Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-101 Contractor:

Concrete Grade: DM, 4500HP Sample Date: 6/5/23 Dates Test Represents: 6/6/2023 6/12/2023 through

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

--- Verify this number is 100%

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	1
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	1
1"	95.6	100.0	100.0	97.7	2.3	2.3	1
3/4"	79.1	100.0	100.0	89.2	8.5	10.8	1
1/2"	43.0	97.1	100.0	70.3	18.9	29.7	1
3/8"	28.2	86.8	100.0	61.7	8.5	38.3	١,
#4	6.2	21.9	96.8	43.5	18.2	56.5	١,
#8	2.5	6.0	83.9	35.1	8.4	64.9	no
#16	2.0	3.2	69.8	29.0	6.1	71.0	١,
#30	1.9	2.6	53.0	22.2	6.8	77.8	no
#50	1.8	2.4	23.7	10.5	11.7	89.5	١,
#100	1.8	2.3	4.6	3.0	7.6	97.0	а
LBW	1.6	2.1	0.7	1.3	1.7	98.7]
Production G	radation O Batch Plant Grada	tions Aggregate Supplier Gra	dations	Adjusted WF	Initial Producti	on Sample (IP	- S)

*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.

i loddciion Gradation		© 1991-94-1		Aujusteu
Coarseness Factor:	59	Workability Factor:	35	37.6
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Production Gradation 60, 36s	75, 28	
40 45 ActionLimits Boundary =	50 5	5 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"	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

Production Gradation

Sample Date: 6/5/23 Concrete Grade: DM, 4500HP

MDOT No.:	

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.1

Dates Test Represents: 6/6/2023 6/12/2023 through Specific % ft³ Agg. Class Pit# Source Weight (SSD) 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

<---- 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"	98.9	100.0	100.0	99.4	0.6	0.6
3/4"	80.0	100.0	100.0	89.2	10.3	10.8
1/2"	48.7	99.6	100.0	72.1	17.0	27.9
3/8"	21.8	85.4	100.0	56.6	15.6	43.4
#4	7.4	10.2	99.2	43.4	13.2	56.6
#8	1.4	1.6	86.6	34.6	8.7	65.4
#16	0.9	1.2	70.9	28.2	6.4	71.8
#30	0.7	1.1	52.3	20.8	7.4	79.2
#50	0.6	1.0	27.2	11.0	9.8	89.0
#100	0.5	1.0	8.1	3.5	7.5	96.5
LBW	0.3	1.0	1.3	0.7	2.8	99.3

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.

45 45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	40 67 40 68, 38 Production G	75, 39 Gradation	
40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	80

Batch Plant Gradations

Work	Workability Factor:		
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

Pleasant Lake

PLANT #: P-103

81-019

Sample Date:

2NS

Production Gradation

Concrete Grade: DM, 4500HP 6/5/23

ates Test F	Represents:	6/6/2023	through	6/12/2023		
\gg. Class	Pit #	Source	Weight (SSD)	ft ³	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

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

Contractor:

Superior Materials, L	<u>LC</u>
30701 W. 10 Mile Rd.	
Suite 500	
Farmington Hills, MI 483	336

	Total 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"	98.9	100	0.0	100.0	99.4	0.6	0.6
3/4"	80.0	100	0.0	100.0	89.2	10.3	10.8
1/2"	48.7	99.	.6	100.0	72.1	17.0	27.9
3/8"	21.8	85.	.4	100.0	56.6	15.6	43.4
#4	7.4	10.	.2	99.2	43.4	13.2	56.6
#8	1.4	1.0	6	86.6	34.6	8.7	65.4
#16	0.9	1.3	2	70.9	28.2	6.4	71.8
#30	0.7	1.1	1	52.3	20.8	7.4	79.2
#50	0.6	1.0	0	27.2	11.0	9.8	89.0
#100	0.5	1.0	0	8.1	3.5	7.5	96.5
LBW	0.3	1.0	0	1.3	0.7	2.8	99.3
Production Grad	dation O Batch Plant Gradat	tions Aggr	egate Supplier Gr	adations	Adjusted WF	Intial Production	on Sample (IPS

2.65

39.0

37.1

*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.

Coarseness Factor:	66	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Production 67, 32 67, 32 67, 32 32	JMF Zone 75, 39	
25 40 45 ActionLimits Boundary =	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

61

PREPARED BY: SM, LLC Technical Service Approved BY:

PLANT #: Contractor:

Sample Date: 6/5/23 Concrete Grade: DM, 4500HP Dates Test Represents: 6/6/2023 6/12/2023 through

				0, 12,200		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.9



Builders Redi-Mix

30701 W. 10 Mile Rd. Suite 500

Farmington Hills, MI 48336

	10tal Wt 2960 17.68			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"	98.9	100.0	100.0	99.4	0.6	0.6
3/4"	80.0	100.0	100.0	89.2	10.2	10.8
1/2"	48.7	99.6	100.0	72.2	17.0	27.8
3/8"	21.8	85.4	100.0	56.4	15.8	43.6
#4	7.4	10.2	99.9	42.0	14.4	58.0
#8	1.4	1.6	90.1	34.4	7.6	65.6 r
#16	0.9	1.2	69.4	26.4	8.0	73.6
#30	0.7	1.1	44.5	17.0	9.4	83.0 r
#50	0.6	1.0	14.3	5.7	11.3	94.3
#100	0.5	1.0	2.7	1.4	4.4	98.6
LBW	0.3	1.0	0.2	0.3	1.0	99.7

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:	66	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	68, 40 68, 38 60, 3GPS Production G 68, 32 68, 32	75, 39 radation	
40 45 ActionLimits Boundary =	50 5	Coarseness Factor (%)	75	80

Batch Plant Gradations

Production Gradation

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

6/5/23

PLANT #: **12**

Sample Date:

Concrete Grade: DM, 4500HP

Contractor:

Dates Test Represents: 6/6/2023 6/12/2023 through

MDOT No.:

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

---- Verify this number is 100%

SUPERIOR

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

Total Wt		2505	17.00		C Verily 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"	96.9	100.0	100.0	98.4	1.6	1.6
3/4"	83.5	100.0	100.0	91.5	6.9	8.5
1/2"	41.2	97.5	100.0	69.4	22.1	30.6
3/8"	25.7	89.2	100.0	60.7	8.7	39.3
#4	4.3	19.3	96.7	42.2	18.5	57.8
#8	2.0	4.1	80.3	33.2	9.0	66.8
#16	1.8	1.7	64.5	26.6	6.6	73.4
#30	1.7	1.3	48.4	20.2	6.5	79.8
#50	1.7	1.2	24.9	10.8	9.3	89.2
#100	1.7	1.1	4.4	2.7	8.1	97.3
LBW	1.4	1.0	0.6	1.0	1.7	99.0

*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	ons	Adjusted WF	Intial Producti	on Sample (IPS)
Coarseness Factor: 59	Workability Factor: 33	35.7	Coars	eness Factor:	
7 45		\neg \top	Work	ability Factor:	
45, 44	JMF Zone	7 I I	Sieve	Cumulative	
52, 41			Sieve	% Passing	ı
40]		- 11	2"	100.0	
	68, 38	- 11	1.5"	100.0	
	!	- 11	1"	99.3	
Q	■ Pro60cf6P@radation	- 11	3/4"	89.0	
Factor (%)		- 11	1/2"	70.3	
	<u> </u>	- 11	3/8"	59.9	
Applied Applie	22	- 11	#4	41.9	
30 -	68, 32 68, 31	- 11	#8	35.9	
Operating Zone		- 11	#16	27.8	1
Boundary	75, 28	- 11	#30	18.9	Ī
> 1 25			#50	6.3	1
	60 65 70 75	80	#100	1.7	
	Coarseness Factor (%) ⁷⁰ 75		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 #: p11

Sample Date:

#100

LBW

2.1

1.8

Dates Test Represents:

Concrete Grade: DM, 4500HP 6/5/23

6/6/2023 6/12/2023 through

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	150	0.92	2.62	5.2
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

96.0

98.4

MDOT No.:

6.7

2.4

Contractor:

---- Verify this number is 100%

SUPERIO	OR L S

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"	98.5	100.0	100.0	99.2	0.8	0.8
3/4"	84.6	100.0	100.0	91.5	7.7	8.5
1/2"	49.1	97.5	100.0	71.7	19.7	28.3
3/8"	30.3	89.2	100.0	60.9	10.8	39.1
#4	5.4	19.3	96.5	42.2	18.8	57.8
#8	2.8	4.1	84.4	35.2	7.0	64.8
#16	2.4	1.7	69.2	28.8	6.4	71.2
#30	2.3	1.3	49.3	20.9	8.0	79.1
#50	2.3	1.2	23.7	10.7	10.1	89.3

7.0

1.4

4.0

1.6

1.1

1.0

*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	djusted WF	Intial Production	on Sample (IPS)
Coarseness Factor: 60 Workability Factor: 35	37.7	Coars	eness Factor:	
45		Work	ability Factor:	
JMF Zone		Sieve	Cumulative	
52.41		Sieve	% Passing	
67, 40		2"	100.0	
68, 38		1.5"	100.0	
Production Gradation		1"	100.0	L
♀ ■ 60,388S		3/4"	95.0	
50 35		1/2"	72.3	L
		3/8"	60.4	
45, 33 Operating Zone Boundary 75, 28		#4	42.6	L
30 -		#8	36.0	
Operating Zone		#16	29.5	ĺ
9 Boundary 75, 28		#30	20.3	
25 1		#50	9.5	
	o I	#100	3.4	Ĺ
40 45 50 55 Coarseness Factor (%) ⁷⁰ 75 8		LBW	1.3	
ActionLimits Boundary =				

Work	ability Factor:	36	
Sieve	Sieve Cumulative % Passing		Cumulative % Retained
2"	100.0	Retained 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

LBW

Production Gradation

6/5/23 Concrete Grade: DM, 4500HP

Sample Date: Dates Test Represents: 6/6/2023 6/12/2023 through

Jaics Tost I	тергезепта.	0/0/2020	unougn	0/12/2020		
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	150	0.92	2.62	5.2
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

1.0

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

---- 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	ı
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	ı
1"	98.5	100.0	100.0	99.2	0.8	0.8	ı
3/4"	84.6	100.0	100.0	91.5	7.7	8.5	ı
1/2"	49.1	97.5	100.0	71.7	19.7	28.3	ı
3/8"	30.3	89.2	100.0	60.9	10.8	39.1	ı
#4	5.4	19.3	96.5	42.2	18.8	57.8	ı
#8	2.8	4.1	84.4	35.2	7.0	64.8	n
#16	2.4	1.7	69.2	28.8	6.4	71.2	ı
#30	2.3	1.3	49.3	20.9	8.0	79.1	n
#50	2.3	1.2	23.7	10.7	10.1	89.3	ı
#100	2.1	1.1	7.0	4.0	6.7	96.0	a

Aggregate Supplier Gradations

1.4

1.6

37.7

*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.

Coarseness Factor:	60	Workability Factor:	35	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Production Gradelion 60, 38S 68, 38 68, 38 68, 38	75, 39	
25 40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%) ⁷⁰	75	80

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

PREPARED BY: SM, LLC Technical Service

1.8

Batch Plant Gradations

Sample Date:

Production Gradation

6/5/23 Concrete Grade: DM, 4500HP

ates Test Represents:		6/6/2023	through	6/12/2023		
gg. Class	Pit#	Source	Weight (SSD)	ft ³	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

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.1



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

	Total Wt	2950	17.68		100.0	< Verify this number 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"	98.9	100	0.0	100.0	99.4	0.6	0.6
3/4"	80.0	100	0.0	100.0	89.2	10.3	10.8
1/2"	48.7	99	.6	100.0	72.1	17.0	27.9
3/8"	21.8	85	.4	100.0	56.6	15.6	43.4
#4	7.4	10	.2	99.2	43.4	13.2	56.6
#8	1.4	1.0	6	86.6	34.6	8.7	65.4
#16	0.9	1.:	2	70.9	28.2	6.4	71.8
#30	0.7	1.	1	52.3	20.8	7.4	79.2
#50	0.6	1.0	0	27.2	11.0	9.8	89.0
#100	0.5	1.0	0	8.1	3.5	7.5	96.5
LBW	0.3	1.0	0	1.3	0.7	2.8	99.3

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	eness Factor:	66	Workability Factor:	35	
Workability Factor (%) 20 30 30 30 30 30 30 30 30 30	45, 44	52, 41 56,		JMF Zone 75, 39	
25 + 40	Operating Zone Boundary	56, 50 55		75, 28	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

6/5/23 Concrete Grade: DM, 4500HP

38.2

Dates Test Represents:		6/6/2023	through	6/12/2023		
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	150	0.92	2.62	5.2
2NS	63-92	Grange Hall	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:

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"	96.9	100.0	100.0	98.3	1.7	1.7
3/4"	83.5	100.0	100.0	90.9	7.4	9.1
1/2"	41.2	97.5	100.0	67.4	23.5	32.6
3/8"	25.7	89.2	100.0	58.4	9.0	41.6
#4	4.3	19.3	98.3	42.3	16.1	57.7
#8	2.0	4.1	86.8	35.7	6.6	64.3
#16	1.8	1.7	70.9	29.1	6.5	70.9
#30	1.7	1.3	47.2	19.7	9.5	80.3
#50	1.7	1.2	18.8	8.4	11.2	91.6
#100	1.7	1.1	3.2	2.3	6.2	97.7
LBW	1.4	1.0	0.7	1.1	1.2	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 Fa	ctor: 65	Workability Factor:	36	
45 45, 44 45, 44 45, 33 Operatin	52, 41 52, 34	58, 39 Production Grad 60, 36 IPS 68, 331	JMF Zone	
25 40 4 ActionLimits Boundary	5 50 5	⁵ Coarseness Factor (%)	75, 28	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

Concrete Grade: DM, 4500HP

6/5/23 Sample Date: Dates Test Represents: 6/6/2023 6/12/2023 through

Dates Test Nepresents.		0/0/2023	unougn	0/12/2023			
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	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	
		T-4-1 \A/4	2050	47.00		1000	

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.

61 36

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

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

Total Wt		2950	17.68		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"	98.9	10	0.0	100.0	99.4	0.6	0.6
3/4"	80.0	100.0		100.0	89.2	10.3	10.8
1/2"	48.7	99	9.6	100.0	72.1	17.0	27.9
3/8"	21.8	85	5.4	100.0	56.6	15.6	43.4
#4	7.4	10).2	99.2	43.4	13.2	56.6
#8	1.4	1	.6	86.6	34.6	8.7	65.4
#16	0.9	1	.2	70.9	28.2	6.4	71.8
#30	0.7	1.1		52.3	20.8	7.4	79.2
#50	0.6	1.0		27.2	11.0	9.8	89.0
#100	0.5	1.0		8.1	3.5	7.5	96.5
LBW	0.3	1	.0	1.3	0.7	2.8	99.3

75, 28

80

75

 Batch Plant Gradations Aggregate Supplier Gradations **Production Gradation** Adjusted WF Intial Production Sample (IPS) Coarseness Factor: **Workability Factor:** 35 37.1 66 45 JMF Zone 45, 44 Workability Factor (%) duction Gradatio

■ 60,₁36

Coarseness Factor (%) 70

Workability Factor: % 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" 29.5 70.5 18.6 3/8' 10.0 39.5 60.5 #4 44.1 55.9 16.4 #8 35.6 8.5 64.4 #16 27.7 7.9 72.3 20.6 79.4 #30 7.1 #50 91.3 8.7 11.8 #100 1.6 7.1 98.4 LBW 98.9

PREPARED BY: SM, LLC Technical Service

50

45, 33

25

Operating Zone

Boundary

45

ActionLimits Boundary = - - - - -

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP 6/5/23

6/12/2023

Dates Test Represents:		6/6/2023	through	6/12/2023		
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	250	1.53	2.62	8.6
2NS	44-051	Krake Willis Rd	1100	6.65	2.65	37.9
		Total Wt	2905	17.69		100.0

MDOT No.:

Contractor:

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	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"	95.6	100.0)	100.0	97.6	2.4	2.4
3/4"	79.1	100.0)	100.0	88.8	8.8	11.2
1/2"	43.0	97.1		100.0	69.2	19.6	30.8
3/8"	28.2	86.8	1	100.0	60.4	8.8	39.6
#4	6.2	21.9		95.7	41.4	19.0	58.6
#8	2.5	6.0		81.9	32.9	8.6	67.1
#16	2.0	3.2		66.9	26.7	6.2	73.3
#30	1.9	2.6		50.2	20.2	6.4	79.8
#50	1.8	2.4		25.0	10.6	9.6	89.4
#100	1.8	2.3		7.5	4.0	6.6	96.0
LBW	1.6	2.1		1.3	1.5	2.5	98.5
Production Gradatic	on O Batch Plant Grada	ations	gate 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.

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

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

Coarseness Factor:	59	Workability Factor:	33	
45 45, 44 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	56, 40 68, 38 Production & Sadation 58, 32	JMF Zone 75, 39	
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"	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

through

Weight (SSD)

1655

100

1150

2905

264

1.1

1.0

Aggregate SupplierGradations

6/6/2023

Source

Presque Isle

Presque Isle

Ray Rd

644

1.7

Total Wt

Batch Plant Gradations

PLANT #: P-02

Pit#

71-47

71-47

63-115

Sample Date:

Agg. Class

6AA

26A

2NS

#100

LBW

Production Gradation

Dates Test Represents:

6/5/23 Concrete Grade: DM, 4500HP

ft³

10.12

0.61

6.95

17.69

6/12/2023

Specific

Gravity

2.62

2.62

2.65

SINC

4.4

	M
%	
Contribution	
57.0	
3.4	

39.6

100.0

Cumulative

2.7

1.1

35.6

IDOT No.:

8.1

1.7

Adjusted WF Intial Production Sample (IPS)

Contractor:

----- Verify this number is 100%

Cumulative

97.3

98.9

Coarseness Factor:

SUPER	IOR

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

Sieve	6AA	26A	2NS	% Passing	% Retained	% Retained	ļ
2"	100.0	100.0	100.0	100.0	0.0	0.0	ı
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	ĺ
1"	96.9	100.0	100.0	98.2	1.8	1.8	ı
3/4"	83.5	100.0	100.0	90.6	7.6	9.4	ĺ
1/2"	41.2	97.5	100.0	66.4	24.2	33.6	ı
3/8"	25.7	89.2	100.0	57.3	9.1	42.7	,
#4	4.3	19.3	96.7	41.4	15.9	58.6	,
#8	2.0	4.1	80.3	33.1	8.3	66.9	no
#16	1.8	1.7	64.5	26.6	6.5	73.4	*
#30	1.7	1.3	48.4	20.2	6.4	79.8	no
#50	1.7	1.2	24.9	10.9	9.3	89.1	*

*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.

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:	64	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 39 68, 38 60, 36 Production Gradation	75, 39	
Boundary 40 45	50	55 60 65 70 Coarseness Factor (%)	75, 28 75	80
ActionLimits Boundary =		Coarseness Factor (%)		

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