREPARED BY: SM, LLC Technical Service Approved By:

5/29/23

PLANT #: P-02

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.2

Dates Test F	Represents:	5/30/2023	through	6/5/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1655	10.12	2.62	57.0
26A	71-47	Presque Isle	100	0.61	2.62	3.4
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1655	10.12	2.62	57.0
26A	71-47	Presque Isle	100	0.61	2.62	3.4
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

Verify this n	umber is 100%	SUPERIOR MATERIALS
% Retained	Cumulative	Superior Materials, LL
	% Retained	30701 W. 10 Mile Rd.

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"	98.6	100.0	100.0	99.2	0.8	0.8
3/4"	84.1	100.0	100.0	90.9	8.3	9.1
1/2"	46.4	95.6	100.0	69.3	21.6	30.7
3/8"	28.1	86.8	100.0	58.6	10.7	41.4
#4	5.7	18.5	96.6	42.1	16.5	57.9
#8	2.4	4.6	81.2	33.7	8.5	66.3
#16	2.0	2.1	66.4	27.5	6.2	72.5
#30	1.8	1.5	50.6	21.1	6.4	78.9
#50	1.8	1.3	25.2	11.0	10.1	89.0
#100	1.7	1.2	4.1	2.6	8.4	97.4
LBW	1.2	1.0	0.5	0.9	1.7	99.1

Aggregate SupplierGradations

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

Suite 500

*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.,

Farmington Hills, MI 48336

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

*% Retained must be at least 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

Coarseness Factor:	62	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 39 68, 38 60, 36 Production Gradation IPS	JMF Zone 75, 39	
\$ 25 40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	80

Batch Plant Gradations

Workability 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