## Aggregate Optimization Chart

## **Production Gradation Report**

PLANT #: P-101 Contractor:

Concrete Grade: DM, 4500HP Sample Date: 3/28/22 Dates Test Represents: 3/29/2022 4/4/2022 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

MDOT No.:

---- Verify this number is 100%

**Coarseness Factor:** 

SUPERIOR MATERIALS

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

					Tomy and named 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"	98.7	100.0	100.0	99.3	0.7	0.7	
3/4"	80.4	100.0	100.0	90.2	9.2	9.8	
1/2"	36.5	98.8	100.0	68.0	22.1	32.0	
3/8"	17.8	86.5	100.0	57.4	10.7	42.6	
#4	2.9	17.8	98.5	42.2	15.2	57.8	
#8	2.0	4.3	83.3	34.4	7.9	65.6	
#16	1.7	2.6	68.3	28.1	6.3	71.9	
#30	1.6	2.3	53.3	22.1	6.0	77.9	
#50	1.6	2.1	29.2	12.6	9.5	87.4	
#100	1.5	2.0	7.3	3.8	8.7	96.2	
LBW	1.4	1.7	0.6	1.1	2.7	98.9	
Production Gra	dation O Batch Plant Gradat	ions    Aggregate Supplier Gr	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.

Todaotion Oladation		9	, tajaotoa	
Coarseness Factor:	65	Workability Factor:	34	36.9
45, 44  45, 44  45, 33  Operating Zone Boundary  40, 45	52, 34	57, 39  60, 36s  Production Grad  67, 39  68, 38  Production Grad  67, 68, 131  70  Coarseness Factor (%)	JMF Zone 75, 39 lation 75, 28	80
ActionLimits Boundary =		Coarseness Factor (%)		

Work	ability Factor:	35	
Sieve	Cumulative	%	Cumulative
	% 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

62

Sample Date:

Dates Test Represents:

Concrete Grade: DM, 4500HP 3/28/22

	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribu
:	3/29/2022	through	4/4/2022		

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.4
26A	58-003	Stoneco	405	2.41	2.69	13.7
2NS	81-019	Pleasant Lake	1150	6.95	2.65	38.9
		Total Wt	2955	17 71		100.0

Contractor:

MDOT No.:

**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"	99.8	10	0.0	100.0	99.9	0.1	0.1
3/4"	83.4	10	0.0	100.0	92.1	7.8	7.9
1/2"	39.0	99	).4	100.0	71.0	21.1	29.0
3/8"	18.4	83	3.9	100.0	59.1	11.9	40.9
#4	2.8	9	.0	99.4	41.2	17.9	58.8
#8	1.3	2	.9	85.5	34.3	7.0	65.7
#16	1.5	2	.6	67.7	27.4	6.9	72.6
#30	1.3	1	.8	48.8	19.9	7.6	80.1
#50	1.2	1	.6	23.8	10.1	9.8	89.9
#100	1.1	1.6		6.5	3.3	6.8	96.7
LBW	0.6	1	.5	2.0	1.3	2.0	98.7
Production Gr	roduction Gradation						

Coarse	eness Factor:	62	Workability Factor:	34	36.8
Factor (%)	45, 44 45, 33	52, 41	68, 38 60   38	JMF Zone 75, 39	
Workability 25	Operating Zone Boundary			75, 28	
ActionLim	) 45 nits 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"	89.2	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

Stoneco

Pleasant Lake

O Batch Plant Gradations

PLANT #: P-103

Pit#

58-003

81-019

Sample Date:

Agg. Class

6AA

26A

2NS

**Production Gradation** 

3/28/22 Concrete Grade: DM, 4500HP

405

1150

Dates Test Represents: 3/29/2022 4/4/2022 through Specific % ft<sup>3</sup> Weight (SSD) Source Gravity Contribution 58-003 Stoneco 1400 8.34 2.69 47.4

2.41

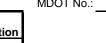
6.95

2.69

2.65

MDOT No.:

Contractor:



Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

13.7

38.9

36.8



**Superior Materials, LLC** 

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Farmington Hills, MI 48336

	Total Wt	2955 17.71		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"	99.8	100.0	100.0	99.9	0.1	0.1
3/4"	83.4	100.0	100.0	92.1	7.8	7.9
1/2"	39.0	99.4	100.0	71.0	21.1	29.0
3/8"	18.4	83.9	100.0	59.1	11.9	40.9
#4	2.8	9.0	99.4	41.2	17.9	58.8
#8	1.3	2.9	85.5	34.3	7.0	65.7
#16	1.5	2.6	67.7	27.4	6.9	72.6
#30	1.3	1.8	48.8	19.9	7.6	80.1
#50	1.2	1.6	23.8	10.1	9.8	89.9
#100	1.1	1.6	6.5	3.3	6.8	96.7
I BW	0.6	1.5	2.0	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	: 62	Workability Factor:	34	
45   45, 44   45, 44   45, 33   45, 33   45, 33   Operating Zor Boundary	52, 34	68, 38 Production Gradation 60188	JMF Zone 75, 39 75, 28	
25 + 40 45 ActionLimits Boundary =		Coarseness Factor (%)	75	80

Workability Factor:		36	
Siovo	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

PREPARED BY: SM, LLC Technical Service Approved BY:

Sample Date:

LBW

3/28/22

Concrete Grade: DM, 4500HP

1.1

Contractor:

MDOT No.:

Dates Test F	Represents:	3/29/2022	through	4/4/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	48.2
26A	71-47	Presque Isle	355	2.17	2.62	12.2
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2005	17.60		100.0

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	48.2
26A	71-47	Presque Isle	355	2.17	2.62	12.2
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0
,	·	·		·		·

V	erify this	number	is 100°	%	

SUPER	IOR

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"	100.0	100.0	100.0	100.0	0.0	0.0	ĺ
3/4"	84.9	100.0	100.0	92.7	7.3	7.3	ĺ
1/2"	31.3	97.8	100.0	66.6	26.1	33.4	ĺ
3/8"	12.9	87.8	100.0	56.5	10.1	43.5	1
#4	2.3	27.7	96.6	42.7	13.8	57.3	1
#8	2.0	9.4	79.9	33.7	9.0	66.3	n
#16	1.8	4.3	63.5	26.5	7.2	73.5	1
#30	1.8	3.0	46.8	19.8	6.8	80.2	n
#50	1.7	2.6	24.3	10.8	9.0	89.2	1
#100	1.6	2.4	4.6	2.9	7.9	97.1	а

\*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 Grad	lations	Adjusted WF	Intial Product	on Sample (IPS)	)
Coarseness Factor	: 66	Workability Factor: 34	4 36.2	Coars	seness Factor:	
45				Worl	ability Factor:	
45, 44		IM	1F Zone	Sieve	Cumulative	
1 1	52, 41	<i>***</i>		Sieve	% Passing	
_ 40 1		57, 40 68, 40	- 11	2"	100.0	
│ 🥷 │		68, 38	75, 39	1.5"	100.0	
-		!		1"	99.3	
9		■ 60, 36PS ■ Production Gradation		3/4"	89.0	
Factor (%)		i i i		1/2"	70.3	
	52, 34	<u>-</u> !		3/8"	59.9	
Morkability Operating Zon Boundary		22		#4	41.9	
<b>=</b> 30	`	68, 32 68, 31		#8	35.9	
Operating Zon	_			#16	27.8	
Boundary			75, 28	#30	18.9	
25				#50	6.3	
40 45	50 55	60 65 70 7	5 80	#100	1.7	
		Coarseness Factor (%) <sup>70</sup>	,	LBW	1.0	
ActionLimits Boundary = -						

Workability Factor:		36	
Sieve	Cumulative	%	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

Sample Date:

**Production Gradation** 

3/28/22 Concrete Grade: DM, 4500HP 4/4/2022

Dates Test Represents:		3/29/2022	through	4/4/2022		
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	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17 69		100.0

MDOT No.:

---- Verify this number is 100%

Contractor:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

37.4

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	ı
1"	97.9	100.0	100.0	98.9	1.1	1.1	ı
3/4"	80.8	100.0	100.0	90.1	8.9	9.9	ı
1/2"	39.8	97.8	100.0	68.6	21.4	31.4	ı
3/8"	18.9	87.8	100.0	56.9	11.7	43.1	ŀ
#4	3.7	27.7	95.9	42.3	14.7	57.7	ľ
#8	2.5	9.4	82.8	34.9	7.4	65.1	no
#16	2.2	4.3	68.1	28.5	6.4	71.5	,
#30	2.0	3.0	49.7	21.0	7.5	79.0	no
#50	2.0	2.6	24.9	11.1	9.9	88.9	,
#100	1.9	2.4	7.6	4.2	6.9	95.8	а
LBW	1.4	2.0	1.8	1.6	2.6	98.4	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.

\*% 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: 66	Workability Factor:	35	
- I I '	52, 34	68, 38 68, 38 Froduction 60, 38S	JMF Zone 75, 39 Gradation 75, 28	
25 40 ActionLimits Boundar		Coarseness Factor (%) <sup>70</sup>	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"	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

Sample Date:

**Production Gradation** 

DM 4500HP 3/28/22

	Concrete Grade:	DIVI, 450011
4/4/2022		

Dates Test Represents:		3/29/2022	through	4/4/2022			
	Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
	6AA	58-003	Stoneco	1450	8.64	2.69	49.1
	26A	58-003	Stoneco	405	2.41	2.69	13.7
	2NS	81-019	Pleasant Lake	1100	6.65	2.65	37.2
			Total Wt	2955	17 70		100.0

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

35.4

SUPERI	

**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	17.70		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	iΑ	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"	99.8	10	0.0	100.0	99.9	0.1	0.1
3/4"	83.4	100.0		100.0	91.9	8.0	8.1
1/2"	39.0	99	).4	100.0	70.0	21.9	30.0
3/8"	18.4	83	3.9	100.0	57.8	12.2	42.2
#4	2.8	9.0		99.4	39.6	18.1	60.4
#8	1.3	2	9	85.5	32.9	6.7	67.1
#16	1.5	2.6		67.7	26.3	6.6	73.7
#30	1.3	1.	8	48.8	19.1	7.2	80.9
#50	1.2	1.6		23.8	9.7	9.4	90.3
#100	1.1	1.6		6.5	3.2	6.5	96.8
LBW	0.6	1.	.5	2.0	1.2	1.9	98.8

Aggregate Supplier Gradations

**Coarseness Factor:** 63 **Workability Factor:** 33 JMF Zone 45, 44 Workability Factor (%) ■ 60,1 Production Gradation 52, 34 Operating Zone Boundary 75, 28 25 Coarseness Factor (%) $^{60}$ 45 55 75 80 ActionLimits Boundary = - - -

Batch Plant Gradations

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"	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:

3/28/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	3/29/2022	through	4/4/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	48.2
26A	71-47	Presque Isle	405	2.48	2.62	13.9
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.5

Contractor:

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 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"	84.9	10	100.0		92.7	7.3	7.3	
1/2"	31.3	97	97.8		66.6	26.1	33.4	
3/8"	12.9	87	87.8		56.3	10.3	43.7	
#4	2.3	27	27.7		41.9	14.4	58.1	
#8	2.0	9	.4	83.7	34.0	8.0	66.0	
#16	1.8	4	4.3		26.9	7.1	73.1	
#30	1.8	3	3.0		19.7	7.3	80.3	
#50	1.7	2	2.6		9.1	10.5	90.9	
#100	1.6	2.4		3.6	2.5	6.7	97.5	
LBW	1.2	2	2.0		1.1	1.3	98.9	
Production 6	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.

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:	66	Workability Factor:	34	
45 45, 44			JMF Zone	$\overline{\mathbb{n}}$
% 40 ]	52, 41	<b>58</b> , 39 <b>68</b> , 38	75, 39	
Morkability Factor (%)  30  Operating Zone Boundary	52, 34	■ 60, 36 Production Gra	adatior	
		58, 31 688,31	75, 28	
25 + 40 45  ActionLimits Boundary =	50 5	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"	99.1	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

PLANT #:

Sample Date:

**Production Gradation** 

3/28/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	3/29/2022	through	4/4/2022		
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

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

34.2

Contractor:

MDOT No.:



--- Verify this number is 100%

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

	TOTAL WI	2903	17.09		100.0	< verily 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	ı
1.5"	100.0	100	0.0	100.0	100.0	0.0	0.0	ı
1"	98.7	100	0.0	100.0	99.3	0.7	0.7	ı
3/4"	80.4	100	0.0	100.0	89.8	9.5	10.2	ı
1/2"	36.5	98	.8	100.0	67.0	22.9	33.0	ı
3/8"	17.8	86	.5	100.0	56.0	11.0	44.0	ı
#4	2.9	17	.8	96.4	39.8	16.2	60.2	ŀ
#8	2.0	4.	3	79.9	31.7	8.1	68.3	n
#16	1.7	2.	6	64.4	25.5	6.2	74.5	ı
#30	1.6	2.	3	47.5	19.1	6.5	80.9	n
#50	1.6	2.	1	22.3	9.5	9.6	90.5	ı
#100	1.5	2.	0	5.9	3.2	6.3	96.8	а
LBW	1.4	1.	7	0.6	1.1	2.1	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.

\*% 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:	32	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	56, 40 68, 38 60, 36 IPS Production Gradation	75, 39	
Operating Zone Boundary			75, 28	
40 45  ActionLimits Boundary =	50	Coarseness Factor (%)	75	80

O Batch Plant Gradations

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"	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

63

Ray Rd

Batch Plant Gradations

**PLANT #:** P-02

63-115

Sample Date:

2NS

**Production Gradation** 

Concrete Grade: DM, 4500HP

17.60

2.65

Dates Test F	Represents:	3/29/2022	through	4/4/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1455	8.90	2.62	50.1
26A	71-47	Presque Isle	350	2.14	2.62	12.0

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

34.9



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"	84.9	10	0.0	100.0	92.4	7.6	7.6
1/2"	31.3	97	7.8	100.0	65.3	27.1	34.7
3/8"	12.9	87	<b>'</b> .8	100.0	54.9	10.4	45.1
#4	2.3	27	<b>'</b> .7	96.6	41.1	13.8	58.9
#8	2.0	9.	.4	79.9	32.4	8.7	67.6
#16	1.8	4.	.3	63.5	25.5	6.9	74.5
#30	1.8	3.	.0	46.8	19.0	6.5	81.0
#50	1.7	2	.6	24.3	10.4	8.6	89.6
#100	1.6	2	.4	4.6	2.8	7.5	97.2
LBW	1.2	2	.0	0.7	1.1	1.7	98.9

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.

Coarseness Factor:	67	Workability Factor:	32	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 39 68, 39 68, 38 Froduction 68 331	75, 39 on Gradation	
25 40 45  ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	80

Workability Factor:		35	
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"	95.1	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