## Aggregate Optimization Chart

## **Production Gradation Report**

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

Sample Date: 5/16/22 Concrete Grade: DM, 4500HP Dates Test Represents: 5/17/2022 5/23/2022 MDOT No.: through

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



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"	99.5	100	0.0	100.0	99.7	0.3	0.3
3/4"	86.2	100	0.0	100.0	93.1	6.7	6.9
1/2"	43.0	95	.0	100.0	70.9	22.2	29.1
3/8"	25.0	84	.5	100.0	60.8	10.1	39.2
#4	4.6	27	.4	98.5	44.1	16.7	55.9
#8	2.3	10	.8	83.3	35.2	8.9	64.8
#16	1.9	4.	9	68.3	28.4	6.7	71.6
#30	1.8	3.	4	53.3	22.3	6.1	77.7
#50	1.8	3.	0	29.2	12.8	9.6	87.2
#100	1.7	2.	7	7.3	4.0	8.7	96.0
LBW	1.6	2.	5	0.6	1.3	2.7	98.7
Production Gra	dation O Batch Plant Grada	tions 💿 Agg	regate Supplier Gra	adations	Adjusted WF	Initial Producti	on Sample (IP

\*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:	35	37.7
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 68, 38 Production Graphation 60, 3βS	75, 28	
40 45  ActionLimits Boundary =	50	Coarseness Factor (%)	75	80

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

PREPARED BY: SM, LLC Technical Service

**Production Gradation** 

Sample Date:

**Production Gradation** 

5/16/22 Concrete Grade: DM, 4500HP

through 5/23/2022

Dates Test F	Represents:	5/17/2022	through	5/23/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1525	9.09	2.69	51.6
26A	58-003	Stoneco	280	1.67	2.69	9.5
2NS	81-019	Pleasant Lake	1150	6.95	2.65	38.9
		Total Wt	2955	17.71		100.0

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

SUPERIOR MATERIALS

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

Farmington Hills, MI 48336

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

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

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

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

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

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

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

	Total Wt	2955	17.71		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"	78.3	10	0.0	100.0	88.8	11.2	11.2
1/2"	40.7	99	99.7		69.4	19.4	30.6
3/8"	17.8	85	5.8	100.0	56.2	13.1	43.8
#4	2.7	17	7.9	97.6	41.1	15.2	58.9
#8	1.3	5	.3	82.7	33.4	7.7	66.6
#16	0.8	3	.2	66.1	26.4	6.9	73.6
#30	0.7	2	.6	48.0	19.3	7.2	80.7
#50	0.6	2	.3	21.2	8.8	10.5	91.2
#100	0.6	2	.2	5.9	2.8	6.0	97.2
LBW	0.6	2	.0	1.4	1.0	1.8	99.0

Aggregate Supplier Gradations

35.9

Coarseness Factor:	66	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	40 68, 38 68, 38 Production 68, 38	75, 39 Gradation 75, 28	
40 45  ActionLimits Boundary =	50 55	Coarseness Factor (%) <sup>70</sup>	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

through

Weight (SSD)

1525

280

1150

5/17/2022

Source

Stoneco

Stoneco

Pleasant Lake

PLANT #: P-103

Pit#

58-003

58-003

81-019

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

5/16/22 Concrete Grade: DM, 4500HP

9.09

1.67

6.95

5/23/2022 Specific ft<sup>3</sup> Gravity Cor

2.69

2.69

2.65

	ME
%	
ntribution	
51.6	
9.5	
000	

DOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

35.9

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

•	Total Wt	2955	17.71		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"	100.0	10	0.0	100.0	100.0	0.0	0.0	
3/4"	78.3	10	0.0	100.0	88.8	11.2	11.2	
1/2"	40.7	99	9.7	100.0	69.4	19.4	30.6	
3/8"	17.8	85	5.8	100.0	56.2	13.1	43.8	
#4	2.7	17	7.9	97.6	41.1	15.2	58.9	
#8	1.3	5	.3	82.7	33.4	7.7	66.6	
#16	0.8	3	.2	66.1	26.4	6.9	73.6	
#30	0.7	2	.6	48.0	19.3	7.2	80.7	
#50	0.6	2	.3	21.2	8.8	10.5	91.2	
#100	0.6	2.2		5.9	2.8	6.0	97.2	
LBW	0.6	2	.0	1.4	1.0	1.8	99.0	
Production G	radation O Batch Plant Grad	ations	regate Supplier Gr	adations	Adjusted WF	Intial Production	on Sample (IPS	

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

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

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

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

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

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

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

Coarseness Factor:	66	Workability Factor: 33
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	JMF Zone  75, 39  68, 38  75, 39  75, 28
25	50 55	60 65 65 70 75 80 Coarseness Factor (%)

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:

Sample Date:

Concrete Grade: DM, 4500HP 5/16/22 5/23/2022

Dates Test Represents:		5/17/2022	through	5/23/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2005	17.60		100.0

MDOT No.:

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	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"	98.7	10	0.0	100.0	99.3	0.7	0.7
3/4"	85.8	10	0.0	100.0	92.7	6.7	7.3
1/2"	44.9	96	5.2	100.0	71.2	21.5	28.8
3/8"	28.1	85	5.0	100.0	61.6	9.7	38.4
#4	7.2	30	0.0	96.8	44.7	16.9	55.3
#8	2.8	10	).1	80.5	34.2	10.5	65.8
#16	2.3	4.	.9	63.6	26.8	7.4	73.2
#30	2.2	3.	.8	46.9	20.0	6.8	80.0
#50	2.1	3.3		24.0	10.9	9.2	89.1
#100	2.0	3.	.1	4.4	3.0	7.8	97.0
LBW	1.7	2	.6	0.8	1.4	1.6	98.6
Draduation Cra	detion Batch Plant Grada	tions 📵 Aga	regate Supplier Gr	adations	Adjusted M/E	Intial Draduatio	on Comple (IDC

\*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 Grada	ations    Aggregate Supplier Gradation	ons	Adjusted WF	Intial Producti	on Sample (IPS)
Coarseness Factor:	58	Workability Factor:	34	36.7	Coars	seness Factor:
45				$\neg \top$	Work	ability Factor:
45, 44			JMF Zone	7 I I	Sieve	Cumulative
	52, 41		31411 20110	<b>-</b>	Sieve	% Passing
40	52, 1	7, 40 68, 40		- 11	2"	100.0
Factor (%)		68, 38	75, 39		1.5"	100.0
<del>                                    </del>		Dec ducation Operators			1"	99.3
9		<ul><li>Production Gradation</li><li>60, 39PS</li></ul>		- 11	3/4"	89.0
35 -		i			1/2"	70.3
1 7	52, 34	<del>-</del>		- 11	3/8"	59.9
Operating Zone Boundary		- 22 68 32			#4	41.9
30 -		<b>68, 32</b>		- 11	#8	35.9
Operating Zone					#16	27.8
Boundary			75, 28		#30	18.9
<b>&gt;</b> 25 <b>  - - - - - - - - - -</b>					#50	6.3
40 45	50 55	60 65 70	75	80	#100	1.7
		Coarseness Factor (%) <sup>70</sup>			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 #:

Sample Date:

Dates Test Represents:

Concrete Grade: DM, 4500HP

			 	,	
5/17/2022	through	5/23/2022	'		

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	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:** 

37.7



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"	98.7	100.0	100.0	99.3	0.7	0.7
3/4"	85.1	100.0	100.0	92.0	7.3	8.0
1/2"	45.4	96.2	100.0	70.5	21.5	29.5
3/8"	24.0	85.0	100.0	58.3	12.2	41.7
#4	4.3	30.0	96.8	42.7	15.6	57.3
#8	2.1	10.1	84.3	35.2	7.5	64.8
#16	1.8	4.9	69.0	28.6	6.6	71.4
#30	1.7	3.8	50.1	21.0	7.6	79.0
#50	1.6	3.3	24.4	10.7	10.3	89.3
#100	1.4	3.1	7.1	3.8	7.0	96.2
LBW	0.6	2.6	1.6	1.1	2.6	98.9
Production Gra	adation O Batch Plant Grada	tions	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 Fa	ctor: 64	Workability Factor:	35	
45 45, 44 45, 44 Operating Boun	52, 34 sg Zone	6, 40 67, 40 68, 38 Production Gra 60, 38S 67, 40 68, 38		
25 40 4 ActionLimits Boundary	5 50 5	<sup>5</sup> Coarseness Factor (%)	75, 28 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"	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

**Total Wt** 

Batch Plant Gradations

PLANT #: P-35

Sample Date:

LBW

**Production Gradation** 

5/16/22 Concrete Grade: DM, 4500HP

17.68

Dates Test F	Represents:	5/17/2022	through	5/23/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1520	9.06	2.69	51.5
26A	58-003	Stoneco	280	1.67	2.69	9.5
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0

2950

Contractor:

1.8

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

35.9

MDOT No.:



----- Verify this number is 100%

M	A	T	E	R	-	A	L	S	
Su	per	ior	٠ ٧	1at	eı	rial	s,	LLC	2
307	701	W	. 1	0 N	1il	e R	d.		
Sui	te 5	ດດ							

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"	78.3	100.0	100.0	88.8	11.2	11.2
1/2"	40.7	99.7	100.0	69.4	19.4	30.6
3/8"	17.8	85.8	100.0	56.3	13.1	43.7
#4	2.7	17.9	97.6	41.1	15.2	58.9
#8	1.3	5.3	82.7	33.4	7.7	66.6
#16	0.8	3.2	66.1	26.5	6.9	73.5
#30	0.7	2.6	48.0	19.3	7.2	80.7
#50	0.6	2.3	21.2	8.8	10.5	91.2
#100	0.6	2.2	5.9	2.8	6.0	97.2

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:	66	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 56, 52, 34	68, 38 ■ Production 0		
25 40 45  ActionLimits Boundary =	50 55	Coarseness Factor (%)	75, 28	80

Workability 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

61

PREPARED BY: SM, LLC Technical Service

0.6

Sample Date:

**Production Gradation** 

5/16/22 Concrete Grade: DM, 4500HP

5/23/2022

36.2

Dates Test F	Represents:	5/17/2022	through	5/23/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1600	9.79	2.62	55.1
26A	71-47	Presque Isle	205	1.25	2.62	7.1
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
		Total W/t	2005	17.60		100.0

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

Contractor:

SUPERIOR MATERIALS

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

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

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

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

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

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

63

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

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

	Total Wt	2905	17.69		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"	98.7	10	0.0	100.0	99.3	0.7	0.7
3/4"	85.8	10	0.0	100.0	92.2	7.1	7.8
1/2"	44.9	96	5.2	100.0	69.4	22.8	30.6
3/8"	28.1	85	5.0	100.0	59.3	10.0	40.7
#4	7.2	30	0.0	97.7	43.1	16.3	56.9
#8	2.8	10	).1	83.1	33.7	9.4	66.3
#16	2.3	4	.9	68.4	27.5	6.2	72.5
#30	2.2	3	.8	50.4	20.6	6.9	79.4
#50	2.1	3	.3	24.6	10.7	9.9	89.3
#100	2.0	3	.1	3.2	2.5	8.2	97.5
LBW	1.7	2	.6	0.3	1.2	1.3	98.8

Aggregate Supplier Gradations

Coarseness Factor:	61	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zon Boundary	52, 41 52, 34	58, 39 68, 38 60, Psoduction Gradation IPS 58, 31	75, 39 75, 28	
25 40 45  ActionLimits Boundary =	50	Coarseness Factor (%)	75	80

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"	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:

5/16/22 Concrete Grade: DM, 4500HP

75, 28

80

75

Dates Test Represents:		5/17/2022	through	5/23/2022		
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	300	1.83	2.62	10.3
2NS	44-051	Krake Willis Rd	1100	6.65	2.65	37.9
		Total Wt	2905	17.69		100.0

MDOT No.:

**Coarseness Factor:** 

Contractor:



**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	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"	99.5	10	0.0	100.0	99.7	0.3	0.3
3/4"	86.2	10	0.0	100.0	92.9	6.9	7.1
1/2"	43.0	95	5.0	100.0	70.0	22.9	30.0
3/8"	25.0	84	ł.5	100.0	59.5	10.4	40.5
#4	4.6	27	<b>'</b> .4	96.5	41.8	17.8	58.2
#8	2.3	10	).8	79.6	32.4	9.3	67.6
#16	1.9	4	.9	63.2	25.4	7.0	74.6
#30	1.8	3	.4	47.0	19.1	6.3	80.9
#50	1.8	3	.0	26.4	11.2	7.8	88.8
#100	1.7	2	.7	9.6	4.8	6.4	95.2
LBW	1.6	2	.5	1.0	1.5	3.3	98.5

**Production Gradation** Adjusted WF Intial Production Sample (IPS) **Coarseness Factor: Workability Factor:** 32 34.9 60 45 JMF Zone 45, 44 52, 41 Workability Factor (%) ■ 60, 36 IPS ■ Production Gradation 52, 34 Operating Zone

Coarseness Factor (%) $^{60}$ 

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"	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

PREPARED BY: SM, LLC Technical Service

50

55

Boundary

45

ActionLimits Boundary = - - -

25

5/17/2022

Batch Plant Gradations

PLANT #: P-02

Sample Date:

Dates Test Represents:

**Production Gradation** 

Concrete Grade: DM, 4500HP 5/16/22

5/23/2022

	ME
%	
ontribution	
51.6	

Contractor:

DOT No.:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

36.7

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

through

--- Verify this number is 100%

SUPERIOR MATERIALS

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

	Total Wt	2303 17.03		100.0	C Verily tills if	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"	98.7	100.0	100.0	99.3	0.7	0.7
3/4"	85.8	100.0	100.0	92.7	6.7	7.3
1/2"	44.9	96.2	100.0	71.2	21.5	28.8
3/8"	28.1	85.0	100.0	61.6	9.7	38.4
#4	7.2	30.0	96.8	44.7	16.9	55.3
#8	2.8	10.1	80.5	34.2	10.5	65.8
#16	2.3	4.9	63.6	26.8	7.4	73.2
#30	2.2	3.8	46.9	20.0	6.8	80.0
#50	2.1	3.3	24.0	10.9	9.2	89.1
#100	2.0	3.1	4.4	3.0	7.8	97.0
LBW	1.7	2.6	0.8	1.4	1.6	98.6

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:	58	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 39 68, 38 68, 38 Production Gradation 60, 36 IPS 68, 31	75, 39 75, 28	
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"	95.1	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