Aggregate Optimization Chart

Batch Plant Gradations

Production Gradation Report

PLANT #: P-101

Production Gradation

5/1/23 Concrete Grade: DM, 4500HP Sample Date:

Dates Lest F	Represents:	5/2/2023	tnrougn	5/8/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1450	8.87	2.62	50.0
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	75-051	Mid Michigan	1150	6.93	2.66	39.7

MDOT No.:

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:

Contractor:



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"	99.0	100	0.0	100.0	99.5	0.5	0.5
3/4"	83.3	100	0.0	100.0	91.7	7.8	8.3
1/2"	38.8	96	.8	100.0	69.1	22.6	30.9
3/8"	21.9	87	.1	100.0	59.6	9.5	40.4
#4	3.6	21	.3	97.1	42.5	17.1	57.5
#8	1.7	5.3	3	82.2	34.0	8.5	66.0
#16	1.5	3.	0	66.8	27.6	6.4	72.5
#30	1.5	2.	6	50.2	20.9	6.6	79.1
#50	1.4	2.	4	24.1	10.5	10.4	89.5
#100	1.4	2.:	3	6.5	3.5	7.0	96.5
LBW	1.2	2.	1	0.9	1.2	2.3	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:	61	Workability Factor:	34	36.5
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 60, Production Gradation 97, 31 67, 31	75, 39	
40 45 ActionLimits Boundary =	50 5	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

Total Wt

Batch Plant Gradations

PLANT #: P-102

Sieve

2"

1.5"

3/4" 1/2" 3/8"

#4

#8

#16

#30

#50

#100

LBW

Production Gradation

Sample Date: 5/1/23 Concrete Grade: **DM**, **4500HP**

1.8

1.5

Aggregate Supplier Gradations

Dates Test F	represents:	5/2/2023	tnrougn	5/8/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific	%
Ayy. Class	FIL#	Source	Weight (SSD)	IL	Gravity	Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	52.5
26A	58-003	Stoneco	250	1.49	2.69	8.5
2NS	81-019	Pleasant Lake	1150	6 95	2 65	30 N

2950

Contractor:

Cumulative

97.2

99.1

Coarseness Factor:

MDOT No.:

6.6

1.9

Adjusted WF Intial Production Sample (IPS)

100.0 Cumulative

2.8

0.9

36.3

----- Verify this number is 100%

SUPERIOR	

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

•	6AA	26A	2NS	% Passing	% Retained	% Retained	
	100.0	100.0	100.0	100.0	0.0	0.0	ĺ
	100.0	100.0	100.0	100.0	0.0	0.0	ı
	100.0	100.0	100.0	100.0	0.0	0.0	ı
	88.1	100.0	100.0	93.7	6.3	6.3	ı
	42.0	97.8	100.0	69.3	24.4	30.7	ı
	18.9	87.8	100.0	56.4	13.0	43.6	,
	1.7	9.8	98.7	40.2	16.2	59.8	,
	1.0	3.0	84.8	33.8	6.4	66.2	n
	0.9	2.2	67.7	27.1	6.8	72.9	,
	0.8	1.9	48.1	19.3	7.7	80.7	n
	0.7	1.8	22.9	9.4	9.9	90.6	,

6.0

1.4

17.68

*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 Operating Zone Boundary	52, 34	68, 38 60, 38 Production	75, 39 Gradation	
40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	80

Work	ability Factor:	36	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.2	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

0.6

0.5

Approved By

Pleasant Lake

PLANT #: P-103

81-019

Sample Date:

2NS

Concrete Grade: DM, 4500HP 5/1/23

Dates Test F	Represents:	5/2/2023	through	5/8/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	52.5
26A	58-003	Stoneco	250	1.49	2.69	8.5

1150

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

Contractor:

2.65 39.0 17 68

36.3

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

	Total Wt	2950	17.68		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"	100.0	10	0.0	100.0	100.0	0.0	0.0	
3/4"	88.1	100.0		100.0	93.7	6.3	6.3	
1/2"	42.0	97.8		100.0	69.3	24.4	30.7	
3/8"	18.9	87	7.8	100.0	56.4	13.0	43.6	
#4	1.7	9	.8	98.7	40.2	16.2	59.8	
#8	1.0	3	.0	84.8	33.8	6.4	66.2	
#16	0.9	2	.2	67.7	27.1	6.8	72.9	
#30	0.8	1	.9	48.1	19.3	7.7	80.7	
#50	0.7	1	.8	22.9	9.4	9.9	90.6	
#100	0.6	1.8		6.0	2.8	6.6	97.2	
LBW	0.5	1.5		1.4	0.9	1.9	99.1	
Production	Gradation	ations	gregate 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:	66	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 60 36 Production	JMF Zone 75, 39 Gradation 75, 28	
25 40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	80

Work	ability Factor:	36	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.2	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 #: 14 Contractor:

Sample Date: 5/1/23 Concrete Grade: DM, 4500HP

Dates Test Represents: 5/2/2023 through 5/8/2023 MDOT No.:

				0,0,000		
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

OT No.:_____

----- Verify this number is 100%

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.8

Builders'
REDI-MIX
Finish First With Builders*

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	ı
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	ı
1"	100.0	100.0	100.0	100.0	0.0	0.0	i
3/4"	88.1	100.0	100.0	93.7	6.3	6.3	ı
1/2"	42.0	97.8	100.0	69.2	24.5	30.8	1
3/8"	18.9	87.8	100.0	56.0	13.2	44.0	1
#4	1.7	9.8	99.9	39.0	17.0	61.0	1
#8	1.0	3.0	90.1	34.3	4.7	65.7	no
#16	0.9	2.2	69.4	26.5	7.8	73.5	1
#30	0.8	1.9	44.5	17.2	9.3	82.8	n
#50	0.7	1.8	14.3	5.9	11.3	94.1	1
#100	0.6	1.8	2.7	1.5	4.4		а
LBW	0.5	1.5	0.2	0.5	1.0	99.5	1

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.

 $\ensuremath{^{*}\%}$ 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	
Workability Factor (%)	45, 44 45, 33 Operating Zone Boundary	52, 41	68, 40 68, 38 roduction 0	JMF Zone 75, 39 Gradation 75, 28	
25 - 4	0 45 mits Boundary =	50 5	Coarseness Factor (%)	75	80

O Batch Plant Gradations

Production Gradation

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

PREPARED BY: SM, LLC Technical Service Approved By:

5/2/2023

Source

Presque Isle

Presque Isle

Ray Rd

PLANT #: 12

Pit#

71-47

71-47

63-115

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

5/1/23

ft³

9.82

0.92

6.95

Weight (SSD)

1605

150

1150

Concrete Grade: DM, 4500HP 5/8/2023 through

Specific

Gravity

2.62

2.62

2.65

	MD
%	
Contribution	
55.2	
5.2	

39.6

Contractor:

OOT No.:



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

Tot		2905 17.69			100.0	< Verify this number is 100%		
Total Wt		2903	17.09		100.0	< verily trils in	ullibel 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"	97.7	10	100.0		98.7	1.3	1.3	
3/4"	85.7	100.0		100.0	92.1	6.6	7.9	
1/2"	49.0	90	90.2		71.3	20.8	28.7	
3/8"	32.3	78	3.4	100.0	61.5	9.8	38.5	
#4	8.3	15	15.9		43.7	17.8	56.3	
#8	3.6	4	.5	80.1	33.9	9.8	66.1	
#16	2.8	2	2.1		27.2	6.7	72.8	
#30	2.6	1	1.6		21.0	6.2	79.0	
#50	2.4	1.5		25.9	11.7	9.3	88.3	
#100	2.3	1	1.4		3.0	8.6	97.0	
LBW	1.8	1	.2	0.6	1.3	1.8	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 8% for the 1" sieve when

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

Production	Gradation	Batch Plant Gra	dations	ns	Adjusted WF	Intial Producti	on Sample (IPS)
Coarse	ness Factor:	58	Workability Factor:	34	36.4	Coars	seness Factor:	
7 45 -					$\neg \top$	Work	ability Factor:	
	45, 44			JMF Zone	7 I I	Sieve	Cumulative	
1 1		52, 41		31111 20110	-	Sieve	% Passing	
40			57, 40 68, 40			2"	100.0	
%			68, 38	75, 39		1.5"	100.0	
-						1"	99.3	
유	Factor		Production Production		- 11	3/4"	89.0	
35			12, 34		- 11	1/2"	70.3	
1 . 4		52, 34			3/8"	59.9		
Workability	45, 33		17-22 68-32			#4	41.9	
<u> </u>			57, 22 688, 33			#8	35.9	
뽇 :]	Operating Zone	1				#16	27.8	
Ō	Boundary			75, 28		#30	18.9	
> ₂₅		J				#50	6.3	
40	45	50 55	60 65 70	75	80	#100	1.7	
			Coarseness Factor (%)			LBW	1.0	
ActionLim	its 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:

Concrete Grade: DM, 4500HP 5/1/23

Dates Test F	Represents:	5/2/2023	through	5/8/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1405	8.59	2.62	48.4
26A	71-47	Presque Isle	350	2.14	2.62	12.0
2NS	95-013	Smelter Bay	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	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	84.8	100.0	100.0	92.6	7.4	7.4
1/2"	40.0	90.2	100.0	69.8	22.8	30.2
3/8"	23.3	78.4	100.0	60.3	9.5	39.7
#4	2.7	15.9	96.1	41.3	19.0	58.7
#8	1.4	4.5	83.3	34.2	7.1	65.8
#16	1.2	2.1	68.2	27.8	6.4	72.2
#30	1.1	1.6	49.4	20.3	7.6	79.7
#50	1.1	1.5	23.7	10.1	10.2	89.9
#100	1.1	1.4	6.5	3.3	6.8	96.7
LBW	0.8	1.2	1.3	1.0	2.2	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.

Production Gradation	Batch Plant Gradation	ns	ons	Adjusted WF	Intial Producti	ion Sample (IPS)
Coarseness Factor	: 60	Workability Factor:	34	36.7	Coars	seness Factor:
7 45				\neg \top	Work	cability Factor:
45, 44			JMF Zone	711	Sieve	Cumulative
	52, 41					% Passing
40 -	56.40	67, 40	75.00		2"	100.0
(%)	į į	68, 38	75, 39		1.5"	100.0
-	!	- D 1 (1)			1"	100.0
2		Production Gradation			3/4"	95.0
Factor 35	_	i l			1/2"	72.3
	52, 34	i			3/8"	60.4
Operating Zon Boundary	56.92	32			#4	42.6
30 -	00,022	67 _{68,31}			#8	36.0
Operating Zon	ρ				#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
		oarseness Factor (%) ⁷⁰	. 3	33	LBW	1.3
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

5/1/23

PLANT #: P-32

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP

MDOT No.:		

Dates Test F	Represents:	5/2/2023	through	5/8/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1405	8.59	2.62	48.4
26A	71-47	Presque Isle	350	2.14	2.62	12.0
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.7

SUPERIOR MATERIALS

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"	100.0	10	0.0	100.0	100.0	0.0	0.0
3/4"	84.8	10	0.0	100.0	92.6	7.4	7.4
1/2"	40.0	90).2	100.0	69.8	22.8	30.2
3/8"	23.3	78	3.4	100.0	60.3	9.5	39.7
#4	2.7	15	5.9	96.1	41.3	19.0	58.7
#8	1.4	4.	.5	83.3	34.2	7.1	65.8
#16	1.2	2	.1	68.2	27.8	6.4	72.2
#30	1.1	1.	.6	49.4	20.3	7.6	79.7
#50	1.1	1.5		23.7	10.1	10.2	89.9
#100	1.1	1.	.4	6.5	3.3	6.8	96.7
LBW	0.8	1.	.2	1.3	1.0	2.2	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.

62

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

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

Coarseness Factor:	60	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Production Gradation 60, 388	JMF Zone 75, 39 75, 28	
40 45 ActionLimits Boundary =	<u>50</u> 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

through

Weight (SSD)

1550

250

1150

5/2/2023

Source

Stoneco

Stoneco

Pleasant Lake

Batch Plant Gradations

PLANT #: P-35

Pit#

58-003

58-003

81-019

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

5/1/23 Concrete Grade: DM, 4500HP 5/8/2023

ft³

9.23

1.49

6.95

Specific

Gravity

2.69

2.69

2.65

	MDOT No.:
%	
Contribution	
52.5	

8.5

39.0

36.3

Contractor:

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 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"	88.1	10	100.0		93.7	6.3	6.3
1/2"	42.0	97	7.8	100.0	69.3	24.4	30.7
3/8"	18.9	87	7.8	100.0	56.4	13.0	43.6
#4	1.7	9	.8	98.7	40.2	16.2	59.8
#8	1.0	3	.0	84.8	33.8	6.4	66.2
#16	0.9	2	2.2		27.1	6.8	72.9
#30	0.8	1	1.9		19.3	7.7	80.7
#50	0.7	1	.8	22.9	9.4	9.9	90.6
#100	0.6	1	.8	6.0	2.8	6.6	97.2
LBW	0.5	1	.5	1.4	0.9	1.9	99.1

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 40 40, 45, 44 45, 33 Operating Zo Boundary		68, 38 Production 67, 68, 31	JMF Zone 75, 39 Gradation 75, 28	
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"	89.1	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

PLANT #: P-36

Sample Date:

Production Gradation

5/1/23 Concrete Grade: DM, 4500HP 5/8/2023

MDOT No.		

Dates Test F	Represents:	5/2/2023	through	5/8/2023		
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	200	1.22	2.62	6.9
2NS	63-92	Grange Hall	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

MDO1 No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

39.0

--- Verify this number is 100%

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"	97.7	100.0	100.0	98.8	1.2	1.2
3/4"	85.7	100.0	100.0	92.3	6.4	7.7
1/2"	49.0	90.2	100.0	72.0	20.3	28.0
3/8"	32.3	78.4	100.0	62.3	9.8	37.7
#4	8.3	15.9	97.7	44.2	18.1	55.8
#8	3.6	4.5	86.5	36.5	7.7	63.5
#16	2.8	2.1	72.3	30.3	6.2	69.7
#30	2.6	1.6	52.4	22.2	8.0	77.8
#50	2.4	1.5	20.9	9.7	12.6	90.3
#100	2.3	1.4	3.8	2.8	6.8	97.2
LBW	1.8	1.2	0.7	1.3	1.5	98.7
Production Gra	adation O Batch Plant Gradat	ions Aggregate Supplier Gra	dations	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 Facto	or: 59	Workability Factor:	36	
45				$\overline{\Box}$
45, 44 (%) Aorkapility Factor (%) 30 Operating Z Boundary		58, 39 Production Gradation 68, 38 • 60, 36 IPS 68, 31	75, 39	
25 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"	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

63

5/1/23

PLANT #: P-38

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP

Dates Test Represents:		5/2/2023	through	5/8/2023			
	Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific	%
	Agg. Class	111.77	Source	Weight (33b)	11	Gravity	Contribution
	6AA	58-003	Stoneco	1550	9.23	2.69	52.5
	26A	58-003	Stoneco	250	1.49	2.69	8.5
	2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
			Total Wt	2950	17.68		100.0

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.3

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"	100.0	10	0.0	100.0	100.0	0.0	0.0
3/4"	88.1	10	0.0	100.0	93.7	6.3	6.3
1/2"	42.0	97	' .8	100.0	69.3	24.4	30.7
3/8"	18.9	87	' .8	100.0	56.4	13.0	43.6
#4	1.7	9	.8	98.7	40.2	16.2	59.8
#8	1.0	3	.0	84.8	33.8	6.4	66.2
#16	0.9	2	.2	67.7	27.1	6.8	72.9
#30	0.8	1	.9	48.1	19.3	7.7	80.7
#50	0.7	1	.8	22.9	9.4	9.9	90.6
#100	0.6	1	.8	6.0	2.8	6.6	97.2
LBW	0.5	1	.5	1.4	0.9	1.9	99.1

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.

Coarsene	ss Factor:	66	Workability Factor:	34	
ability Factor (%) 20 32 32 34 35 36 36 37 38 38 38 38 38 38 38 38 38	5, 44 45, 33 Operating Zone Boundary	52, 34	67, 40 68, 38 60, 36 67, 38 67, 38	75, 28	
25 40 ActionLimits B	45 oundary =	50 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"	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

PLANT #: P-39

Sample Date:

Production Gradation

5/1/23 Concrete Grade: DM, 4500HP

Dates Test Represents: 5/2/2023 5/8/2023 through Specific % ft³ Agg. Class Pit# Weight (SSD) Source Gravity Contribution 6AA 71-47 Presque Isle 1555 9.51 2.62 53.5

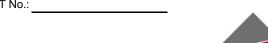
MDOT No.:

Adjusted WF Intial Production Sample (IPS)

34.8

Coarseness Factor:

Contractor:



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 2005 17 60

Superior	Materials, LLC
30701 W.	10 Mile Rd.
Suite 500	
Farmingto	on 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"	99.0	100	0.0	100.0	99.5	0.5	0.5
3/4"	83.3	100	0.0	100.0	91.1	8.4	8.9
1/2"	38.8	96	.8	100.0	67.0	24.1	33.0
3/8"	21.9	87	.1	100.0	57.1	9.9	42.9
#4	3.6	21	.3	95.2	39.8	17.3	60.2
#8	1.7	5.	3	81.6	32.3	7.5	67.7
#16	1.5	3.	0	66.6	26.3	6.0	73.7
#30	1.5	2.	6	50.4	20.1	6.2	79.9
#50	1.4	2.	4	24.0	10.0	10.1	90.0
#100	1.4	2.	3	6.8	3.5	6.5	96.5
LBW	1.2	2.	1	1.1	1.2	2.3	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:	63	Workability Factor:	32	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	56, 40 68, 38 60, 36 IPS Production Gradation Gradati	75, 39	
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"	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

PLANT #: P-02

Sample Date:

Production Gradation

5/1/23 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	5/2/2023	through	5/8/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific	%
Ayy. Class	FIL#	Source	weight (SSD)	11	Gravity	Contribution
6AA	71-47	Presque Isle	1605	9.82	2.62	55.2
004	74 47	D	450	0.00	0.00	5 0

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

36.4

Coarseness Factor:

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	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0



---- Verify this number is 100%

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

Cumulative Cumulative 6AA 26A 2NS % Retained Sieve % Passing % 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 98.7 97.7 100.0 100.0 1.3 1.3 3/4" 85.7 100.0 100.0 92.1 6.6 7.9 1/2' 49.0 90.2 100.0 71.3 20.8 28.7 3/8' 32.3 78.4 100.0 61.5 9.8 38.5 #4 8.3 15.9 96.8 43.7 17.8 56.3 #8 3.6 4.5 80.1 33.9 9.8 66.1 #16 2.8 2.1 64.6 27.2 6.7 72.8 #30 2.6 49.2 21.0 6.2 79.0 1.6 #50 2.4 1.5 25.9 11.7 9.3 88.3 #100 2.3 1.4 4.3 3.0 8.6 97.0 LBW 1.8 1.3 1.8

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 Fact	or: 58	Workability Factor:	34	
45 45, 44	52, 41		JMF Zone	
Workability Factor (%)	52, 34	58, 39 68, 38 68, 38 Production IPS	75, 39	
Norway 30 Asia and a second and		58, 31 689, 391	75, 28	
40 45 ActionLimits Boundary =	50 5	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