Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-101 Contractor:

Sample Date: 8/14/23 Concrete Grade: DM, 4500HP Dates Test Represents: 8/15/2023 8/21/2023 through

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

MDOT No.:

Coarseness Factor:

SUPER	IOR

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	2900	17.63		100.0	< Verify this number is 100%	
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"	96.7	10	0.0	100.0	98.3	1.7	1.7
3/4"	84.6	10	0.0	100.0	92.0	6.3	8.0
1/2"	41.8	93.4		100.0	69.3	22.7	30.7
3/8"	24.5	80).7	100.0	59.3	10.0	40.7
#4	4.2	14	l.3	96.1	41.5	17.8	58.5
#8	2.3	2	.5	80.2	33.2	8.3	66.8
#16	2.0	1.	.2	65.1	27.0	6.3	73.0
#30	2.0	2.0		50.1	21.1	5.9	78.9
#50	1.9	0.9		27.8	12.1	9.0	87.9
#100	1.8	0	.9	8.5	4.4	7.7	95.6
LBW	1.5	0	.8	1.2	1.3	3.1	98.7

 Batch Plant Gradations Aggregate Supplier Gradations **Production Gradation** Adjusted WF Initial Production Sample (IPS) **Coarseness Factor:** 61 **Workability Factor:** 33 35.7 45 JMF Zone 45, 44

Workability Factor (%) 75, 39 ■ Problection Gradation 52, 34 45, 33 Operating Zone 75, 28 Boundary 50 Coarseness Factor (%) 70 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"	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

62

Pleasant Lake

PLANT #: P-102

81-019

Sample Date:

2NS

8/14/23 Concrete Grade: DM, 4500HP

6.95

2.65

39.0

Dates Test F	Represents:	8/15/2023	through	8/21/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1525	9.09	2.69	51.7
26A	58-003	Stoneco	275	1.64	2.69	9.3

Coarseness Factor:

MDOT No.:



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

Farmington Hills, MI 48336

3.5	
3.8	*Maximum % Retai

61

ined 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.

	2950	17.68		100.0	< Verify this number is 100%		
6AA	26A		2NS	Cumulative % Passing	% Retained	Cumulative % Retained	
100.0	10	0.0	100.0	100.0	0.0	0.0	
100.0	10	0.0	100.0	100.0	0.0	0.0	
100.0	100.0		100.0	100.0	0.0	0.0	
77.4	100.0		100.0	88.3	11.7	11.7	
35.3	99.8		100.0	66.5	21.8	33.5	
17.4	88	3.0	100.0	56.2	10.4	43.8	
3.7	9	.7	97.3	40.7	15.4	59.3	
2.1	3	.1	80.9	32.9	7.8	67.1	
1.5	2	.2	63.7	25.8	7.1	74.2	
1.4	1.	.9	45.3	18.6	7.3	81.4	
1.3	1.8		22.8	9.7	8.8	90.3	
1.2	1.8		7.0	3.5	6.2	96.5	
1.2	1.6		1.2	1.2	2.3	98.8	
	100.0 100.0 100.0 77.4 35.3 17.4 3.7 2.1 1.5 1.4 1.3 1.2 1.2	100.0 10 100.0 10 100.0 10 77.4 10 35.3 99 17.4 88 3.7 9 2.1 3 1.5 2 1.4 1 1.3 1 1.2 1 1.2 1	100.0 100.0 100.0 100.0 100.0 100.0 77.4 100.0 35.3 99.8 17.4 88.0 3.7 9.7 2.1 3.1 1.5 2.2 1.4 1.9 1.3 1.8 1.2 1.8 1.2 1.6	100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 77.4 100.0 100.0 35.3 99.8 100.0 17.4 88.0 100.0 3.7 9.7 97.3 2.1 3.1 80.9 1.5 2.2 63.7 1.4 1.9 45.3 1.3 1.8 22.8 1.2 1.8 7.0 1.2 1.6 1.2	6AA 26A 2NS % Passing 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 77.4 100.0 100.0 88.3 35.3 99.8 100.0 66.5 17.4 88.0 100.0 56.2 3.7 9.7 97.3 40.7 2.1 3.1 80.9 32.9 1.5 2.2 63.7 25.8 1.4 1.9 45.3 18.6 1.3 1.8 22.8 9.7 1.2 1.8 7.0 3.5 1.2 1.6 1.2 1.2	6AA 26A 2NS % Passing % Retained 100.0 100.0 100.0 100.0 0.0 100.0 100.0 100.0 100.0 0.0 100.0 100.0 100.0 100.0 0.0 77.4 100.0 100.0 88.3 11.7 35.3 99.8 100.0 66.5 21.8 17.4 88.0 100.0 56.2 10.4 3.7 9.7 97.3 40.7 15.4 2.1 3.1 80.9 32.9 7.8 1.5 2.2 63.7 25.8 7.1 1.4 1.9 45.3 18.6 7.3 1.3 1.8 22.8 9.7 8.8 1.2 1.8 7.0 3.5 6.2 1.2 1.2 1.2 2.3	

roduction Gradation

75, 28

80

75

 Batch Plant Gradations Aggregate Supplier Gradations **Production Gradation** Adjusted WF Intial Production Sample (IPS) **Coarseness Factor: Workability Factor:** 33 35.4 65 45 JMF Zone 45, 44 Workability Factor (%)

■ 60µ36

Coarseness Factor (%)⁷⁰

1150

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"	89.2	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

45, 33

25

Operating Zone Boundary

45

ActionLimits Boundary = - - - -

52, 34

50

55

Approved By:

Sample Date:

Production Gradation

8/14/23 Concrete Grade: DM, 4500HP

Dates Test I	Represents:	8/15/2023	through	8/21/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific	% ••••••••••••••••••••••••••••••••••••
					Gravity	Contribution
6AA	58-003	Stoneco	1525	9.09	2.69	51.7
26A	58-003	Stoneco	275	1.64	2.69	9.3
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:

35.4

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	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"	77.4	100.0	100.0	88.3	11.7	11.7
1/2"	35.3	99.8	100.0	66.5	21.8	33.5
3/8"	17.4	88.0	100.0	56.2	10.4	43.8
#4	3.7	9.7	97.3	40.7	15.4	59.3
#8	2.1	3.1	80.9	32.9	7.8	67.1
#16	1.5	2.2	63.7	25.8	7.1	74.2
#30	1.4	1.9	45.3	18.6	7.3	81.4 ı
#50	1.3	1.8	22.8	9.7	8.8	90.3
#100	1.2	1.8	7.0	3.5	6.2	96.5
LBW	1.2	1.6	1.2	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 4% for the 3/4" sieve when

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

Coarseness Factor:	65	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	6, 40 67, 40 68, 38 68, 38 Froduction Gradation Gradatio	JMF Zone 75, 39 75, 28	
25 40 45 ActionLimits Boundary =	50 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

PREPARED BY: SM, LLC Technical Service Approved BY:

PLANT #: Contractor:

Concrete Grade: DM, 4500HP Sample Date: 8/14/23 Dates Test Represents: 8/15/2023 8/21/2023 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.:

Builders Redi-Mix

30701 W. 10 Mile Rd. Suite 500

Farmington Hills, MI 48336

	i otai Wt	2960	17.68		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"	77.4	10	0.0	100.0	88.5	11.5	11.5
1/2"	35.3	99	9.8	100.0	67.2	21.4	32.8
3/8"	17.4	88	3.0	100.0	56.7	10.5	43.3
#4	3.7	9	.7	99.9	40.2	16.5	59.8
#8	2.1	3	.1	90.1	34.9	5.3	65.1
#16	1.5	2	.2	69.4	26.8	8.1	73.2
#30	1.4	1.	.9	44.5	17.5	9.3	82.5
#50	1.3	1.	.8	14.3	6.2	11.3	93.8
#100	1.2	1.	.8	2.7	1.8	4.4	98.2
LBW	1.2	1.	.6	0.2	0.9	1.0	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	Batch Plant Gra	dations		Adjusted WF	Intial Product	ion Sample (IPS)
Coarseness Factor:	67	Workability Factor:	35	37.4	Coars	seness Factor:	
45					Worl	kability Factor:	ī
45, 44			JMF Zone	7	Sieve	Cumulative	
1,			JIVII ZOIIC	J 	Sieve	% Passing	ı
1 10	52, 41	57, 40 68, 40			2"	100.0	ı
(a) do 1			75, 39		1.5"	100.0	Ī
စီ		68, 38 Production Grade	otido		1"	99.3	ī
Factor (%)		■ 60, 36PS	aliuri		3/4"	89.0	
½ 35		- 00, 34F3			1/2"	70.3	Ī
╙	52, 34	_i :			3/8"	59.9	
Aboundary Approximately 45, 33 Operating Zone Boundary					#4	41.9	
30 1		57, 32 68, 31			#8	35.9	
Operating Zone	\Box				#16	27.8	
Boundary	·		75, 28		#30	18.9	
					#50	6.3	_
25 1				-	#100	1.7	
40 45	5055	Coarseness Factor (%)	75	80	LBW	1.0	Ī
ActionLimits Boundary =		254.55555 : 46.61 (70)					

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

Aggregate Optimization Chart

PLANT #:

Sample Date:

12

Contractor:

8/14/23 Dates Test Represents: 8/15/2023 Concrete Grade: DM, 4500HP

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	205	1.25	2.62	7.1
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

through

MDOT No.:

---- 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	ĺ
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	ĺ
1"	98.7	100.0	100.0	99.3	0.7	0.7	ĺ
3/4"	78.0	100.0	100.0	88.3	11.0	11.7	ĺ
1/2"	39.0	92.2	100.0	66.9	21.4	33.1	ĺ
3/8"	19.2	79.0	100.0	55.4	11.5	44.6	ĺ
#4	4.3	11.6	96.2	41.2	14.2	58.8	ı
#8	2.3	2.6	80.3	33.2	8.0	66.8	n
#16	2.1	1.3	64.2	26.6	6.6	73.4	ı
#30	2.0	1.0	47.7	20.0	6.6	80.0	n
#50	1.9	0.9	24.2	10.7	9.4	89.3	ı
#100	1.8	0.9	5.2	3.1	7.6	96.9	а
LBW	1.6	0.7	0.6	1.1	1.9	98.9	ĺ

8/21/2023

*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	tions Aggregate Supplier Gradations	Adjusted WF	Intial Producti	ion Sample (IPS	()
Coarseness Factor: 67	Workability Factor: 33	35.7	Coars	seness Factor:	
7 45		\neg \top	Work	cability Factor:	
45, 44	JMF Zone	7 I I	Sieve	Cumulative	
52, 41			Sieve	% Passing	
40]	7, 40 68, 40	- 11	2"	100.0	
🧝	68, 38	- 11	1.5"	100.0	
	! 7	- 11	1"	99.3	L
Q	■ 60, 36PS ■ Production Gradation	- 11	3/4"	89.0	L
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	L
Boundary	75, 28	- 11	#30	18.9	
25			#50	6.3	
	60 65 70 75	80	#100	1.7	
	Coarseness Factor (%) ⁷⁰ 75		LBW	1.0	
ActionLimits 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

Aggregate Optimization Chart

8/14/23

8/15/2023

PLANT #: p11

Sample Date:

Dates Test Represents:

Concrete Grade: DM, 4500HP

Contractor:

MDOT No.:

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	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

through

--- Verify this number is 100%

Coarseness Factor:

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

		101011111 2000 11100				uiiiboi io 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"	95.8	100.0	100.0	98.0	2.0	2.0
3/4"	70.6	100.0	100.0	85.8	12.1	14.2
1/2"	30.6	92.2	100.0	65.6	20.2	34.4
3/8"	17.0	79.0	100.0	57.4	8.2	42.6
#4	3.8	11.6	97.0	41.6	15.8	58.4
#8	1.8	2.6	86.1	35.3	6.4	64.7
#16	1.6	1.3	71.4	29.2	6.1	70.8
#30	1.4	1.0	51.2	21.1	8.1	78.9
#50	1.3	0.9	23.9	10.2	10.9	89.8
#100	1.2	0.9	6.8	3.4	6.8	96.6
LBW	0.8	0.7	1.0	0.9	2.5	99.1

8/21/2023

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

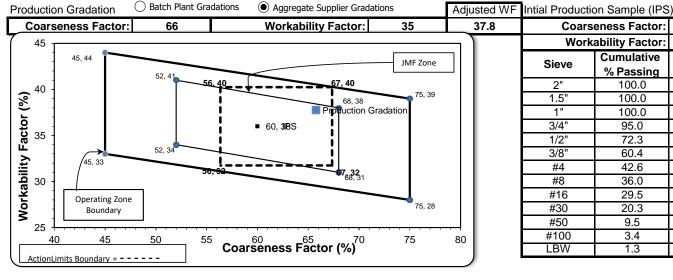
*Any two adjacent sieves must equal 10% except max.,

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.



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

PREPARED BY: SM, LLC Technical Service Approved By:

Sample Date:

8/14/23 Concrete Grade: DM, 4500HP

8/21/2023

Dates Test F	Represents:	8/15/2023	through	8/21/2023		
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	95-013	Smelter Bay	1150	6.95	2.65	39.6

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.8

SUPERIOR

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	2905	17.69		100.0	< Verify this n	umber is 100%	
Sieve	6AA	26	i A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained	
2"	100.0	10	0.0	100.0	100.0	0.0	0.0	1
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0	
1"	95.8	10	0.0	100.0	98.0	2.0	2.0	
3/4"	70.6	10	0.0	100.0	85.8	12.1	14.2	1
1/2"	30.6	92	2.2	100.0	65.6	20.2	34.4	1
3/8"	17.0	79	0.0	100.0	57.4	8.2	42.6	1
#4	3.8	11	.6	97.0	41.6	15.8	58.4	1
#8	1.8	2	.6	86.1	35.3	6.4	64.7	n
#16	1.6	1.	.3	71.4	29.2	6.1	70.8	1
#30	1.4	1.	.0	51.2	21.1	8.1	78.9	n
#50	1.3	0	9	23.9	10.2	10.9	89.8	1
#100	1.2	0.	.9	6.8	3.4	6.8	96.6	а
LBW	0.8	0.	.7	1.0	0.9	2.5	99.1]
Production G	Bradation Batch Plant Grad	dations	regate Supplier Gr	adations	Adjusted WF	Intial Production	on Sample (IPS	3)

Coarseness Factor: Workability Factor: 35 66 45 JMF Zone 45, 44 Workability Factor (%) Production Gradation ■ 60,3MBS 45, 33 Operating Zone Boundary 75, 28 25 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"	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

PREPARED BY: SM, LLC Technical Service

ActionLimits Boundary = - - - -

Sample Date:

Production Gradation

8/14/23 Concrete Grade: **DM**, **4500HP**

Jales Test Represents:		0/13/2023	through	8/21/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific	%
riggi Giaco		oou.oo	rroigint (002)		Gravity	Contribution
6AA	58-003	Stoneco	1525	9.09	2.69	51.7
26A	58-003	Stoneco	275	1.64	2.69	9.3
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.4



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Farmington Hills, MI 48336

	Total Wt	2950	17.68		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"	100.0	100	0.0	100.0	100.0	0.0	0.0
3/4"	77.4	100	0.0	100.0	88.3	11.7	11.7
1/2"	35.3	99	.8	100.0	66.5	21.8	33.5
3/8"	17.4	88	.0	100.0	56.2	10.4	43.8
#4	3.7	9.	7	97.3	40.7	15.4	59.3
#8	2.1	3.	1	80.9	32.9	7.8	67.1
#16	1.5	2.	2	63.7	25.8	7.1	74.2
#30	1.4	1.	9	45.3	18.6	7.3	81.4 r
#50	1.3	1.	8	22.8	9.7	8.8	90.3
#100	1.2	1.	8	7.0	3.5	6.2	96.5
LBW	1.2	1.	6	1.2	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 4% for the 3/4" sieve when

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

Coarseness	Factor: 65	Workability Factor:	33	
30 J Op	52, 41 52, 34 52, 34	56, 40 68, 38 60, 36 Production G	JMF Zone 75, 39 radation 75, 28	
25 40 ActionLimits Bour	45 50 ndary =	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"	89.1	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 Approved By

Pit#

71-47

71-47

63-92

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

8/14/23

Contractor:

Concrete Grade: DM, 4500HP

0/10/2023	through	8/21/2023			
Course	Weight (000)	ft ³	Specific	%	
Source	Weight (SSD)	π	Gravity	Contribution	
Presque Isle	1500	9.17	2.62	51.6	
Presque Isle	255	1.56	2.62	8.8	
Grange Hall	1150	6.95	2.65	39.6	

MDOT No.:

Coarseness Factor:

37.2



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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"	98.7	10	0.0	100.0	99.3	0.7	0.7
3/4"	78.0	10	0.0	100.0	88.6	10.7	11.4
1/2"	39.0	92	2.2	100.0	67.8	20.8	32.2
3/8"	19.2	79	9.0	100.0	56.4	11.4	43.6
#4	4.3	11	.6	97.4	41.8	14.6	58.2
#8	2.3	2	.6	84.2	34.7	7.0	65.3
#16	2.1	1	.3	70.3	29.0	5.7	71.0
#30	2.0	1	.0	51.2	21.4	7.6	78.6
#50	1.9	0.9		20.5	9.2	12.2	90.8
#100	1.8	0.9		3.1	2.2	6.9	97.8
LBW	1.6	0	.7	0.5	1.1	1.2	98.9
Production Gra	dation O Batch Plant Grad	ations	regate Supplier Gr	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	58, 39 68, 38 68, 38 Production 0 1PS 68, 31	JMF Zone 75, 39 Gradation 75, 28	
25 40 45 ActionLimits Boundary =	50 5	Coarseness Factor (%)	75	80

Worl	kability 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"	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:

Production Gradation

8/14/23 Concrete Grade: DM, 4500HP

Dates Test F	represents:	8/15/2023	tnrougn	8/21/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1525	9.09	2.69	51.7
26A	58-003	Stoneco	275	1.64	2.69	9.3
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.4

Contractor:



Superior Materials, LLC
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Suite 500
Farmington Hills, MI 48336

	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	77.4	100.0	100.0	88.3	11.7	11.7
1/2"	35.3	99.8	100.0	66.5	21.8	33.5
3/8"	17.4	88.0	100.0	56.2	10.4	43.8
#4	3.7	9.7	97.3	40.7	15.4	59.3
#8	2.1	3.1	80.9	32.9	7.8	67.1
#16	1.5	2.2	63.7	25.8	7.1	74.2
#30	1.4	1.9	45.3	18.6	7.3	81.4 ı
#50	1.3	1.8	22.8	9.7	8.8	90.3
#100	1.2	1.8	7.0	3.5	6.2	96.5
LBW	1.2	1.6	1.2	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 4% for the 3/4" sieve when

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

Coarseness Factor:	65	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 60, 136 Production Grad	75, 39 dation 75, 28	
25 + 40 45 ActionLimits Boundary =	50	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

61

Sample Date:

#100

LBW

Production Gradation

8/14/23 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	8/15/2023	through	8/21/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific	%
Agg. Olass	110#	Oource	Weight (SSD)	11	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
		Total Wt	2905	17.69		100.0

Contractor:

96.6

98.6

Coarseness Factor:

MDOT No.:

6.2

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"	96.7	100.0	100.0	98.2	1.8	1.8
3/4"	84.6	100.0	100.0	91.5	6.7	8.5
1/2"	41.8	93.4	100.0	67.4	24.1	32.6
3/8"	24.5	80.7	100.0	57.0	10.4	43.0
#4	4.2	14.3	97.7	40.3	16.7	59.7
#8	2.3	2.5	83.2	32.9	7.4	67.1
#16	2.0	1.2	67.2	26.6	6.3	73.4
#30	2.0	2.0	49.3	19.9	6.7	80.1
#50	1.9	0.9	22.5	9.6	10.3	90.4

Aggregate Supplier Gradations

6.3

3.4

1.4

35.4

0.9

0.8

*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 4% for the 3/4" sieve when

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

Coarseness Factor:	64	Workability Factor:	33	
45 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 60, 36 PProduct on Grades 58, 32		
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"	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

1.8

Batch Plant Gradations

8/14/23

PLANT #: P-O2

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP

Contractor:

Dates Test Represents: 8/15/2023

through 8/21/2023

	_	_	_			
М	П	n	т	N	\sim	٠

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	205	1.25	2.62	7.1
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.7

<---- Verify this number is 100%

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MATERIA	

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					,	
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"	98.7	100.0	100.0	99.3	0.7	0.7
3/4"	78.0	100.0	100.0	88.3	11.0	11.7
1/2"	39.0	92.2	100.0	66.9	21.4	33.1
3/8"	19.2	79.0	100.0	55.4	11.5	44.6
#4	4.3	11.6	96.2	41.2	14.2	58.8
#8	2.3	2.6	80.3	33.2	8.0	66.8 n
#16	2.1	1.3	64.2	26.6	6.6	73.4
#30	2.0	1.0	47.7	20.0	6.6	80.0 n
#50	1.9	0.9	24.2	10.7	9.4	89.3
#100	1.8	0.9	5.2	3.1	7.6	96.9 a
LBW	1.6	0.7	0.6	1.1	1.9	98.9

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 4% for the 3/4" sieve when

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

Coarseness	Factor: 67	Workability Factor:	33	
Ope Ope	52, 41 52, 34 55, 33 erating Zone Boundary	58, 39	JMF Zone 75, 39 Gradation 75, 28	
40 ActionLimits Bound		Coarseness Factor (%)	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

63

PREPARED BY: SM, LLC Technical Service Approved By