Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-101 Contractor:

Sample Date: 6/19/23 Concrete Grade: DM, 4500HP Dates Test Represents: 6/20/2023 6/26/2023 MDOT No.: through

24100 10011	100.000	0,-0,-0-0	un o a g	0,20,2020		
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
	<u> </u>	Total Wt	2900	17.63		100.0



Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:

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	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"	96.2	100	0.0	100.0	98.0	2.0	2.0
3/4"	78.0	100	0.0	100.0	88.6	9.4	11.4
1/2"	37.4	96	5.0	100.0	67.3	21.3	32.7
3/8"	22.4	87	.8	100.0	58.8	8.5	41.2
#4	4.5	22	7	97.0	42.8	16.1	57.3
#8	1.9	6.	8	83.7	34.8	8.0	65.2
#16	1.6	3.	7	69.4	28.7	6.1	71.3
#30	1.6	3.	0	52.4	21.9	6.8	78.1
#50	1.6	2.	7	24.0	10.6	11.3	89.4
#100	1.6	2.	5	5.3	3.1	7.4	96.9
LBW	1.2	2.	3	0.9	1.2	2.0	98.8

*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.

Coarseness Factor:	63	Workability Factor:	35	37.3
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 67, 39 68, 38 Production Gradation 60, 368 67,63,131	75, 39 75, 28	
40 45 ActionLimits Boundary =	50	Coarseness Factor (%)	75	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"	95.0	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

PREPARED BY: SM, LLC Technical Service

Production Gradation

Stoneco

Pleasant Lake

Batch Plant Gradations

PLANT #: P-102

58-003

81-019

Sample Date:

26A

2NS

Production Gradation

6/19/23 Concrete Grade: DM, 4500HP

1.79

6.95

2.69

2.65

Dates Test F	Represents:	6/20/2023	through	6/26/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.8

300

1150

10.2

39.0

36.2

Contractor:

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	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"	99.0	10	0.0	100.0	99.5	0.5	0.5
3/4"	80.0	10	0.0	100.0	89.8	9.7	10.2
1/2"	41.7	99	9.5	100.0	70.3	19.5	29.7
3/8"	18.8	86	6.8	100.0	57.4	12.9	42.6
#4	3.9	5	.4	98.8	41.0	16.3	59.0
#8	1.7	1	.2	83.9	33.7	7.4	66.3
#16	1.3	1	1.1		26.3	7.3	73.7
#30	1.2	1.0		45.9	18.6	7.7	81.4
#50	1.1	0	.9	22.3	9.3	9.3	90.7
#100	1.1	0	.8	5.9	2.9	6.4	97.1
LBW	1.0	0	.6	1.3	1.1	1.9	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:	64	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 68, 38 Production Grad	JMF Zone 75, 39 75, 28	
25 40 45 ActionLimits Boundary =	50 5	5 Coarseness Factor (%)	75	80

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

PLANT #: P-103

Sample Date:

Production Gradation

6/19/23 Concrete Grade: DM, 4500HP

Dates Test Represents:		6/20/2023	through	6/26/2023		
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

Contractor:

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	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"	99.0	10	0.0	100.0	99.5	0.5	0.5
3/4"	80.0	10	100.0		89.8	9.7	10.2
1/2"	41.7	99	99.5		70.3	19.5	29.7
3/8"	18.8	86	6.8	100.0	57.4	12.9	42.6
#4	3.9	5	.4	98.8	41.0	16.3	59.0
#8	1.7	1	.2	83.9	33.7	7.4	66.3
#16	1.3	1	.1	65.6	26.3	7.3	73.7
#30	1.2	1.0		45.9	18.6	7.7	81.4
#50	1.1	0.9		22.3	9.3	9.3	90.7
#100	1.1	0	0.8		2.9	6.4	97.1
LBW	1.0	0	.6	1.3	1.1	1.9	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:	64	Workability Factor:	34	36.2
45 45, 44 40 45, 44 45, 33 45, 33 Operating Zone Boundary	52, 34	68, 38 60) 88 Production Gradation	75, 28	
40 45 ActionLimits Boundary =	50 5	5 Coarseness Factor (%) ⁷⁰	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

PREPARED BY: SM, LLC Technical Service Approved BY:

PLANT #: Contractor:

Sample Date: 6/19/23 Concrete Grade: DM, 4500HP Dates Test Represents: 6/20/2023 6/26/2023 through

24100 1001110110101101		un o a g	0,20,2020			
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

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	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"	99.0	100	0.0	100.0	99.5	0.5	0.5
3/4"	80.0	100	0.0	100.0	89.5	10.0	10.5
1/2"	41.7	99).5	100.0	69.2	20.2	30.8
3/8"	18.8	86	5.8	100.0	55.9	13.4	44.1
#4	3.9	5.	.4	99.9	39.7	16.1	60.3
#8	1.7	1.	.2	90.1	34.5	5.2	65.5 r
#16	1.3	1.	.1	69.4	26.6	7.9	73.4
#30	1.2	1.	.0	44.5	17.3	9.3	82.7 r
#50	1.1	0.	.9	14.3	6.0	11.3	94.0
#100	1.1	0.	.8	2.7	1.7	4.3	98.3
LBW	1.0	0.	.6	0.2	0.7	1.0	99.3

*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 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 Gradations	Adjusted WF	Intial Producti	on Sample (IPS	6)
Coarseness Factor:	67	Workability Factor: 35	37.0	Coars	eness Factor:	Ī
45				Work	ability Factor:	
45, 44		JMF Zone	$\neg \sqcap$	Sieve	Cumulative	Г
1 1 1		3 20.10	-	Sieve	% Passing	
	52, 41	57, 40	- 11	2"	100.0	Ī
(a) 40 f		75, 39	- 11	1.5"	100.0	
		68, 38	- 11	1"	99.3	
5		■ Production Gradation ■ 60, 36PS	- 11	3/4"	89.0	Г
Factor (%)		- 00, 34F3	- 11	1/2"	70.3	Γ
1 1 /	52, 34	_i	- 11	3/8"	59.9	Г
Available 19 Avail			- 11	#4	41.9	Г
<u> </u>		57, 32 68, 31	- 11	#8	35.9	Г
Operating Zone	\Box		- 11	#16	27.8	Г
Boundary	·	75, 28	- 11	#30	18.9	Г
				#50	6.3	Г
25 1 15			 	#100	1.7	Γ
40 45	50 55	5 Coarseness Factor (%) 75	80	LBW	1.0	Γ
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 #: 12 Sample Date: 6/19/23

Concrete Grade: DM, 4500HP

Dates Test Represents: 6/20/2023 through 6/26/2023

Agg. Class

6AA

26A

2NS

Pit#

71-47

71-47

63-115

0/20/2020	tillough	0/20/2023		
Source	Weight (SSD)	ft ³	Specific	%
			Gravity	Contribution
Presque Isle	1450	8.87	2.62	49.9
Presque Isle	305	1.87	2.62	10.5
Ray Rd	1150	6.95	2.65	39.6

MDOT No.:

Contractor:



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

	Total Wt	2905	17.69		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"	97.3	10	0.0	100.0	98.7	1.3	1.3
3/4"	76.4	10	0.0	100.0	88.2	10.4	11.8
1/2"	30.4	96	6.5	100.0	64.9	23.3	35.1
3/8"	15.0	80).4	100.0	55.5	9.4	44.5
#4	2.5	12	2.3	96.4	40.7	14.8	59.3
#8	1.9	2	.4	80.5	33.1	7.6	66.9
#16	1.8	1	.4	65.0	26.8	6.3	73.2
#30	1.7	1	.2	48.9	20.3	6.4	79.7
#50	1.7	1	.1	25.2	10.9	9.4	89.1
#100	1.6	1	.0	4.7	2.8	8.2	97.2
LBW	1.1	0	.8	0.6	0.9	1.9	99.1

*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	Gradations Aggregate Supplier Gradations	Adjusted WF	Intial Product	ion Sample (IPS)
Coarseness Factor: 66	Workability Factor: 33	35.6	Coars	seness Factor:	
45		\neg \top	Worl	kability Factor:	
45, 44	JMF Zone	7 I I	Sieve	Cumulative	
52, 41			Sieve	% Passing	ı
40]	57, 40 68, 40		2"	100.0	
(%	68, 38		1.5"	100.0	ĺ
	!		1"	99.3	ĺ
 	■ 60, 36PS ■ Production Gradation		3/4"	89.0	
Factor (%)			1/2"	70.3	
	<u> </u>		3/8"	59.9	
Applied 30 Operating Zone Boundary	57 , 22 688, 32		#4	41.9	
G 30	68, 31		#8	35.9	Ĺ
Operating Zone			#16	27.8	
Boundary	75, 28		#30	18.9	Ĺ
> 25 1 			#50	6.3	
40 45 50	55 60 65 70 75	80	#100	1.7	
	55 Coarseness Factor (%) ⁷⁰ 75		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

Sample Date:

6/19/23 Concrete Grade: DM, 4500HP

6/20/2023 through 6/26/2023

Dates Test F	Represents:	6/20/2023	through	6/26/2023		
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 W/s	2005	17.60		100.0

Contractor:

MDOT No.:

Superior Materials, LLC	2
30701 W. 10 Mile Rd.	
Suite 500	
Farmington Hills, MI 4833	36

	i otai vvt	2905	7.09	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"	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	96.5	100.0	71.5	21.3	28.5
3/8"	20.1	80.4	100.0	57.0	14.5	43.0
#4	2.0	12.3	96.6	40.4	16.7	59.6
#8	1.2	2.4	84.8	34.4	6.0	65.6
#16	1.0	1.4	69.4	28.1	6.3	71.9
#30	1.0	1.2	49.5	20.2	7.9	79.8
#50	0.9	1.1	23.7	9.9	10.3	90.1
#100	0.9	1.0	7.0	3.3	6.6	96.7
LBW	0.7	0.8	1.7	1.1	2.2	98.9

*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	36.9	Coar	seness Factor:
45		-		Wor	kability Factor:
45, 44	52, 41		Zone	Sieve	Cumulative % Passing
_ 40 -	56, 40			2"	100.0
%	i	68, 38	75, 39	1.5"	100.0
<u> </u>	!	Production Gradation		1"	100.0
Lactor 35 2		■ 60, 3BS		3/4"	95.0
<u>8</u> 35 -	į į	il I		1/2"	72.3
	52, 34	!		3/8"	60.4
≟ /45, 33	50.92	67 32		#4	42.6
2 30 -	,	67 ₆₈ , 31		#8	36.0
Operating Zone				#16	29.5
Operating Zone Boundary			75, 28	#30	20.3
> ₂₅	J			#50	9.5
40 45	50 55 _	60 _6570 _75	80	#100	3.4
		coarseness Factor (%) ⁷⁰ 75	00	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

62

PLANT #: P-32

Sample Date:

Production Gradation

6/19/23

Contractor:

Concrete Grade: DM, 4500HP

MDOT No.:

Dates Test F	Represents:	6/20/2023	through	6/26/2023		
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

....

<---- Verify this number is 100%

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.9

SUPE	RIOR

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	96.5	100.0	71.5	21.3	28.5
3/8"	20.1	80.4	100.0	57.0	14.5	43.0
#4	2.0	12.3	96.6	40.4	16.7	59.6
#8	1.2	2.4	84.8	34.4	6.0	65.6
#16	1.0	1.4	69.4	28.1	6.3	71.9
#30	1.0	1.2	49.5	20.2	7.9	79.8
#50	0.9	1.1	23.7	9.9	10.3	90.1
#100	0.9	1.0	7.0	3.3	6.6	96.7
LBW	0.7	0.8	1.7	1.1	2.2	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:	66	Workability Factor:	34	
45 45, 44			JMF Zone	
Factor (%)	52, 41	68, 38 Production Grad	75, 39 dation	
Morkability Factor (%) 35 45, 33 Operating Zone Boundary		67 ₆ 3 ² 3 ₁	75, 28	
25	50 55	Coarseness Factor (%) ⁷⁰	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"	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 Approved By

6/19/23

Batch Plant Gradations

PLANT #: P-35

Sample Date:

Production Gradation

25

Concrete Grade: DM, 4500HP

75

80

Dates Test F	Represents:	6/20/2023	through	6/26/2023		
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.:

Coarseness Factor:

Contractor:

SUPERIOR	

Superior Materials, LLC 30701 W. 10 Mile Rd. 48336

Suite 500
Farmington Hills, MI 4

*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.

	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"	99.0	10	0.0	100.0	99.5	0.5	0.5
3/4"	80.0	10	0.0	100.0	89.8	9.7	10.2
1/2"	41.7	99	9.5	100.0	70.3	19.5	29.7
3/8"	18.8	86	6.8	100.0	57.4	12.9	42.6
#4	3.9	5	.4	98.8	41.0	16.3	59.0
#8	1.7	1	.2	83.9	33.7	7.4	66.3
#16	1.3	1	.1	65.6	26.3	7.3	73.7
#30	1.2	1	.0	45.9	18.6	7.7	81.4
#50	1.1	0	.9	22.3	9.3	9.3	90.7
#100	1.1	0	.8	5.9	2.9	6.4	97.1
LBW	1.0	0	.6	1.3	1.1	1.9	98.9

Aggregate Supplier Gradations

Adjusted WF Intial Production Sample (IPS) **Coarseness Factor: Workability Factor:** 34 36.2 64 JMF Zone 45, 44 Workability Factor (%) ■ 60, 36 ■ Production Gradation 52, 34 Operating Zone Boundary 75, 28

Coarseness Factor (%) 60

Work	Workability Factor:		
Sieve	Cumulative	%	Cumulative
01010	% 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

PREPARED BY: SM, LLC Technical Service

50

55

45

ActionLimits Boundary = - - - -

through

Weight (SSD)

1450

305

1150

6/20/2023

Source

Presque Isle

Presque Isle

Grange Hall

PLANT #: P-36

Pit#

71-47

71-47

63-92

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

6/19/23

ft³

8.87

1.87

6.95

Concrete Grade: DM, 4500HP 6/26/2023

2.65

Specific	%
Gravity	Contribution
2.62	49.9
2.62	10.5

39.6

37.2

Contractor:

MDOT No.:

Coarseness Factor:



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

			0.00				
	Total Wt	2905	17.69		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"	97.3	10	0.0	100.0	98.7	1.3	1.3
3/4"	76.4	10	0.0	100.0	88.2	10.4	11.8
1/2"	30.4	96	6.5	100.0	64.9	23.3	35.1
3/8"	15.0	80).4	100.0	55.5	9.4	44.5
#4	2.5	12	2.3	97.7	41.2	14.3	58.8
#8	1.9	2	.4	84.5	34.7	6.6	65.3
#16	1.8	1	.4	69.2	28.4	6.2	71.6
#30	1.7	1.2		48.6	20.2	8.2	79.8
#50	1.7	1.1		18.4	8.2	12.0	91.8
#100	1.6	1.0		3.4	2.2	6.0	97.8
LBW	1.1	0	.8	0.6	0.9	1.4	99.1
Production G	radation O Batch Plant Grad	ations	regate Supplier Gra	adations	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 8% for the 1" sieve when

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

Coarseness Factor:	68	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 38 Production 1PS 68, 31	JMF Zone 75, 39 on Gradation 75, 28	
25 40 45 ActionLimits Boundary =	50 5:	Coarseness Factor (%)	75	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"	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

PLANT #: P-38

Sample Date:

Production Gradation

6/19/23 Concrete Grade: DM, 4500HP

Dates Test Represents:		6/20/2023	through	6/26/2023		
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		6.95	2.65	39.0
		T - (- 1 M/c	2	1		4000

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.2



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	SA.	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"	99.0	10	0.0	100.0	99.5	0.5	0.5
3/4"	80.0	10	0.0	100.0	89.8	9.7	10.2
1/2"	41.7	99	9.5	100.0	70.3	19.5	29.7
3/8"	18.8	86	6.8	100.0	57.4	12.9	42.6
#4	3.9	5	.4	98.8	41.0	16.3	59.0
#8	1.7	1.	.2	83.9	33.7	7.4	66.3
#16	1.3	1.	.1	65.6	26.3	7.3	73.7
#30	1.2	1.	.0	45.9	18.6	7.7	81.4
#50	1.1	0	.9	22.3	9.3	9.3	90.7
#100	1.1	0	.8	5.9	2.9	6.4	97.1
LBW	1.0	0.	.6	1.3	1.1	1.9	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:	64	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	56, 31 67, 40 68, 38 Production Gradation 67, 41 31	75, 39	
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

Krake Willis Rd

PLANT #: P-39

44-051

Sample Date:

2NS

6/19/23 Concrete Grade: DM, 4500HP

6.65

2.65

37.9

Dates Test F	Represents:	6/20/2023	through	6/26/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1555	9.51	2.62	53.5
264	71_//7	Presque Isla	250	1 53	2.62	8.6

1100

MDOT No.:

Contractor:



etained	Cumulative % Retained	<u>Superior Materials, LLC</u> 30701 W. 10 Mile Rd.
) ()	0.0	Suite 500

63

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	2905 17.69		100.0	< Verify this number 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"	96.2	10	0.0	100.0	98.0	2.0	2.0
3/4"	78.0	10	0.0	100.0	88.2	9.7	11.8
1/2"	37.4	96	6.0	100.0	66.1	22.1	33.9
3/8"	22.4	87	7.8	100.0	57.4	8.7	42.6
#4	4.5	22	2.7	95.7	40.6	16.8	59.4
#8	1.9	6	.8	81.9	32.6	8.0	67.4
#16	1.6	3.7		66.9	26.5	6.1	73.5
#30	1.6	3.0		50.2	20.1	6.4	79.9
#50	1.6	2.7		25.0	10.6	9.6	89.4
#100	1.6	2.5		7.5	3.9	6.6	96.1
LBW	1.2	2	.3	1.3	1.3	2.6	98.7

 Batch Plant Gradations Aggregate Supplier Gradations **Production Gradation** Adjusted WF Intial Production Sample (IPS) 33 35.1 Coarseness Factor: 63 **Workability Factor:** 45 JMF Zone 45, 44 52, 41

36 **Workability Factor:** % 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" 19.4 29.7 70.3 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 78.8 #30 21.2 7.7 #50 9.8 90.2 11.5 3.7 #100 6.1 96.3 LBW 2.5 98.8

Coarseness Factor:

Workability Factor (%) ■ 60, 36 Production Gradation 52, 34 Operating Zone Boundary 75, 28 25 Coarseness Factor (%)⁷⁰ 45 50 55 75 80 ActionLimits Boundary = - - -

PLANT #: P-02

Sample Date:

6/19/23 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	6/20/2023	through	6/26/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1450	8.87	2.62	49.9
26A	71-47	Presque Isle	305	1.87	2.62	10.5
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total W/s	2005	47.60		100.0

MDOT No.:

Contractor:

Coarseness Factor:

35.6

SUPER	RIOR

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.

100.0 100.0 97.3	10 10	0.0 0.0	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
100.0 97.3	10				0.0	0.0
97.3		0.0	400.0			0.0
	10		100.0	100.0	0.0	0.0
70.4	10	0.0	100.0	98.7	1.3	1.3
76.4	10	0.0	100.0	88.2	10.4	11.8
30.4	96	6.5	100.0	64.9	23.3	35.1
15.0	80).4	100.0	55.5	9.4	44.5
2.5	12	2.3	96.4	40.7	14.8	59.3
1.9	2	.4	80.5	33.1	7.6	66.9
1.8	1.4		65.0	26.8	6.3	73.2
1.7	1.2		48.9	20.3	6.4	79.7
1.7	1.1		25.2	10.9	9.4	89.1
1.6	1	.0	4.7	2.8	8.2	97.2
1.1	0.8		0.6	0.9	1.9	99.1
	2.5 1.9 1.8 1.7 1.7 1.6 1.1	2.5 12 1.9 2 1.8 1 1.7 1 1.7 1 1.6 1 1.1 0	2.5 12.3 1.9 2.4 1.8 1.4 1.7 1.2 1.7 1.1 1.6 1.0 1.1 0.8	2.5 12.3 96.4 1.9 2.4 80.5 1.8 1.4 65.0 1.7 1.2 48.9 1.7 1.1 25.2 1.6 1.0 4.7 1.1 0.8 0.6	2.5 12.3 96.4 40.7 1.9 2.4 80.5 33.1 1.8 1.4 65.0 26.8 1.7 1.2 48.9 20.3 1.7 1.1 25.2 10.9 1.6 1.0 4.7 2.8 1.1 0.8 0.6 0.9	2.5 12.3 96.4 40.7 14.8 1.9 2.4 80.5 33.1 7.6 1.8 1.4 65.0 26.8 6.3 1.7 1.2 48.9 20.3 6.4 1.7 1.1 25.2 10.9 9.4 1.6 1.0 4.7 2.8 8.2 1.1 0.8 0.6 0.9 1.9

Coarseness Factor: Workability Factor: 33 66 45 JMF Zone 45, 44 52, 41 Workability Factor (%) Production Gradation 52, 34 Operating Zone Boundary 75, 28 25 Coarseness Factor (%) 60 45 50 55 75 80 ActionLimits Boundary = - - -

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