Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-101 Contractor:

Sample Date: Concrete Grade: DM, 4500HP 7/3/23 Dates Test Represents: 7/4/2023 7/10/2023 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.:



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

	Total Wt	2900	17.63		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	SA.	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"	97.0	10	0.0	100.0	98.4	1.6	1.6
3/4"	81.0	10	0.0	100.0	90.2	8.3	9.8
1/2"	39.4	95	5.8	100.0	68.3	21.9	31.7
3/8"	24.3	86	6.4	100.0	59.7	8.6	40.3
#4	4.8	21	.7	96.4	42.6	17.1	57.4
#8	2.4	6	.0	80.1	33.5	9.1	66.5
#16	2.1	3	.2	64.8	27.1	6.5	72.9
#30	2.0	2	.6	50.1	21.1	5.9	78.9
#50	2.0	2.	.3	26.9	11.9	9.2	88.1
#100	1.9	2	.2	7.1	4.0	7.9	96.0
LBW	1.6	2	.0	1.4	1.6	2.4	98.4

*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 Gra	dations Aggregate Supplier Gradation	ns	Adjusted WF	Initial Product	tion Sample (IPS	3)
Coarseness Factor:	61	Workability Factor:	34	36.0	Coars	seness Factor:	
45 —					Worl	cability Factor:	
45, 44			JMF Zone]	Sieve	Cumulative % Passing	F
	52, 41	\downarrow		- 11	2"	100.0	
3 3 4 9 9 9 9 9 9 9 9 9 9		57, 39 68, 38	75, 39	- 11	1.5"	100.0	
		08, 38	I	- 11	1"	100.0	Τ
Factor →		■ 60,700 uction Gradation		- 11	3/4"	95.0	
2 35 -		- 7 IPS		- 11	1/2"	70.5	
1. 1/	52, 34	-! :		- 11	3/8"	60.0	
45, 33				- 11	#4	44.4	
Apriliped 30 - April 200 - Apr		67 ₆ 3 ,1 ₃₁		- 11	#8	35.5	
Operating Zone			\longrightarrow	- 11	#16	28.5	
Boundary			75, 28	- 11	#30	21.5	
≥ ₂₅ □					#50	10.2	
40 45	50 5	55 60 65 70	75	80	#100	3.1	
		Coarseness Factor (%)	. 0	~~	LBW	1.3	
ActionLimits Boundary =							

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

Batch Plant Gradations

PLANT #: P-102

58-003

Sample Date:

Agg. Class

6AA

26A

Production Gradation

7/3/23 Concrete Grade: DM, 4500HP

1.79

2.69

Dates Test Represents: 7/4/2023 7/10/2023 through Specific ft³ Pit# Source Weight (SSD) Gravity Contribution 58-003 Stoneco 1500 8.94 2.69

300

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.1

Contractor:

50.8 10.2

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 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	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"		98.5	10	0.0	100.0	99.2	0.8	0.8
3/4"		79.6	10	0.0	100.0	89.6	9.6	10.4
1/2"		42.3	99	9.0	100.0	70.6	19.1	29.4
3/8"		21.6	85	5.6	100.0	58.7	11.9	41.3
#4		2.8	6	.8	98.7	40.6	18.1	59.4
#8		1.4	1	.4	84.1	33.6	7.0	66.4
#16		1.3	1	.0	66.6	26.7	6.9	73.3
#30		1.2	0	.9	47.3	19.1	7.6	80.9
#50		1.1	0	.8	23.4	9.8	9.4	90.2
#100		1.1	0	.8	6.3	3.1	6.7	96.9
LBW		0.8	0	.7	1.2	0.9	2.2	99.1

Aggregate Supplier Gradations

Coarseness Factor: 62 **Workability Factor:** 34 45 45, 44 JMF Zone Workability Factor (%) 75, 39 ■ 60 R roduction Gradation 52, 34 45, 33 Operating Zone Boundary 75, 28 25 45 50 55 Coarseness Factor (%)⁷⁰ 75 80 ActionLimits Boundary = - - - -

Work	ability Factor:	36	
Sieve	Cumulative	%	Cumulative
01070	% 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"	89.2	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 7/3/23

Dates Test F	Represents:	7/4/2023	through	7/10/2023		
Agg Class	Pit#	Source	Weight (SSD)	£43	Specific	%
Agg. Class	FIL#	Source	weight (SSD)	ft³	Gravity	Contributi

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.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.1



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"	98.5	100.0	100.0	99.2	0.8	0.8
3/4"	79.6	100.0	100.0	89.6	9.6	10.4
1/2"	42.3	99.0	100.0	70.6	19.1	29.4
3/8"	21.6	85.6	100.0	58.7	11.9	41.3
#4	2.8	6.8	98.7	40.6	18.1	59.4
#8	1.4	1.4	84.1	33.6	7.0	66.4 r
#16	1.3	1.0	66.6	26.7	6.9	73.3
#30	1.2	0.9	47.3	19.1	7.6	80.9 r
#50	1.1	0.8	23.4	9.8	9.4	90.2
#100	1.1	0.8	6.3	3.1	6.7	96.9 a
LBW	0.8	0.7	1.2	0.9	2.2	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.

Coarse	eness Factor:	62	Workability Factor:	34	
Workability Factor (%) 08 19 10 10 10 10 10 10 10 10 10	45, 44 45, 33 Operating Zone	52, 34	56, 40 68, 38 60, 28 Production Gradation 67, 32, 31	JMF Zone 75, 39	
25 + 40	45 its Boundary =		55 Coarseness Factor (%)	75, 28 75	80

O 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 #: 14 Contractor:

Sample Date: 7/3/23 Concrete Grade: DM, 4500HP

Dates Test Represents: 7/4/2023 through 7/10/2023 MDOT No.:

Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1560	9.29	2.69	52.7
26A	58-003	Stoneco	300	1.79	2.69	10.1
2NS	19-04	Schlegel	1100	6.60	2.67	37.2
		Total Wt	2960	17.68		100.0



---- Verify this number is 100%

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.9

Builders Redi-Mix	
30701 W. 10 Mile Rd.	
Suite 500	
Farmington Hills, MI 483	36

Total Wi		2000 17.00	2000 17.00		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"	98.5	100.0	100.0	99.2	0.8	0.8
3/4"	79.6	100.0	100.0	89.2	10.0	10.8
1/2"	42.3	99.0	100.0	69.5	19.8	30.5
3/8"	21.6	85.6	100.0	57.2	12.3	42.8
#4	2.8	6.8	99.9	39.3	17.9	60.7
#8	1.4	1.4	90.1	34.4	4.9	65.6
#16	1.3	1.0	69.4	26.6	7.8	73.4
#30	1.2	0.9	44.5	17.3	9.3	82.7
#50	1.1	0.8	14.3	6.0	11.3	94.0
#100	1.1	0.8	2.7	1.7	4.3	98.3
LBW	0.8	0.7	0.2	0.6	1.1	99.4

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.

 $^{\star}\%$ 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 F	actor: 65	Workability Factor:	34	
1 5 1 1	52, 41 52, 34 sting Zone	68, 40 68, 38 Production Gra	JMF Zone 75, 39 adation 75, 28	
	45 50 55	Coarseness Factor (%)	75	80

O Batch Plant Gradations

Production Gradation

Work	ability Factor:	36	
Sieve	Cumulative	% Datains I	Cumulative
	% 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

PREPARED BY: SM, LLC Technical Service Approved By

PLANT #: 12 Contractor:

Concrete Grade: DM, 4500HP Sample Date: 7/3/23 Dates Test Represents: 7/4/2023 7/10/2023 MDOT No.: through

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



-- Verify this number is 100%

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

	i Otai Wt	2903 17.09		100.0	< verily tris fi	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"	96.5	100.0	100.0	98.1	1.9	1.9
3/4"	81.9	100.0	100.0	90.3	7.8	9.7
1/2"	43.2	93.1	100.0	69.2	21.1	30.8
3/8"	27.1	81.8	100.0	59.8	9.4	40.2
#4	5.7	15.0	96.6	42.3	17.5	57.7
#8	2.9	3.2	81.1	33.9	8.5	66.1
#16	2.6	1.8	66.4	27.8	6.1	72.2
#30	2.5	1.5	50.4	21.4	6.4	78.6
#50	2.4	1.4	25.6	11.5	9.9	88.5
#100	2.2	1.3	5.4	3.4	8.1	96.6
LBW	1.8	1.0	0.6	1.3	2.1	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 Gra	dations Aggregate Supplier Gradation	ns	Adjusted WF	Intial Producti	on Sample (IPS)
Coarseness Factor:	Coarseness Factor: 61		34	36.4	Coarseness Fact	
45				$\neg \overline{1}$	Work	ability Factor:
45, 44			JMF Zone	711	Sieve	Cumulative
	52, 41	57, 40 68, 40		- 	2"	% Passing 100.0
3 40 1		68, 38	75, 39	- 11	1.5"	100.0
&		00, 30	I		1"	99.3
Factor 85 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		∎ைடுrஒகுயூtion Gradation		- 11	3/4"	89.0
35		i 1		- 11	1/2"	70.3
	52, 34	<u> </u>		- 11	3/8"	59.9
Available 30 - 45, 33 Operating Zone Boundary		57, 3 2 68, 32		- 11	#4	41.9
30 -		68,31		- 11	#8	35.9
Operating Zone			⊸ l		#16	27.8
Boundary			75, 28		#30	18.9
25					#50	6.3
40 45	50 55	5 60 65 70	75	80	#100	1.7
		Coarseness Factor (%)			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

PLANT #:

6AA 26A 2NS Concrete Grade: DM, 4500HP

Sample Date	e:	7/3/23	_		Concrete Grade:	DM, 4
Dates Test F	Represents:	7/4/2023	through	7/10/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific	Contri

.00.000	., .,	11110 01911	.,,====		
Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
71-47	Presque Isle	1500	9.17	2.62	51.6
71-47	Presque Isle	255	1.56	2.62	8.8
95-013	Smelter Bay	1150	6.95	2.65	39.6
· ·	T - 4 - 1 \A/4	0005	47.00	· ·	400.0

Contractor:

MDOT No.:



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	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"	79.5	10	0.0	100.0	89.4	10.6	10.6
1/2"	35.5	93	3.1	100.0	66.1	23.3	33.9
3/8"	19.8	81	.8	100.0	57.0	9.1	43.0
#4	4.1	15	5.0	96.5	41.6	15.4	58.4
#8	2.3	3	.2	85.4	35.3	6.4	64.7
#16	2.1	1	.8	70.8	29.3	6.0	70.7
#30	2.0	1	.5	50.6	21.2	8.1	78.8
#50	1.9	1	.4	25.2	11.1	10.1	88.9
#100	1.7	1	.3	7.6	4.0	7.1	96.0
LBW	1.2	1	.0	1.2	1.2	2.8	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.

Coarseness Factor:	66	Workability Factor:	35 37.8	Coars	eness Factor:
45				Work	ability Factor:
45, 44	52, 41		MF Zone	Sieve	Cumulative % Passing
_ 40 -	52, 41	67, 40	- 11	2"	100.0
§ ⁴⁰]	i	68, 38	75, 39	1.5"	100.0
	!	Production Gradati	ioh	1"	100.0
35		■ 60,3MBS	1 11	3/4"	95.0
g 35 -	_	il	1 11	1/2"	72.3
	52, 34	<u> </u>	1 11	3/8"	60.4
45, 33	50.9	A7 32	1 11	#4	42.6
30 -	00,02	67 _{68,31}	1 11	#8	36.0
Operating Zone]		J	#16	29.5
30 - 45, 33 Operating Zone Boundary			75, 28	#30	20.3
25				#50	9.5
40 45	50 55	60 65 70	75 80	#100	3.4
		Coarseness Factor (%) ⁷⁰		LBW	1.3

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

7/3/23

PLANT #: P-32

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP

MDOT	No.:

Contractor:

Dates Test F	Represents:	7/4/2023	through	7/10/2023		
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	255	1.56	2.62	8.8
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.8

SUPERIO MATERIAL	

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"	100.0	100.0)	100.0	100.0	0.0	0.0
3/4"	79.5	100.0)	100.0	89.4	10.6	10.6
1/2"	35.5	93.1		100.0	66.1	23.3	33.9
3/8"	19.8	81.8		100.0	57.0	9.1	43.0
#4	4.1	15.0		96.5	41.6	15.4	58.4
#8	2.3	3.2		85.4	35.3	6.4	64.7
#16	2.1	1.8		70.8	29.3	6.0	70.7
#30	2.0	1.5		50.6	21.2	8.1	78.8
#50	1.9	1.4		25.2	11.1	10.1	88.9
#100	1.7	1.3	_	7.6	4.0	7.1	96.0
LBW	1.2	1.0		1.2	1.2	2.8	98.8
Production G	Bradation O Batch Plant Grada	ations	ate Supplier Grac	lations	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.

Coarsen	ess Factor:	66	Workability Factor:	35	
Workability Factor (%)	45, 44 45, 33 Operating Zone	52, 34	66, 40 67, 40 68, 38 7 oduction 60, 38S		
25 40 ActionLimits 6	Boundary 45 Boundary =	50 5 	⁵ Coarseness Factor (%)	75, 28 75	80

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

Pleasant Lake

Total Wt

Batch Plant Gradations

PLANT #: P-35

81-019

Sample Date:

2NS

Production Gradation

7/3/23 Concrete Grade: **DM, 4500HP**

6.95

17.68

2.65

39.0

36.1

Dates Test Represents: 7/4/2023 7/10/2023 through Specific ft³ Agg. Class Pit# Source Weight (SSD) Gravity Contribution 6AA 58-003 Stoneco 1500 8.94 2.69 50.8 26A 58-003 Stoneco 300 1.79 2.69 10.2

1150

2950

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:



<---- Verify this number is 100%

Cumulative
% RetainedSuperior Materials, LLC
30701 W. 10 Mile Rd.0.0Suite 5000.0Farmington 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"	98.5	100.0	100.0	99.2	0.8	0.8
3/4"	79.6	100.0	100.0	89.6	9.6	10.4
1/2"	42.3	99.0	100.0	70.6	19.1	29.4
3/8"	21.6	85.6	100.0	58.7	11.9	41.3
#4	2.8	6.8	98.7	40.6	18.1	59.4
#8	1.4	1.4	84.1	33.6	7.0	66.4
#16	1.3	1.0	66.6	26.7	6.9	73.3
#30	1.2	0.9	47.3	19.1	7.6	80.9
#50	1.1	0.8	23.4	9.8	9.4	90.2
#100	1.1	0.8	6.3	3.1	6.7	96.9
LBW	0.8	0.7	1.2	0.9	2.2	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.

 $\ensuremath{^{*}\%}$ 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.

Coarsene	ess Factor:	62	Workability Factor:	34	
Workability Factor (%) 08 28 42 42	45, 44 45, 33 Operating Zone Boundary	52, 41 56 52, 34	68, 38 60, 38 roduction Gradation	75, 28	
25 40 ActionLimits B	45 Boundary = 	50 5	5 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

PREPARED BY: SM, LLC Technical Service Approved By:

Sample Date:

Dates Test Represents:

Production Gradation

7/3/23 Concrete Grade: DM, 4500HP

7/4/2023	through	7/10/2023		
Source	Weight (SSD)	ft ³	Specific	%
Source	weight (SSD)	It	Gravity	Contribution
Presque Isle	1550	9.48	2.62	53.4

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.9

Contractor:

MDOT No.:



<---- Verify this number is 100%

SUPERIOR MATERIALS

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

	rotui mt	2000 17.00		100.0	Verify this Humber 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"	96.5	100.0	100.0	98.1	1.9	1.9	
3/4"	81.9	100.0	100.0	90.3	7.8	9.7	
1/2"	43.2	93.1	100.0	69.2	21.1	30.8	
3/8"	27.1	81.8	100.0	59.8	9.4	40.2	
#4	5.7	15.0	97.7	42.8	17.0	57.2	
#8	2.9	3.2	85.0	35.4	7.4	64.6	
#16	2.6	1.8	71.7	29.9	5.5	70.1	
#30	2.5	1.5	53.4	22.6	7.3	77.4	
#50	2.4	1.4	23.4	10.6	11.9	89.4	
#100	2.2	1.3	5.3	3.4	7.3	96.6	
LBW	1.8	1.0	2.1	1.9	1.5	98.1	

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:	62	Workability Factor:	35	
45			JMF Zone	$\overline{\mathbb{T}}$
Morkability Factor (%) 40 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 38 Froduction G padation • 60, 36 IPS	75, 39	
Operating Zone Boundary 40 45	50	58, 31 68, 31 55 Coarseness Factor (%)	75, 28 75	80
ActionLimits Boundary =		Coarseness Factor (%)		

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

Sample Date:

Production Gradation

7/3/23 Concrete Grade: DM, 4500HP 7/4/2023

Dates Test F	Represents:	7/4/2023	through	7/10/2023		
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 <u>-</u> 019	Pleasant Lake	1150	6 95	2 65	30 N

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.1



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

	i otai wt	10tal 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	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	100	0.0	100.0	100.0	0.0	0.0
1"	98.5	100	0.0	100.0	99.2	0.8	0.8
3/4"	79.6	100	0.0	100.0	89.6	9.6	10.4
1/2"	42.3	99	.0	100.0	70.6	19.1	29.4
3/8"	21.6	85	.6	100.0	58.7	11.9	41.3
#4	2.8	6.	8	98.7	40.6	18.1	59.4
#8	1.4	1.	4	84.1	33.6	7.0	66.4
#16	1.3	1.	0	66.6	26.7	6.9	73.3
#30	1.2	0.	9	47.3	19.1	7.6	80.9
#50	1.1	0.	8	23.4	9.8	9.4	90.2
#100	1.1	0.	8	6.3	3.1	6.7	96.9
LBW	0.8	0.	7	1.2	0.9	2.2	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.

61

*% 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:	34	
45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 5 6	68, 38 60, 38 roduction Gradation	75, 39 75, 28	
25 40 45 ActionLimits Boundary =	50 5	⁵ Coarseness Factor (%) ⁷⁰	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"	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 7/3/23

Dates Test Represents:		7/4/2023	through	7/10/2023		
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	44-051	Krake Willis Rd	1100	6.65	2.65	37.9

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.5



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

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"	97.0	10	0.0	100.0	98.4	1.6	1.6
3/4"	81.0	10	0.0	100.0	89.8	8.6	10.2
1/2"	39.4	95	5.8	100.0	67.2	22.6	32.8
3/8"	24.3	86	6.4	100.0	58.3	8.9	41.7
#4	4.8	21	.7	95.9	40.8	17.6	59.2
#8	2.4	6	.0	82.4	33.0	7.7	67.0 r
#16	2.1	3	.2	68.2	27.2	5.8	72.8
#30	2.0	2	.6	51.0	20.6	6.6	79.4 r
#50	2.0	2	.3	23.0	10.0	10.6	90.0
#100	1.9	2	.2	5.6	3.3	6.7	96.7
LBW	1.6	2	.0	1.1	1.4	1.9	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:	62	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 60, 36 rd R Setion Considerion 58, 32	JMF Zone 75, 39	
Boundary 40 45	50 55	60 65 70 Coarseness Factor (%)	75, 28 75	80
ActionLimits Boundary =		Coarseness Factor (%)		

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"	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

Ray Rd

1150

PLANT #: P-02

Concrete Grade: DM, 4500HP

2.65

39.6

36.4

7/3/23 Sample Date: 7/4/2023 **Dates Test Represents:** Pit#

71-47

71-47

63-115

Agg. Class

6AA

26A

2NS

7/4/2023	through	7/10/2023		
Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
Presque Isle	1550	9.48	2.62	53.4
Presque Isle	205	1.25	2.62	7.1

6.95

17.60

MDOT No.:

Coarseness Factor:

Contractor:

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"	96.5	100.0	100.0	98.1	1.9	1.9
3/4"	81.9	100.0	100.0	90.3	7.8	9.7
1/2"	43.2	93.1	100.0	69.2	21.1	30.8
3/8"	27.1	81.8	100.0	59.8	9.4	40.2
#4	5.7	15.0	96.6	42.3	17.5	57.7
#8	2.9	3.2	81.1	33.9	8.5	66.1 r
#16	2.6	1.8	66.4	27.8	6.1	72.2
#30	2.5	1.5	50.4	21.4	6.4	78.6 r
#50	2.4	1.4	25.6	11.5	9.9	88.5
#100	2.2	1.3	5.4	3.4	8.1	96.6 a
LBW	1.8	1.0	0.6	1.3	2.1	98.7
Production Gradati	ion O Batch Plant Gradat	ions Aggregate SupplierG	radations	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.

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:	61	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zon Boundary	52, 41 52, 34	58, 39 68	75, 28	
25 40 45 ActionLimits Boundary =	50 55	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"	95.1	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