## Aggregate Optimization Chart

Total Wt

Batch Plant Gradations

## **Production Gradation Report**

PLANT #: P-101

Sample Date:

**Production Gradation** 

12/26/22 Concrete Grade: **DM, 4500HP** 

17.69

Dates Test F	Represents:	12/27/2022	through	1/2/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1510	9.24	2.62	51.9
26A	71-47	Presque Isle	250	1.53	2.62	8.6
SINC	75-051	Mid Michigan	1150	6.03	2.66	20.5

2910

Contractor:

MDOT No.:

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:



Farmington Hills, MI 48336

<---- Verify this number is 100%

ımulative Retained	Superior ivialerials, LLC
Retained	30701 W. 10 Mile Rd.
0.0	Suite 500

					1 10111) 11110 111111111111111111111111		
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	99.2	0.8	0.8	
3/4"	88.9	100.0	100.0	94.2	4.9	5.8	
1/2"	48.0	96.2	100.0	72.7	21.5	27.3	
3/8"	28.9	86.1	100.0	61.9	10.8	38.1	
#4	4.4	19.3	97.7	42.6	19.4	57.4	
#8	1.8	3.7	81.3	33.4	9.2	66.6	
#16	1.7	1.9	65.7	27.0	6.4	73.0	
#30	1.6	1.6	49.4	20.5	6.5	79.5	
#50	1.6	1.5	26.5	11.4	9.1	88.6	
#100	1.6	1.5	8.2	4.2	7.2	95.8	
LBW	1.4	1.3	1.5	1.4	2.8	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.

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

Coarseness Factor:	57	Workability Factor:	33	35.9
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 Prodection Spadation 57, 31	75, 39	
40 45 ActionLimits Boundary =	50	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

Approved By

Sample Date:

12/26/22 Concrete Grade: DM, 4500HP

Dates Test Represents:		12/27/2022	through	1/2/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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

Contractor:

MDOT No.:

**Coarseness Factor:** 



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

Farmington Hills, MI 48336

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

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

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

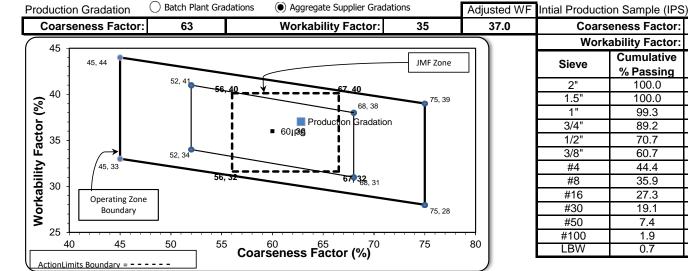
\*% Retained must be at least 4% for each sieve except max.,

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

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

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

_	Total Wt	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"	100.0	10	0.0	100.0	100.0	0.0	0.0
3/4"	88.7	10	0.0	100.0	94.3	5.7	5.7
1/2"	43.9	99	9.5	100.0	71.4	22.8	28.6
3/8"	21.5	88	3.1	100.0	58.9	12.5	41.1
#4	6.3	17	7.2	97.4	42.9	16.0	57.1
#8	3.0	4	.5	83.5	34.5	8.4	65.5
#16	2.4	2	.7	67.0	27.6	6.9	72.4
#30	2.0	1.8		49.7	20.6	7.0	79.4
#50	1.7	1.7		24.2	10.5	10.1	89.5
#100	1.6	1.6		6.9	3.7	6.8	96.3
LBW	1.4	1	.4	1.8	1.6	2.1	98.4



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:

Sample Date:

**Production Gradation** 

12/26/22 Concrete Grade: **DM**, **4500HP** 

Dates Test Represents:		12/21/2022	tnrougn	1/2/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	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

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

37.0



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"	88.7	100	0.0	100.0	94.3	5.7	5.7
1/2"	43.9	99	.5	100.0	71.4	22.8	28.6
3/8"	21.5	88	.1	100.0	58.9	12.5	41.1
#4	6.3	17	.2	97.4	42.9	16.0	57.1
#8	3.0	4.	5	83.5	34.5	8.4	65.5
#16	2.4	2.	2.7		27.6	6.9	72.4
#30	2.0	1.	8	49.7	20.6	7.0	79.4
#50	1.7	1.	7	24.2	10.5	10.1	89.5
#100	1.6	1.	6	6.9	3.7	6.8	96.3
LBW	1.4	1.	4	1.8	1.6	2.1	98.4

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 Factor:	63	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Production Gradation 60188	75, 39	
40 45  ActionLimits Boundary =	50 5	Coarseness Factor (%)	75	80

Batch Plant Gradations

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"	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

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PREPARED BY: SM, LLC Technical Service Approved BY:

PLANT #: P-14 Contractor:
Sample Date: 12/26/22 Concrete Grade: DM, 4500HP

Dates Test Represents: 12/27/2022 through 1/2/2023

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1530	9.11	2.69	51.7
26A	58-003	Stoneco	330	1.97	2.69	11.1
2NS	19-55	Schlegel	1100	6.60	2.67	37.2
		Total Wt	2960	17.68		100.0

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

38.0



**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	ı
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0	ı
1"	100.0	10	0.0	100.0	100.0	0.0	0.0	ĺ
3/4"	88.7	10	0.0	100.0	94.2	5.8	5.8	ĺ
1/2"	43.9	99	9.5	100.0	70.9	23.2	29.1	ı
3/8"	21.5	88	3.1	100.0	58.1	12.8	41.9	
#4	6.3	17	'.2	99.9	42.3	15.8	57.7	
#8	3.0	4	.5	90.1	35.5	6.8	64.5	n
#16	2.4	2	.7	69.4	27.3	8.2	72.7	
#30	2.0	1	.8	44.5	17.8	9.6	82.2	n
#50	1.7	1	.7	14.3	6.4	11.4	93.6	
#100	1.6	1	.6	2.7	2.0	4.4	98.0	а
LBW	1.4	1	.4	0.2	1.0	1.1	99.0	ı

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.

Coars	seness Factor:	65	Workability Factor:	36	
45	45, 44			JMF Zone	$\overline{\mathbb{I}}$
Factor (%)	<b>→</b>	52, 41	57, 40 68, 40  Production Gr  60, 36PS	75, 39	
Workability Factor (%)	45, 33  Operating Zone Boundary	52, 34	57, 22 68, 32	75, 28	
	0 45 mits Boundary =	50 55	Coarseness Factor (%)	75	80

O Batch Plant Gradations

**Production Gradation** 

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"	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

Sample Date:

12/26/22 Concrete Grade: DM, 4500HP

Dates Test Represents:		12/21/2022	tnrougn	1/2/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	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

Contractor:

MDOT No.:



Superior Materials, LLC	2
30701 W. 10 Mile Rd.	
Suite 500	
Farmington Hills, MI 4833	6

	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"	96.9	10	0.0	100.0	98.3	1.7	1.7
3/4"	80.2	10	0.0	100.0	89.4	8.9	10.6
1/2"	44.8	97	7.7	100.0	70.3	19.1	29.7
3/8"	25.4	87	7.2	100.0	59.2	11.1	40.8
#4	3.4	15	5.8	96.6	41.1	18.0	58.9
#8	2.0	3	.8	78.9	32.6	8.6	67.4
#16	1.8	1	.8	62.2	25.7	6.9	74.3
#30	1.7	1	.6	46.0	19.2	6.5	80.8
#50	1.6	1	.4	23.6	10.3	8.9	89.7
#100	1.6	1	.3	4.6	2.8	7.5	97.2
LBW	1.2	1	.0	0.5	0.9	1.9	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 8% for the 1" sieve when

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

Production Gradation	Gradations • Aggregate Supplier Gradati	ons	Adjusted WF	Intial Producti	on Sample (IPS)	)
Coarseness Factor: 61	Workability Factor:	33	35.1	Coars	seness Factor:	
7 45			$\neg  \top$	Work	ability Factor:	
45, 44		JMF Zone	7 I I	Sieve	Cumulative	_
52, 41		31111 20110	<b>-</b>	Sieve	% Passing	F
1 40 ]	57, 40 68, 40			2"	100.0	
<b>(%)</b>	68, 38	75, 39		1.5"	100.0	
	!		- 11	1"	99.3	
<b>2</b>	■_60, 36PS			3/4"	89.0	
35 - 52.34	Production Gradation			1/2"	70.3	
	<u> </u>			3/8"	59.9	
Applied Morkage Manage	27 22			#4	41.9	
<del>2</del> 30	<del>57, 22</del> <b>68</b> , 32			#8	35.9	
Operating Zone				#16	27.8	
Boundary		75, 28		#30	18.9	
> 25				#50	6.3	
40 45 50	55 _ 60 _6570	75	80	#100	1.7	
	Coarseness Factor (%)	. 0	33	LBW	1.0	
ActionLimits Boundary =						
ActionLimits Boundary =	Coarseness Factor (%)			LBW	1.0	_

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"	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 #:

Sample Date:

Concrete Grade: DM, 4500HP 12/26/22

12/27/2022 1/2/2023 through

Contractor:

Dates Test F	Represents:	12/27/2022	through	1/2/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

---- Verify this number is 100%

**Coarseness Factor:** 

_		
SUF		

## **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.

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

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

	10tal VVI 2905 17.05			100.0	Verify this number is 100%		
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained	
2"	100.0	100.0	100.0	100.0	0.0	0.0	
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	
1"	98.6	100.0	100.0	99.3	0.7	0.7	
3/4"	84.4	100.0	100.0	91.6	7.6	8.4	
1/2"	47.4	97.7	100.0	71.7	20.0	28.3	
3/8"	27.1	87.2	100.0	60.1	11.6	39.9	
#4	5.0	15.8	95.1	41.4	18.7	58.6	
#8	2.0	3.8	83.2	34.3	7.1	65.7	
#16	1.7	1.8	68.1	28.0	6.3	72.0	
#30	1.6	1.6	49.2	20.4	7.5	79.6	
#50	1.6	1.4	22.8	10.0	10.5	90.0	
#100	1.6	1.3	6.4	3.5	6.5	96.5	
LBW	1.2	1.0	1.0	1.1	2.4	98.9	
Production Grad	dation	tions	radations	Adjusted WF	Intial Production	on Sample (IPS	

Coarseness Factor:	61	Workability Factor:	34	$\perp$ :
45 40 45, 44 45, 33 30 Operating Zone Boundary	52, 41 <b>56, 4</b> 52, 34 50, 3	Production Gradation	JMF Zone 75, 39 75, 28	
40 45	<u>50</u> 55	Coarseness Factor (%) <sup>70</sup>	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"	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

ActionLimits Boundary = - - - - -

Sample Date:

**Production Gradation** 

12/26/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	12/27/2022	through	1/2/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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	95-013	Smelter Bay	1150	6.95	2.65	39.6

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

36.8

<---- Verify this number is 100%

SUPERIOR MATERIALS

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	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"	98.6	10	0.0	100.0	99.3	0.7	0.7
3/4"	84.4	10	0.0	100.0	91.6	7.6	8.4
1/2"	47.4	97	7.7	100.0	71.7	20.0	28.3
3/8"	27.1	87	87.2		60.1	11.6	39.9
#4	5.0	15	15.8		41.4	18.7	58.6
#8	2.0	3	.8	83.2	34.3	7.1	65.7 ı
#16	1.7	1.	.8	68.1	28.0	6.3	72.0
#30	1.6	1.	.6	49.2	20.4	7.5	79.6
#50	1.6	1.	1.4		10.0	10.5	90.0
#100	1.6	1.3		6.4	3.5	6.5	96.5
LBW	1.2	1.	.0	1.0	1.1	2.4	98.9
Production G	Gradation O Batch Plant Gra	dations	regate Supplier Gra	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 Fac	tor: 61	Workability Factor:	34	
45 45, 44 45, 44 45, 44 45, 33 45, 33 Operating Bound	52, 34 30 g Zone	68, 38  Production Gradation 60, 38S	75, 39	
25 40 45  ActionLimits Boundary =		Coarseness Factor (%)	75	80

Worl	kability 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

Batch Plant Gradations

PLANT #: P-35

Sample Date:

**Production Gradation** 

Concrete Grade: DM, 4500HP

Dates Test F	Represents:	12/27/2022	through	1/2/2023		
Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	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

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

Total Wt		2950	17.68		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	6 <b>A</b>	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"	88.7	10	0.0	100.0	94.3	5.7	5.7
1/2"	43.9	99.5		100.0	71.4	22.8	28.6
3/8"	21.5	88	3.1	100.0	58.9	12.5	41.1
#4	6.3	17	7.2	97.4	42.9	16.0	57.1
#8	3.0	4	.5	83.5	34.5	8.4	65.5
#16	2.4	2.7		67.0	27.6	6.9	72.4
#30	2.0	1	.8	49.7	20.6	7.0	79.4
#50	1.7	1	.7	24.2	10.5	10.1	89.5
#100	1.6	1	.6	6.9	3.7	6.8	96.3
LBW	1.4	1	.4	1.8	1.6	2.1	98.4

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.

\*% 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	37.0
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 56, 52, 34	68, 38  ■ Production Gradation ■ 60 1 β §	75, 39	
40 45  ActionLimits Boundary =	50 55	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

Grange Hall

**Total Wt** 

O Batch Plant Gradations

PLANT #: P-36

63-92

Sample Date:

2NS

LBW

**Production Gradation** 

2/26/22 Concrete Grade: **DM**, **4500HP** 

6.65

17.69

2.65

37.9

1.0

35.8

Dates Test Represents:		12/27/2022	through	1/2/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1550	9.48	2.62	53.4
26A	71-47	Presque Isle	255	1.56	2.62	8.8

1100

2905

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:



<---- Verify this number is 100%

ed	Cumulative % Retained	<u>Superior Materials, LLC</u> 30701 W. 10 Mile Rd.
	0.0	Suite 500
	0.0	Farmington Hills, MI 48336

Cumulative 6AA 26A % Retaine Sieve 2NS % Passing 2" 100.0 100.0 100.0 100.0 0.0 1.5" 100.0 100.0 100.0 100.0 0.0 0.0 96.9 100.0 100.0 98.3 1.7 1.7 3/4" 80.2 100.0 100.0 89.4 8.9 10.6 1/2' 44.8 97.7 100.0 70.3 19.1 29.7 3/8' 87.2 100.0 59.1 40.9 25.4 11.3 #4 3.4 15.8 97.6 40.2 18.9 59.8 #8 2.0 3.8 84.3 33.3 6.8 66.7 #16 1.8 1.8 70.6 27.9 5.5 72.1 #30 52.8 21.0 6.8 79.0 1.7 1.6 #50 1.6 1.4 24.1 10.1 10.9 89.9 #100 2.3 1.6 1.3 3.5 7.8 97.7

Aggregate Supplier Gradations

1.0

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

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

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

 $^{*}\%$  Retained must be at least 4% for each sieve except max.,

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

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

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

Coarseness Factor:	61	Workability Factor:	33	
45 45,44			JMF Zone	$\overline{\mathbb{T}}$
	52, 41	58, 39	75, 39	
Morkapility Factor (%) 35 Operating Zone Boundary	52, 34	• வ.Reduction Gradation		
Operating Zone Boundary		58, 31 68,31	75, 28	
40 45  ActionLimits Boundary =	50	Coarseness Factor (%) <sup>70</sup>	75	80

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

PREPARED BY: SM, LLC Technical Service Approved By

Sample Date:

#100

LBW

**Production Gradation** 

12/26/22 Concrete Grade: DM, 4500HP Contractor:

MDOT No.:

5.8

3.2

Adjusted WF Intial Production Sample (IPS)

Dates Test Represents:		12/27/2022	through	1/2/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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

1.5

1.3

(	Verify thi	s 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"	98.4	100.0	100.0	99.1	0.9	0.9	ĺ
3/4"	88.9	100.0	100.0	93.9	5.2	6.1	ĺ
1/2"	48.0	96.2	100.0	71.0	22.9	29.0	ĺ
3/8"	28.9	86.1	100.0	59.8	11.2	40.2	ĺ
#4	4.4	19.3	96.2	40.2	19.6	59.8	ĺ
#8	1.8	3.7	80.4	31.7	8.5	68.3	n
#16	1.7	1.9	65.2	25.8	5.9	74.2	ĺ
#30	1.6	1.6	49.4	19.7	6.1	80.3	n
#50	1.6	1.5	24.3	10.2	9.5	89.8	ĺ

Aggregate Supplier Gradations

9.0

4.4

1.2

34.2

\*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 40 45, 33 45, 33	52, 41	58, 40 68, 38 Production Gradation 58, 32	JMF Zone 75, 39	
Operating Zone Boundary	50 58		75, 28 75	80
ActionLimits Boundary =		Coarseness Factor (%) <sup>70</sup>		

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

95.6

98.8

**Coarseness Factor:** 

PREPARED BY: SM, LLC Technical Service

1.6

Batch Plant Gradations

Sample Date:

**Production Gradation** 

12/26/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	12/27/2022	through	1/2/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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
	·	T . ( . I M//	0005	47.00	11	4000

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.1

Contractor:



---- Verify this number is 100%

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

Total Wt 2905 17.69 Cumulative Cumulative 26A 6AA % Retained Sieve 2NS % Passing % 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 96.9 100.0 100.0 98.3 1.7 1.7 3/4" 80.2 100.0 100.0 89.4 8.9 10.6 1/2' 44.8 97.7 100.0 70.3 19.1 29.7 3/8' 87.2 100.0 59.2 40.8 25.4 11.1 #4 3.4 15.8 96.6 41.1 18.0 58.9 #8 2.0 3.8 78.9 32.6 8.6 67.4 #16 1.8 1.8 62.2 25.7 6.9 74.3 #30 6.5 80.8 1.7 1.6 46.0 19.2 #50 1.6 1.4 23.6 10.3 8.9 89.7 #100 1.6 1.3 4.6 2.8 7.5 97.2 LBW 1.0 0.9 1.9

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 8% for the 1" sieve when

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

Coarsei	ness Factor:	61	Workability Factor:	33	
Workability Factor (%)  90  91  91  92  94  94  94  94  94  94  94  94  94	45, 44  45, 33  Operating Zone Boundary	52, 41	58, 39	75, 39	
25 + 40 ActionLimits	45 s Boundary =	50	Coarseness Factor (%) <sup>70</sup>	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"	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