Aggregate Optimization Chart

Batch Plant Gradations

Production Gradation Report

PLANT #: P-101

Sample Date:

Production Gradation

12/12/22 Concrete Grade: DM, 4500HP

Dates Test Represents: 12/13/2022 12/19/2022 through

MDOT No.:

	•					
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1360	8.32	2.62	46.7
26A	71-47	Presque Isle	400	2.45	2.62	13.7
2NS	75-051	Mid Michigan	1150	6.93	2.66	39.5
		Total Wt	2910	17.69		100.0



-- Verify this number is 100%

Contractor:

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:

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

	TOTAL AND	2910 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"	98.6	100.0	100.0	99.3	0.7	0.7
3/4"	79.5	100.0	100.0	90.4	8.9	9.6
1/2"	37.4	97.1	100.0	70.3	20.1	29.7
3/8"	20.0	87.5	100.0	60.9	9.5	39.1
#4	3.1	21.0	98.0	43.1	17.8	56.9
#8	2.1	3.9	83.0	34.3	8.7	65.7
#16	1.9	1.8	68.3	28.1	6.2	71.9
#30	1.8	1.5	52.0	21.6	6.5	78.4
#50	1.7	1.5	27.1	11.7	9.9	88.3
#100	1.7	1.4	8.4	4.3	7.4	95.7
LBW	1.5	1.3	1.7	1.6	2.8	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 8% for the 1" sieve when

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

Coarseness Factor:	60	Workability Factor:	34	36.8
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 Production Gradation 60, 3\beta_S 57, 31 6768,131	75, 39 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

Stoneco

PLANT #: P-102

Pit#

58-003

58-003

81-019

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

12/12/22 Concrete Grade: DM, 4500HP

12/13/2022	through	12/19/2022		
Source	Weight (SSD)	ft ³	Specific	%
Source	weight (SSD)	IL	Gravity	Contribution
Stoneco	1500	8.94	2.69	50.8

300 1.79 2.69 10.2 Pleasant Lake 1150 6.95 2.65 39.0

Contractor:

MDOT No.:



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.

61

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

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

tained I	Cumulative % Retained
0.0	0.0
	0.0
0.0	0.0
).4	0.4
1.5	11.9
7.5	29.4
2.3	41.7
7.1	58.8
7.1	65.9
7.1	73.0
7.3	80.3
9.6	89.8
3.7	96.5
1.9	98.4
	0.0 0.4 1.5 7.5 2.3 7.1 7.1 7.1 7.3 9.6 6.7 1.9

 Batch Plant Gradations Aggregate Supplier Gradations **Production Gradation** Adjusted WF Intial Production Sample (IPS) **Coarseness Factor:** 63 **Workability Factor:** 34 36.6

	45	45, 44 52, 41 56, 40 67, 40	JMF Zone
Workability Factor (%)	35 -	68, 38 • 60126 Production Gradation 52, 34	75, 39
Workabilit		56, 32 67, 32, 31 Operating Zone Boundary	75, 28
A		10 45 50 55 60 65 70 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

Coarseness Factor:

Sample Date:

#100

LBW

Production Gradation

12/12/22 Concrete Grade: **DM**, **4500HP**

Dates Test Represents: 12/13/2022 12/19/2022 through Specific % ft³ Agg. Class Pit# Weight (SSD) Source 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.:

96.5

98.4

Coarseness Factor:

Contractor:

----- Verify this number is 100%

6.7

1.9

Adjusted WF Intial Production Sample (IPS)

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"	99.3	100.0	100.0	99.6	0.4	0.4
3/4"	76.6	100.0	100.0	88.1	11.5	11.9
1/2"	42.2	99.6	100.0	70.6	17.5	29.4
3/8"	20.4	87.5	100.0	58.3	12.3	41.7
#4	4.5	7.0	97.9	41.2	17.1	58.8
#8	2.7	2.7	83.2	34.1	7.1	65.9
#16	1.8	2.4	66.3	27.0	7.1	73.0
#30	1.6	2.2	48.0	19.7	7.3	80.3
#50	1.6	2.2	23.4	10.2	9.6	89.8

Aggregate Supplier Gradations

6.6

3.5

1.6

36.6

2.1

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.

 $^{\star}\%$ 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	68, 38 Production Gradati	JMF Zone 75, 39	
25 40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	80

Work	Workability Factor:		
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.2	10.1	10.8
1/2"	70.7	18.5	29.3
3/8"	60.7	10.0	39.3
#4	44.4	16.3	55.6
#8	35.9	8.5	64.1
#16	27.3	8.6	72.7
#30	19.1	8.2	80.9
#50	7.4	11.7	92.6
#100	1.9	5.6	98.1
LBW	0.7	1.2	99.3

PREPARED BY: SM, LLC Technical Service

1.4

O Batch Plant Gradations

Approved BY:

Stoneco

Schlegel

Batch Plant Gradations

PLANT #: P-14

58-003

19-55

Sample Date:

26A

2NS

Production Gradation

12/12/22 Concrete Grade: DM, 4500HP

1.97

6.60

2.69

2.67

11.1

37.2

37.7

Dates Test F	Represents:	12/13/2022	through	12/19/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1530	9.11	2.69	51.7

330

1100

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:



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	20	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"	99.3	10	0.0	100.0	99.6	0.4	0.4
3/4"	76.6	10	0.0	100.0	87.9	11.7	12.1
1/2"	42.2	99	9.6	100.0	70.1	17.8	29.9
3/8"	20.4	87	7.5	100.0	57.5	12.6	42.5
#4	4.5	7	.0	99.9	40.2	17.2	59.8
#8	2.7	2	.7	90.1	35.2	5.1	64.8
#16	1.8	2	.4	69.4	27.0	8.2	73.0
#30	1.6	2	.2	44.5	17.6	9.4	82.4
#50	1.6	2	.2	14.3	6.4	11.2	93.6
#100	1.4		.1	2.7	2.0	4.4	98.0
LBW	1.5	2	0	0.2	1.1	0.9	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.

63

*% 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:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	68, 40 68, 38 Production 0 60, 39PS	JMF Zone 75, 39 Gradation 75, 28	
25 40 45 ActionLimits Boundary =	50 58	Coarseness Factor (%)	75	80

Work	Workability Factor:		
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.0	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

Sample Date:

12/12/22

Contractor:

Concrete Grade: DM, 4500HP

MDOT No.:

Dates Test F	Represents:	12/13/2022	through	12/19/2022		
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	63-115	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

	i otai wt	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"	98.5	100.0	100.0	99.2	0.8	0.8
3/4"	89.2	100.0	100.0	94.2	5.0	5.8
1/2"	46.9	97.2	100.0	71.4	22.8	28.6
3/8"	29.9	82.0	100.0	61.2	10.1	38.8
#4	6.0	10.3	96.9	42.3	19.0	57.7
#8	2.2	2.7	81.0	33.4	8.9	66.6
#16	1.8	1.4	65.7	27.1	6.4	72.9
#30	1.7	1.1	50.0	20.8	6.3	79.2
#50	1.6	1.0	26.4	11.4	9.4	88.6
#100	1.6	0.9	4.2	2.6	8.8	97.4
LBW	1.3	0.7	0.6	1.0	1.6	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.

Production Gradation	Batch Plant Grada	tions Aggregate Supplier Gradatio	ns	Adjusted WF	Intial Production	on Sample (IPS)
Coarseness Factor:	58	Workability Factor:	33	35.9	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 1	57	7, 40 68, 40		- 1	2"	100.0
@		68, 38	75, 39	- 1	1.5"	100.0
		!		- 1	1"	99.3
Factor (%)		■ Pr∎d େ ଧାର ିଗB &adation		- 1	3/4"	89.0
E 35		i		- 1	1/2"	70.3
1	52, 34	!		- 1	3/8"	59.9
Operating Zone Boundary		22		- 1	#4	41.9
2 30	٠.	68,32		- 1	#8	35.9
Operating Zone				- 1	#16	27.8
Boundary			75, 28	- 1	#30	18.9
> 25 				_	#50	6.3
	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

PLANT #: 11

Dates Test Represents:

Sample Date:

12/12/22 Concrete Grade: DM, 4500HP

12/13/2022 12/19/2022 through

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:



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	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"	97.6	100	0.0	100.0	98.8	1.2	1.2
3/4"	82.6	100	0.0	100.0	91.3	7.5	8.7
1/2"	43.4	97	.2	100.0	71.4	19.9	28.6
3/8"	27.6	82	.0	100.0	61.9	9.5	38.1
#4	6.8	10	.3	98.4	43.4	18.5	56.6
#8	3.0	2.	7	84.2	35.1	8.3	64.9
#16	2.6	1.	4	67.9	28.3	6.8	71.7
#30	2.5	1.	1	49.9	21.1	7.2	78.9
#50	2.4	1.	0	24.6	11.0	10.1	89.0
#100	2.2	0.	9	7.3	4.1	7.0	95.9
LBW	1.8	0.	7	1.8	1.7	2.4	98.3

*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 Batch Plant G	radations Aggregate Supplier Gradations	Adjusted WF	Intial Producti	ion Sample (IPS)
Coarseness Factor: 59	Workability Factor: 35	37.6	Coars	seness Factor:
7 45		$\neg \top$	Worl	kability Factor:
45, 44	JMF Zo	ne	Sieve	Cumulative
52, 41			Sieve	% Passing
1 40]	67, 40		2"	100.0
(%)	68, 38	39	1.5"	100.0
	Production Gradation		1"	100.0
FE 35 1 52 34	■ 60,3MBS		3/4"	95.0
8 35	i i l		1/2"	72.3
	<u> </u>		3/8"	60.4
Morkability Operating Zone Boundary	0 1.92		#4	42.6
2 30	67 _{68,31}		#8	36.0
Operating Zone			#16	29.5
Boundary	75,	28	#30	20.3
> 25			#50	9.5
1	55 _ 60 _6570 75	80	#100	3.4
	55 Coarseness Factor (%) ⁷⁰ 75		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

through

Weight (SSD)

1455

300

1150

2905

12/13/2022

Source

Presque Isle

Presque Isle

Smelter Bay

Total Wt

Batch Plant Gradations

PLANT #: P-32

Pit#

71-47

71-47

95-013

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

12/12/22

ft³

8.90

1.83

6.95

17.69

Concrete Grade: DM, 4500HP 12/19/2022

Specific	%
Gravity	Contribution
2.62	50.1
2.62	10.3

2.65

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

37.6

Coarseness Factor:

Workability Factor:

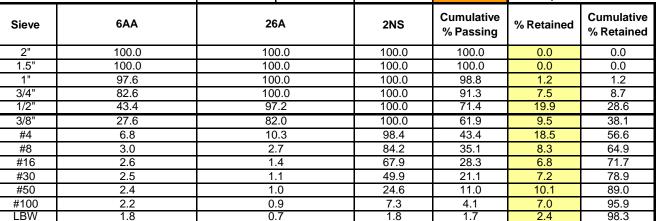
Contractor:



<---- Verify this number is 100%

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

Farmington Hills, MI 48336



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.

45 45, 44 52, 41 56, 40 40	JMF Zone	$\overline{\Box}$
% Pro	68, 38 duction Gradation 60, 38S 75, 28	
	ness Factor (%) ⁷⁰ 75	80

Workability Factor.		30	
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:

Dates Test Represents:

12/12/22 Concrete Grade: DM, 4500HP

12/13/2022 12/19/2022 through

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

Contractor:

MDOT No.:

Coarseness Factor:

Sι	perior Materials, LLC
30	701 W. 10 Mile Rd.
Su	ite 500
Fa	rmington Hills, MI 48336

61

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

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

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

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

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

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

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

	Total Wt	2950 17.68		100.0	< Verify this n	umber is 100%
Sieve	6AA	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"	99.3	100.0	100.0	99.6	0.4	0.4
3/4"	76.6	100.0	100.0	88.1	11.5	11.9
1/2"	42.2	99.6	100.0	70.6	17.5	29.4
3/8"	20.4	87.5	100.0	58.3	12.3	41.7
#4	4.5	7.0	97.9	41.2	17.1	58.8
#8	2.7	2.7	83.2	34.1	7.1	65.9
#16	1.8	2.4	66.3	27.0	7.1	73.0
#30	1.6	2.2	48.0	19.7	7.3	80.3
#50	1.6	2.2	23.4	10.2	9.6	89.8
#100	1.4	2.1	6.6	3.5	6.7	96.5
LBW	1.5	2.0	1.7	1.6	1.9	98.4
Production Grad	dation	ions Aggregate Supplier (Gradations	Adjusted WF	Intial Producti	on Sample (IPS

80

75

Production Gradation	Batch Plant Gradation	s • Aggregate Supplier Gradat	tions	Adjusted V
Coarseness Factor:	63	Workability Factor:	34	36.6
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 56, 49 52, 34	60, 38 Production Gradation	75, 28	

55

Coarseness Factor (%)⁷⁰

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

PREPARED BY: SM, LLC Technical Service

45

ActionLimits Boundary = - - - -

25

Approved By:

Sample Date:

12/12/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	12/13/2022	through	12/19/2022		
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	255	1.56	2.62	8.8
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
_		Total Wt	2905	17.69	·	100.0

MDOT No.:

<---- Verify this number is 100%

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.9

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

	i Otai Wt	2903 17.09		100.0	< verily this if	uniber 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"	98.5	100.0	100.0	99.2	0.8	0.8
3/4"	89.2	100.0	100.0	94.2	5.0	5.8
1/2"	46.9	97.2	100.0	71.4	22.8	28.6
3/8"	29.9	82.0	100.0	61.0	10.4	39.0
#4	6.0	10.3	97.6	41.1	20.0	58.9
#8	2.2	2.7	84.6	33.4	7.6	66.6
#16	1.8	1.4	69.6	27.4	6.0	72.6
#30	1.7	1.1	51.0	20.3	7.1	79.7
#50	1.6	1.0	23.0	9.7	10.7	90.3
#100	1.6	0.9	3.5	2.3	7.4	97.7
LBW	1.3	0.7	0.7	1.0	1.2	99.0
Production Gradat	ion O Batch Plant Grada	itions	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 Facto	r: 59	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zo Boundary	52, 41 52, 34	58, 39 68, 38 68, 38 68, 38 68, 38 68, 38	JMF Zone 75, 39	
Boundary 25 40 45 ActionLimits Boundary = -	<u></u>	Coarseness Factor (%)	75, 28 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"	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:

Dates Test Represents:

Production Gradation

Concrete Grade: DM, 4500HP 12/12/22

Contractor:

12/13/2022 12/19/2022 through

MDOT No.:

Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1505	9.21	2.62	51.8
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	44-051	Krake Willis Rd	1100	6.65	2.65	37.9
		Total Wt	2905	17.69		100.0

EUDEBIOL

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

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	26A		2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0		100.0	100.0	0.0	0.0
1.5"	100.0	100.0		100.0	100.0	0.0	0.0
1"	98.6	100.0		100.0	99.3	0.7	0.7
3/4"	79.5	100.0		100.0	89.4	9.9	10.6
1/2"	37.4	97	' .1	100.0	67.3	22.1	32.7
3/8"	20.0	87.5		100.0	57.3	10.0	42.7
#4	3.1	21.0		96.2	40.2	17.1	59.8
#8	2.1	3	.9	80.4	31.9	8.3	68.1
#16	1.9	1.8		65.2	25.9	6.1	74.1
#30	1.8	1	.5	49.4	19.8	6.1	80.2
#50	1.7	1.5		24.3	10.2	9.6	89.8
#100	1.7	1.4		9.0	4.4	5.8	95.6
LBW	1.5	1	.3	0.8	1.2	3.2	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	34.4
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 68, 40 68, 38 68, 38 Production Gradation 58, 32	75, 39 75, 28	
40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%) ⁷⁰	75	80

Batch Plant Gradations

Wor	Workability Factor:		
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

Sample Date:

Production Gradation

12/12/22 Concrete Grade: **DM**, **4500HP**

Dates Test F	Represents:	12/13/2022	through	12/19/2022		
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	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.9

<---- 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	i
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	1
1"	98.5	100.0	100.0	99.2	0.8	0.8	l
3/4"	89.2	100.0	100.0	94.2	5.0	5.8	1
1/2"	46.9	97.2	100.0	71.4	22.8	28.6	İ
3/8"	29.9	82.0	100.0	61.2	10.1	38.8	*1
#4	6.0	10.3	96.9	42.3	19.0	57.7	*/
#8	2.2	2.7	81.0	33.4	8.9	66.6	noi
#16	1.8	1.4	65.7	27.1	6.4	72.9	*0
#30	1.7	1.1	50.0	20.8	6.3	79.2	noı
#50	1.6	1.0	26.4	11.4	9.4	88.6	*0
#100	1.6	0.9	4.2	2.6	8.8	97.4	a 2
LBW	1.3	0.7	0.6	1.0	1.6	99.0	1

Aggregate SupplierGradations

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

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

om. 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: 58	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Z. Boundary		58, 39 68, 39 68, 38 68, 38 Pred60:066 Gradation IPS	75, 39 75, 28	
25 40 45 ActionLimits Boundary = -	50 5	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

PREPARED BY: SM, LLC Technical Service Approved By