Aggregate Optimization Chart

Production Gradation

Production Gradation Report

PLANT #: P-101 Sample Date:

4/11/22 Concrete Grade: DM, 4500HP 4/18/2022

Dates Test Represents:		4/12/2022	through	4/18/2022			
	Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
	6AA	71-47	Presque Isle	1460	8.93	2.62	50.2
	26A	71-47	Presque Isle	300	1.83	2.62	10.3
	2NS	75-051	Mid Michigan	1150	6.93	2.66	39.5

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	2910	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"	98.5	10	0.0	100.0	99.2	0.8	0.8
3/4"	84.5	10	0.0	100.0	92.2	7.0	7.8
1/2"	36.1	97	7.6	100.0	67.7	24.5	32.3
3/8"	18.4	87	7.8	100.0	57.8	9.9	42.2
#4	3.0	13	13.4		41.8	16.0	58.2
#8	1.9	3	.7	83.3	34.3	7.6	65.7
#16	1.7	2	2.3		28.1	6.2	71.9
#30	1.6	2	2.1		22.1	6.0	77.9
#50	1.6	1.9		29.2	12.5	9.5	87.5
#100	1.5	1.7		7.3	3.8	8.7	96.2
LBW	1.4	1	.5	0.6	1.1	2.7	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	36.8
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 60, 3\beta_S Production Grada 57, 31	75, 39 75, 28	
40 45 ActionLimits Boundary =	50	Coarseness Factor (%)	75	80

Batch Plant Gradations

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

P-102 PLANT #:

Sample Date:

Production Gradation

4/11/22 Concrete Grade: DM, 4500HP

Dates Test Represents:		4/12/2022	through	4/18/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.1
26A	58-003	Stoneco	205	1.22	2.69	6.9
2NS	81-019	Pleasant Lake	1150	6.95	2.65	38.9

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.8



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

	Total Wt	2955	17.71		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"	100.0	100	.0	100.0	100.0	0.0	0.0
3/4"	93.4	100	.0	100.0	96.4	3.6	3.6
1/2"	56.3	99.	4	100.0	76.3	20.1	23.7
3/8"	26.9	88.	8	100.0	59.6	16.7	40.4
#4	3.5	11.	9	99.4	41.4	18.2	58.6
#8	1.1	5.	7	85.5	34.3	7.1	65.7
#16	0.9	4.4	4	67.7	27.1	7.1	72.9
#30	0.8	3.8	3	48.8	19.7	7.5	80.3
#50	0.7	3.	5	23.8	9.9	9.8	90.1
#100	0.6	3.0	3	6.5	3.1	6.8	96.9
LBW	0.5	2.9	9	2.0	1.3	1.8	98.7

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	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Production Gradation 60 98	75, 39 75, 28	
25 + 40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	80

Batch Plant Gradations

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

Total Wt

O Batch Plant Gradations

8.0

0.7

0.6

0.5

PLANT #: P-103

Sample Date:

#30

#50

#100

LBW

Production Gradation

4/11/22 Concrete Grade: DM, 4500HP

Dates Test Represents:		4/12/2022	through	4/18/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.1
26A	58-003	Stoneco	205	1.22	2.69	6.9
2NS	81-019	Pleasant Lake	1150	6.95	2.65	38.9

3.8

3.5

3.3

2.9

Aggregate Supplier Gradations

2955

Contractor:

7.5

9.8

6.8

1.8

Adjusted WF Intial Production Sample (IPS)

MDOT No.:

2.65 17.71

48.8

23.8

6.5

19.7

9.9

3.1

1.3

36.8

<---- Verify this number is 100%

80.3

90.1

96.9

Coarseness Factor:

SUPERIOR
MATERIALS
Superior Materials, LLC
30701 W. 10 Mile Rd.

Farmington Hills, MI 48336

Cumulative Cumulative 6AA 26A % Retained Sieve 2NS % 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 0.0 100.0 100.0 100.0 100.0 0.0 0.0 3/4" 93.4 100.0 100.0 96.4 3.6 3.6 1/2' 56.3 99.4 100.0 76.3 20.1 23.7 3/8' 100.0 59.6 16.7 40.4 26.9 88.88 #4 3.5 11.9 99.4 41.4 18.2 58.6 #8 1.1 5.7 85.5 34.3 7.1 65.7 #16 0.9 4.4 67.7 27.1 7.1 72.9

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

Suite 500

*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	,
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Production Gradation 60/188	JMF Zone 75, 39	
40 45 ActionLimits Boundary =	50 5	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"	89.2	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:

Sample Date:

Sieve

2"

1.5"

3/4"

1/2'

3/8'

#4

#8

#16

#30

#50

#100

LBW

4/11/22

6AA

100.0

100.0

99.4

83.1

37.8

19.9

4.7

2.6

2.2

2.1

2.0

1.8

Concrete Grade: DM, 4500HP

2NS

100.0

100.0

100.0

100.0

100.0

100.0

96.9

79.8

63.7

47.5

26.0

4.8

Cumulative

% Passing

100.0

100.0

99.7

91.9

69.7

60.1

44.6

34.2

26.9

20.2

11.6

3.1

1.2

Contractor:

Cumulative

% Retained

0.0

79.8

88.4

96.9

MDOT No.:

% Retained

0.0

0.0

0.3

7.9

22.1

9.6

15.5

10.4

7.3

6.7

8.6

8.5

1.8

Dates Test F	Represents:	4/12/2022	through	4/18/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific	%
			• , ,		Gravity	Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	48.2
26A	71-47	Presque Isle	355	2.17	2.62	12.2
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		T-4-1 \A/4	2005	47.00		400.0

Total Wt 2905 17.69

26A

100.0

100.0

100.0

100.0

97.4

89.7

32.8

11.3

4.9

3.2

2.8

2.5

2.0

<---- Verify this number is 100%

SUPER	RIOR

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

0.0	
0.3	
8.1	
30.3	
39.9	*Maximu
55.4	*Any two
65.8	nom. max
73.1	*% Reta

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

vo adjacent sieves must equal 10% except max.,

ax., #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	lations Aggregate Supplier Gradations	Adjusted WF	Intial Producti	on Sample (IPS)
Coarseness Factor: 61	Workability Factor: 34	36.7	Coars	seness Factor:	
7 45		$\neg \top$	Work	ability Factor:	
45, 44	JMF Zoi	ne	Sieve	Cumulative	
52, 41			Sieve	% Passing	
40]	57, 40 68, 40		2"	100.0	
	68, 38	39	1.5"	100.0	
	Production Cradition		1"	99.3	
	Production Gradation 60, 36PS		3/4"	89.0	
Fa 35 - 52 34	i i i		1/2"	70.3	
32,01	<u> </u>		3/8"	59.9	
Operating Zone Boundary	68, 32 68, 33		#4	41.9	
30 -	68, 31		#8	35.9	
Operating Zone			#16	27.8	
Boundary	75, :	28	#30	18.9	
25			#50	6.3	
40 45 50 55	_ 60 _6570 75	80	#100	1.7	
	Coarseness Factor (%) ⁷⁰		LBW	1.0	
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"	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

Pit#

71-47

71-47

95-013

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

4/11/22

Contractor:

Concrete Grade: DM, 4500HP

4/12/2022	through	4/18/2022		
Source	Weight (SSD)	ft ³	Specific	%
Source	weight (SSD)	π	Gravity	Contribution
Presque Isle	1505	9.21	2.62	51.8
Presque Isle	250	1.53	2.62	8.6
Smelter Bay	1150	6.95	2.65	39.6

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.2

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"	97.9	10	0.0	100.0	98.9	1.1	1.1
3/4"	85.1	10	0.0	100.0	92.3	6.6	7.7
1/2"	39.7	97	97.4		68.5	23.7	31.5
3/8"	21.8	89	9.7	100.0	58.6	9.9	41.4
#4	4.2	32	2.8	96.2	43.1	15.5	56.9
#8	2.2	11	1.3	82.3	34.7	8.4	65.3
#16	1.8	4	.9	67.7	28.2	6.5	71.8
#30	1.8	3	.2	49.0	20.6	7.5	79.4
#50	1.6	2	.8	25.2	11.0	9.6	89.0
#100	1.4	2	.5	7.6	3.9	7.1	96.1
LBW	1.0	2	.0	1.9	1.4	2.5	98.6

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:	35	
45 45, 44			JMF Zone	$\overline{\mathbb{T}}$
%) 40 April 1 April 2 April 2	52, 34	67, 40 68, 38 Production Gradatio 60, 3BS	75, 39	
			75, 28	
25	50 55	Coarseness Factor (%) ⁷⁰	75	80

Batch Plant Gradations

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

Sample Date:

LBW

Production Gradation

4/11/22 Concrete Grade: DM, 4500HP

1.2

35.3



MDOT No.:

Contractor:

1.8

Adjusted WF Intial Production Sample (IPS)

<---- Verify this number is 100%

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	l
1"	100.0	100.0	100.0	100.0	0.0	0.0	ı
3/4"	93.4	100.0	100.0	96.3	3.7	3.7	ĺ
1/2"	56.3	99.4	100.0	75.6	20.8	24.4	ı
3/8"	26.9	88.8	100.0	58.4	17.2	41.6	*
#4	3.5	11.9	99.4	39.8	18.6	60.2	*
#8	1.1	5.7	85.5	32.8	6.9	67.2	nc
#16	0.9	4.4	67.7	26.0	6.8	74.0	*
#30	0.8	3.8	48.8	18.9	7.1	81.1	nc
#50	0.7	3.5	23.8	9.5	9.4	90.5	,
#100	0.6	3.3	6.5	3.0	6.5	97.0	а

2.9

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:	62	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 56, 52, 34	68, 38	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"	89.1	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

98.8

Coarseness Factor:

PREPARED BY: SM, LLC Technical Service

0.5

Batch Plant Gradations

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP 4/11/22

Dates Test F	Represents:	4/12/2022	through	4/18/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	48.2
26A	71-47	Presque Isle	405	2.48	2.62	13.9
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
		Total Wt	2905	17.69		100.0

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.0

---- Verify this number is 100%

S				R

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"	99.4	100.0	100.0	99.7	0.3	0.3
3/4"	83.1	100.0	100.0	91.9	7.9	8.1
1/2"	37.8	97.4	100.0	69.7	22.2	30.3
3/8"	19.9	89.7	100.0	60.0	9.7	40.0
#4	4.7	32.8	97.8	43.9	16.1	56.1
#8	2.6	11.3	83.6	34.5	9.4	65.5
#16	2.2	4.9	68.3	27.6	6.9	72.4
#30	2.1	3.2	49.0	20.0	7.6	80.0
#50	2.0	2.8	21.3	9.4	10.6	90.6
#100	1.8	2.5	3.6	2.6	6.8	97.4
LBW	1.4	2.0	1.0	1.3	1.2	98.7

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	
45 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 Production Gradation 60, 36 IPS 68,331	75, 39	
25 40 45 ActionLimits Boundary =	50 5	Coarseness Factor (%)	75, 28	80

Batch Plant Gradations

Work	ability Factor:	35	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.1	0.9	0.9
3/4"	90.3	8.8	9.7
1/2"	69.2	21.1	30.8
3/8"	59.1	10.1	40.9
#4	41.8	17.3	58.2
#8	35.1	6.6	64.9
#16	28.5	6.6	71.5
#30	21.2	7.3	78.8
#50	8.7	12.5	91.3
#100	1.8	7.0	98.2
LBW	0.7	1.0	99.3

63

6AA

100.0

100.0

Sample Date:

Sieve

2"

1.5"

4/11/22 Concrete Grade: DM, 4500HP

2NS

100.0

100.0

75

80

100.0

100.0

Dates Test Represents:		4/12/2022	through	4/18/2022		
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

26A

100.0

100.0

Contractor:

MDOT No.:



---- Verify this number is 100%

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

Cumulative Cumulative % Retained % Passing % Retained 0.0 0.0 0.0 0.0 0.8 8.0 8.0 33.4 43.5 60.6 68.7 74.7 80.6

*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 8% for the 1" sieve when

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

45 —					Work	ability Factor:
Coarsen	Coarseness Factor: 63 Workability Factor: 31 33.8					eness Factor:
Production G	Gradation O Batch Plant Grad	dations Aggregate Supplier Grad	lations	Adjusted WF	Intial Production	on Sample (IPS
LBW	1.4	1.5	1.2	1.3	3.0	98.7
#100	1.5	1.7	8.9	4.3	7.0	95.7
#50	1.6	1.9	27.2	11.3	8.1	88.7
#30	1.6	2.1	48.5	19.4	5.9	80.6
#16	1.7	2.3	63.9	25.3	6.0	74.7
#8	1.9	3.7	79.1	31.3	8.1	68.7
#4	3.0	13.4	96.3	39.4	17.1	60.6
3/8"	18.4	87.8	100.0	56.5	10.2	43.5
1/2"	36.1	97.6	100.0	66.6	25.3	33.4
3/4"	84.5	100.0	100.0	92.0	7.3	8.0
1"	98.5	100.0	100.0	99.2	0.8	0.8

Coar	seness Factor:	63	Workability Factor:	31	33.8
Workability Factor (%)	45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 68, 38 60, 36 IPS Production Gradation 58, 32	75, 39 75, 28	

55

Coarseness Factor (%) 60

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

45

ActionLimits Boundary = - - -

Approved By:

through

Weight (SSD)

1455

350

1100

4/12/2022

Source

Presque Isle

Presque Isle

Ray Rd

Batch Plant Gradations

PLANT #: P-02

Pit#

71-47

71-47

63-115

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

4/11/22 Concrete Grade: DM, 4500HP

37.9

35.4

1/18/2022			
ft ³	Specific	%	
π	Gravity	Contribution	
8.90	2.62	50.1	
2.14	2.62	12.0	

2.65

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:



Superior Materials, LLC
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Suite 500
Farmington Hills, MI 48336

	Total 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"	99.4	100.0	100.0	99.7	0.3	0.3
3/4"	83.1	100.0	100.0	91.5	8.2	8.5
1/2"	37.8	97.4	100.0	68.5	23.0	31.5
3/8"	19.9	89.7	100.0	58.6	9.9	41.4
#4	4.7	32.8	96.9	43.0	15.6	57.0
#8	2.6	11.3	79.8	32.9	10.1	67.1
#16	2.2	4.9	63.7	25.8	7.1	74.2
#30	2.1	3.2	47.5	19.4	6.4	80.6
#50	2.0	2.8	26.0	11.2	8.2	88.8
#100	1.8	2.5	4.8	3.0	8.2	97.0
LBW	1.4	2.0	0.8	1.2	1.8	98.8

Aggregate SupplierGradations

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

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

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

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

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

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

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

Coarseness Factor:	62	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 39 68, 38 68	75, 39	
25 40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	80

Workability Factor:		35	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.1	4.9	4.9
1/2"	74.6	20.5	25.4
3/8"	59.3	15.3	40.7
#4	42.1	17.2	57.9
#8	35.1	7.1	64.9
#16	29.2	5.9	70.8
#30	21.9	7.3	78.1
#50	9.6	12.4	90.4
#100	2.4	7.2	97.6
LBW	0.9	1.5	99.1