Aggregate Optimization Chart

6/26/23

Batch Plant Gradations

Sample Date:

Production Gradation

Production Gradation Report

PLANT #: P-101

Concrete Grade: DM, 4500HP

Dates Test Represents:		6/27/2023	through	7/3/2023		
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.:

Contractor:

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:



---- Verify this number is 100%

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

Farmington Hills, MI 48336

	Total Wt	2300 17.03		100.0	C Verily this humber 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"	99.5	100.0	100.0	99.7	0.3	0.3
3/4"	89.2	100.0	100.0	94.4	5.3	5.6
1/2"	51.4	95.8	100.0	74.5	19.9	25.5
3/8"	23.5	86.4	100.0	59.3	15.2	40.7
#4	6.7	21.7	96.5	43.6	15.7	56.4
#8	2.7	6.0	81.8	34.4	9.3	65.6
#16	2.3	3.2	67.1	28.1	6.3	71.9
#30	2.2	2.6	51.6	21.8	6.3	78.2
#50	2.2	2.3	27.7	12.3	9.5	87.7
#100	2.1	2.2	7.5	4.3	8.1	95.8
LBW	1.8	2.0	1.0	1.5	2.8	98.5

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:	62	Workability Factor:	34	36.9
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 68, 38 60, 36S 6763,131	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

Sample Date:

Production Gradation

6/26/23 Concrete Grade: DM, 4500HP

sents:	6/27/2023	through	7/3/2023		
it#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
-003	Stoneco	1500	8.94	2.69	50.8

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.3

Contractor:

Dates Test Repres Agg. Class Pit 6AA 58-26A 58-003 300 1.79 2.69 10.2 Stoneco 2NS 81-019 Pleasant Lake 1150 6.95 2.65 39.0

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	6A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained	
2"	100.0	10	0.0	100.0	100.0	0.0	0.0	1
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0	
1"	99.8	10	0.0	100.0	99.9	0.1	0.1	
3/4"	83.0	10	0.0	100.0	91.4	8.5	8.6	1
1/2"	43.9	98	3.6	100.0	71.3	20.0	28.7	
3/8"	19.8	89	9.6	100.0	58.2	13.2	41.8	*
#4	3.0	11	l.1	98.5	41.1	17.1	58.9	*
#8	1.6	2	.9	83.8	33.8	7.3	66.2	no
#16	1.4	2	.3	66.2	26.8	7.0	73.2	*
#30	1.3	2	.1	46.5	19.0	7.8	81.0	no
#50	1.2	2	.0	22.7	9.7	9.3	90.3	,
#100	1.2	2	.0	6.0	3.2	6.5	96.8	а
LBW	1.0	1	.8	1.0	1.1	2.1	98.9	Ī

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:	63	Workability Factor:	34	
45 45, 44 45, 44 45, 33 45, 33 Operating Zone Boundary	52, 34	68, 38 60, 26 Production Gradation	75, 39	
25 + 40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	80

Batch Plant Gradations

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"	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

Pleasant Lake

Batch Plant Gradations

PLANT #: P-103

81-019

Sample Date:

2NS

Production Gradation

6/26/23 Concrete Grade: **DM**, **4500HP**

6.95

2.65

39.0

36.3

Dates Test Represents:		6/27/2023	through	7/3/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.8
264	58-003	Stoneco	300	1 70	2 69	10.2

1150

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

Contractor:



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%
Sieve	6AA	26	A	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"	99.8	100	.0	100.0	99.9	0.1	0.1
3/4"	83.0	100	.0	100.0	91.4	8.5	8.6
1/2"	43.9	98.	6	100.0	71.3	20.0	28.7
3/8"	19.8	89.	6	100.0	58.2	13.2	41.8
#4	3.0	11.	.1	98.5	41.1	17.1	58.9
#8	1.6	2.9	9	83.8	33.8	7.3	66.2
#16	1.4	2.3	3	66.2	26.8	7.0	73.2
#30	1.3	2.	1	46.5	19.0	7.8	81.0
#50	1.2	2.0)	22.7	9.7	9.3	90.3
#100	1.2	2.0)	6.0	3.2	6.5	96.8
LBW	1.0	1.8	3	1.0	1.1	2.1	98.9

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.

 $^{\star}\%$ 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:	63	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	60188 Production Gradation	75, 39	
25 40 45 ActionLimits Boundary =	50 5	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"	89.2	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: 6/26/23 Concrete Grade: DM, 4500HP Dates Test Represents: 6/27/2023 7/3/2023 through MDOT No.:

Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1560	9.29	2.69	52.7
26A	58-003	Stoneco	300	1.79	2.69	10.1
2NS	19-04	Schlegel	1100	6.60	2.67	37.2
		Total Wt	2960	17.68		100.0

---- Verify this number is 100%

11.3

4.3

Builders Redi-Mix					
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	ĺ
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	
1"	99.8	100.0	100.0	99.9	0.1	0.1	
3/4"	83.0	100.0	100.0	91.0	8.9	9.0	
1/2"	43.9	98.6	100.0	70.3	20.7	29.7	
3/8"	19.8	89.6	100.0	56.7	13.6	43.3	4
#4	3.0	11.1	99.9	39.8	16.8	60.2	*
#8	1.6	2.9	90.1	34.6	5.2	65.4	no
#16	1.4	2.3	69.4	26.8	7.9	73.2	*
#30	1.3	2.1	44.5	17.4	9.3	82.6	no

14.3

2.7

6.1

1.8

0.8

2.0

2.0

1.8

*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	O Batch Plant Gra	adations Aggregate Supplier Gradatio	ns	Adjusted WF	Intial Producti	on Sample (IPS	;)
Coarseness Factor:	66	Workability Factor:	35	37.1	Coars	eness Factor:	
45					Work	ability Factor:	
45, 44			JMF Zone	7	Sieve	Cumulative	
	52, 41	57, 40 68, 40		-	2"	% Passing 100.0	F
3 40 f			75, 39	- 11	1.5"	100.0	r
(%)		68, 38]	- 11	1"	99.3	Γ
Factor 35		Production Gra	dation	- 11	3/4"	89.0	Г
5 35		- 00, 5urs		- 11	1/2"	70.3	
	52, 34			- 11	3/8"	59.9	
Atomos Approximate				- 11	#4	41.9	
<u></u> 30		57, 32 68, 31		- 11	#8	35.9	
Operating Zone				- 11	#16	27.8	
b Boundary			75, 28	- 11	#30	18.9	
	_				#50	6.3	
25 1	50 5		75	700	#100	1.7	
40 45	50 55	Coarseness Factor (%)	75	80	LBW	1.0	
ActionLimits Boundary =		(,,,			_		

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

93.9

98.2

99.2

PREPARED BY: SM, LLC Technical Service

1.2

1.2

#50

#100

LBW

PLANT #: Contractor:

Concrete Grade: DM, 4500HP Sample Date: 6/26/23 Dates Test Represents: 6/27/2023 7/3/2023 MDOT No.: through

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

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

							_
6AA	26	A	2NS	Cumulative % Passing	% Retained		
100.0	100	0.0	100.0	100.0	0.0	0.0	1
100.0	100	.0	100.0	100.0	0.0	0.0	1
100.0	100	.0	100.0	100.0	0.0	0.0	7
80.0	100	.0	100.0	89.3	10.7	10.7	1
44.4	95.	0	100.0	70.0	19.3	30.0	1
28.4	86.	8	100.0	60.9	9.1	39.1	1
5.8	20.	.1	96.5	42.7	18.2	57.3	1
3.0	4.2	2	80.4	33.7	9.0	66.3	n
2.6	2.2	2	65.1	27.3	6.4	72.7	1
2.4	1.8	3	49.5	21.0	6.3	79.0	n
2.3	1.6	ĵ	25.6	11.5	9.5	88.5	1
2.2	1.5	5	4.8	3.2	8.3	96.8	а
1.6	1.3	3	0.7	1.2	2.0	98.8	1
	100.0 100.0 100.0 80.0 44.4 28.4 5.8 3.0 2.6 2.4 2.3 2.2	100.0 100 100.0 100 100.0 100 80.0 100 44.4 95. 28.4 86. 5.8 20. 3.0 4.: 2.6 2.: 2.4 1.8 2.3 1.6	100.0 100.0 100.0 100.0 100.0 100.0 80.0 100.0 44.4 95.0 28.4 86.8 5.8 20.1 3.0 4.2 2.6 2.2 2.4 1.8 2.3 1.6 2.2 1.5	100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 80.0 100.0 100.0 44.4 95.0 100.0 28.4 86.8 100.0 5.8 20.1 96.5 3.0 4.2 80.4 2.6 2.2 65.1 2.4 1.8 49.5 2.3 1.6 25.6 2.2 1.5 4.8	6AA 26A 2NS % Passing 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 80.0 100.0 100.0 89.3 44.4 95.0 100.0 70.0 28.4 86.8 100.0 60.9 5.8 20.1 96.5 42.7 3.0 4.2 80.4 33.7 2.6 2.2 65.1 27.3 2.4 1.8 49.5 21.0 2.3 1.6 25.6 11.5 2.2 1.5 4.8 3.2	6AA 26A 2NS % Passing % Retained 100.0 100.0 100.0 100.0 0.0 100.0 100.0 100.0 100.0 0.0 100.0 100.0 100.0 100.0 0.0 80.0 100.0 100.0 89.3 10.7 44.4 95.0 100.0 70.0 19.3 28.4 86.8 100.0 60.9 9.1 5.8 20.1 96.5 42.7 18.2 3.0 4.2 80.4 33.7 9.0 2.6 2.2 65.1 27.3 6.4 2.4 1.8 49.5 21.0 6.3 2.3 1.6 25.6 11.5 9.5 2.2 1.5 4.8 3.2 8.3	6AA 26A 2NS % Passing % Retained % Retained 100.0 100.0 100.0 100.0 0.0 0.0 100.0 100.0 100.0 100.0 0.0 0.0 100.0 100.0 100.0 0.0 0.0 0.0 80.0 100.0 100.0 89.3 10.7 10.7 44.4 95.0 100.0 70.0 19.3 30.0 28.4 86.8 100.0 60.9 9.1 39.1 5.8 20.1 96.5 42.7 18.2 57.3 3.0 4.2 80.4 33.7 9.0 66.3 2.6 2.2 65.1 27.3 6.4 72.7 2.4 1.8 49.5 21.0 6.3 79.0 2.3 1.6 25.6 11.5 9.5 88.5 2.2 1.5 4.8 3.2 8.3 96.8

*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	O Batch Plant Grada	tions Aggregate Supplier Gradation	ons	Adjusted WF	Intial Product	ion Sample (IPS)
Coarseness Factor:	59	Workability Factor:	34	36.2	Coars	seness Factor:
7 45				$\neg \top$	Worl	kability Factor:
45, 44			JMF Zone	71	Sieve	Cumulative
1 1	52, 41		31111 20110	-	Sieve	% Passing
_ 40 1	57	7, 40 68, 40		- 1	2"	100.0
@~		68, 38	75, 39	- 1	1.5"	100.0
		!		- 1	1"	99.3
Factor (%)		■ Prodyction & radation		- 1	3/4"	89.0
35		i		- 1	1/2"	70.3
1 -	52, 34	<u>.</u> i		- 1	3/8"	59.9
About Applied 30 Applied 30	- 55	22		- 1	#4	41.9
2 30	•	68, 32 68, 31		- 1	#8	35.9
Operating Zon	e			- 1	#16	27.8
Boundary			75, 28	- 1	#30	18.9
> 25				_	#50	6.3
40 45	50 55	60 65 70	75	80	#100	1.7
		Coarseness Factor (%) ⁷⁰	. 0	55	LBW	1.0
ActionLimits Boundary = -						

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

PLANT #: p11 Contractor:

Concrete Grade: DM, 4500HP Sample Date: 6/26/23 Dates Test Represents: 6/27/2023 7/3/2023 through

20100 10011	100.000	0,,-0-0	u o u.g	., 0, 2020		
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	95-013	Smelter Bay	1150	6.95	2.65	39.6
		T - (- 1 M/c	200	1		4000

MDOT No.:



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

	Total Wt	2905	17.69		100.0	< Verify this number 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		100.0	100.0	0.0	0.0
1"	98.8	100.0		100.0	99.4	0.6	0.6
3/4"	86.1	100.0		100.0	92.8	6.6	7.2
1/2"	45.4	95.0		100.0	71.4	21.5	28.6
3/8"	20.1	86.8		100.0	57.6	13.8	42.4
#4	2.0	20.1		96.4	41.0	16.6	59.0
#8	1.2	4.2		85.6	34.9	6.1	65.1 r
#16	1.0	2.2		71.2	28.9	6.0	71.1
#30	1.0	1.8		51.0	20.9	8.0	79.1
#50	0.9	1.6		25.4	10.7	10.2	89.3
#100	0.9	1.	5	7.6	3.6	7.1	96.4
LBW	0.7	1.	3	1.4	1.0	2.6	99.0

*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.

Coarseness Factor:	65	Workability Factor: 35	37.4	Coar	seness Factor:	
45 —				Wor	Workability Factor:	
45, 44	52, 41		IF Zone	Sieve	Cumulative % Passing	
_ 40 -	56, 40	67, 40	- 11	2"	100.0	
%	i	68, 38	75, 39	1.5"	100.0	
<u>`</u>	!	Production Gradation		1"	100.0	
35 E		■ 60,38BS		3/4"	95.0	
S 35 -	i	il		1/2"	72.3	
	52, 34	!		3/8"	60.4	
45, 33	50.92	67 32		#4	42.6	
2 30 -		-67 32 68, 31		#8	36.0	
Operating Zone				#16	29.5	
45, 33 Operating Zone Boundary		•	75, 28	#30	20.3	
25	J			#50	9.5	
40 45	50 55 _	60 _6570 7	5 80	#100	3.4	
		coarseness Factor (%)		LBW	1.3	

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

Sample Date:

Production Gradation

6/26/23

Concrete Grade: DM, 4500HP

Dates Test F	Represents:	6/27/2023	through	7/3/2023		
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	95-013	Smelter Bay	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:

37.4

-- 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"	98.8	100.0	100.0	99.4	0.6	0.6
3/4"	86.1	100.0	100.0	92.8	6.6	7.2
1/2"	45.4	95.0	100.0	71.4	21.5	28.6
3/8"	20.1	86.8	100.0	57.6	13.8	42.4
#4	2.0	20.1	96.4	41.0	16.6	59.0
#8	1.2	4.2	85.6	34.9	6.1	65.1 r
#16	1.0	2.2	71.2	28.9	6.0	71.1
#30	1.0	1.8	51.0	20.9	8.0	79.1
#50	0.9	1.6	25.4	10.7	10.2	89.3
#100	0.9	1.5	7.6	3.6	7.1	96.4
LBW	0.7	1.3	1.4	1.0	2.6	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:	65	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	67, 40 68, 38 Production Gra 60, 38S	JMF Zone 75, 39 adation 75, 28	
25 + 40 45 ActionLimits Boundary =	50 5	5 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

Sample Date:

Production Gradation

6/26/23 Concrete Grade: DM, 4500HP

36.3

Dates Test F	Represents:	6/27/2023	through	7/3/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.8
26A	58-003	Stoneco	300	1.79	2.69	10.2
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68		100.0

MDOT No.:

---- Verify this number is 100%

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

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"	99.8	100.0	100.0	99.9	0.1	0.1	
3/4"	83.0	100.0	100.0	91.4	8.5	8.6	
1/2"	43.9	98.6	100.0	71.3	20.0	28.7	
3/8"	19.8	89.6	100.0	58.2	13.2	41.8	*
#4	3.0	11.1	98.5	41.1	17.1	58.9	9
#8	1.6	2.9	83.8	33.8	7.3	66.2	no
#16	1.4	2.3	66.2	26.8	7.0	73.2	*
#30	1.3	2.1	46.5	19.0	7.8	81.0	no
#50	1.2	2.0	22.7	9.7	9.3	90.3	*
#100	1.2	2.0	6.0	3.2	6.5	96.8	а
I RW	1.0	1.8	1.0	11	2.1	98.9	

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:	63	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 56 , 52, 34 56 ,	■ 60,136 Production Gradation	75, 39 75, 28	
25 40 45 ActionLimits Boundary =	50 55	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"	89.1	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

6/26/23 Concrete Grade: DM, 4500HP

7/3/2023		
£43	Specific	%
π	Gravity	Contribution

Contractor:

MDOT No.:

Dates Test F	Represents:	6/27/2023	through	7/3/2023		
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	63-92	Grange Hall	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

--- Verify this number is 100%

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.9

SUPER	IOR

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

	i Otai Wt	2905 17.09		100.0	< verity 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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	80.0	100.0	100.0	89.3	10.7	10.7
1/2"	44.4	95.0	100.0	70.0	19.3	30.0
3/8"	28.4	86.8	100.0	60.9	9.1	39.1
#4	5.8	20.1	97.2	43.0	17.9	57.0
#8	3.0	4.2	84.6	35.4	7.6	64.6
#16	2.6	2.2	71.0	29.6	5.7	70.4
#30	2.4	1.8	52.0	22.0	7.7	78.0
#50	2.3	1.6	19.8	9.2	12.8	90.8
#100	2.2	1.5	3.5	2.7	6.5	97.3
LBW	1.6	1.3	0.6	1.2	1.5	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 8% for the 1" sieve when

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

Coarseness Factor	r: 61	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zo Boundary	52, 41 52, 34	58, 39 Production Gradation 60, 36 IPS 68, 38 68, 38 68, 38	75, 39 75, 28	
25 + 40 45 ActionLimits Boundary = -	50	Coarseness Factor (%)	75	80

Batch Plant Gradations

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:

Production Gradation

6/26/23

Contractor:

Concrete Grade: DM, 4500HP

Dates Test F	Represents:	6/27/2023	through	7/3/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.8
26A	58-003	Stoneco	300	1.79	2.69	10.2
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2050	17 68		100.0

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.3

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

	i otai vyt	2950	17.68		100.0	< Verify this n	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"	99.8	100	0.0	100.0	99.9	0.1	0.1
3/4"	83.0	100	0.0	100.0	91.4	8.5	8.6
1/2"	43.9	98	.6	100.0	71.3	20.0	28.7
3/8"	19.8	89	.6	100.0	58.2	13.2	41.8
#4	3.0	11	.1	98.5	41.1	17.1	58.9
#8	1.6	2.	9	83.8	33.8	7.3	66.2
#16	1.4	2.	3	66.2	26.8	7.0	73.2
#30	1.3	2.	1	46.5	19.0	7.8	81.0
#50	1.2	2.	0	22.7	9.7	9.3	90.3
#100	1.2	2.	0	6.0	3.2	6.5	96.8
LBW	1.0	1.	8	1.0	1.1	2.1	98.9

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 8% for the 1" sieve when

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

Coarseness Factor:	63	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary		68, 38 60, 36 Production Gradation 67, 38 31	75, 39 75, 28	
25 40 45 ActionLimits Boundary =	50 5	Coarseness Factor (%) ⁷⁰	75	80

Batch Plant Gradations

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"	89.1	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

6/26/23

PLANT #: P-39

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP

Dates Test F	Represents:	6/27/2023	through	7/3/2023		
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

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.5

--- Verify this number is 100%

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

	1000.111			. 0 0.0	· voing and in	di 11001 10 10070
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"	99.5	100.0	100.0	99.7	0.3	0.3
3/4"	89.2	100.0	100.0	94.2	5.5	5.8
1/2"	51.4	95.8	100.0	73.6	20.6	26.4
3/8"	23.5	86.4	100.0	57.9	15.7	42.1
#4	6.7	21.7	95.8	41.7	16.2	58.3
#8	2.7	6.0	82.0	33.0	8.7	67.0 r
#16	2.3	3.2	67.7	27.1	5.9	72.9
#30	2.2	2.6	50.6	20.6	6.6	79.4 r
#50	2.2	2.3	22.8	10.0	10.6	90.0
#100	2.1	2.2	5.4	3.4	6.7	96.6
LBW	1.8	2.0	1.0	1.5	1.8	98.5

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 Fac	tor: 63	Workability Factor:	33	
45 45, 44 45, 44 45, 44 45, 33 45, 33 Operating Bound	52, 41 52, 34	58, 40 68, 38 60, 36 PMBBuction Gradation 58, 32	75, 39	
25 +	ary		75, 28	
40 45 ActionLimits Boundary =		Coarseness Factor (%)	75	80

Batch Plant Gradations

Workability 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"	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

6/26/23

Ray Rd

Batch Plant Gradations

PLANT #: P-02

Pit#

71-47

71-47

63-115

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

Concrete Grade: DM, 4500HP

39.6

36.2

2.65

Contractor:

1150

6/27/2023	through	7/3/2023		
Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
Presque Isle	1550	9.48	2.62	53.4
Presque Isle	205	1.25	2.62	7.1

6.95

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

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

Total Wt 2905		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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	80.0	100.0	100.0	89.3	10.7	10.7
1/2"	44.4	95.0	100.0	70.0	19.3	30.0
3/8"	28.4	86.8	100.0	60.9	9.1	39.1
#4	5.8	20.1	96.5	42.7	18.2	57.3
#8	3.0	4.2	80.4	33.7	9.0	66.3
#16	2.6	2.2	65.1	27.3	6.4	72.7
#30	2.4	1.8	49.5	21.0	6.3	79.0
#50	2.3	1.6	25.6	11.5	9.5	88.5
#100	2.2	1.5	4.8	3.2	8.3	96.8
LBW	1.6	1.3	0.7	1.2	2.0	98.8

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 8% for the 1" sieve when

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

Coarseness Factor:	59	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39	75, 39	
25 40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	 80

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