Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-101

Sample Date:

9/18/23

Contractor:

Concrete Grade: DM, 4500HP 9/25/2023

MDOT No.:		

Dates Test F	Represents:	9/19/2023	through	9/25/2023		
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

Coarseness Factor:

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

	i otai 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	100.0	100.0	0.0	0.0
1.5"	100.0	100	.0	100.0	100.0	0.0	0.0
1"	99.3	100.	.0	100.0	99.6	0.4	0.4
3/4"	85.9	100.	.0	100.0	92.7	6.9	7.3
1/2"	43.7	97.0	0	100.0	70.6	22.1	29.4
3/8"	25.5	88.	7	100.0	60.5	10.1	39.5
#4	4.3	22.0	6	96.4	42.4	18.1	57.6
#8	2.5	4.9)	80.6	33.7	8.7	66.3
#16	2.3	2.2		66.2	27.6	6.0	72.4
#30	2.2	1.8	3	51.2	21.6	6.0	78.4
#50	2.1	1.6	;	24.1	10.8	10.8	89.2
#100	2.0	1.5	,	7.4	4.1	6.7	95.9
LBW	1.7	1.4		0.9	1.4	2.7	98.6

*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:	60	Workability Factor:	34	36.2
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 68, 38 68, 38 68, 38 68, 38 68, 38 68, 38 68, 38	75, 39	
40 45 ActionLimits Boundary =	50 5	Coarseness Factor (%)	75	80

Work	ability Factor:	35	
Sieve	Sieve Cumulative % Passing		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

PLANT #: P-102

Sample Date:

Production Gradation

9/18/23 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	9/19/2023	through	9/25/2023		
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
		T . (. I M/c	2	47.00		4000

Contractor:

MDOT No.:

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.

*% 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 number is 100%	
Sieve	6AA	26A		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"	100.0	10	0.0	100.0	100.0	0.0	0.0
3/4"	79.1	10	0.0	100.0	89.4	10.6	10.6
1/2"	37.6	99).4	100.0	68.2	21.2	31.8
3/8"	17.1	85	5.6	100.0	56.4	11.8	43.6
#4	2.7	10).8	97.9	40.6	15.7	59.4
#8	1.7	2	.5	83.0	33.5	7.2	66.5
#16	1.5	1	.8	66.4	26.8	6.6	73.2
#30	1.4	1	.6	47.2	19.3	7.6	80.7
#50	1.3	1	.4	23.2	9.8	9.4	90.2
#100	1.3	1	.4	4.4	2.5	7.3	97.5
LBW	1.0	1	.2	0.4	0.8	1.7	99.2

Aggregate Supplier Gradations

Coarseness Factor: Workability Factor: 33 36.0 66 45 45, 44 JMF Zone Workability Factor (%) Production Gradation 45, 33 Operating Zone Boundary 25 45 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"	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

ActionLimits Boundary = - - - -

9/18/23

Pleasant Lake

1150

PLANT #: P-103

Pit#

58-003

58-003

81-019

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Concrete Grade: DM, 4500HP

39.0

2.65

/19/2023	through	9/25/2023		
Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
Stoneco	1500	8.94	2.69	50.8
Stoneco	300	1.79	2.69	10.2

MDOT No.:

Contractor:



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

	Total Wt	Total Wt 2950 17.68			100.0	< Verify this number 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"	79.1	100.0		100.0	89.4	10.6	10.6	
1/2"	37.6	99.4		100.0	68.2	21.2	31.8	
3/8"	17.1	85.6		100.0	56.4	11.8	43.6	
#4	2.7	10.8		97.9	40.6	15.7	59.4	
#8	1.7	2.5		83.0	33.5	7.2	66.5	
#16	1.5	1.8		66.4	26.8	6.6	73.2	
#30	1.4	1.6		47.2	19.3	7.6	80.7	
#50	1.3	1.4		23.2	9.8	9.4	90.2	
#100	1.3	1.4		4.4	2.5	7.3	97.5	
LBW	1.0	1.2		0.4	0.8	1.7	99.2	

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

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

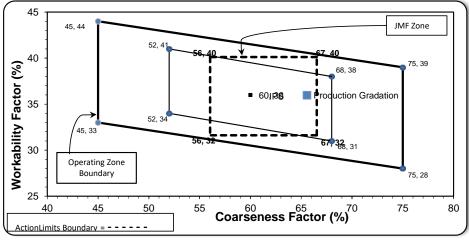
nom. max., #100 and #200 sieves.

*% 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 Gra	Batch Plant Gradations		Adjusted WF	Intial Production Sample (IPS)	
Coarseness Factor: 66		Workability Factor:	Workability Factor: 33		Coarseness Factor:		
						Workability Factor:	



Tronkability i actori		•	
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

PREPARED BY: SM, LLC Technical Service Approved BY:

PLANT #: Contractor:

Concrete Grade: DM, 4500HP Sample Date: 9/18/23 Dates Test Represents: 9/19/2023 9/25/2023 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	2960	17.68		100.0

MDOT No.:

--- Verify this number is 100%

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.1

Builders'
Finish First With Builders

Builders Redi-Mix

30701 W. 10 Mile Rd. Suite 500

Farmington Hills, MI 48336

	i Otai III	2000	17.00		100.0	< verify tills in	umber 13 10070
Sieve	6AA	26	6A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0		100.0	100.0	0.0	0.0
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0
1"	100.0	10	0.0	100.0	100.0	0.0	0.0
3/4"	79.1	10	0.0	100.0	89.4	10.6	10.6
1/2"	37.6	99	9.4	100.0	68.3	21.1	31.7
3/8"	17.1	85	5.6	100.0	56.2	12.1	43.8
#4	2.7	10).8	99.9	39.8	16.4	60.2
#8	1.7	2	.5	90.1	34.6	5.2	65.4
#16	1.5	1	.8	69.4	26.8	7.9	73.2
#30	1.4	1	.6	44.5	17.4	9.3	82.6
#50	1.3	1	.4	14.3	6.1	11.3	93.9
#100	1.3	1	.4	2.7	1.8	4.3	98.2
LBW	1.0	1	.2	0.2	0.7	1.1	99.3
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 4% for the 3/4" sieve when

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

Coarseness Factor:	67	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	68, 40 68, 38 roduction	75, 39 n Gradation	
25 + 40 45 ActionLimits Boundary =	50 5	5 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"	89.0	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

63

PREPARED BY: SM, LLC Technical Service

Production Gradation

Aggregate Optimization Chart

9/18/23

PLANT #:

PREPARED BY:

SM, LLC Technical Service

Sample Date:

Concrete Grade: DM, 4500HP

MDOT No.:

Contractor:

Dates Test Represents:		9/19/2023	through	9/25/2023		
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 Wt	2905	17 69		100.0

SUPERIOR	

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	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"	96.5	100	0.0	100.0	98.3	1.7	1.7
3/4"	75.9	100.0		100.0	88.0	10.3	12.0
1/2"	34.7	94.3		100.0	66.8	21.2	33.2
3/8"	16.9	86.0		100.0	57.1	9.8	42.9
#4	2.9	27	'.9	96.0	42.4	14.7	57.6
#8	1.6	6.5		80.9	33.5	8.9	66.5
#16	1.4	3.	2	65.9	27.1	6.4	72.9
#30	1.4	2.	.6	49.5	20.6	6.6	79.4
#50	1.3	2.4		25.5	11.0	9.6	89.0
#100	1.3	2.	.3	5.4	3.0	8.0	97.0
LBW	1.0	2.	.0	0.6	0.9	2.1	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 4% for the 3/4" sieve when

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

Production Gradation	O Batch Plant Gradati	ons	S	Adjusted WF	Intial Producti	on Sample (IPS)
Coarseness Factor:	65	Workability Factor:	34	36.0	Coars	eness Factor:	
7 45				$\neg \top$	Work	ability Factor:	
45, 44			JMF Zone	7 I I	Sieve	Cumulative	
 	52, 41		31111 20110	-	Sieve	% Passing	
_ 40]	57,	40 68, 40			2"	100.0	
Factor (%)		68, 38	75, 39	- 11	1.5"	100.0	
-		!			1"	99.3	
유		■ 60, 36PS Production Gradatio	n	- 11	3/4"	89.0	
35					1/2"	70.3	
1 7	52, 34	!		- 11	3/8"	59.9	
A5, 33 Operating Zone Boundary	57.	68, 32 68, 31			#4	41.9	
2 30 -	,	68,31			#8	35.9	
Operating Zone	s .		-		#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	
		Coarseness 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

9/18/23

PLANT #: p11

Sample Date:

6AA

26A 2NS Concrete Grade: DM, 4500HP

Contractor:

Dates Test Represents: 9/19/2023 9/25/2023 through Agg. Class Pit

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
Smelter Bay	1150	6.95	2.65	39.6
	Presque Isle Presque Isle	Presque Isle 1455 Presque Isle 300	Presque Isle 1455 8.90 Presque Isle 300 1.83	Source Weight (ssb) ft 3 Gravity Presque Isle 1455 8.90 2.62 Presque Isle 300 1.83 2.62

MDOT No.:



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

	Total Wt	2905 17.6	9	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"	97.8	100.0	100.0	98.9	1.1	1.1
3/4"	79.6	100.0	100.0	89.8	9.1	10.2
1/2"	43.3	94.3	100.0	71.0	18.8	29.0
3/8"	25.5	86.0	100.0	61.2	9.8	38.8
#4	5.2	27.9	97.2	44.0	17.3	56.0
#8	2.7	6.5	85.4	35.8	8.1	64.2
#16	2.2	3.2	69.9	29.1	6.7	70.9
#30	2.1	2.6	50.3	21.2	7.9	78.8
#50	2.0	2.4	24.6	11.0	10.2	89.0
#100	1.9	2.3	7.2	4.0	6.9	96.0
LBW	1.4	2.0	0.9	1.3	2.8	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.

Р	roduction Gradation	Batch Plant Gradat	ions Aggregate Supplier Gradatio	ns	Adjusted WF	Intial Product	on Sample (IPS)
	Coarseness Factor:	60	Workability Factor:	36	38.3	Coars	seness Factor:	
7	45				$\neg $	Worl	ability Factor:	
	45, 44			JMF Zone	7 I I	Sieve	Cumulative	
	-	52, 41				Sieve	% Passing	F
	40	56.4	67, 40			2"	100.0	
	૾ ૺ૽	i	Production Gradation 38	75, 39		1.5"	100.0	
	<u> </u>	!	1 Toddellori Crasallori			1"	100.0	
	유		■ 60, 3/BS			3/4"	95.0	
	Factor 35	į	i l			1/2"	72.3	
		52, 34	<u> </u>		- 11	3/8"	60.4	
	Applied 30 - 45, 33 Operating Zone Boundary	36.9	67 32			#4	42.6	
	<u>ā</u> 30 -		67 , 32 , 31			#8	36.0	
	Operating Zone	,		_	- 11	#16	29.5	
	Boundary			75, 28		#30	20.3	
	> 25					#50	9.5	
	40 45	50 55	60 65 70	75	80	#100	3.4	
			Coarseness Factor (%) ⁷⁰			LBW	1.3	
	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"	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:

Concrete Grade: DM, 4500HP 9/18/23

38.3

Dates Test F	Represents:	9/19/2023	through	9/25/2023		
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.:

Contractor:

---- Verify this number is 100%

Coarseness Factor:

SUPERMATER	RIOR

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

	i Otai Wi	2000 17.00		100.0	< Verily tills if	umber 13 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"	97.8	100.0	100.0	98.9	1.1	1.1
3/4"	79.6	100.0	100.0	89.8	9.1	10.2
1/2"	43.3	94.3	100.0	71.0	18.8	29.0
3/8"	25.5	86.0	100.0	61.2	9.8	38.8
#4	5.2	27.9	97.2	44.0	17.3	56.0
#8	2.7	6.5	85.4	35.8	8.1	64.2
#16	2.2	3.2	69.9	29.1	6.7	70.9
#30	2.1	2.6	50.3	21.2	7.9	78.8
#50	2.0	2.4	24.6	11.0	10.2	89.0
#100	1.9	2.3	7.2	4.0	6.9	96.0
LBW	1.4	2.0	0.9	1.3	2.8	98.7
roduction Grad	lation	ions	Gradations	Adjusted WF	Intial Production	on Sample (I

*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	: 60	Workability Factor:	36	
45 45, 44 45, 44 45, 33 Operating Zon Boundary	52, 34	Froduction Gradaij68 38 60, 388	75, 28	
25 40 45 ActionLimits Boundary =	50 5	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"	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-35

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP 9/18/23

MDOT	Nο·	

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.0

Dates Test Represents:		9/19/2023	through	9/25/2023		
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



Superior Materials, LLC

30701 W. 10 Mile Rd.

Suite 500

Farmington Hills, MI 48336

	Total Wt	2950	17.68		100.0	< Verify this no	umber is 100%
Sieve	6AA	26/	4	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"	79.1	100	.0	100.0	89.4	10.6	10.6
1/2"	37.6	99.	4	100.0	68.2	21.2	31.8
3/8"	17.1	85.	6	100.0	56.4	11.8	43.6
#4	2.7	10.	8	97.9	40.6	15.7	59.4
#8	1.7	2.5	5	83.0	33.5	7.2	66.5 r
#16	1.5	1.8	3	66.4	26.8	6.6	73.2
#30	1.4	1.6	6	47.2	19.3	7.6	80.7 r
#50	1.3	1.4	1	23.2	9.8	9.4	90.2
#100	1.3	1.4		4.4	2.5	7.3	97.5 a
LBW	1.0	1.2	2	0.4	0.8	1.7	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.

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:	66	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 60, 136 67, 88, 31	JMF Zone 75, 39 dation	
Boundary 25 40 45 ActionLimits Boundary =	50	55 Coarseness Factor (%)	75, 28 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

Total Wt

Batch Plant Gradations

2905

PLANT #: P-36

1.0

Sample Date:

LBW

Production Gradation

9/18/23 Concrete Grade: DM, 4500HP 9/19/2023

100.0

1.0

36.7

Dates Test Represents:		9/19/2023	through	9/25/2023		
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	63-92	Grange Hall	1150	6.95	2.65	39.6

17.69

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

<---- 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"	96.5	100.0	100.0	98.3	1.7	1.7	
3/4"	75.9	100.0	100.0	88.0	10.3	12.0	
1/2"	34.7	94.3	100.0	66.8	21.2	33.2	
3/8"	16.9	86.0	100.0	57.1	9.8	42.9	*
#4	2.9	27.9	97.2	42.9	14.2	57.1	*
#8	1.6	6.5	82.6	34.2	8.7	65.8	no
#16	1.4	3.2	67.9	27.9	6.3	72.1	*
#30	1.4	2.6	49.3	20.5	7.4	79.5	no
#50	1.3	2.4	20.4	9.0	11.5	91.0	*
#100	1.3	2.3	3.4	2.2	6.7	97.8	۵,

Aggregate Supplier Gradations

2.0

*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 4% for the 3/4" sieve when

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

Coarseness Factor:	65	Workability Factor:	34	
45 45, 44			JMF Zone	$\overline{\mathbb{n}}$
Morkability Factor (%) 30 Operating Zone Boundary	52, 41	58, 39 66, 38 Production Grada 60, 36 IPS 68, 31	75, 39 75, 28	
25 + 40 45	50	55 Coarseness Factor (%)	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"	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

99.0

Coarseness Factor:

Pleasant Lake

Batch Plant Gradations

PLANT #: P-38

81-019

Sample Date:

2NS

Production Gradation

9/18/23 Concrete Grade: **DM, 4500HP**

6.95

2.65

39.0

36.0

Dates Test F	Represents:	9/19/2023	through	9/25/2023		
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

1150

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

MDOT No.:



Superior	Mater	ials, LLC
30701 W.	10 Mile	Rd.
Suite 500		
Farmingto	n Hills	MI 48336

	Total Wt	2950	17.68		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	4	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"	79.1	100	.0	100.0	89.4	10.6	10.6
1/2"	37.6	99.	4	100.0	68.2	21.2	31.8
3/8"	17.1	85.	6	100.0	56.4	11.8	43.6
#4	2.7	10.	8	97.9	40.6	15.7	59.4
#8	1.7	2.5	5	83.0	33.5	7.2	66.5
#16	1.5	1.8	3	66.4	26.8	6.6	73.2
#30	1.4	1.6	6	47.2	19.3	7.6	80.7
#50	1.3	1.4		23.2	9.8	9.4	90.2
#100	1.3	1.4		4.4	2.5	7.3	97.5
LBW	1.0	1.2	2	0.4	0.8	1.7	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.

Coarse	eness Factor:	66	Workability Factor:	33	
45	45, 44	52, 41		JMF Zone	
tor (%)		56,	68, 38	75, 39	
Workability Factor (%)	45, 33	52, 34 56,			
Morka 25	Operating Zone Boundary	· · · · · · · · · · · · · · · · · · ·		75, 28	
40	45 hits 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

PREPARED BY: SM, LLC Technical Service Approved By

PLANT #: P-39

Sample Date:

Production Gradation

9/18/23 Concrete Grade: **DM**, **4500HP**

Dates Test F	Represents:	9/19/2023	through	9/25/2023		
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

Contractor:

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

	Total Wt	2905	17.69		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	4	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"	99.3	100	.0	100.0	99.6	0.4	0.4
3/4"	85.9	100	.0	100.0	92.2	7.4	7.8
1/2"	43.7	97.	0	100.0	68.7	23.5	31.3
3/8"	25.5	88.	7	100.0	58.1	10.6	41.9
#4	4.3	22.	6	98.9	41.4	16.7	58.6
#8	2.5	4.9)	84.6	33.8	7.6	66.2
#16	2.3	2.2	2	68.9	27.5	6.2	72.5
#30	2.2	1.8	3	49.7	20.2	7.4	79.8
#50	2.1	1.6	6	23.8	10.3	9.9	89.7
#100	2.0	1.5	5	6.5	3.7	6.6	96.3
LBW	1.7	1.4	1	1.6	1.6	2.0	98.4

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:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 60, 36 Production Gradat 56, 32		
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"	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

9/18/23

PLANT #: P-02

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.0

Dates Test F	Represents:	9/19/2023	through	9/25/2023		
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 Wt	2005	17.60		100.0

MDOT No.:



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

	i otai wt	2905	17.69		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"	96.5	100	0.0	100.0	98.3	1.7	1.7
3/4"	75.9	100	0.0	100.0	88.0	10.3	12.0
1/2"	34.7	94	.3	100.0	66.8	21.2	33.2
3/8"	16.9	86	.0	100.0	57.1	9.8	42.9
#4	2.9	27	.9	96.0	42.4	14.7	57.6
#8	1.6	6.	5	80.9	33.5	8.9	66.5
#16	1.4	3.	2	65.9	27.1	6.4	72.9
#30	1.4	2.	6	49.5	20.6	6.6	79.4
#50	1.3	2.	4	25.5	11.0	9.6	89.0
#100	1.3	2.	3	5.4	3.0	8.0	97.0
LBW	1.0	2.	0	0.6	0.9	2.1	99.1

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.

63

*% 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:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 39 68, 38 Production Gradati	JMF Zone 75, 39	
25	<u> </u>		75, 28	
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"	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