Aggregate Optimization Chart

Batch Plant Gradations

Production Gradation Report

PLANT #: P-101

Sample Date:

Production Gradation

9/26/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	9/27/2022	through	10/3/2022		
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

Contractor:

MDOT No.:

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:



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

	Total Wt 2910 17.69		7.69	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"	97.8	100.0	100.0	98.9	1.1	1.1
3/4"	84.5	100.0	100.0	92.2	6.7	7.8
1/2"	31.8	96.2	100.0	65.4	26.8	34.6
3/8"	17.3	83.0	100.0	56.8	8.6	43.2
#4	3.8	22.4	99.0	43.3	13.4	56.7
#8	2.0	6.0	84.3	34.9	8.4	65.1 r
#16	1.8	2.8	67.7	27.9	7.0	72.1
#30	1.7	2.4	49.4	20.6	7.3	79.4 r
#50	1.6	2.2	22.4	9.9	10.7	90.1
#100	1.6	2.0	6.0	3.4	6.5	96.6
LBW	1.4	1.8	1.0	1.3	2.1	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 Fa	actor: 66	Workability Factor:	35	37.4
	52, 41 52, 34 33	57, 39 68, 38 Production 0 60, 3β _S 57, 31 67 ₆ β ₁ 1 ₃₁	JMF Zone 75, 39 Gradation 75, 28	
40 ActionLimits Bounda		Coarseness Factor (%)	75	80

Work	ability Factor:	35	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	70.5	24.5	29.5
3/8"	60.0	10.5	40.0
#4	44.4	15.6	55.6
#8	35.5	9.0	64.5
#16	28.5	7.0	71.5
#30	21.5	7.0	78.5
#50	10.2	11.3	89.8
#100	3.1	7.1	96.9
LBW	1.3	1.8	98.7

Pleasant Lake

PLANT #: P-102

81-019

Sample Date:

Dates Test

2NS

9/26/22 Concrete Grade: DM, 4500HP

6.95

2.65

39.0

Dates Test F	Represents:	9/27/2022	through	10/3/2022		
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

Coarseness Factor:

MDOT No.:



Superior Materials, LLC 30701 W. 10 Mile Rd.

Farmington Hills, MI 48336

*Mavimum	0/_	Patainad	muct h	a ahova	tha	3/8" ciovo	

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.

	Total Wt	2950 17.68			100.0	< Verify this number is 100%	
Sieve	6AA	26	iA	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"	84.3	10	0.0	100.0	91.8	8.2	8.2
1/2"	49.8	99).5	100.0	73.6	18.2	26.4
3/8"	25.0	85	5.2	100.0	59.3	14.2	40.7
#4	3.1	14	.0	98.8	41.3	18.0	58.7
#8	1.2	5	.0	81.9	33.0	8.3	67.0
#16	0.7	3	4	61.8	24.7	8.2	75.3
#30	0.6	2	.7	44.5	17.9	6.9	82.1
#50	0.6	2	.5	20.0	8.3	9.6	91.7
#100	0.5	2	.3	5.6	2.6	5.7	97.4
LBW	0.6	2	.1	0.8	0.8	1.8	99.2
Production Gra	adation O Batch Plant Grad	dations () Agg	regate Supplier Gra	adations	Adjusted WF	Intial Production	on Sample (IPS

Coarseness Factor: Workability Factor: 33 35.5 61 45 JMF Zone 45, 44 Workability Factor (%) 75, 39 Production Gradation 45, 33 Operating Zone Boundary 75, 28 25 45 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"	89.2	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

ActionLimits Boundary = - - - -

Approved By:

Sample Date:

Production Gradation

9/26/22 Concrete Grade: DM, 4500HP 10/3/2022

Dates Test F	Represents:	9/27/2022	through	10/3/2022		
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
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.5

Contractor:



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	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"	84.3	100	.0	100.0	91.8	8.2	8.2
1/2"	49.8	99.	5	100.0	73.6	18.2	26.4
3/8"	25.0	85.	2	100.0	59.3	14.2	40.7
#4	3.1	14.	0	98.8	41.3	18.0	58.7
#8	1.2	5.0)	81.9	33.0	8.3	67.0
#16	0.7	3.4	1	61.8	24.7	8.2	75.3
#30	0.6	2.7	7	44.5	17.9	6.9	82.1
#50	0.6	2.5	5	20.0	8.3	9.6	91.7
#100	0.5	2.3	3	5.6	2.6	5.7	97.4
LBW	0.6	2.′		0.8	0.8	1.8	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 8% for the 1" sieve when

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

Coarseness Factor	: 61	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zor Boundary	52, 34	68, 38 68, 38 69 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	75, 28	
25 40 45 ActionLimits Boundary =		⁵ 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

61

PREPARED BY: SM, LLC Technical Service Approved BY:

Sample Date:

Production Gradation

9/26/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	9/27/2022	through	10/3/2022		
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	260	1.55	2.69	8.8
2NS	19-55	Schlegel	1100	6.60	2.67	37.2
		Total Wt	2960	17.68		100.0

MDOT No.:



-- Verify this number is 100%

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.5

Builders Redi-Mix

30701 W. 10 Mile Rd. Suite 500

Farmington Hills, MI 48336

	i Otai VVI	2900 17.00		100.0	< verily trils fi	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"	84.3	100.0	100.0	91.5	8.5	8.5
1/2"	49.8	99.5	100.0	72.8	18.7	27.2
3/8"	25.0	85.2	100.0	58.2	14.7	41.8
#4	3.1	14.0	100.0	40.1	18.1	59.9
#8	1.2	5.0	91.3	35.0	5.1	65.0
#16	0.7	3.4	71.6	27.3	7.7	72.7
#30	0.6	2.7	47.8	18.3	9.0	81.7
#50	0.6	2.5	15.8	6.4	11.9	93.6
#100	0.5	2.3	3.2	1.7	4.8	98.3
LBW	0.6	2.1	0.5	0.7	1.0	99.3

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:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 40 68, 40 68, 38 Production Gra 60, 36PS 68, 32	JMF Zone 75, 39 dation	
Boundary 25 40 45 ActionLimits Boundary =	50 5 	⁵ Coarseness Factor (%)	75, 28	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"	89.0	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

Sample Date:

Concrete Grade: DM, 4500HP 9/26/22

Dates Test Represents: 9/27/2022 10/3/2022 through

M	DOT	ĪΝ	o.:	
				٠

Contractor:

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	250	1.53	2.62	8.6
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	3

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

	i Otai Wt	2303 17.03		100.0	C Verily tills if	ulliber 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"	97.1	100.0	100.0	98.5	1.5	1.5
3/4"	77.9	100.0	100.0	88.6	9.9	11.4
1/2"	37.7	95.6	100.0	67.3	21.2	32.7
3/8"	21.7	84.7	100.0	58.1	9.2	41.9
#4	3.3	21.5	96.8	41.9	16.2	58.1
#8	2.0	6.4	80.5	33.5	8.4	66.5
#16	1.8	2.9	64.7	26.8	6.7	73.2
#30	1.7	2.2	48.7	20.3	6.4	79.7
#50	1.6	2.0	26.2	11.4	9.0	88.6
#100	1.6	1.9	6.4	3.5	7.8	96.5
LBW	1.3	1.7	0.9	1.2	2.3	98.8

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

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

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

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

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

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

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

Production Gradation	Aggregate Supplier Gradations	Adjusted WF	Intial Production	on Sample (IPS)
Coarseness Factor: 63	Vorkability Factor: 33	36.0	Coars	eness Factor:	
7 45		$\neg \top$	Work	ability Factor:	
45, 44	JMF Zone	7 I I	Sieve	Cumulative	
52, 41		-	Sieve	% Passing	
57, 40	68, 40	- 11	2"	100.0	
	75, 39	- 11	1.5"	100.0	
- - -	7	- 11	1"	99.3	
Q	■ 60, 36 PSoduction Gradation	- 11	3/4"	89.0	
Factor (%)		- 11	1/2"	70.3	
02,01		- 11	3/8"	59.9	
Operating Zone Boundary	68, 32	- 11	#4	41.9	
30 -	68,31	- 11	#8	35.9	
Operating Zone		- 11	#16	27.8	
Boundary	75, 28	- 11	#30	18.9	
25			#50	6.3	
	65 70 75	80	#100	1.7	
	ness Factor (%) 70 75		LBW	1.0	
ActionLimits Boundary =				<u> </u>	

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

Sample Date:

Production Gradation

9/26/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	9/27/2022	through	10/3/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1355	8.29	2.62	46.6
20.4	74 47	Draggue Isla	400	2.45	2.02	42.0

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.4

Contractor:

MDOT No.:

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1355	8.29	2.62	46.6
26A	71-47	Presque Isle	400	2.45	2.62	13.8
2NS	95-013	Smelter Bay	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

	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"	97.0	100	0.0	100.0	98.6	1.4	1.4
3/4"	81.0	100	0.0	100.0	91.1	7.5	8.9
1/2"	40.4	95	.6	100.0	71.6	19.5	28.4
3/8"	21.4	84	.7	100.0	61.2	10.4	38.8
#4	3.8	21	.5	95.9	42.7	18.5	57.3
#8	2.0	6.	4	83.6	34.9	7.8	65.1
#16	1.8	2.	9	69.2	28.6	6.3	71.4
#30	1.6	2.	2	50.4	21.0	7.6	79.0
#50	1.6	2.	0	24.3	10.6	10.4	89.4
#100	1.5	1.	9	6.9	3.7	6.9	96.3
LBW	1.2	1.	7	1.3	1.3	2.4	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.

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:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Production Gradal on 60, 38S	75, 28	
25 40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	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:

Production Gradation

9/26/22 Concrete Grade: DM, 4500HP

MDOT NO	٠.	

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.5

Dates Test F	Represents:	9/27/2022	through	10/3/2022		
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
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 n	umber is 100%
Sieve	6AA	26	6 A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	10	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0
1"	100.0	10	0.0	100.0	100.0	0.0	0.0
3/4"	84.3	10	0.0	100.0	91.8	8.2	8.2
1/2"	49.8	99	9.5	100.0	73.6	18.2	26.4
3/8"	25.0	85	5.2	100.0	59.3	14.2	40.7
#4	3.1	14	1.0	98.8	41.3	18.0	58.7
#8	1.2	5	.0	81.9	33.0	8.3	67.0
#16	0.7	3	.4	61.8	24.7	8.2	75.3
#30	0.6	2	.7	44.5	17.9	6.9	82.1
#50	0.6	2	.5	20.0	8.3	9.6	91.7
#100	0.5	2	.3	5.6	2.6	5.7	97.4
LBW	0.6	2	.1	0.8	0.8	1.8	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 8% for the 1" sieve when

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

Coarseness Factor:	61	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 56, 52, 34	68, 38	75, 39 75, 28	
40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	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"	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

Sample Date:

Production Gradation

9/26/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	9/27/2022	through	10/3/2022		
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	250	1.53	2.62	8.6
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
		Total Wt	2005	17.60		100.0

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

Contractor:

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 8% for the 1" sieve when

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

	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"	97.1	10	0.0	100.0	98.4	1.6	1.6
3/4"	77.9	10	0.0	100.0	88.2	10.3	11.8
1/2"	37.7	95	5.6	100.0	66.3	21.9	33.7
3/8"	21.7	84	l.7	100.0	56.8	9.5	43.2
#4	3.3	21	.5	97.3	40.5	16.3	59.5
#8	2.0	6	.4	81.5	32.5	8.0	67.5
#16	1.8	2	.9	66.5	26.4	6.1	73.6
#30	1.7	2	.2	48.5	19.5	6.9	80.5
#50	1.6	2	.0	20.2	8.7	10.8	91.3
#100	1.6	1	.9	3.6	2.4	6.3	97.6
LBW	1.3	1	.7	0.4	1.0	1.4	99.0
Production Grad	dation O Batch Plant Grada	ations	regate Supplier Gra	adations	Adjusted WF	Intial Production	on Sample (IPS

Coarseness Factor:	64	Workability Factor:	32	35.0
45 45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 60, 36 P\$roduction Gradation 58, 31	75, 28	
25 40 45	50 5	5 Coarseness Factor (%)	75	80

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

PREPARED BY: SM, LLC Technical Service

ActionLimits Boundary = - - - - -

Sample Date:

9/26/22 Concrete Grade: DM, 4500HP

10/3/2022 through

Dates Test F	Represents:	9/27/2022	through	10/3/2022		
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

MDOT No.:

Contractor:

	4	4					
S		J _F	E	7.	?/	0	R

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.

63

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

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

Cumulative

% Retained

0.0

0.0

0.0

10.3

29.7

40.9

57.2

64.5

71.0

78.8

90.2

96.3

98.8

•	Total Wt	2905	17.69		100.0	< Verify this number is 100%	
Sieve	6AA	26	6A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	10	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0
1"	97.8	10	0.0	100.0	98.9	1.1	1.1
3/4"	84.5	10	0.0	100.0	92.0	6.9	8.0
1/2"	31.8	96	5.2	100.0	64.3	27.7	35.7
3/8"	17.3	83	3.0	100.0	55.4	8.9	44.6
#4	3.8	22	2.4	96.2	40.7	14.7	59.3
#8	2.0	6	.0	80.6	32.2	8.5	67.8
#16	1.8	2	.8	65.9	26.2	6.0	73.8
#30	1.7	2	.4	50.9	20.4	5.8	79.6
#50	1.6	2	.2	27.6	11.5	8.9	88.5
#100	1.6	2	.0	8.4	4.2	7.3	95.8
LBW	1.4	1	.8	1.6	1.5	2.7	98.5

 Batch Plant Gradations Aggregate Supplier Gradations **Production Gradation** Adjusted WF Intial Production Sample (IPS) **Workability Factor:** 32 34.7 **Coarseness Factor:** 66

36 **Workability Factor:** % Cumulative Sieve % Passing Retained 2" 100.0 0.0 1.5" 100.0 0.0 1" 100.0 0.0 3/4" 89.7 10.3 1/2" 19.4 70.3 3/8' 11.2 59.1 #4 42.8 16.3 #8 35.5 7.3 #16 29.0 6.5 #30 21.2 7.7 #50 9.8 11.5 3.7 #100 6.1 LBW 2.5

Coarseness Factor:

Workability Factor (%) 00 28 00 00 00 00 00 00 00 00 00 00 00 00 00		45, 44 45, 33 Operating Zone Boundary	52, 41		56 , 40 6 0, 3 56 , 22		68, 38 oduction Gra	75, 28	
25	40	45 Boundary =	50	55	60 Coarsenes	s Factor	· (%) ⁷⁰	75	80

Sample Date:

Production Gradation

9/26/22 Concrete Grade: **DM, 4500HP**

Dates Test F	represents:	9/21/2022	through	10/3/2022		
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, 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"	97.1	100.0	100.0	98.4	1.6	1.6
3/4"	77.9	100.0	100.0	88.2	10.3	11.8
1/2"	37.7	95.6	100.0	66.3	21.8	33.7
3/8"	21.7	84.7	100.0	57.0	9.3	43.0
#4	3.3	21.5	96.8	41.6	15.5	58.4
#8	2.0	6.4	80.5	33.4	8.2	66.6
#16	1.8	2.9	64.7	26.8	6.6	73.2
#30	1.7	2.2	48.7	20.3	6.4	79.7
#50	1.6	2.0	26.2	11.4	9.0	88.6
#100	1.6	1.9	6.4	3.5	7.8	96.5
I RW	1.3	1 7	0.9	1.2	2.4	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	: 64	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zon Boundary	52, 41 52, 34	58, 39	75, 39	
25 40 45 ActionLimits Boundary =	50	60 Coarseness Factor (%) 70	75	80

Batch Plant Gradations

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

PREPARED BY: SM, LLC Technical Service Approved By