Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-101 Contractor:

Sample Date: Concrete Grade: DM, 4500HP 8/15/22 Dates Test Represents: 8/16/2022 8/22/2022 MDOT No.: through

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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

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

	TOTAL WIL	2910 17.09		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"	98.0	100.0	100.0	99.0	1.0	1.0
3/4"	87.4	100.0	100.0	93.7	5.3	6.3
1/2"	41.8	98.7	100.0	70.7	23.0	29.3
3/8"	21.0	87.9	100.0	59.1	11.5	40.9
#4	2.9	22.1	99.0	42.9	16.3	57.1
#8	1.9	5.2	85.3	35.2	7.7	64.8 r
#16	1.6	2.9	70.1	28.8	6.4	71.2
#30	1.5	2.4	53.2	22.0	6.8	78.0 r
#50	1.4	2.1	26.3	11.3	10.7	88.7
#100	1.3	1.9	6.8	3.5	7.8	96.5 a
LBW	1.2	1.7	1.0	1.2	2.4	98.8
Production Grada	ation Batch Plant Grada	tions Aggregate Supplier Gra	adations	Adjusted WF	Initial Producti	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.

62

*% 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 Gra	dations Aggregate Supplier Gradatio	ns	Adjusted WF	Initial Product	tion Sample (IPS	S)	
Coarseness Factor: 63		Workability Factor: 35		37.7	Coarseness Factor:		:	
45 -					Worl	cability Factor:		
45, 44			JMF Zone	$\neg \mid \blacksquare$	Sieve	Cumulative		
1 1			JIVII Zone	-	Sieve	% Passing	F	
1 10	52, 41			- 11	2"	100.0		
3 3 4 3 4 4 3 4 4 4 4 4 4 4 4 4 4		57, 39 68, 38	75, 39	- 11	1.5"	100.0		
		Production Gradation	ı	- 11	1"	100.0		
		■ 60, 3 _B S		- 11	3/4"	95.0		
35]		i iPS		- 11	1/2"	70.5		
	52, 34	-! :		- 11	3/8"	60.0		
Operating Zone Boundary				- 11	#4	44.4		
5 30 		67 ₆ 3 ,1 ₃₁		- 11	#8	35.5		
Operating Zone				- 11	#16	28.5		
Boundary			75, 28	- 11	#30	21.5		
≥ 25					#50	10.2		
40 45	50 5	55 60 65 70	75	80	#100	3.1		
		Coarseness Factor (%)	. 0	•	LBW	1.3		
ActionLimits Boundary =								

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

Sample Date:

Production Gradation

8/15/22 Concrete Grade: **DM**, **4500HP**

Dates Test Represents:		8/16/2022	through	8/22/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	13.6
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68		100.0

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.2

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MATERIALS

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	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"	81.1	100.0		100.0	91.0	9.0	9.0
1/2"	43.7	99.6		100.0	73.2	17.8	26.8
3/8"	20.1	86.4		100.0	60.2	13.0	39.8
#4	3.8	23	3.1	99.3	43.6	16.6	56.4
#8	1.8	6	.7	84.5	34.7	8.9	65.3
#16	1.2	3	.5	68.5	27.7	7.0	72.3
#30	1.0	2.6		50.6	20.6	7.2	79.4
#50	0.9	2.3		26.2	11.0	9.6	89.0
#100	0.8	2.2		7.6	3.6	7.3	96.4
LBW	1.0	2	.0	1.4	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.

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

Coarse	ness Factor:	61	Workability Factor:	35	
Workability Factor (%) 20 30 30 30 30	45, 44 45, 33 Operating Zone Boundary	52, 34	Production Gradation 68, 38 Production Gradation 60, 38 67, 32 67, 32 31	75, 39	
25 + 40 ActionLimit	45 ts Boundary =	50 5	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

PREPARED BY: SM, LLC Technical Service Approved By

Sample Date:

8/15/22 Concrete Grade: DM, 4500HP

Dates Test Represents:		8/16/2022	through	8/22/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	13.6
2NS	81-019	Pleasant Lake		6.95	2.65	39.0
		T	5	1		4000

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.2

Contractor:



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	i otai 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"	81.1	100	0.0	100.0	91.0	9.0	9.0	
1/2"	43.7	99	.6	100.0	73.2	17.8	26.8	
3/8"	20.1	86.4		100.0	60.2	13.0	39.8	
#4	3.8	23.1		99.3	43.6	16.6	56.4	
#8	1.8	6.	7	84.5	34.7	8.9	65.3	n
#16	1.2	3.	5	68.5	27.7	7.0	72.3	
#30	1.0	2.	6	50.6	20.6	7.2	79.4	n
#50	0.9	2.	3	26.2	11.0	9.6	89.0	
#100	0.8	2.2		7.6	3.6	7.3	96.4	а
LBW	1.0	2.	0	1.4	1.3	2.3	98.7	
Production C	Gradation O Batch Plant Grad	dations	regate Supplier G	radations	Adjusted WF	Intial Production	on Sample (IPS	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.

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:	61	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Production Gradation 60] 8	75, 39 75, 28	
25	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"	89.2	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:

PLANT #: P-14 Contractor:

Sample Date: 8/15/22 Concrete Grade: DM, 4500HP Dates Test Represents: 8/16/2022 8/22/2022 through

Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1460	8.70	2.69	49.3
26A	58-003	Stoneco	400	2.38	2.69	13.5
2NS	19-55	Schlegel	1100	6.60	2.67	37.2
		Total Wt	2960	17.68		100.0

MDOT No.:

- Verify this number is 100%

Builders Redi-Mix

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Farmington Hills, MI 48336

	TOTAL VVI	2900	17.00		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"	81.1	100	0.0	100.0	90.7	9.3	9.3
1/2"	43.7	99	.6	100.0	72.2	18.5	27.8
3/8"	20.1	86	.4	100.0	58.8	13.4	41.2
#4	3.8	23	.1	99.9	42.1	16.6	57.9
#8	1.8	6.	7	89.3	35.0	7.1	65.0
#16	1.2	3.	5	67.3	26.1	8.9	73.9
#30	1.0	2.	6	45.8	17.9	8.2	82.1
#50	0.9	2.	3	17.0	7.1	10.8	92.9
#100	0.8	2.	2	2.8	1.7	5.3	98.3
LBW	1.0	2.	0	0.5	0.9	0.8	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	O Batch Plant Gra	adations Aggregate Supplier Gradations	Adjusted WF	Intial Product	ion Sample (IPS)
Coarseness Factor:	ss Factor: 63 Workability Factor: 35 37.5		Coars	seness Factor:	
45				Worl	cability Factor:
45, 44		JMF Z	one	Sieve	Cumulative % Passing
	52, 41	57, 40 68, 40	- 11	2"	100.0
(a) 40 f		75	, 39	1.5"	100.0
Factor (%)		68, 38 Production Gradation		1"	99.3
o		■ 60, 36PS		3/4"	89.0
💆 35 -		- 50, 501 5	- 11	1/2"	70.3
1 1 /	52, 34		- 11	3/8"	59.9
About April 1975				#4	41.9
5 30		57, 32 68, 31	- 11	#8	35.9
Operating Zone				#16	27.8
o Boundary		75	, 28	#30	18.9
				#50	6.3
25 1 15				#100	1.7
40 45	50 55	Coarseness Factor (%)	80	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

8/15/22

PLANT #: P-12

Sample Date:

Concrete Grade: DM, 4500HP

Contractor:

Dates Test F	Represents:	8/16/2022	through	8/22/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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

MDOT No.:

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Total Wt		2905	17.69		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	26A		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"	94.8	10	0.0	100.0	97.3	2.7	2.7
3/4"	71.3	10	100.0		85.1	12.2	14.9
1/2"	33.8	96	6.8	100.0	65.4	19.7	34.6
3/8"	16.5	86	6.1	100.0	55.5	9.9	44.5
#4	3.9	27	7.7	96.1	42.4	13.1	57.6
#8	2.6	8	.2	77.4	32.7	9.8	67.3
#16	2.1	3	.8	61.3	25.7	7.0	74.3
#30	1.8	2	2.8		19.5	6.2	80.5
#50	1.7	2.5		26.8	11.7	7.8	88.3
#100	1.5	2.3		7.6	4.0	7.7	96.0
LBW	1.2	1	.9	1.1	1.2	2.8	98.8

*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	adations Aggregate Supplier Gradations	Adjusted WF	Intial Producti	on Sample (IPS)
Coarseness Factor: 66	Workability Factor: 33	35.2	Coars	eness Factor:
7 45		$\neg \top$	Work	ability Factor:
45, 44	JMF Zone	$\neg \vdash \vdash$	Sieve	Cumulative
52, 41	3/11/20/10	-	Sieve	% Passing
40]	57, 40 68, 40	- 11	2"	100.0
@	68, 38	- 11	1.5"	100.0
		- 11	1"	99.3
9	■ 60, 36PS	- 11	3/4"	89.0
Factor (%)	Preduction Gradation	- 11	1/2"	70.3
52, 54	<u> </u>	- 11	3/8"	59.9
Morkapility Operating Zone Boundary	17-22 17-22	- 11	#4	41.9
2 30	37, 32 68 , 32	- 11	#8	35.9
Operating Zone		- 11	#16	27.8
Boundary	75, 28	- 11	#30	18.9
> 25			#50	6.3
	5 _ 60 _6570 75	80	#100	1.7
	5 Coarseness Factor (%)		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

Sample Date:

Production Gradation

8/15/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	8/16/2022	through	8/22/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
644	71-//7	Procauo Ielo	1555	0.51	2.62	53.5

Adjusted WF Intial Production Sample (IPS)

36.9

Coarseness Factor:

Contractor:

MDOT No.:

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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%

	<u> </u>	
SUPE	RIOR	

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

	Total Wt 2905 17.09 100.0 < Verify this nur		uniber 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"	97.6	100.0	100.0	98.7	1.3	1.3
3/4"	85.4	100.0	100.0	92.2	6.5	7.8
1/2"	49.9	96.8	100.0	73.0	19.2	27.0
3/8"	28.7	86.1	100.0	60.9	12.1	39.1
#4	6.1	27.7	95.5	43.0	17.9	57.0
#8	2.4	8.2	82.3	34.4	8.5	65.6
#16	1.9	3.8	67.1	27.8	6.6	72.2
#30	1.8	2.8	48.8	20.5	7.4	79.5
#50	1.8	2.5	24.7	10.9	9.6	89.1
#100	1.7	2.3	8.0	4.2	6.7	95.8
LBW	1.5	1.9	1.4	1.5	2.7	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:	60	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	66, 40 67, 40 68, 38 68	75, 28	
25 40 45 ActionLimits Boundary =	50 5	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"	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:

Production Gradation

8/15/22 Concrete Grade: DM, 4500HP 8/22/2022

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.2

Dates Test F	Represents:	8/16/2022	through	8/22/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	13.6
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%

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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	81.1	100.0	100.0	91.0	9.0	9.0
1/2"	43.7	99.6	100.0	73.2	17.8	26.8
3/8"	20.1	86.4	100.0	60.2	13.0	39.8
#4	3.8	23.1	99.3	43.6	16.6	56.4
#8	1.8	6.7	84.5	34.7	8.9	65.3
#16	1.2	3.5	68.5	27.7	7.0	72.3
#30	1.0	2.6	50.6	20.6	7.2	79.4
#50	0.9	2.3	26.2	11.0	9.6	89.0
#100	0.8	2.2	7.6	3.6	7.3	96.4
LBW	1.0	2.0	1.4	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.

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:	61	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 56, 52, 34	68, 38 ■ Production Gladation ■ 60 ₁ β§	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:

Production Gradation

8/15/22

Batch Plant Gradations

Contractor:

Concrete Grade: DM, 4500HP

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.1

Dates Test F	Represents:	8/16/2022	through	8/22/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	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	63-92	Grange Hall	1100	6.65	2.65	37.9
		Total Wt	2005	17.60		100.0

SUPERI	OR

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

Farmington Hills, MI 48336

	i otai vyt	l otal wt 2905 17.69 100.0 Verify this nu		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"	94.8	100	0.0	100.0	97.3	2.7	2.7
3/4"	71.3	100	0.0	100.0	85.1	12.2	14.9
1/2"	33.8	96	.8	100.0	65.4	19.8	34.6
3/8"	16.5	86	.1	100.0	55.3	10.1	44.7
#4	3.9	27	.7	97.0	41.6	13.7	58.4
#8	2.6	8.	2	80.2	32.6	9.0	67.4
#16	2.1	3.	8	63.8	25.6	6.9	74.4
#30	1.8	2.	8	44.6	18.1	7.5	81.9
#50	1.7	2.	5	19.0	8.3	9.8	91.7
#100	1.5	2.	3	3.2	2.2	6.1	97.8
LBW	1.2	1.	9	0.7	1.1	1.1	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.

63

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

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

Coa	rseness Factor:	66	Workability Factor:	33	
45	45, 44	52, 41		JMF Zone	
Workability Factor (%)		52, 34	58, 39 68, 38 68, 38 Freduction G	75, 39	
Workability	45, 33 Operating Zone Boundary		58, 31 68,331	75, 28	
	40 45 Limits Boundary =	50	55 Coarseness Factor (%) ⁷⁰	75	80

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:

Production Gradation

8/15/22 Concrete Grade: DM, 4500HP

8/22/2022

Dates Test F	Represents:	8/16/2022	through	8/22/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	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

MDOT No.:

---- Verify this number is 100%

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

34.7

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"	98.0	100.0	100.0	98.9	1.1	1.1	ĺ
3/4"	87.4	100.0	100.0	93.0	5.9	7.0	ĺ
1/2"	41.8	98.7	100.0	67.8	25.3	32.2	ĺ
3/8"	21.0	87.9	100.0	55.5	12.2	44.5	ĺ
#4	2.9	22.1	96.7	39.7	15.8	60.3	ĺ
#8	1.9	5.2	81.3	32.2	7.5	67.8	n
#16	1.6	2.9	67.2	26.5	5.7	73.5	ĺ
#30	1.5	2.4	50.9	20.3	6.3	79.7	n
#50	1.4	2.1	24.9	10.3	9.9	89.7	ĺ
#100	1.3	1.9	7.3	3.6	6.7	96.4	а
I RW	1.2	17	1.2	1.2	2.4	98.8	i

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 Fa	actor: 66	Workability Factor:	32	
45 45, 44 45, 44 45, 33 Operation Bould Bo		58, 40 68, 38 68, 38 Production C		
N Operation Boundary	ing Zone ndary		75, 28	
40 4	45 50 55 y =	Coarseness Factor (%) ⁷⁰	75	80

Batch Plant Gradations

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"	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

8/15/22 Concrete Grade: DM, 4500HP

8/22/2022 through

Dates Test F	Represents:	8/16/2022	through	8/22/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.2

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 W	t 2905	17.69		100.0	< Verify this n	umbor ic 100%
	TOTAL W	2303	17.09		100.0	< verily this h	uniber 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"	94.8	10	0.0	100.0	97.3	2.7	2.7
3/4"	71.3	10	0.0	100.0	85.1	12.2	14.9
1/2"	33.8	96	6.8	100.0	65.4	19.7	34.6
3/8"	16.5	86	3.1	100.0	55.5	9.9	44.5
#4	3.9	27	7.7	96.1	42.4	13.1	57.6
#8	2.6	8	.2	77.4	32.7	9.8	67.3
#16	2.1	3	.8	61.3	25.7	7.0	74.3
#30	1.8	2	.8	46.2	19.5	6.2	80.5
#50	1.7	2	.5	26.8	11.7	7.8	88.3
#100	1.5	2	.3	7.6	4.0	7.7	96.0
LBW	1.2	1	.9	1.1	1.2	2.8	98.8

Aggregate SupplierGradations

Coarseness Factor: Workability Factor: 33 66 45 JMF Zone 45, 44 52, 41 Workability Factor (%) IPS Production Gradation 52, 34 Operating Zone Boundary 75, 28 25 Coarseness Factor (%)⁷⁰ 45 50 55 75 80 ActionLimits Boundary = - - -

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

PREPARED BY: SM, LLC Technical Service Approved By: