Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-101 Contractor:

Sample Date: 11/7/22 Concrete Grade: DM, 4500HP

Dates Test Represents: 11/8/2022 through 11/14/2022 MDOT No.:

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

JI 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
1.5"	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"	82.9	100.0	100.0	91.4	7.9	8.6
1/2"	45.6	94.7	100.0	72.2	19.3	27.8
3/8"	23.3	79.7	100.0	59.4	12.7	40.6
#4	4.1	22.7	98.8	43.4	16.0	56.6
#8	2.1	8.6	84.7	35.4	8.0	64.6
#16	1.8	4.8	69.2	28.7	6.7	71.3
#30	1.7	3.9	50.9	21.4	7.4	78.6
#50	1.7	3.5	21.0	9.5	11.9	90.5
#100	1.7	3.2	4.5	3.0	6.6	97.0
LBW	1.5	2.8	0.6	1.3	1.7	98.7
Production G	radation O Batch Plant Gradat	tions Aggregate Supplier Gra	adations	Adjusted WF	Initial Producti	on Sample (IP

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

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

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

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

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Coarseness Factor:	63	Workability Factor:	35	37
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 Production Gradation 60, 36S 67, 31 67, 31	75, 28	
40 45 ActionLimits Boundary =	50	Coarseness Factor (%)	75	80

Work	ability Factor:	35	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	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

Approved By:

Sample Date:

Production Gradation

11/7/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	11/8/2022	through	11/14/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1650	9.83	2.69	55.9
26A	58-003	Stoneco	150	0.89	2.69	5.1
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

36.6

Coarseness Factor:

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

	Total Wt	t 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"	99.7	10	0.0	100.0	99.8	0.2	0.2
3/4"	83.8	10	0.0	100.0	90.9	8.9	9.1
1/2"	50.5	99	9.8	100.0	72.3	18.6	27.7
3/8"	28.7	88	3.7	100.0	59.5	12.8	40.5
#4	4.9	6	.0	98.1	41.3	18.3	58.7
#8	1.9	1	.3	84.5	34.1	7.2	65.9
#16	1.4	1	.0	68.0	27.3	6.7	72.7
#30	1.2	1	.0	49.2	19.9	7.4	80.1
#50	1.1	0	.8	25.7	10.7	9.2	89.3
#100	1.0	0	.8	7.2	3.4	7.3	96.6
LBW	0.8	0	.6	1.4	1.0	2.4	99.0

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: 61	Workability Factor:	34	
1 5 4 1 '	52, 34	68, 38 60, 20 60, 32 67, 32 67, 32, 31	75, 39	
25 +	45 50 5	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

61

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP 11/7/22 11/14/2022

MDOT	Nο	

Adjusted WF Intial Production Sample (IPS)

36.6

Coarseness Factor:

Contractor:

Dates Test F	Represents:	11/8/2022	through	11/14/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1650	9.83	2.69	55.9
26A	58-003	Stoneco	150	0.89	2.69	5.1
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68		100.0

---- 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"	99.7	100.0	100.0	99.8	0.2	0.2
3/4"	83.8	100.0	100.0	90.9	8.9	9.1
1/2"	50.5	99.8	100.0	72.3	18.6	27.7
3/8"	28.7	88.7	100.0	59.5	12.8	40.5
#4	4.9	6.0	98.1	41.3	18.3	58.7
#8	1.9	1.3	84.5	34.1	7.2	65.9
#16	1.4	1.0	68.0	27.3	6.7	72.7
#30	1.2	1.0	49.2	19.9	7.4	80.1
#50	1.1	0.8	25.7	10.7	9.2	89.3
#100	1.0	0.8	7.2	3.4	7.3	96.6
LBW	0.8	0.6	1.4	1.0	2.4	99.0

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:	61	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 68, 38 60) Production Gradation	75, 28	
40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%)	75	80

O 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:

Production Gradation

11/7/22 Concrete Grade: DM, 4500HP

11/1//2022

Dates Test F	Represents:	11/8/2022	through	11/14/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific	%
Agg. Class	FIL#	Source	weight (SSD)	IL	Gravity	Contribution
6AA	58-003	Stoneco	1710	10.19	2.69	57.8
26A	58-003	Stoneco	150	0.89	2.69	5.1
2NS	19-55	Schlegel	1100	6.60	2.67	37.2
		Total Wt	2960	17.68		100.0

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.4



Builders Redi-Mix

30701 W. 10 Mile Rd. Suite 500

Farmington Hills, MI 48336

,	Total Wt	2960	17.68		100.0	< Verify this n	umber is 100%	
Sieve	6AA	26	6 A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained	
2"	100.0	10	0.0	100.0	100.0	0.0	0.0	1
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0	1
1"	99.7	10	0.0	100.0	99.8	0.2	0.2	
3/4"	83.8	10	0.0	100.0	90.6	9.2	9.4	
1/2"	50.5	99	9.8	100.0	71.4	19.2	28.6	1
3/8"	28.7	88	3.7	100.0	58.2	13.2	41.8	*
#4	4.9	6	.0	100.0	40.3	17.9	59.7	*
#8	1.9	1.	.3	90.8	34.9	5.4	65.1	no
#16	1.4	1.	.0	71.2	27.3	7.6	72.7	*
#30	1.2	1.	.0	48.1	18.6	8.7	81.4	no
#50	1.1	0	.8	16.9	7.0	11.7	93.0	*
#100	1.0	0	.8	3.2	1.8	5.1	98.2	a 2
LBW	0.8	0.	.6	0.3	0.6	1.2	99.4	1

Aggregate Supplier Gradations

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

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

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

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

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

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

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

Coarseness Factor:	64	Workability Factor:	35	
45 45, 44 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	68, 40 68, 38 Production Grad 60, 36IPS	75, 39 75, 28	
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"	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

63

Sample Date:

Concrete Grade: DM, 4500HP 11/7/22

11/14/2022

MDOT No.:	

Contractor:

Dates Test Represents:		11/8/2022	through	11/14/2022		
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			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 III	2000 17.00		100.0	< Verily tills in	umber 13 10070
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	97.6	100.0	100.0	98.8	1.2	1.2
3/4"	83.3	100.0	100.0	91.3	7.4	8.7
1/2"	36.9	96.2	100.0	67.0	24.4	33.0
3/8"	16.2	86.5	100.0	55.4	11.6	44.6
#4	2.7	21.4	96.9	41.6	13.8	58.4
#8	1.8	5.6	80.4	33.2	8.4	66.8
#16	1.6	2.6	65.3	26.9	6.3	73.1
#30	1.6	2.1	50.6	21.0	5.9	79.0
#50	1.5	1.9	28.1	12.1	9.0	87.9
#100	1.5	1.8	6.1	3.3	8.7	96.7
LBW	1.2	1.7	0.7	1.0	2.3	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 O Batch	Plant Gradations	Supplier Gradations	Adjusted WF	Intial Production	on Sample (IPS)
Coarseness Factor: 6	7 Workabilit	y Factor: 33	35.7	Coars	eness Factor:
45			$\neg $	Work	ability Factor:
45, 44		JMF Zone	7	Sieve	Cumulative
52, 4			-	0.010	% Passing
40]	57, 40	68, 40		2"	100.0
[] []		68, 38		1.5"	100.0
 	!			1"	99.3
Q	■ 60, 36PS	■ Production Gradation		3/4"	89.0
52 , 34	↓ i			1/2"	70.3
	4	i I		3/8"	59.9
45, 33	17-27	 ., ,,		#4	41.9
<u>5</u> 30	01,0	68, 31 68, 31		#8	35.9
Operating Zone Boundary				#16	27.8
Boundary		75, 28		#30	18.9
25			」 Ⅰ	#50	6.3
40 45 50	55 60 65	70 75	80	#100	1.7
	Coarseness Fact	tor (%)		LBW	1.0
ActionLimits Boundary =					

Workability 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

63

PLANT #: 11 Contractor:

Concrete Grade: DM, 4500HP Sample Date: 11/7/22 Dates Test Represents: 11/8/2022 11/14/2022 MDOT No.: through

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1405	8.59	2.62	48.4
26A	71-47	Presque Isle	350	2.14	2.62	12.0
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0



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"	96.9	10	0.0	100.0	98.5	1.5	1.5
3/4"	81.8	10	0.0	100.0	91.2	7.3	8.8
1/2"	44.0	96	6.2	100.0	72.5	18.7	27.5
3/8"	22.1	86	6.5	100.0	60.7	11.8	39.3
#4	4.3	21	1.4	96.1	42.7	18.0	57.3
#8	2.2	5	.6	83.3	34.7	8.0	65.3 ı
#16	1.8	2	.6	68.4	28.3	6.5	71.7
#30	1.7	2	.1	49.6	20.7	7.6	79.3 ı
#50	1.6	1	.9	24.2	10.6	10.1	89.4
#100	1.5	1	.8	6.9	3.7	6.9	96.3
LBW	1.3	1	.7	1.3	1.3	2.3	98.7

*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.

*% 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	37.2	Coars	seness Factor:
45					Work	ability Factor:
45, 44	52, 41		JMF Zone] 	Sieve	Cumulative % Passing
_ 40 -	56.40	67, 40			2"	100.0
૾ ૺ૽	i	68, 38	75, 39		1.5"	100.0
	!	Production Gradation			1"	100.0
35 1		■ 60, 3MBS			3/4"	95.0
g 35 -	i	i l			1/2"	72.3
	52, 34	i			3/8"	60.4
45, 33	50.92	A7 32			#4	42.6
30 -	33, 32	67 _{68,31}			#8	36.0
Operating Zone	7				#16	29.5
30 - 45, 33 Operating Zone Boundary			75, 28		#30	20.3
25					#50	9.5
40 45	50 55	60 65 70	75	80	#100	3.4
ActionLimits Boundary =		Coarseness Factor (%) ⁷⁰	. 0	"	LBW	1.3

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"	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:

11/7/22

11/8/2022

Contractor:

Concrete Grade: DM, 4500HP 11/14/2022

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

37.2

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1405	8.59	2.62	48.4
26A	71-47	Presque Isle	350	2.14	2.62	12.0
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

through

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	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"	96.9	100	0.0	100.0	98.5	1.5	1.5
3/4"	81.8	100	0.0	100.0	91.2	7.3	8.8
1/2"	44.0	96	.2	100.0	72.5	18.7	27.5
3/8"	22.1	86	.5	100.0	60.7	11.8	39.3
#4	4.3	21	.4	96.1	42.7	18.0	57.3
#8	2.2	5.	6	83.3	34.7	8.0	65.3
#16	1.8	2.	6	68.4	28.3	6.5	71.7
#30	1.7	2.	1	49.6	20.7	7.6	79.3
#50	1.6	1.	9	24.2	10.6	10.1	89.4
#100	1.5	1.	8	6.9	3.7	6.9	96.3
LBW	1.3	1.	7	1.3	1.3	2.3	98.7
Production Gra	dation O Batch Plant Grada	tions Aggı	regate Supplier Gr	adations	Adjusted WF	Intial Production	on Sample (IPS

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

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

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

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

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

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 Gradation 68, 38 68, 38 768, 31	75, 28	
40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%) ⁷⁰	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

Stoneco

Pleasant Lake

Batch Plant Gradations

150

1150

PLANT #: P-35

Pit#

58-003

58-003

81-019

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

11/7/22 Concrete Grade: DM, 4500HP

11/8/2022 11/14/2022 through Specific ft³ Weight (SSD) Source Gravity Cor Stoneco 1650 9.83 2.69

0.89

6.95

2.69

2.65

	IVIL
%	
ntribution	
55.9	
5.1	

39.0

36.6

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:



Superior Materials, L	<u>LC</u>
30701 W. 10 Mile Rd.	
Suite 500	
Farmington Hills, MI 48	336

	Total Wt	2950 17.68		100.0	< Verify this no	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"	83.8	100.0	100.0	90.9	8.9	9.1
1/2"	50.5	99.8	100.0	72.3	18.6	27.7
3/8"	28.7	88.7	100.0	59.5	12.8	40.5
#4	4.9	6.0	98.1	41.3	18.3	58.7
#8	1.9	1.3	84.5	34.1	7.2	65.9 r
#16	1.4	1.0	68.0	27.3	6.7	72.7
#30	1.2	1.0	49.2	19.9	7.4	80.1 r
#50	1.1	0.8	25.7	10.7	9.2	89.3
#100	1.0	0.8	7.2	3.4	7.3	96.6
LBW	0.8	0.6	1.4	1.0	2.4	99.0

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:	61	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41 56 ; 52, 34 56 ;	68, 38 Production Gradation	75, 28	
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"	89.1	10.2	10.9
1/2"	70.5	18.6	29.5
3/8"	60.5	10.0	39.5
#4	44.1	16.4	55.9
#8	35.6	8.5	64.4
#16	27.7	7.9	72.3
#30	20.6	7.1	79.4
#50	8.7	11.8	91.3
#100	1.6	7.1	98.4
LBW	1.1	0.6	98.9

61

Presque Isle

Grange Hall

Batch Plant Gradations

305

1100

PLANT #: P-36

Pit#

71-47

71-47

63-92

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

11/7/22 Concrete Grade: DM, 4500HP

11/8/2022	through	11/14/2022		
Source	Weight (SSD)	ft ³	Specific	%
Source	weight (SSD)	It	Gravity	Contribution
Presque Isle	1500	9.17	2.62	51.6

1.87

6.65

2.62

2.65

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.6

Contractor:





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

	Total Wt	2905	17.69		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	100	0.0	100.0	100.0	0.0	0.0
1"	97.6	100	0.0	100.0	98.8	1.2	1.2
3/4"	83.3	100	0.0	100.0	91.4	7.4	8.6
1/2"	36.9	96	.2	100.0	67.0	24.4	33.0
3/8"	16.2	86	.5	100.0	55.3	11.7	44.7
#4	2.7	21	.4	97.5	40.6	14.8	59.4
#8	1.8	5.	6	83.4	33.1	7.5	66.9
#16	1.6	2.	6	69.4	27.4	5.7	72.6
#30	1.6	2.	1	51.5	20.5	6.8	79.5
#50	1.5	1.	9	22.1	9.3	11.2	90.7
#100	1.5	1.	8	4.1	2.5	6.8	97.5
LBW	1.2	1.	7	1.0	1.2	1.3	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:	67	Workability Factor:	33	
45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 60, 36 IPS Poduction G	75, 39 Gradation 75, 28	
40 45 ActionLimits Boundary =	50	Coarseness Factor (%)	75	80

Work	ability Factor:	35	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	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:

LBW

Production Gradation

11/7/22 Concrete Grade: DM, 4500HP

11/8/2022 11/14/2022 through

Dates Test F	Represents:	11/8/2022	through	11/14/2022		
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.:

2.0

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

1.2

Contractor:



---- Verify this number is 100%

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

Cumulative Cumulative 6AA 26A 2NS % Retained Sieve % Passing % 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 99.3 98.7 100.0 100.0 0.7 0.7 3/4" 82.9 100.0 100.0 90.6 8.7 9.4 30.4 1/2' 45.6 94.7 100.0 69.6 21.0 3/8' 23.3 79.7 100.0 56.2 13.4 43.8 59.7 #4 4.1 22.7 96.3 40.3 15.9 #8 2.1 8.6 79.4 31.8 8.5 68.2 #16 1.8 4.8 63.5 25.4 6.4 74.6 #30 3.9 18.5 6.9 81.5 1.7 45.6 #50 1.7 3.5 21.0 9.1 9.3 90.9 #100 1.7 3.2 5.5 3.2 5.9 96.8

Aggregate Supplier Gradations

2.8

*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.

Coarseness Factor:	64	Workability Factor:	32	34.3
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 68, 40 68, 38 68, 38 Product on Gradation 68, 32	75, 39 75, 28	
40 45 ActionLimits Boundary =	50 5	Coarseness Factor (%)	75	80

O 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

11/7/22 Concrete Grade: DM, 4500HP 11/8/2022

ites Test F	Represents:	11/8/2022	through	11/14/2022		
gg. 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:

35.7

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

Farmington Hills, MI 48336

	i otai Wt	2905	17.69		100.0	< Verify this n	umber is 100%	
Sieve	6AA	26	A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained	
2"	100.0	100	0.0	100.0	100.0	0.0	0.0	1
1.5"	100.0	100	0.0	100.0	100.0	0.0	0.0	1
1"	97.6	100	0.0	100.0	98.8	1.2	1.2	1
3/4"	83.3	100	0.0	100.0	91.3	7.4	8.7	1
1/2"	36.9	96	.2	100.0	67.0	24.4	33.0	1
3/8"	16.2	86	.5	100.0	55.4	11.6	44.6	*
#4	2.7	21	.4	96.9	41.6	13.8	58.4	*
#8	1.8	5.	6	80.4	33.2	8.4	66.8	no
#16	1.6	2.	6	65.3	26.9	6.3	73.1	*
#30	1.6	2.	1	50.6	21.0	5.9	79.0	no
#50	1.5	1.	9	28.1	12.1	9.0	87.9	*
#100	1.5	1.	8	6.1	3.3	8.7	96.7	a 2
LBW	1.2	1.	7	0.7	1.0	2.3	99.0	1

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: 33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	JMF Zone 58, 39 68, 38 75, 39 68, 38 75, 39 68, 38 75, 28	
25 40 45 ActionLimits Boundary =	50 5	⁵ Coarseness Factor (%) ⁷⁰ 75	-T 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"	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