# **Aggregate Optimization Chart**

6AA

Sieve

### **Production Gradation Report**

**PLANT #:** P-101 Contractor:

Sample Date: 9/19/22 Concrete Grade: DM, 4500HP **Dates Test Represents:** 9/20/2022 9/26/2022 through

2NS

	10   10 0 0 11101			0,-0,-0		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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

26A

MDOT No.:

---- Verify this number is 100%

Cumulative

% Passing

SUPERIOR MATERIALS

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

% Retained	Cumulative % Retained	
0.0	0.0	
0.0	0.0	
0.5	0.5	
6.0	6.5	
22.9	29.4	
11.4	40.8	*Maxin
16.1	56.9	*Any tv
7.3	64.1	nom. ma
6.4	70.5	*% Re
1	1	

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

wo adjacent sieves must equal 10% except max.,

ax., #100 and #200 sieves.

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

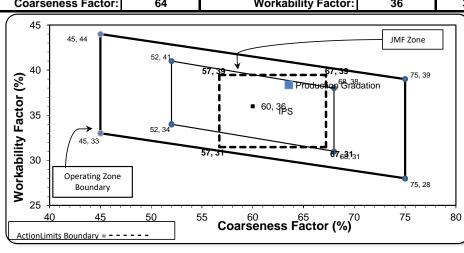
nom. max., #100 and #200 sieves.

62

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

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

Coarsen						
Production (	Gradation O Batch Plant Gra	dations    Aggregate Supplier Grad	lations	Adjusted WF	Initial Producti	on Sample (IF
LBW	1.2	1.8	1.0	1.2	1.7	98.8
#100	1.3	2.1	5.2	2.9	7.1	97.1
#50	1.4	2.3	22.9	10.0	12.2	90.0
#30	1.5	2.5	53.6	22.2	7.3	77.8
#16	1.6	3.1	71.8	29.5	6.4	70.5
#8	1.8	6.7	86.7	35.9	7.3	64.1
#4	3.1	23.3	99.1	43.1	16.1	56.9
3/8"	22.3	82.7	100.0	59.2	11.4	40.8
1/2"	42.3	95.8	100.0	70.6	22.9	29.4
3/4"	87.0	100.0	100.0	93.5	6.0	6.5
1"	99.0	100.0	100.0	99.5	0.5	0.5
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
2"	100.0	100.0	100.0	100.0	0.0	0.0



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:

Dates Test Represents:

**Production Gradation** 

9/19/22 Concrete Grade: DM, 4500HP

9/20/2022	through	9/26/2022		
Source	Weight (SSD)	ft <sup>3</sup>	Specific	%
Source	weight (SSD)	π	Gravity	Contribution
Stoneco	1500	8.94	2.69	50.8

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

36.6

Contractor:

MDOT No.:



SL M A	JP E	E <b>R</b> R I	I	OR LS

**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"	86.8	100.0	100.0	93.3	6.7	6.7
1/2"	51.0	99.4	100.0	75.0	18.3	25.0
3/8"	24.3	80.0	100.0	59.5	15.5	40.5
#4	4.4	12.6	99.1	42.2	17.3	57.8
#8	1.6	4.9	84.2	34.1	8.0	65.9 r
#16	1.6	3.4	66.5	27.1	7.1	72.9
#30	1.5	2.8	46.6	19.2	7.9	80.8 r
#50	1.4	2.6	22.0	9.6	9.7	90.4
#100	1.2	2.4	8.6	4.2	5.3	95.8 a
LBW	0.8	2.2	1.1	1.1	3.1	98.9

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	Coarseness Factor: 62 Workability Factor:		34	
45 45, 44 45, 44 45, 44 45, 33 45, 33 Operating Bound	52, 41 <b>56</b> 52, 34 <b>56</b>	68, 38 60) Residention Gradation	JMF Zone 75, 39	
Bound 25 40 45 ActionLimits Boundary	50 5	5 Coarseness Factor (%)	75, 28 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

61

Sample Date:

**Production Gradation** 

9/19/22 Concrete Grade: DM, 4500HP

9/26/2022

Dates Test F	Represents:	9/20/2022	through	9/26/2022		
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
Total Wt			2950	17.68		100.0

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

36.6

---- Verify this number is 100%

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

Farmington Hills, MI 48336

Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	86.8	100.0	100.0	93.3	6.7	6.7
1/2"	51.0	99.4	100.0	75.0	18.3	25.0
3/8"	24.3	80.0	100.0	59.5	15.5	40.5
#4	4.4	12.6	99.1	42.2	17.3	57.8
#8	1.6	4.9	84.2	34.1	8.0	65.9 r
#16	1.6	3.4	66.5	27.1	7.1	72.9
#30	1.5	2.8	46.6	19.2	7.9	80.8 r
#50	1.4	2.6	22.0	9.6	9.7	90.4
#100	1.2	2.4	8.6	4.2	5.3	95.8 a
LBW	0.8	2.2	1.1	1.1	3.1	98.9

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.

Coars	seness Factor:	62	Workability Factor:	34	
45 ]	45, 44	52, 41		JMF Zone	
Factor (%)		52, 4	68, 38 60, 38 60, 38	75, 39	
lity Facto	45, 33	52, 34			
Workability	Operating Zone Boundary		<b>67, 32</b> , 31	75, 28	
25 -	0 45 nits Boundary =	50 5	5 Coarseness Factor (%)	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

61

PREPARED BY: SM, LLC Technical Service Approved BY:

Schlegel

O Batch Plant Gradations

PLANT #: P-14

19-55

Sample Date:

2NS

**Production Gradation** 

9/19/22 Concrete Grade: **DM**, **4500HP** 

6.60

2.67

37.2

37.4

Dates Test F	Represents:	9/20/2022	through	9/26/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	Specific	%
Agg. Olass	,	oou.oo	rroigint (002)		Gravity	Contribution
6AA	58-003	Stoneco	1560	9.29	2.69	52.7
267	E0 003	Stonogo	300	1.70	2.60	10.1

1100

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

Builders'

Builders Redi-Mix 30701 W. 10 Mile Rd. Suite 500 Farmington Hills, MI 48336

	Total Wt	2960 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"	86.8	100.0	100.0	93.0	7.0	7.0
1/2"	51.0	99.4	100.0	74.1	18.9	25.9
3/8"	24.3	80.0	100.0	58.1	16.0	41.9
#4	4.4	12.6	100.0	40.8	17.3	59.2
#8	1.6	4.9	90.4	34.9	5.8	65.1
#16	1.6	3.4	68.8	26.8	8.2	73.2
#30	1.5	2.8	44.3	17.5	9.2	82.5
#50	1.4	2.6	14.4	6.4	11.2	93.6
#100	1.2	2.4	2.7	1.9	4.5	98.1
IBW	0.8	2.2	0.3	0.8	11	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.

 $\ensuremath{^{*}\%}$  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:	64	Workability Factor:	35	
45 -	45, 44	52, 41	57, 40 68, 40	JMF Zone	
Workability Factor (%)		52, 34	68, 38 ■ Production Grada ■ 60, 36PS	75, 39 ation	
Workability	0perating Zone Boundary		68, 32 68, 32	75, 28	
25 -	0 45 mits Boundary =	50 5	Coarseness Factor (%)	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"	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

6AA

1.7

1.6

Sample Date:

Sieve

#50

#100

LBW

9/19/22 Concrete Grade: DM, 4500HP

**2NS** 

23.5

5.7

Cumulative

10.4

3.2

1.3

Dates Test F	Represents:	9/20/2022	through	9/26/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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

26A

2.0

1.9

MDOT No.:

Cumulative

89.6

96.8

---- Verify this number is 100%

Contractor:

% Retained

8.8

7.1

2.0

SUPERIOR MATERIALS	

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

				% 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
1"	98.4	100.0	100.0	99.2	0.8	0.8
3/4"	88.4	100.0	100.0	94.0	5.2	6.0
1/2"	50.1	96.7	100.0	73.9	20.1	26.1
3/8"	21.7	86.7	100.0	58.3	15.6	41.7
#4	6.2	23.4	97.0	43.6	14.7	56.4
#8	2.3	6.3	79.6	33.2	10.4	66.8
#16	1.9	2.8	62.7	26.0	7.2	74.0
#30	1.8	2.2	45.6	19.2	6.0	80.8

\*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.

Production Gradation	Batch Plant Gradation	ons    Aggregate Supplier Gradation	ons	Adjusted WF	Intial Producti	on Sample (IPS	)
Coarseness Factor:	62	Workability Factor:	33	35.7	Coars	eness Factor:	
45				$\neg  $	Work	ability Factor:	
45, 44			JMF Zone	7 I I	Sieve	Cumulative	
1 1	52, 41				Sieve	% Passing	
40	57,	40 68, 40		- 11	2"	100.0	
<b>%</b>		68, 38	75, 39		1.5"	100.0	ĺ
T					1"	99.3	ĺ
용	<b>↓</b> •	■ 60, <mark>3句针S</mark> duction Gradation		- 11	3/4"	89.0	
Factor (%)		i	i I		1/2"	70.3	
1 7	52, 34	<u> </u>		- 11	3/8"	59.9	
<b>≛</b>	57.	68, 32 68, 31			#4	41.9	
<b>a</b> 30 -		68,31			#8	35.9	
Operating Zone			<b>⊸</b>	- 11	#16	27.8	L
A5, 33 Operating Zone Boundary			75, 28		#30	18.9	
25				l	#50	6.3	L
40 45	50 55 _	60 _6570	75	80	#100	1.7	L
		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

Sample Date:

Dates Test Represents:

**Production Gradation** 

19/22 Concrete Grade: **DM, 4500HP** 

3/13/22			Concrete Grade.	DIVI, 430011
9/20/2022	through	9/26/2022		

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

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

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	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"	96.3	100.0	100.0	98.3	1.7	1.7	
3/4"	76.7	100.0	100.0	89.1	9.1	10.9	
1/2"	35.6	96.7	100.0	69.5	19.6	30.5	
3/8"	18.1	86.7	100.0	60.0	9.5	40.0	*
#4	4.1	23.4	96.5	43.3	16.6	56.7	*
#8	2.3	6.3	84.6	35.4	7.9	64.6	no
#16	1.9	2.8	69.7	28.9	6.6	71.1	*
#30	1.8	2.2	50.5	21.1	7.7	78.9	nc
#50	1.7	2.0	23.8	10.5	10.6	89.5	*
#100	1.6	1.9	6.7	3.7	6.8	96.3	a :
LBW	1.4	1.7	1.1	1.3	2.3	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:	62	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	66, 40 67, 40 68, 38 Production Fradation 60, 3BS 67, 83	75, 39 75, 28	
40 45  ActionLimits Boundary =	50 5	5 Coarseness Factor (%) <sup>70</sup>	75	80

Batch Plant Gradations

Wor	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

PREPARED BY: SM, LLC Technical Service Approved By

Sample Date:

**Production Gradation** 

9/19/22 Concrete Grade: DM, 4500HP

9/26/2022

Dates Test F	Represents:	9/20/2022	through	9/26/2022		
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
		Total Wt	2950	17 68		100.0

MDOT No.:

---- Verify this number is 100%

Contractor:

Adjusted WF Intial Production Sample (IPS)

36.6

**Coarseness Factor:** 

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	l
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	l
1"	100.0	100.0	100.0	100.0	0.0	0.0	l
3/4"	86.8	100.0	100.0	93.3	6.7	6.7	l
1/2"	51.0	99.4	100.0	75.0	18.3	25.0	l
3/8"	24.3	80.0	100.0	59.5	15.5	40.5	*
#4	4.4	12.6	99.1	42.2	17.3	57.8	*
#8	1.6	4.9	84.2	34.1	8.0	65.9	nc
#16	1.6	3.4	66.5	27.1	7.1	72.9	*
#30	1.5	2.8	46.6	19.2	7.9	80.8	nc
#50	1.4	2.6	22.0	9.6	9.7	90.4	*
#100	1.2	2.4	8.6	4.2	5.3	95.8	а
LBW	0.8	2.2	1.1	1.1	3.1	98.9	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.

\*% 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 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 56, 52, 34	Exponential Production Gradation	75, 28	
25 40 45  ActionLimits Boundary =	50 55	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"	89.1	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:

9/19/22 Concrete Grade: DM, 4500HP

Dates Test I	Represents:	9/20/2022	through	9/26/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	Specific	%
55					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	63-92	Grange Hall	1100	6.65	2.65	37.9
		Total Wt	2905	17.69		100.0

MDOT No.:

**Coarseness Factor:** 

Contractor:

SUPERIOR MATERIALS

## **Superior Materials, LLC** ∕lile Rd. lls, MI 48336

30701 W. 10 M
Suite 500
Farmington Hil

\*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	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"	98.4	100	0.0	100.0	99.1	0.9	0.9
3/4"	88.4	100	0.0	100.0	93.8	5.4	6.2
1/2"	50.1	96	.7	100.0	73.0	20.8	27.0
3/8"	21.7	86	5.7	100.0	56.9	16.1	43.1
#4	6.2	23	.4	97.6	42.3	14.7	57.7
#8	2.3	6.	3	84.2	33.7	8.6	66.3
#16	1.9	2.	8	70.8	28.1	5.6	71.9
#30	1.8	2.	2	52.7	21.1	7.0	78.9
#50	1.7	2.	0	22.8	9.7	11.4	90.3
#100	1.6	1.	9	5.1	3.0	6.8	97.0
LBW	1.3	1.	7	2.0	1.6	1.4	98.4
Production Grad	dation O Batch Plant Grada	tions	regate Supplier Gra	adations	Adjusted WF	Intial Production	on Sample (IPS

**Production Gradation** Adjusted WF Intial Production Sample (IPS) **Coarseness Factor: Workability Factor:** 34 36.2 65 45 JMF Zone 45, 44 Workability Factor (%) ■ 60, 36 Production Gradation 52, 34 45, 33 Operating Zone Boundary

Coarseness Factor (%) $^{70}$ 

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

PREPARED BY: SM, LLC Technical Service

50

55

45

ActionLimits Boundary = - - - - -

25

Krake Willis Rd

**Total Wt** 

O Batch Plant Gradations

PLANT #: P-39

44-051

Sample Date:

Agg. Class 6AA 26A 2NS

LBW

**Production Gradation** 

9/19/22 Concrete Grade: DM, 4500HP

6.65

17.69

2.65

37.9

100.0

1.4

Dates Test F	Represents:	9/20/2022	through	9/26/2022		
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

1100

2905

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

ify this number is 100%	SUPERIOR MATERIALS

<---- Verify this number is 100%

umulative Retained	
0.0	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	i
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	ĺ
1"	99.0	100.0	100.0	99.4	0.6	0.6	ĺ
3/4"	87.0	100.0	100.0	92.8	6.6	7.2	ĺ
1/2"	42.3	95.8	100.0	67.8	25.0	32.2	i
3/8"	22.3	82.7	100.0	55.9	12.0	44.1	*
#4	3.1	23.3	96.2	39.7	16.1	60.3	*
#8	1.8	6.7	80.6	32.0	7.8	68.0	no
#16	1.6	3.1	65.9	26.1	5.9	73.9	*
#30	1.5	2.5	50.9	20.3	5.8	79.7	no
#50	1.4	2.3	27.6	11.4	8.9	88.6	*
#100	1.3	2.1	8.4	4.0	7.3	96.0	a 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:	32	34.5
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 68, 38 Production Grades 158, 32	JMF Zone 75, 39 dation 75, 28	
40 45  ActionLimits Boundary =	50 55	Coarseness Factor (%)	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"	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:

**Production Gradation** 

Concrete Grade: DM, 4500HP 9/19/22

MDOT No ·	

Dates Test F	Represents:	9/20/2022	through	9/26/2022		
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
Total Wt			2905	17.69		100.0

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

35.7

Contractor:

---- Verify this number is 100%

SUPERIOR

**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"	98.4	100.0	100.0	99.1	0.9	0.9
3/4"	88.4	100.0	100.0	93.8	5.4	6.2
1/2"	50.1	96.7	100.0	73.1	20.7	26.9
3/8"	21.7	86.7	100.0	57.2	15.9	42.8
#4	6.2	23.4	97.0	43.3	13.8	56.7
#8	2.3	6.3	79.6	33.2	10.2	66.8
#16	1.9	2.8	62.7	26.0	7.1	74.0
#30	1.8	2.2	45.6	19.2	6.9	80.8
#50	1.7	2.0	23.5	10.4	8.8	89.6
#100	1.6	1.9	5.7	3.2	7.1	96.8
LBW	1.3	1.7	1.2	1.3	2.0	98.7

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.

Coarseness Factor:	64	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 39 68, 39 68, 38 Froduction Gradation 68, 31	JMF Zone 75, 39	
Boundary 25 40 45	50	55 60 65 70 Coarseness Factor (%)	75, 28 75	80
ActionLimits Boundary =		Codisciless Factor (%)		

Batch Plant Gradations

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