Aggregate Optimization Chart

Batch Plant Gradations

Production Gradation

Production Gradation Report

PLANT #: P-101 Contractor:

Sample Date: 10/31/22 Concrete Grade: DM, 4500HP Dates Test Represents: 11/1/2022 11/7/2022 through

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
			0010			1000

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		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"	98.4	100	.0	100.0	99.2	0.8	0.8
3/4"	80.4	100	.0	100.0	90.2	9.0	9.8
1/2"	39.0	96.	7	100.0	69.1	21.1	30.9
3/8"	21.1	85.	0	100.0	58.9	10.2	41.1
#4	3.6	17.	3	98.8	42.6	16.2	57.4
#8	1.9	4.8	3	84.6	34.9	7.8	65.1
#16	1.7	3.0)	69.6	28.7	6.2	71.3
#30	1.6	2.6	6	52.2	21.7	7.0	78.3
#50	1.6	2.4	1	23.2	10.2	11.5	89.8
#100	1.5	2.2	2	5.2	3.0	7.2	97.0
LBW	1.3	2.0)	0.8	1.2	1.9	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:	35	37.4
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 Production Gradation 60, 3\beta_S 67, 33 68, 38 67, 33 67, 33	75, 28	
40 45 ActionLimits Boundary =	50 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"	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

Sample Date:

Production Gradation

10/31/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	11/1/2022	through	11/7/2022		
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

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

Contractor:

MDOT No.:

SUPERIOR MATERIALS

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

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

*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.

2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0		
		Total Wt	2950	2950 17.68		100.0	< Verify this number is 100%	
Sieve	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	100.0		100.0	100.0	0.0	0.0
3/4"	84.7		100.0		100.0	92.0	8.0	8.0
1/2"	42.3		98.9		100.0	69.6	22.4	30.4
3/8"	21.0		83.8		100.0	57.1	12.5	42.9
#4		2.7	5.3		98.0	40.1	17.0	59.9
#8	1.1		1	.2	84.1	33.5	6.6	66.5
#16		1.2	0	.9	67.4	27.0	6.5	73.0
#30		1.1	0	.7	49.3	19.9	7.1	80.1
#50	1.0		0	.7	25.1	10.4	9.5	89.6
#100	1.0		0	.6	7.4	3.5	6.9	96.5
LBW		0.6	0	.7	1.4	0.9	2.5	99.1

Aggregate Supplier Gradations

Coarseness Factor: Workability Factor: 33 36.0 64 45 JMF Zone 45, 44 Workability Factor (%) ■ 6018 ■ Production Gradation Operating Zone Boundary 25 Coarseness Factor (%) 70 45 50 75 80 ActionLimits Boundary = - - - -

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

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP 10/31/22

Dates Test Represents:		11/1/2022	through	11/7/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	52.5
004	=	O /	0=0	4 40	0.00	~ =

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.0

Contractor:

MDOT No.:

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

---- Verify this number is 100%

SUPERIOR	

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

Farmington Hills, MI 48336

	Total Wt	2550 17.00		100.0	C Verily this ii	uniber is 10076
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"	84.7	100.0	100.0	92.0	8.0	8.0
1/2"	42.3	98.9	100.0	69.6	22.4	30.4
3/8"	21.0	83.8	100.0	57.1	12.5	42.9
#4	2.7	5.3	98.0	40.1	17.0	59.9
#8	1.1	1.2	84.1	33.5	6.6	66.5
#16	1.2	0.9	67.4	27.0	6.5	73.0
#30	1.1	0.7	49.3	19.9	7.1	80.1
#50	1.0	0.7	25.1	10.4	9.5	89.6
#100	1.0	0.6	7.4	3.5	6.9	96.5
LBW	0.6	0.7	1.4	0.9	2.5	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:	64	Workability Factor:	33	
45 45, 44 45, 44 85, 44	52, 41	68, 38	JMF Zone 75, 39	
Morkability Factor (%) 35 45, 33 Operating Zone Boundary	52, 34 56	■ 60JPS ■ Production Gradat	tion	
25	· · · · · · · ·		75, 28	
40 45 ActionLimits Boundary =	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"	89.2	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:

Schlegel

PLANT #: P-14

19-55

Sample Date:

2NS

10/31/22 Concrete Grade: DM, 4500HP

6.60

17.60

2.67

37.2

37.2

Dates Test Represents:		11/1/2022	through	11/7/2022			
	Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
	6AA	58-003	Stoneco	1550	9.23	2.69	52.4
	26A	58-003	Stoneco	310	1.85	2.69	10.5

1100

2060

Contractor:

MDOT No.:

Coarseness Factor:



Builders	Redi-Mix
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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	A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained	
2"	100.0	100	0.0	100.0	100.0	0.0	0.0	ĺ
1.5"	100.0	100	0.0	100.0	100.0	0.0	0.0	ĺ
1"	100.0	100	0.0	100.0	100.0	0.0	0.0	ĺ
3/4"	84.7	100	0.0	100.0	92.0	8.0	8.0	ĺ
1/2"	42.3	98	.9	100.0	69.7	22.3	30.3	ĺ
3/8"	21.0	83	.8	100.0	56.9	12.7	43.1	ľ
#4	2.7	5.	3	100.0	39.1	17.8	60.9	ľ
#8	1.1	1.	2	91.6	34.7	4.4	65.3	n
#16	1.2	0.	9	74.0	28.2	6.5	71.8	ľ
#30	1.1	0.	7	53.6	20.6	7.7	79.4	n
#50	1.0	0.	7	19.0	7.7	12.9	92.3	ľ
#100	1.0	0.	6	3.8	2.0	5.7	98.0	а
LBW	0.6	0.	7	0.4	0.5	1.5	99.5	ĺ
Production G	Gradation O Batch Plant Grad	dations	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 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 68, 38 Preduction 68, 32 68, 31	JMF Zone 75, 39 Gradation 75, 28	
25 + 40 45 ActionLimits Boundary =	50 58	Coarseness Factor (%)	75	

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:

#100

LBW

Dates Test Represents:

10/31/22 Concrete Grade: DM, 4500HP

11/1/2022 11/7/2022 through

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

Contractor:

96.7

98.8

MDOT No.:

8.2

2.2

3.3

1.2

6.1

---- Verify this number is 100%



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

Farmington Hills, MI 48336

Sieve	6AA	26A	2NS	% Passing	% Retained	% 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"	99.2	100.0	100.0	99.6	0.4	0.4	
3/4"	84.8	100.0	100.0	92.1	7.5	7.9	
1/2"	41.3	97.8	100.0	69.4	22.7	30.6	
3/8"	21.7	87.3	100.0	58.3	11.1	41.7	*
#4	3.7	24.8	96.5	42.3	16.1	57.7	*
#8	1.9	5.8	78.3	32.5	9.8	67.5	no
#16	1.7	2.4	62.2	25.7	6.8	74.3	*
#30	1.6	2.0	47.6	19.8	5.9	80.2	no
#50	1.6	1.8	26.8	11.6	8.3	88.4	*

1.8

1.6

*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.

Production Gradation	ations Aggregate Supplier Gradations	Adjusted WF	Intial Producti	on Sample (IPS))
Coarseness Factor: 62	Workability Factor: 32	35.0	Coars	eness Factor:	
7 45		-	Work	ability Factor:	
45, 44	JME	Zone	Sieve	Cumulative	
52, 41			Sieve	% Passing	
40 -	68, 40		2"	100.0	
	68, 38	75, 39	1.5"	100.0	
	!	- 11	1"	99.3	
Q	■ 6 <u>0,</u> 36PS	- 11	3/4"	89.0	
Eactor (%)	Production Gradation	- 11	1/2"	70.3	
	- !	- 11	3/8"	59.9	
Morkability Operating Zone Boundary	68 32	- 11	#4	41.9	
	7 7, 32	- 11	#8	35.9	
Operating Zone		- 11	#16	27.8	
Boundary	•	75, 28	#30	18.9	
25			#50	6.3	
40 45 50 55	60 65 70 75	80	#100	1.7	
	Coarseness Factor (%) ⁷⁰		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

PREPARED BY: SM, LLC Technical Service

1.5

PLANT #:

Sample Date: 10/31/22 Contractor:

Concrete Grade: DM, 4500HP

MDOT	No·	
IVIDOI	1 10	

Dates Test F	Represents:	11/1/2022	through	11/7/2022		
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	2005	17 60		100.0

SUPER	IOR

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

Farmington Hills, MI 48336

	l otal 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"	96.5	100	0.0	100.0	98.4	1.6	1.6
3/4"	70.3	100	0.0	100.0	86.1	12.2	13.9
1/2"	31.4	97	.8	100.0	67.7	18.4	32.3
3/8"	15.4	87	.3	100.0	58.8	8.9	41.2
#4	3.1	24	.8	96.1	42.9	15.9	57.1
#8	1.9	5.	8	83.6	34.8	8.1	65.2 r
#16	1.7	2.	4	68.6	28.3	6.5	71.7
#30	1.6	2.	0	49.1	20.5	7.8	79.5
#50	1.6	1.	8	24.0	10.5	10.0	89.5
#100	1.5	1.	8	7.1	3.8	6.7	96.2
LBW	1.2	1.	6	1.4	1.3	2.4	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	O Batch Plant Grada	ations	ons	Adjusted WF	Intial Product	ion Sample (IPS)
Coarseness Factor	63	Workability Factor:	35	37.3	Coars	seness Factor:
7 45				$\neg \top$	Worl	kability Factor:
45, 44			JMF Zone]	Sieve	Cumulative % Passing
40	52, 41	40 67, 40			2"	100.0
 %		68, 38	75, 39	- 11	1.5"	100.0
		Production Gradation		- 11	1"	100.0
Factor 35		■ 60, 319 S		- 11	3/4"	95.0
<u>8</u> 35]		į i		- 11	1/2"	72.3
	52, 34	!		- 11	3/8"	60.4
Operating Zon Boundary	50,5	67 _{68,31}			#4	42.6
30 -		68,31		- 11	#8	36.0
Operating Zon	e		\multimap		#16	29.5
Boundary			75, 28	- 11	#30	20.3
25					#50	9.5
40 45	50 55	_ 60 _6570	75	80	#100	3.4
A ski a ski svojika Davos d		Coarseness Factor (%) ⁷⁰			LBW	1.3
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"	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

Pit#

71-47

71-47

95-013

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

10/31/22

Contractor:

Concrete Grade: DM, 4500HP

11/1/2022	through	11/7/2022		
Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
Presque Isle	1355	8.29	2.62	46.6
Presque Isle	400	2.45	2.62	13.8
Smelter Bay	1150	6.95	2.65	39.6

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.3

Superior Materials, LLC	:
30701 W. 10 Mile Rd.	
Suite 500	
Farmington Hills, MI 4833	6

	Total Wt	2905	17.69		100.0	< Verify this n	umbor ic 100%
	I Otal VVI	2303	17.03	-	100.0	< veilly tills if	uniber 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"	96.5	10	0.0	100.0	98.4	1.6	1.6
3/4"	70.3	10	0.0	100.0	86.1	12.2	13.9
1/2"	31.4	97	7.8	100.0	67.7	18.4	32.3
3/8"	15.4	87	7.3	100.0	58.8	8.9	41.2
#4	3.1	24	1.8	96.1	42.9	15.9	57.1
#8	1.9	5	.8	83.6	34.8	8.1	65.2
#16	1.7	2	.4	68.6	28.3	6.5	71.7
#30	1.6	2	.0	49.1	20.5	7.8	79.5
#50	1.6	1	.8	24.0	10.5	10.0	89.5
#100	1.5	1	.8	7.1	3.8	6.7	96.2
LBW	1.2	1	.6	1.4	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.

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

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

Coarsen	ess Factor:	63	Workability Factor:	35	
Workability Factor (%) 08 08 09 09	45, 44 45, 33 Operating Zone Boundary	52, 34	66, 40 67, 40 68, 38 Production Gradation 60, 38S	75, 39 75, 28	
25 40 ActionLimits I	45 Boundary =	50 5	⁵ Coarseness Factor (%) ⁷⁰	75	80

Batch Plant Gradations

Worl	cability 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

11/1/2022

Batch Plant Gradations

PLANT #: P-35

Sample Date:

Dates Test Represents:

Production Gradation

Congrete Crade: DM 4500HP 10/31/22

	Concrete Grade:	DIVI, 430011F
11/7/2022		

	1						
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	

through

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

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

	l otal 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"	84.7	10	0.0	100.0	92.0	8.0	8.0
1/2"	42.3	98	3.9	100.0	69.6	22.4	30.4
3/8"	21.0	83	3.8	100.0	57.1	12.5	42.9
#4	2.7	5	.3	98.0	40.1	17.0	59.9
#8	1.1	1	.2	84.1	33.5	6.6	66.5
#16	1.2	0	.9	67.4	27.0	6.5	73.0
#30	1.1	0	.7	49.3	19.9	7.1	80.1
#50	1.0	0	.7	25.1	10.4	9.5	89.6
#100	1.0	0	.6	7.4	3.5	6.9	96.5
LBW	0.6	0	.7	1.4	0.9	2.5	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:	64	Workability Factor:	33	36.0
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 56, 52, 34 56,	68, 38 ■ 60, 136 ■ Production Gradation	75, 39 n	
40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%) ⁷⁰	75	80

Work	ability Factor:	36	
Sieve	Sieve Cumulative % Passing		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

Concrete Grade: DM, 4500HP 10/31/22

Dates Test Represents: 11/1/2022 11/7/2022 through

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	51.6
26A	71-47	Presque Isle	305	1.87	2.62	10.5
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
		Total Wt	2905	17.69		100.0

Contractor:

MDOT No.:

Verify this number is 100%

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.9

Superior Materials, L	<u>LC</u>
30701 W. 10 Mile Rd.	
Suite 500	
Farmington Hills, MI 483	336

	TOTAL VVI	2905 17.09		100.0	< verify this n	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"	99.2	100.0	100.0	99.6	0.4	0.4
3/4"	84.8	100.0	100.0	92.2	7.4	7.8
1/2"	41.3	97.8	100.0	69.5	22.7	30.5
3/8"	21.7	87.3	100.0	58.2	11.2	41.8
#4	3.7	24.8	97.6	41.5	16.8	58.5
#8	1.9	5.8	84.1	33.4	8.0	66.6
#16	1.7	2.4	69.3	27.4	6.1	72.6
#30	1.6	2.0	49.4	19.7	7.6	80.3
#50	1.6	1.8	21.0	9.0	10.8	91.0
#100	1.5	1.8	3.4	2.3	6.7	97.7
LBW	1.3	1.6	0.5	1.0	1.2	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.

*% 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:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 38 68, 38 radation IPS 68, 31	75, 28	
25 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"	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

Sample Date:

Dates Test Represents:

Production Gradation

10/31/22 Concrete Grade: DM, 4500HP

11/1/2022 11/7/2022 through

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	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:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

33.1

--- Verify this number is 100%

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

	rotar vvt	2000 17.00	17.00		Verify this number is 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"	98.4	100.0	100.0	99.1	0.9	0.9	
3/4"	80.4	100.0	100.0	89.2	9.9	10.8	
1/2"	39.0	96.7	100.0	66.1	23.1	33.9	
3/8"	21.1	85.0	100.0	55.4	10.7	44.6	
#4	3.6	17.3	95.8	39.5	15.9	60.5	
#8	1.9	4.8	77.2	30.6	8.8	69.4	
#16	1.7	3.0	61.8	24.5	6.1	75.5	
#30	1.6	2.6	47.0	18.9	5.7	81.1	
#50	1.6	2.4	25.8	10.8	8.0	89.2	
#100	1.5	2.2	8.0	4.0	6.8	96.0	
LBW	1.3	2.0	1.0	1.2	2.8	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 Fa	ctor: 64	Workability Factor:	31	
45 45, 44 45, 44 45, 33 Operating Boun	-	58, 40 68, 38 68, 38 Production Grace 58, 32		
25 40 4 ActionLimits Boundary		Coarseness Factor (%)	75	→ 80 —

Batch Plant Gradations

Work	ability Factor:	36	
Sieve	Sieve Cumulative % Passing		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

Sample Date:

10/31/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	11/1/2022	through	11/7/2022		
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	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

MDOT No.:

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.

63

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

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

6AA 100.0 100.0 99.2 84.8 41.3		0.0	2NS 100.0 100.0 100.0 100.0	Cumulative % Passing 100.0 100.0 99.6 92.1	% Retained 0.0 0.0 0.0 0.4	Cumulative % Retained 0.0 0.0 0.4
100.0 99.2 84.8	100 100 100	0.0	100.0 100.0	100.0 99.6	0.0 0.4	0.0
99.2 84.8	100	0.0	100.0	99.6	0.4	
84.8	100					0.4
		0.0	100.0	02.1		
41.3	97		100.0	92.1	7.5	7.9
	٠.	7.8	100.0	69.4	22.7	30.6
21.7	87	.3	100.0	58.3	11.1	41.7
3.7	24	.8	96.5	42.3	16.1	57.7
1.9	5.	8	78.3	32.5	9.8	67.5
1.7	2.	4	62.2	25.7	6.8	74.3
1.6	2.	0	47.6	19.8	5.9	80.2
1.6	1.	8	26.8	11.6	8.3	88.4
1.5	1.	8	6.1	3.3	8.2	96.7
1.3	1.	6	0.9	1.2	2.2	98.8
	1.9 1.7 1.6 1.6 1.5 1.3	1.9 5. 1.7 2. 1.6 2. 1.6 1. 1.5 1. 1.3 1.	1.9 5.8 1.7 2.4 1.6 2.0 1.6 1.8 1.5 1.8 1.3 1.6	1.9 5.8 78.3 1.7 2.4 62.2 1.6 2.0 47.6 1.6 1.8 26.8 1.5 1.8 6.1 1.3 1.6 0.9	1.9 5.8 78.3 32.5 1.7 2.4 62.2 25.7 1.6 2.0 47.6 19.8 1.6 1.8 26.8 11.6 1.5 1.8 6.1 3.3 1.3 1.6 0.9 1.2	1.9 5.8 78.3 32.5 9.8 1.7 2.4 62.2 25.7 6.8 1.6 2.0 47.6 19.8 5.9 1.6 1.8 26.8 11.6 8.3 1.5 1.8 6.1 3.3 8.2 1.3 1.6 0.9 1.2 2.2

Coarseness Factor: Workability Factor: 32 35.0 62 45 JMF Zone 45, 44 52, 41 Workability Factor (%) Procession Gradation 52, 34 Operating Zone Boundary 75, 28 25 Coarseness Factor (%)⁷⁰ 45 50 55 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"	95.1	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