Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-101 Contractor:

Concrete Grade: DM, 4500HP Sample Date: 9/12/22 Dates Test Represents: 9/13/2022 9/19/2022 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
		Total Wt	2910	17.69		100.0

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	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"	98.2	100	0.0	100.0	99.1	0.9	0.9
3/4"	85.6	100	0.0	100.0	92.8	6.3	7.2
1/2"	43.2	98	.0	100.0	71.3	21.5	28.7
3/8"	24.6	87	.0	100.0	60.8	10.5	39.2
#4	4.2	24	.6	99.2	43.8	17.0	56.2
#8	2.2	6.	8	87.2	36.3	7.6	63.7
#16	1.8	3.	2	72.1	29.7	6.5	70.3
#30	1.7	2.	6	53.0	22.1	7.7	77.9
#50	1.6	2.	4	21.2	9.4	12.6	90.6
#100	1.6	2.	3	4.3	2.7	6.7	97.3
LBW	1.4	2.	0	0.7	1.2	1.6	98.8
Production G	radation O Batch Plant Grada	tions	egate Supplier Gra	adations	Adjusted WF	Initial Producti	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:	61	Workability Factor:	36	38.8
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39	75, 39	
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"	95.0	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

PREPARED BY: SM, LLC Technical Service

Sample Date:

Production Gradation

9/12/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	9/13/2022	through	9/19/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	13.6
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:

36.0

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	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"	83.4	100	0.0	100.0	92.1	7.9	7.9
1/2"	37.2	99	.4	100.0	70.1	22.0	29.9
3/8"	19.4	83	.8	100.0	59.6	10.6	40.4
#4	2.5	19	.0	98.9	42.3	17.2	57.7
#8	1.8	5.	3	82.0	33.5	8.8	66.5 r
#16	1.6	3.	0	63.9	26.1	7.5	73.9
#30	1.4	2.	3	44.2	18.2	7.9	81.8 r
#50	1.3	2.	1	24.5	10.5	7.8	89.5
#100	1.2	2.	1	6.2	3.3	7.2	96.7
LBW	1.0	1.	8	1.5	1.3	2.0	98.7

Aggregate Supplier Gradations

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

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

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

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

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

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

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

Coarseness Factor:	61	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 68, 38 68, 38 67, 32 67, 32, 31	JMF Zone 75, 39	
40 45 ActionLimits Boundary =	50 5	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

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP

Dates Test F	Represents:	9/13/2022	through	9/19/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.5
004	FO 000	0.	400	0.00	0.00	400

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	1400	8.34	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	13.6
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68		100.0

---- Verify this number is 100%

SUPER	IOR

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

1010.111				10010	Tomy time mamber to 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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	83.4	100.0	100.0	92.1	7.9	7.9
1/2"	37.2	99.4	100.0	70.1	22.0	29.9
3/8"	19.4	83.8	100.0	59.6	10.6	40.4
#4	2.5	19.0	98.9	42.3	17.2	57.7
#8	1.8	5.3	82.0	33.5	8.8	66.5
#16	1.6	3.0	63.9	26.1	7.5	73.9
#30	1.4	2.3	44.2	18.2	7.9	81.8
#50	1.3	2.1	24.5	10.5	7.8	89.5
#100	1.2	2.1	6.2	3.3	7.2	96.7
LBW	1.0	1.8	1.5	1.3	2.0	98.7

Aggregate Supplier Gradations

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

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

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

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

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

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

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

Coarseness Factor:	61	Workability Factor:	34	
45 45,44			JMF Zone	$\overline{\mathbb{n}}$
40 d	52, 41	68, 38	75, 39	
Morkability Factor (%) 30 Operating Zone Boundary	52, 34	■ 60 Reduction dradation		
N Operating Zone Boundary		9, 32 67, 32 _{6, 31}	75, 28	
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:

9/13/2022

Source

Stoneco

Stoneco Schlegel

Batch Plant Gradations

PLANT #: P-14

Pit#

58-003

58-003

19-55

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

9/12/22 Concrete Grade: DM, 4500HP

0/10/2022

through	9/19/2022		
Weight (SSD)	ft ³	Specific Gravity	% Contribution
1460	8.70	2.69	49.3
400	2.38	2.69	13.5
1100	6.60	2.67	27.2

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.7



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"	83.4	10	0.0	100.0	91.8	8.2	8.2
1/2"	37.2	99).4	100.0	68.9	22.9	31.1
3/8"	19.4	83	3.8	100.0	58.1	10.9	41.9
#4	2.5	19	0.0	100.0	41.0	17.1	59.0
#8	1.8	5	.3	90.4	35.2	5.8	64.8
#16	1.6	3	.0	68.8	26.8	8.4	73.2
#30	1.4	2	.3	44.3	17.5	9.3	82.5
#50	1.3	2	.1	14.4	6.3	11.2	93.7
#100	1.2	2	.1	2.7	1.9	4.4	98.1
LBW	1.0	1	.8	0.3	0.8	1.0	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:	65	Workability Factor:	35	
45 45, 44 45, 44 Operating Zone Boundary	52, 41	57, 40 68, 40 68, 38 Production Gra 60, 36PS 68, 32 68, 32	JMF Zone 75, 39 adation 75, 28	
25 40 45 ActionLimits Boundary =	50 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"	89.0	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:

9/12/22 Concrete Grade: DM, 4500HP

	MDOT No.:
%	
Contribution	

Dates Test Represents:		9/13/2022	through	9/19/2022		
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

--- Verify this number is 100%

Contractor:

SM	U	IP.	E	R	I (O L	RS

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

	Total Wit	2000 17.00		100.0	< verify this in	umber 13 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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	82.6	100.0	100.0	91.0	9.0	9.0
1/2"	46.4	90.7	100.0	71.4	19.6	28.6
3/8"	28.5	76.2	100.0	60.9	10.5	39.1
#4	4.8	13.4	96.5	41.8	19.1	58.2
#8	2.6	3.7	76.3	31.9	10.0	68.1
#16	2.3	1.8	59.0	24.7	7.2	75.3
#30	2.2	1.3	43.6	18.5	6.2	81.5
#50	2.2	1.2	22.5	10.2	8.4	89.8
#100	2.1	1.1	6.9	3.9	6.2	96.1
LBW	1.8	1.0	0.7	1.3	2.6	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	on O Batch Plant Gra	dations	ns	Adjusted WF	Intial Product	ion Sample (IPS)
Coarseness Fac	ctor: 57	Workability Factor:	32	34.4	Coars	seness Factor:	
45				$\neg \top$	Worl	cability Factor:	
45, 44			JMF Zone	7 I I	Sieve	Cumulative	
-	52, 41		31111 20110	-	Sieve	% Passing	
_ 40 1		57, 40 68, 40			2"	100.0	
(%)		68, 38	75, 39		1.5"	100.0	
		!			1"	99.3	
유		■ 60, 36PS			3/4"	89.0	
Factor 5 5		Production Gradation			1/2"	70.3	
I I 🕕	52, 34	68 32		- 11	3/8"	59.9	
Morkapility 30 Operatin Bound					#4	41.9	
30 -		57, 22 68, 32			#8	35.9	
Operatin	g Zone			- 11	#16	27.8	
Bound	*		75, 28		#30	18.9	
> 25 L					#50	6.3	
40 45	5 50 5	5 60 65 70	75	80	#100	1.7	
		Coarseness Factor (%)		33	LBW	1.0	
ActionLimits Boundary	/=						

Workability 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"	89.0	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

9/13/2022

Batch Plant Gradations

PLANT #: P-32

Sample Date:

Dates Test Represents:

Production Gradation

9/12/22 Concrete Grade: **DM**, **4500HP**

Concrete Grade: **DM**, **4500HF** 9/19/2022

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

through

<---- Verify this number is 100%

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.1

SUPERI	OR A L S

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

Farmington Hills, MI 48336

				10010		uniber 16 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"	97.4	100.0	100.0	98.8	1.2	1.2
3/4"	84.4	100.0	100.0	92.7	6.1	7.3
1/2"	34.7	90.7	100.0	68.3	24.5	31.7
3/8"	16.7	76.2	100.0	57.9	10.4	42.1
#4	3.4	13.4	95.8	41.4	16.5	58.6
#8	2.6	3.7	83.0	34.6	6.8	65.4
#16	2.2	1.8	67.7	28.1	6.5	71.9
#30	2.2	1.3	48.4	20.4	7.7	79.6
#50	2.0	1.2	23.8	10.5	9.8	89.5
#100	1.8	1.1	7.2	3.8	6.7	96.2
LBW	1.4	1.0	1.4	1.3	2.5	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:	64	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	66, 40 67, 40 68, 38 Production Gradation Grad	JMF Zone 75, 39	
Boundary 25 40 45 ActionLimits Boundary =	<u>50</u> 5	⁵ Coarseness Factor (%)	75, 28 75	80

Work	Workability Factor:		
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"	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

9/13/2022

Source

Stoneco

Stoneco

Pleasant Lake

Batch Plant Gradations

PLANT #: P-35

Pit#

58-003

58-003

81-019

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

9/12/22 Concrete Grade: DM, 4500HP

0/10/2022

through	9/19/2022		
Weight (SSD)	ft ³	Specific Gravity	% Contribution
1400	8.34	2.69	47.5
400	2.38	2.69	13.6
1150	6.95	2 65	39.0

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.0

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	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"	83.4	100.0	100.0	92.1	7.9	7.9
1/2"	37.2	99.4	100.0	70.1	22.0	29.9
3/8"	19.4	83.8	100.0	59.6	10.6	40.4
#4	2.5	19.0	98.9	42.3	17.2	57.7
#8	1.8	5.3	82.0	33.5	8.8	66.5 r
#16	1.6	3.0	63.9	26.1	7.5	73.9
#30	1.4	2.3	44.2	18.2	7.9	81.8 r
#50	1.3	2.1	24.5	10.5	7.8	89.5
#100	1.2	2.1	6.2	3.3	7.2	96.7
LBW	1.0	1.8	1.5	1.3	2.0	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 Fac	tor: 61	Workability Factor:	34	
45 45, 44 45, 44 45, 44 April 45, 33 April 45, 34 April 45, 34 April 45, 34 April 45, 35 April 4	•	■ 60, aguction Gladation	JMF Zone 75, 39	
25 40 45 ActionLimits Boundary		Coarseness Factor (%)	75	80

Work	Workability Factor:		
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

61

Presque Isle

Grange Hall

Batch Plant Gradations

250

1100

PLANT #: P-36

Pit#

71-47

71-47

63-92

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

9/12/22 Concrete Grade: DM, 4500HP

9/13/2022	through	9/19/2022		
Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
Presque Isle	1555	9.51	2.62	53.5

1.53

6.65

2.62

2.65

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

36.0

Coarseness Factor:

Contractor:

53.5 8.6 37.9



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

	Total Wt	2905	17.69		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	5A	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"	82.6	10	0.0	100.0	90.7	9.3	9.3
1/2"	46.4	90).7	100.0	70.5	20.2	29.5
3/8"	28.5	76	6.2	100.0	59.7	10.8	40.3
#4	4.8	13	3.4	97.6	40.7	19.0	59.3
#8	2.6	3	.7	83.9	33.5	7.2	66.5
#16	2.3	1	.8	69.1	27.6	5.9	72.4
#30	2.2	1	.3	50.2	20.3	7.3	79.7
#50	2.2	1	.2	20.3	9.0	11.3	91.0
#100	2.1	1	.1	3.3	2.5	6.5	97.5
LBW	1.8	1	.0	0.4	1.2	1.3	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 8% for the 1" sieve when

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

Coarseness Factor	r: 61	Workability Factor:	33	
45 45, 44			JMF Zone	$\overline{\mathbb{T}}$
Morkability Factor (%) 35 Operating Zot Boundary	52, 41 52, 34	58, 39 68, 38 68	75, 39 75, 28	
25 40 45 ActionLimits Boundary =		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

63

Sample Date:

Production Gradation

9/12/22

34.7

Concrete Grade: DM, 4500HP

Dates Test Represents:		9/13/2022	through	9/19/2022		
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

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

Contractor:

Superior Materials, LLC 30701 W. 10 Mile Rd.

Suite 500

Farmington Hills, MI 48336

	Total Wt	2905	17.69		100.0	< Verify this n	umber is 100%	
Sieve	6AA	26A		2NS	Cumulative % Passing	% Retained	Cumulative % Retained	
2"	100.0	100.0		100.0	100.0	0.0	0.0	1
1.5"	100.0	100.0		100.0	100.0	0.0	0.0]
1"	98.2	100.0		100.0	99.0	1.0	1.0	1
3/4"	85.6	100.0		100.0	92.0	7.0	8.0	1
1/2"	43.2	98.0		100.0	68.5	23.6	31.5]
3/8"	24.6	87.0		100.0	57.4	11.0	42.6	*
#4	4.2	24.6		96.2	40.4	17.0	59.6	*
#8	2.2	6.8		80.6	32.2	8.2	67.8	nc
#16	1.8	3.2		65.9	26.2	6.0	73.8	*
#30	1.7	2.6		50.9	20.4	5.8	79.6	no
#50	1.6	2.4		27.6	11.5	8.9	88.5	*
#100	1.6	2.3		8.4	4.2	7.3	95.8	a :
LBW	1.4	2.0		1.6	1.5	2.7	98.5	1
Production Gr	adation O Batch Plant Grada	tions	ate Supplier Gra	adations	Adjusted WF	Intial Production	on Sample (IPS	- 3)

*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:	32	
45 45, 44	52, 41	58, 40 98, 40 68, 38 Production Gradation	JMF Zone 75, 39	
Morkage Market M		56, 22 68,8,32 Coarseness Factor (%)	75, 28	80
ActionLimits Boundary =				

Work	ability Factor:	36	
Sieve	Cumulative	%	Cumulative
Sieve	% Passing	Retained	% Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	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:

Concrete Grade: DM, 4500HP 9/12/22

9/19/2022

Dates Test Represents:		9/13/2022	through	9/19/2022		
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

MDOT No.:

34.4

Coarseness Factor:

Contractor:

--- Verify this number is 100%

SUPERIO)R
MATERIA	

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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	82.6	100.0	100.0	90.7	9.3	9.3
1/2"	46.4	90.7	100.0	70.7	20.0	29.3
3/8"	28.5	76.2	100.0	60.1	10.6	39.9
#4	4.8	13.4	96.5	41.7	18.4	58.3
#8	2.6	3.7	76.3	31.9	9.8	68.1
#16	2.3	1.8	59.0	24.7	7.1	75.3
#30	2.2	1.3	43.6	18.5	6.2	81.5
#50	2.2	1.2	22.5	10.2	8.4	89.8
#100	2.1	1.1	6.9	3.9	6.2	96.1
LBW	1.8	1.0	0.7	1.3	2.6	98.7
Production Gradation	Batch Plant Gradations	Aggregate SupplierGrad	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.

Coarseness Factor:	59	Workability Factor:	32	
45 45, 44 45, 44 45, 44 45, 33 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 39 68, 38 Production Gradation 58, 31 68, 38	JMF Zone 75, 39	
Boundary 25 40 45 ActionLimits Boundary =	50	55 Coarseness Factor (%)	75, 28	80

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

63