## **Aggregate Optimization Chart**

## **Production Gradation Report**

PLANT #: P-101 Contractor:

6/12/23 Sample Date: Concrete Grade: DM, 4500HP **Dates Test Represents:** 6/13/2023 6/19/2023 through

Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	51.7
26A	71-47	Presque Isle	250	1.53	2.62	8.6
2NS	75-051	Mid Michigan	1150	6.93	2.66	39.7
		Total Wt	2900	17.63		100.0

MDOT No.:

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:

SUPERIOR

**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.,

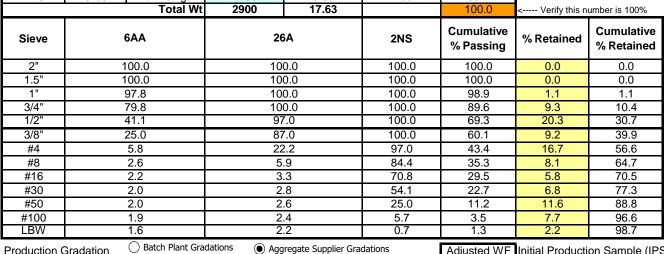
nom. max., #100 and #200 sieves.

\*% 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



**Coarseness Factor:** 35 37.8 62 **Workability Factor:** 45 45, 44 JMF Zone 75, 39 Workability Factor (%) Production G 52, 34 45, 33 Operating Zone 75, 28 Boundary 50 Coarseness Factor (%)<sup>70</sup> 75 80 ActionLimits Boundary = - - - - -

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

**Production Gradation** 

Sample Date:

**Production Gradation** 

Concrete Grade: DM, 4500HP 6/12/23

Dates Test	Represents:	6/13/2023	through	6/19/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
644	E0 003	Ctopooo	1600	0.52	2.60	E4.2

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

37.3

Contractor:

MDOT No.:

Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	200	1.19	2.69	6.8
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68		100.0

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

	i otai vyt	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"	99.7	100.0	100.0	99.8	0.2	0.2
3/4"	83.0	100.0	100.0	90.8	9.1	9.2
1/2"	45.0	99.6	100.0	70.1	20.6	29.9
3/8"	22.1	88.0	100.0	56.9	13.2	43.1
#4	2.9	12.5	99.6	41.2	15.7	58.8
#8	1.4	3.7	86.8	34.8	6.4	65.2 r
#16	1.1	2.7	69.4	27.8	7.0	72.2
#30	1.0	2.3	50.0	20.2	7.6	79.8
#50	1.0	2.2	24.9	10.4	9.8	89.6
#100	1.0	2.1	7.0	3.4	7.0	96.6
LBW	0.9	1.9	1.5	1.2	2.2	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:	66	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Production 60186	JMF Zone 75, 39 Gradatior 75, 28	
25 + 40 45  ActionLimits Boundary =	50 58	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

1.0

0.9

O Batch Plant Gradations

Sample Date:

#100

LBW

**Production Gradation** 

Concrete Grade: DM, 4500HP 6/12/23

Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	Specific	% Camaribusi
Dates Test F	Represents:	6/13/2023	through	6/19/2023		

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	200	1.19	2.69	6.8
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68		100.0

2.1

1.9

Contractor:

96.6

98.8

**Coarseness Factor:** 

MDOT No.:



---- Verify this number is 100%

<u>s</u>	uperior Materials, LLC
3	0701 W. 10 Mile Rd.
S	uite 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	l
1"	99.7	100.0	100.0	99.8	0.2	0.2	l
3/4"	83.0	100.0	100.0	90.8	9.1	9.2	l
1/2"	45.0	99.6	100.0	70.1	20.6	29.9	l
3/8"	22.1	88.0	100.0	56.9	13.2	43.1	1
#4	2.9	12.5	99.6	41.2	15.7	58.8	,
#8	1.4	3.7	86.8	34.8	6.4	65.2	n
#16	1.1	2.7	69.4	27.8	7.0	72.2	1
#30	1.0	2.3	50.0	20.2	7.6	79.8	n
#50	1.0	2.2	24.9	10.4	9.8	89.6	,

Aggregate Supplier Gradations

7.0

3.4

1.2

37.3

7.0

Adjusted WF Intial Production 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:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	6, 40 68, 38 Production 60188 68, 32 67, 32	JMF Zone 75, 39 Gradatior 75, 28	
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"	89.2	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

Approved BY: PREPARED BY: SM, LLC Technical Service

PLANT #: Contractor:

Concrete Grade: DM, 4500HP Sample Date: 6/12/23 Dates Test Represents: 6/13/2023 6/19/2023 through

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.1
26A	58-003	Stoneco	260	1.55	2.69	8.8
2NS	19-04	Schlegel	1100	6.60	2.67	37.2
Total Wt			2960	17.68		100.0

MDOT No.:

---- Verify this number is 100%

<b>Builders'</b>
REDI-MIX
Finish First With Builders'

## **Builders Redi-Mix**

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"	99.7	100.0	100.0	99.8	0.2	0.2
3/4"	83.0	100.0	100.0	90.8	9.0	9.2
1/2"	45.0	99.6	100.0	70.2	20.6	29.8
3/8"	22.1	88.0	100.0	56.8	13.4	43.2
#4	2.9	12.5	99.9	39.8	17.0	60.2
#8	1.4	3.7	90.1	34.6	5.2	65.4
#16	1.1	2.7	69.4	26.6	7.9	73.4
#30	1.0	2.3	44.5	17.3	9.3	82.7
#50	1.0	2.2	14.3	6.0	11.2	94.0
#100	1.0	2.1	2.7	1.7	4.3	98.3
LBW	0.9	1.9	0.2	0.7	1.0	99.3
		•		•		

\*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.

Production Gradation	O Batch Plant Gra	adations    Aggregate Supplier Gradations		Adjusted WF	Intial Production	on Sample (IPS	)
Coarseness Factor:	66	Workability Factor:	35	37.1	Coars	eness Factor:	
45					Work	ability Factor:	
45, 44			JMF Zone	7 I I	Sieve	Cumulative	
1 1			20110	J	Sieve	% Passing	
	52, 41	57, 40 (68, 40)			2"	100.0	
(a) 40 f			75, 39		1.5"	100.0	
		68, 38			1"	99.3	
35	■ Production Gradation ■ 60, 36PS		3/4"	89.0			
<b>½</b> 35		- 00, 041 0			1/2"	70.3	
	52, 34				3/8"	59.9	
Atiling 30 Operating Zone Boundary					#4	41.9	
30 1		57, 32 68, 31			#8	35.9	
Operating Zone					#16	27.8	
Boundary			75, 28		#30	18.9	
					#50	6.3	
25 +	FO 55		75	<del>-</del>	#100	1.7	
40 45	50 55	Coarseness Factor (%)	75	80	LBW	1.0	
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"	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:

6/12/23 Concrete Grade: DM, 4500HP 6/13/2023 through 6/19/2023

Dates Test Represents:		6/13/2023	through	6/19/2023		
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

MDOT No.:

Contractor:



---- 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"	97.4	100.0	100.0	98.7	1.3	1.3
3/4"	83.2	100.0	100.0	91.3	7.3	8.7
1/2"	43.4	96.2	100.0	70.4	20.9	29.6
3/8"	26.6	88.5	100.0	61.1	9.4	38.9
#4	4.6	20.9	96.7	42.5	18.6	57.5
#8	2.2	5.4	80.9	33.6	8.9	66.4
#16	2.0	2.5	65.6	27.2	6.4	72.8
#30	1.8	1.9	49.9	20.9	6.4	79.1
#50	1.8	1.7	26.3	11.5	9.4	88.5
#100	1.7	1.4	5.0	3.0	8.5	97.0

1.1

\*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	Batch Plant Grada	ations	ons	Adjusted WF	Intial Producti	on Sample (IPS	5)
Coarseness Factor:	59	Workability Factor:	34	36.1	Coars	eness Factor:	
7 45				$\neg \top$	Work	ability Factor:	
45, 44			JMF Zone	7 I I	Sieve	Cumulative	
1 1	52, 41		31111 20110	<b>-</b>	Sieve	% Passing	
_ 40 ]	1	68, 40			2"	100.0	
6		68, 38	75, 39		1.5"	100.0	
Factor (%)		!		- 11	1"	99.3	
<del>2</del>	■ Peoder;按照中经*adation 52, 34 57, 32			3/4"	89.0		
Se 35			- 11	1/2"	70.3		
1				3/8"	59.9		
Moderating Zon Boundary			- 11	#4	41.9		
30 -				#8	35.9		
Operating Zon	e		<b>⊸</b>		#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 (%) <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

PREPARED BY: SM, LLC Technical Service

LBW

**PLANT #:** p11

Sample Date:

Concrete Grade: DM, 4500HP 6/12/23

MDOT No ·		

Dates Test F	Represents:	6/13/2023	through	6/19/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1755	10.73	2.62	60.4
26A	71-47	Presque Isle	0	0.00	2.62	0.0
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

Contractor:

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

	l otal 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	99.2	0.8	0.8
3/4"	83.0	10	0.0	100.0	89.7	9.4	10.3
1/2"	50.6	96	5.2	100.0	70.2	19.6	29.8
3/8"	35.3	88	3.5	100.0	60.9	9.2	39.1
#4	7.4	20	).9	96.4	42.6	18.3	57.4
#8	3.4	5.	.4	84.5	35.5	7.1	64.5
#16	2.8	2	.5	69.1	29.0	6.5	71.0
#30	2.7	1.	.9	48.8	20.9	8.1	79.1
#50	2.5	1.	.7	23.0	10.6	10.3	89.4
#100	2.4	1.	.4	6.5	4.0	6.6	96.0
LBW	1.9	1.	.2	1.0	1.5	2.5	98.5

\*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	ons	Adjusted WF	Intial Producti	on Sample (IPS	)
Coarseness Factor:	61	Workability Factor:	36	38.0	Coars	seness Factor:	
7 45				$\neg \top$	Work	ability Factor:	
45, 44			JMF Zone	7 I I	Sieve	Cumulative	
1 1 1	52, 41		31111 20110		Sieve	% Passing	F
_ 40 1	56.40	67, 40			2"	100.0	
<b>?</b>	i	68, 38	75, 39		1.5"	100.0	
	!	Production Gradation			1"	100.0	
유 _		■ 60,3MBS			3/4"	95.0	
Factor (%)	į	i l			1/2"	72.3	
	52, 34	!			3/8"	60.4	
At, 33  Operating Zon Boundary	56.92	67 <sub>68,31</sub>			#4	42.6	
<del>2</del> 30		68, 31			#8	36.0	
Operating Zon	e		<b>_</b>		#16	29.5	Π
Boundary			75, 28		#30	20.3	
25					#50	9.5	
40 45	50 55	60 65 70	75	80	#100	3.4	
		Coarseness Factor (%) <sup>70</sup>	-		LBW	1.3	
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"	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** 

6/12/23 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	6/13/2023	through	6/19/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1755	10.73	2.62	60.4
26A	71-47	Presque Isle	0	0.00	2.62	0.0
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

38.0

**Coarseness Factor:** 

---- Verify this 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
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	98.6	100.0	100.0	99.2	0.8	0.8
3/4"	83.0	100.0	100.0	89.7	9.4	10.3
1/2"	50.6	96.2	100.0	70.2	19.6	29.8
3/8"	35.3	88.5	100.0	60.9	9.2	39.1
#4	7.4	20.9	96.4	42.6	18.3	57.4
#8	3.4	5.4	84.5	35.5	7.1	64.5
#16	2.8	2.5	69.1	29.0	6.5	71.0
#30	2.7	1.9	48.8	20.9	8.1	79.1
#50	2.5	1.7	23.0	10.6	10.3	89.4
#100	2.4	1.4	6.5	4.0	6.6	96.0
LBW	1.9	1.2	1.0	1.5	2.5	98.5
Production G	Gradation O Batch Plant Grad	ations	dations	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:	61	Workability Factor:	36	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Production Graduiton  68, 38  60, 38S	JMF Zone 75, 39 75, 28	
40 45  ActionLimits Boundary =	50 55	Coarseness Factor (%) <sup>70</sup>	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

62

Sample Date:

Dates Test Represents:

**Production Gradation** 

6/12/23 Concrete Grade: DM, 4500HP

6/13/2023	through	6/19/2023		
Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
Stoneco	1600	9.53	2.69	54.2

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

37.3

Contractor:

MDOT No.:



<---- Verify this number is 100%

CUPERIOR	
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
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.7	100.0	100.0	99.8	0.2	0.2
3/4"	83.0	100.0	100.0	90.8	9.1	9.2
1/2"	45.0	99.6	100.0	70.1	20.6	29.9
3/8"	22.1	88.0	100.0	56.9	13.2	43.1
#4	2.9	12.5	99.6	41.2	15.7	58.8
#8	1.4	3.7	86.8	34.8	6.4	65.2
#16	1.1	2.7	69.4	27.8	7.0	72.2
#30	1.0	2.3	50.0	20.2	7.6	79.8
#50	1.0	2.2	24.9	10.4	9.8	89.6
#100	1.0	2.1	7.0	3.4	7.0	96.6
LBW	0.9	1.9	1.5	1.2	2.2	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.

61

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

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

Coars	eness Factor:	66	Workability Factor: 35			
45 ]	45, 44			JMF Zone	$\overline{\mathbb{n}}$	
40 (%)		52, 41 <b></b>	68, 38 Production	75, 39 Gradation		
Workability Factor (%)	45, 33	52, 34	• 60₁β§			
<b>Workab</b>	Operating Zone Boundary	]	<b>31 67</b> , <b>89</b> , 31	75, 28		
40	0 45	50 55	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"	89.1	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:

**Production Gradation** 

6/12/23 Concrete Grade: DM, 4500HP

Dates Test F	Donroconto:	6/13/2023	through	6/19/2023		
Dates Test F	represents.	0/13/2023	unougn	0/19/2023		
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	150	0.92	2.62	5.2
2NS	63-92	Grange Hall	1150	6.95	2.65	39.6

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

38.1



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	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	98.6	1.4	1.4
3/4"	83.2	100.0	100.0	90.7	7.8	9.3
1/2"	43.4	96.2	100.0	68.5	22.2	31.5
3/8"	26.6	88.5	100.0	58.9	9.7	41.1
#4	4.6	20.9	98.0	42.4	16.4	57.6
#8	2.2	5.4	86.1	35.6	6.8	64.4
#16	2.0	2.5	69.9	28.9	6.7	71.1
#30	1.8	1.9	45.8	19.2	9.7	80.8
#50	1.8	1.7	18.3	8.3	10.9	91.7
#100	1.7	1.4	3.5	2.4	5.9	97.6
LBW	1.4	1.2	0.6	1.1	1.3	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.

Coarse	ness Factor:	64	Workability Factor:	36	
Workability Factor (%)	45, 44  45, 33  Operating Zone Boundary	52, 4	58, 39 Production 68, 38 68, 38 Froduction 60, 36 PS 68, 31 68, 31	75, 39	
25 + 40	45	50	55 Coarseness Factor (%)	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"	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** 

6/12/23 Concrete Grade: DM, 4500HP

Dates Test Represents:		6/13/2023	through	6/19/2023		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	200	1.19	2.69	6.8
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
			00.50	-		4000

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

37.3



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

l otal 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"	99.7	100	0.0	100.0	99.8	0.2	0.2
3/4"	83.0	100	0.0	100.0	90.8	9.1	9.2
1/2"	45.0	99	.6	100.0	70.1	20.6	29.9
3/8"	22.1	88	.0	100.0	56.9	13.2	43.1
#4	2.9	12	.5	99.6	41.2	15.7	58.8
#8	1.4	3.	7	86.8	34.8	6.4	65.2
#16	1.1	2.	7	69.4	27.8	7.0	72.2
#30	1.0	2.	3	50.0	20.2	7.6	79.8
#50	1.0	2.	2	24.9	10.4	9.8	89.6
#100	1.0	2.	1	7.0	3.4	7.0	96.6
LBW	0.9	1.	9	1.5	1.2	2.2	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.

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:	66	Workability Factor:	35	
45 45, 44			JMF Zone	
% <sup>40</sup>	52, 41	5, 40 68, 38 Production Gra	75, 39	
25 35	52, 34	■ 60,13€	adation	
%) 35 45, 33 Operating Zone Boundary	56	67, <b>62</b> ( 31	75.00	
25 40 45	50 5	55 _ 60 _6570	75, 28 	80
ActionLimits Boundary =		<sup>65</sup> Coarseness Factor (%) <sup>70</sup>	-	

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"	89.1	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:

**Production Gradation** 

6/12/23 Concrete Grade: DM, 4500HP

Dates Test Represents:		6/13/2023	through	6/19/2023		
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	250	1.53	2.62	8.6
2NS	44-051	Krake Willis Rd	1100	6.65	2.65	37.9

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

35.4



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	4	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"	97.8	100	.0	100.0	98.8	1.2	1.2
3/4"	79.8	100	.0	100.0	89.2	9.6	10.8
1/2"	41.1	97.	0	100.0	68.2	21.0	31.8
3/8"	25.0	87.	0	100.0	58.7	9.5	41.3
#4	5.8	22.	2	95.7	41.3	17.5	58.7
#8	2.6	5.9	)	81.9	32.9	8.3	67.1
#16	2.2	3.3	3	66.9	26.8	6.1	73.2
#30	2.0	2.8	3	50.2	20.3	6.5	79.7
#50	2.0	2.6	6	25.0	10.8	9.6	89.2
#100	1.9	2.4	1	7.5	4.1	6.7	95.9
LBW	1.6	2.2	2	1.3	1.5	2.5	98.5

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:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 68, 38 68, 38 68, 38 68, 38 68, 32 68, 32	75, 39 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"	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

PLANT #:

Sample Date:

**Production Gradation** 

Concrete Grade: DM, 4500HP

A Olasa	D:4.#	0	Mainht (con)	e.3	Specific	%
Dates Test I	Represents:	6/13/2023	through	6/19/2023		

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1655	10.12	2.62	57.0
26A	71-47	Presque Isle	100	0.61	2.62	3.4
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

Contractor:

MDOT No.:



--- Verify this number is 100%

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

36.0

Retained	Cumulative % Retained	
	% Retained	

30701 W. 10 Mile Rd. Suite 500

**Superior Materials, LLC** 

Farmington Hills, MI 48336

				10010	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"	97.4	100.0	100.0	98.5	1.5	1.5
3/4"	83.2	100.0	100.0	90.4	8.1	9.6
1/2"	43.4	96.2	100.0	67.6	22.8	32.4
3/8"	26.6	88.5	100.0	57.8	9.8	42.2
#4	4.6	20.9	96.7	41.6	16.2	58.4
#8	2.2	5.4	80.9	33.5	8.2	66.5
#16	2.0	2.5	65.6	27.2	6.3	72.8
#30	1.8	1.9	49.9	20.8	6.3	79.2
#50	1.8	1.7	26.3	11.5	9.3	88.5
#100	1.7	1.4	5.0	3.0	8.5	97.0
I BW	1 4	1.2	0.6	11	1.9	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.

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:	63	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 38 68, 38 Production Gradat IPS 68, 331	75, 28	
40 45  ActionLimits Boundary =	50 5	Coarseness Factor (%)	75	80

O 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