

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **12**

Sample Date: **10/23/23**

Dates Test Represents: **10/24/2023** through **10/30/2023**

Concrete Grade: **DM, 4500HP**

Contractor: _____

MDOT No.: _____



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

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %	% Retained	Cumulative % Retained
6AA	71-47	Presque Isle	1450	8.87	2.62	49.9	0.0	0.0
26A	71-47	Presque Isle	305	1.87	2.62	10.5	0.0	0.0
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6	0.0	0.0
Total Wt						2905	100.0	100.0
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained	Verify this number is 100%	
2"	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0
3/4"	82.6	100.0	100.0	91.3	8.7	8.7	8.7	8.7
1/2"	43.9	93.8	100.0	71.3	20.0	28.7	20.0	28.7
3/8"	27.5	80.6	100.0	61.8	9.6	38.2	9.6	38.2
#4	5.7	17.8	96.7	43.0	18.8	57.0	18.8	57.0
#8	3.0	4.7	79.6	33.5	9.5	66.5	9.5	66.5
#16	2.6	3.0	62.7	26.4	7.1	73.6	7.1	73.6
#30	2.5	2.6	47.1	20.2	6.3	79.8	6.3	79.8
#50	2.4	2.4	23.4	10.7	9.5	89.3	9.5	89.3
#100	2.2	2.2	5.1	3.3	7.4	96.7	7.4	96.7
LBW	1.9	1.9	0.7	1.4	1.9	98.6	1.9	98.6

*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 4% for the 3/4" sieve when
 a 1.5" max. size (nom. Max. 1.0") aggregate is used.

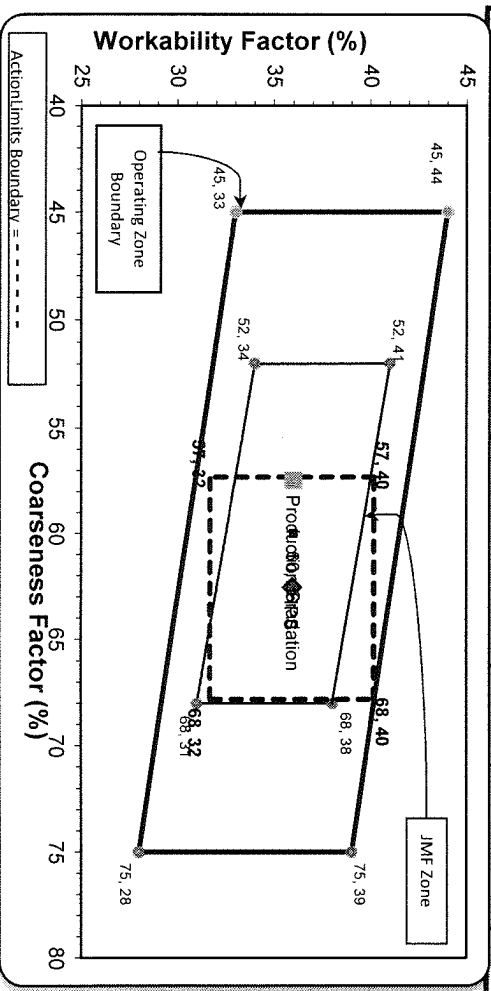
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Initial Production Sample (IPS)

Coarseness Factor: **57** Workability Factor: **34**

Adjusted WF: **36.0**

Coarseness Factor: **63** 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"	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

Approved By: _____



Plant S12-Onsite Southfield

Product 1051-6AA LS

Name/Title Doug Storey / QC Technician

Period: 10/22/2023 - 10/28/2023

Report Date 10/31/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	100.0	%	95-100
	3/4" (19mm)	82.6	%	
	1/2" (12.5mm)	43.9	%	30-60
	3/8" (9.5mm)	27.5	%	
	#4 (4.75mm)	5.7	%	0-8
	#8 (2.36mm)	3.0	%	
	#16 (1.18mm)	2.6	%	
	#30 (.6mm)	2.5	%	
	#50 (.3mm)	2.4	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	1.96	%	
	Wash Loss (#200/75um)	1.9	%	0-2
	Total Moisture	4.33	%	



Plant S12-Onsite Southfield

Product 1067-26A Mod LS

Name/Title Doug Storey / QC Technician

Period: 10/22/2023 - 10/28/2023

Report Date 10/31/2023

Procedure	Sieve/Test	Result	Unit	26A LS Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	100-100
	1/2" (12.5mm)	93.8	%	95-100
	3/8" (9.5mm)	80.6	%	60-95
	#4 (4.75mm)	17.8	%	5-30
	#8 (2.36mm)	4.7	%	0-12
	#16 (1.18mm)	3.0	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.4	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	2.0	%	
	Wash Loss (#200/75µm)	1.9	%	0-3
	Total Moisture	3.38	%	



Plant S12-Onsite Southfield

Product 1022-2NS GR

Period: 10/22/2023 - 10/28/2023

Name/Title Doug Storey / QC Technician

Report Date 10/31/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.7	%	95-100
	#8 (2.36mm)	79.6	%	65-95
	#16 (1.18mm)	62.7	%	35-75
	#30 (.6mm)	47.1	%	20-55
	#50 (.3mm)	23.4	%	10-30
	#100 (.15mm)	5.1	%	0-10
	#200 (75µm)	0.9	%	
	FM	2.86		2.6-3
	Wash Loss (#200/75um)	0.7	%	0-3
	Total Moisture	4.80	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-102**

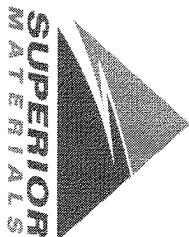
Sample Date: **10/23/23**

Dates Test Represents: **10/24/2023** through **10/30/2023**

Concrete Grade: **DM, 4500HP**

Contractor: _____

MDOT No.: _____



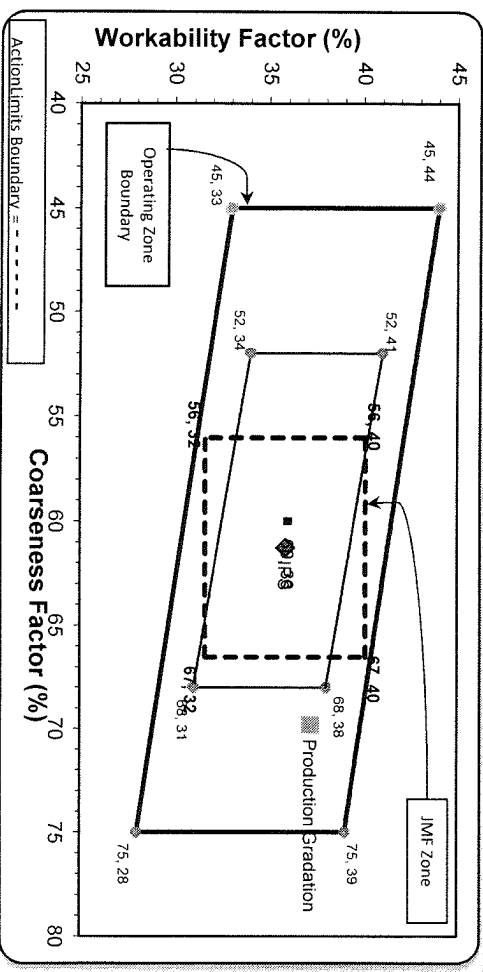
Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %
6AA	58-003	Stoneco	1500	8.94	2.69	50.8
26A	58-003	Stoneco	300	1.79	2.69	10.2
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
Total Wt			2950	17.68		100.0

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"	80.9	100.0	100.0	90.3	9.7	9.7
1/2"	33.6	99.5	100.0	66.2	24.1	33.8
3/8"	12.4	89.8	100.0	54.4	11.8	45.6
#4	3.1	15.0	98.1	41.3	13.1	58.7
#8	2.6	4.8	84.4	34.7	6.6	65.3
#16	2.3	3.5	65.8	27.2	7.5	72.8
#30	2.2	3.0	45.0	19.0	8.2	81.0
#50	2.0	2.8	19.9	9.1	9.9	90.9
#100	1.9	2.8	3.6	2.7	6.4	97.3
LBW	1.7	2.5	0.3	1.2	1.4	98.8

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: **70** Workability Factor: **35** Adjusted WF: **37.2**



Initial Production Sample (IPS)

Sieve	Coarseness Factor:	Workability Factor:	Cumulative % Passing	% Retained	Cumulative % Retained
2"	61	36	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

*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 4% for the 3/4" sieve when
 a 1.5" max. size (nom. Max. 1.0") aggregate is used.

PREPARED BY:
SM, LLC Technical Service

Approved By: _____



Plant S102-Superior Novi

Product 1051-6AA LS

Name/Title Doug Storey / QC Technician

Period: 10/22/2023 - 10/28/2023

Report Date 10/28/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	100.0	%	95-100
	3/4" (19mm)	80.9	%	
	1/2" (12.5mm)	33.6	%	30-60
	3/8" (9.5mm)	12.4	%	
	#4 (4.75mm)	3.1	%	0-8
	#8 (2.36mm)	2.6	%	
	#16 (1.18mm)	2.3	%	
	#30 (.6mm)	2.2	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.80	%	
	Wash Loss (#200/75um)	1.7	%	0-2
	Total Moisture	3.38	%	



Plant S102-Superior Novi
 Product 1067-26A Mod LS
 Period: 10/22/2023 - 10/28/2023

Name/Title Doug Storey / QC Technician
 Report Date 10/28/2023

Procedure	Sieve/Test	Result	Unit	26A Mod LS Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	100-100
	1/2" (12.5mm)	99.5	%	95-100
	3/8" (9.5mm)	89.8	%	60-95
	#4 (4.75mm)	15.0	%	5-30
	#8 (2.36mm)	4.8	%	0-12
	#16 (1.18mm)	3.5	%	
	#30 (.6mm)	3.0	%	
	#50 (.3mm)	2.8	%	
	#100 (.15mm)	2.8	%	
	#200 (75µm)	2.6	%	
	Wash Loss (#200/75um)	2.5	%	0-3
	Total Moisture	3.78	%	



Plant S102-Superior Novi

Product 1022-2NS GR

Name/Title Doug Storey / QC Technician

Period: 10/22/2023 - 10/28/2023

Report Date 10/28/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.1	%	95-100
	#8 (2.36mm)	84.4	%	65-95
	#16 (1.18mm)	65.8	%	35-75
	#30 (.6mm)	45.0	%	20-55
	#50 (.3mm)	19.9	%	10-30
	#100 (.15mm)	3.6	%	0-10
	#200 (75µm)	0.3	%	
	FM	2.83		2.6-3
	Wash Loss (#200/75um)	0.3	%	0-3
	Total Moisture	4.11	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-103**

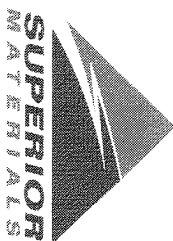
Sample Date: **10/23/23**

Dates Test Represents: **10/24/2023** through **10/30/2023**

Concrete Grade: **DM, 4500HP**

Contractor: _____

MDOT No.: _____



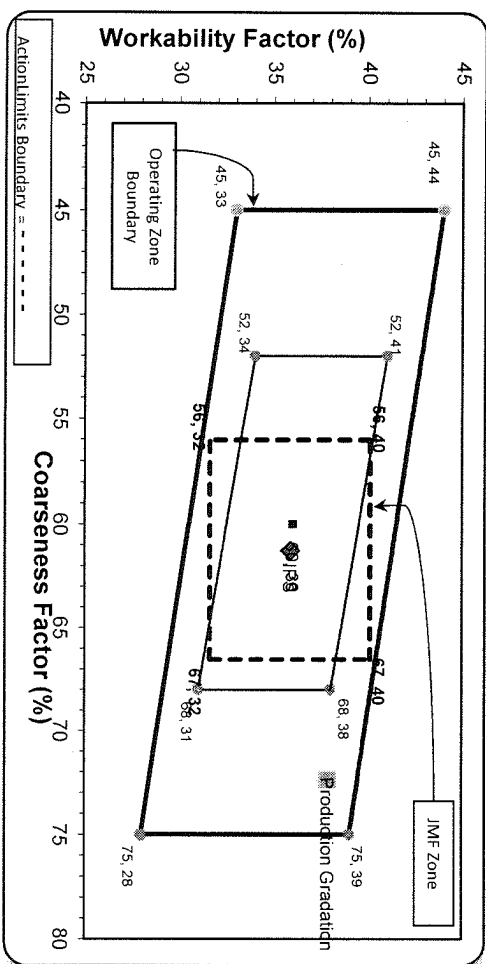
Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %
6AA	58-003	Stoneco	1500	8.94	2.69	50.8
26A	58-003	Stoneco	300	1.79	2.69	10.2
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68		100.0

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	99.3	0.7	0.7
3/4"	74.5	100.0	100.0	87.0	12.3	13.0
1/2"	31.8	99.5	100.0	65.3	21.8	34.7
3/8"	9.9	90.5	100.0	53.2	12.1	46.8
#4	3.0	19.3	98.8	42.0	11.2	58.0
#8	2.8	5.7	85.6	35.4	6.6	64.6
#16	2.6	4.0	66.9	27.8	7.6	72.2
#30	2.4	3.4	47.4	20.0	7.8	80.0
#50	2.3	3.2	19.2	9.0	11.1	91.0
#100	2.2	3.1	3.5	2.8	6.2	97.2
LBW	1.8	2.9	0.5	1.4	1.4	98.6

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	72	Workability Factor:	35	Adjusted WF	37.9
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Sieve	Coarseness Factor:	Workability Factor:	% Retained	Cumulative % Retained
2"	61	36	0.0	0.0
1.5"			0.0	0.0
1"			0.7	0.7
3/4"			10.1	10.8
1/2"			18.5	29.3
3/8"			10.0	39.3
#4			16.3	55.6
#8			8.5	64.1
#16			8.6	72.7
#30			8.2	80.9
#50			11.7	92.6
#100			5.6	98.1
LBW			1.2	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 4% for the 3/4" sieve when
 a 1.5" max. size (nom. Max. 1.0") aggregate is used.

PREPARED BY:
SM, LLC Technical Service

Approved BY: _____



Plant S103-Superior Brighton

Product 1051-6AA LS

Name/Title Doug Storey / QC Technician

Period: 10/22/2023 - 10/28/2023

Report Date 10/28/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.6	%	95-100
	3/4" (19mm)	74.5	%	
	1/2" (12.5mm)	31.8	%	30-60
	3/8" (9.5mm)	9.9	%	
	#4 (4.75mm)	3.0	%	0-8
	#8 (2.36mm)	2.8	%	
	#16 (1.18mm)	2.6	%	
	#30 (.6mm)	2.4	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	1.95	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	2.60	%	



Plant S103-Superior Brighton
 Product 1067-26A Mod LS
 Period: 10/22/2023 - 10/28/2023

Name/Title Doug Storey / QC Technician
 Report Date 10/28/2023

Procedure	Sieve/Test	Result	Unit	26A Mod LS Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	100-100
	1/2" (12.5mm)	99.5	%	95-100
	3/8" (9.5mm)	90.5	%	60-95
	#4 (4.75mm)	19.3	%	5-30
	#8 (2.36mm)	5.7	%	0-12
	#16 (1.18mm)	4.0	%	
	#30 (.6mm)	3.4	%	
	#50 (.3mm)	3.2	%	
	#100 (.15mm)	3.1	%	
	#200 (75µm)	3.0	%	
	Wash Loss (#200/75um)	2.9	%	0-3
	Total Moisture	3.86	%	



Plant S103-Superior Brighton
Product 1022-2NS GR
Period: 10/22/2023 - 10/28/2023

Name/Title Doug Storey / QC Technician
Report Date 10/28/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.8	%	95-100
	#8 (2.36mm)	85.6	%	65-95
	#16 (1.18mm)	66.9	%	35-75
	#30 (.6mm)	47.4	%	20-55
	#50 (.3mm)	19.2	%	10-30
	#100 (.15mm)	3.5	%	0-10
	#200 (75µm)	0.5	%	
	FM	2.79		2.6-3
	Wash Loss (#200/75um)	0.5	%	0-3
	Total Moisture	3.81	%	