

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-32**

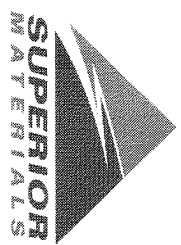
Sample Date: **8/31/20**

Dates Test Represents: **9/1/2020** through **9/7/2020**

Concrete Grade: **S2M**

Contractor: \_\_\_\_\_

MDOT No.: \_\_\_\_\_



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

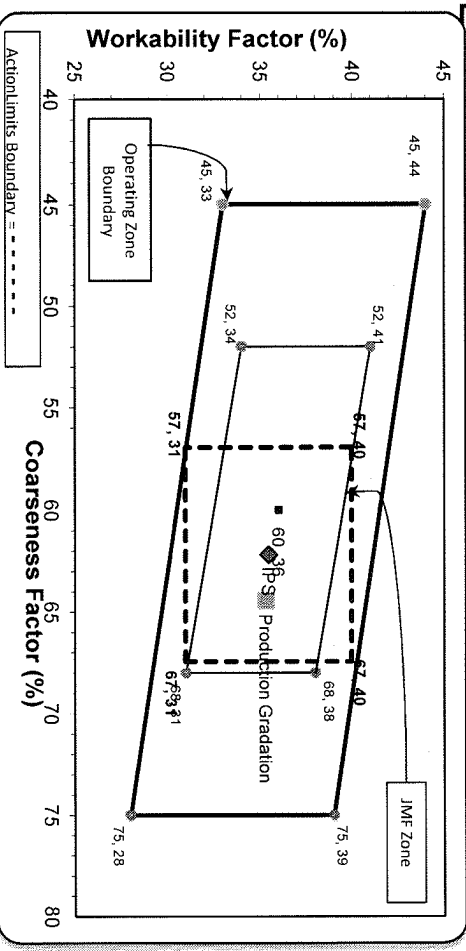
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %	
6AA	71-47	Presque Isle	1620	9.91	2.62	53.1	
26A	71-47	Presque Isle	200	1.22	2.62	6.6	
2NS	95-013	Smelter Bay	1230	7.44	2.65	40.3	
<b>Total Wt:</b>						<b>3050</b>	<b>100.0</b>

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"	80.4	100.0	100.0	89.6	9.1	10.4
1/2"	42.7	95.6	100.0	69.3	20.3	30.7
3/8"	23.8	81.5	100.0	58.3	11.0	41.7
#4	3.5	23.8	96.5	42.3	16.0	57.7
#8	2.3	8.1	83.2	35.3	7.0	64.7
#16	2.0	4.8	67.6	28.6	6.7	71.4
#30	1.9	4.1	47.1	20.3	8.4	79.7
#50	1.8	3.5	21.5	9.9	10.4	90.1
#100	1.7	3.2	5.6	3.4	6.5	96.6
LBW	1.4	2.7	1.4	1.5	1.9	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. 1.5") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **64** Workability Factor: **35**



Initial Production Sample (IPS)

Sieve	Coarseness Factor:	Workability Factor:	Cumulative % Passing	% Retained	Cumulative % Retained
2"	62	35	100.0	0.0	0.0
1.5"			100.0	0.0	0.0
1"			100.0	0.0	0.0
3/4"			94.0	6.0	6.0
1/2"			70.2	23.7	29.8
3/8"			59.9	10.4	40.1
#4			42.7	17.2	57.3
#8			35.5	7.2	64.5
#16			28.4	7.0	71.6
#30			19.2	9.2	80.8
#50			8.9	10.3	91.1
#100			3.1	5.9	96.9
LBW			1.4	1.7	98.6

PREPARED BY:  
SM, LLC Technical Service

Approved By: \_\_\_\_\_

Plant 958-JMT

Product 1054-6AA LS PI

Period: 08/30/2020 - 09/05/2020

Name/Title Doug Storey / QC Technician

Report Date 09/04/2020

Procedure	Sieve/Test	Result	Unit	6AA LS PI Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	97.6	%	95-100
	3/4" (19mm)	80.4	%	
	1/2" (12.5mm)	42.7	%	30-60
	3/8" (9.5mm)	23.8	%	
	#4 (4.75mm)	3.5	%	0-8
	#8 (2.36mm)	2.3	%	
	#16 (1.18mm)	2.0	%	
	#30 (.6mm)	1.9	%	
	#50 (.3mm)	1.8	%	
	#100 (.15mm)	1.7	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75um)	1.3	%	0-2
	Total Moisture	2.1	%	

Plant 958-JMT  
 Product 1067-26A Mod LS  
 Period: 08/30/2020 - 09/05/2020

Name/Title Doug Storey / QC Technician  
 Report Date 09/04/2020

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)	95.6	%	95-100
	3/8" (9.5mm)	81.5	%	60-95
	#4 (4.75mm)	23.8	%	5-30
	#8 (2.36mm)	8.1	%	0-12
	#16 (1.18mm)	4.8	%	
	#30 (.6mm)	4.1	%	
	#50 (.3mm)	3.5	%	
	#100 (.15mm)	3.2	%	
	#200 (75µm)	2.7	%	
	Wash Loss (#200/75µm)	2.6	%	0-3
	Total Moisture	4.2	%	

Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Name/Title Doug Storey / QC Technician

Period: 08/30/2020 - 09/05/2020

Report Date 09/04/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.5	%	95-100
	#8 (2.36mm)	83.2	%	65-95
	#16 (1.18mm)	67.6	%	35-75
	#30 (.6mm)	47.1	%	20-55
	#50 (.3mm)	21.5	%	10-30
	#100 (.15mm)	5.6	%	0-10
	#200 (75µm)	1.4	%	
	FM	2.79		2.6-3
	Wash Loss (#200/75um)	1.4	%	0-3
	Total Moisture	4.5	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-36**

Sample Date: **8/31/20**

Dates Test Represents: **9/1/2020** through **9/7/2020**

Concrete Grade: **S2M**

Contractor: \_\_\_\_\_

MDOT No.: \_\_\_\_\_

Agg. Class	Pit #	Source	Weight (ssd)	ft <sup>3</sup>	Specific Gravity	Contribution %
6AA	71-47	Presque Isle	1500	9.17	2.62	49.2
26A	71-47	Presque Isle	350	2.14	2.62	11.5
2NS	63-92	Grange Hall	1200	7.26	2.65	39.3
<b>Total Wt:</b>						<b>3050</b>
						<b>18.57</b>
						<b>100.0</b>

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"	86.0	100.0	100.0	93.1	6.2	6.9
1/2"	48.3	100.0	100.0	74.3	18.8	25.7
3/8"	26.7	83.4	100.0	62.0	12.2	38.0
#4	4.5	18.5	97.4	42.7	19.4	57.3
#8	2.5	5.4	84.7	35.2	7.5	64.8
#16	2.1	2.8	70.1	28.9	6.2	71.1
#30	2.0	2.3	47.9	20.1	8.8	79.9
#50	1.8	2.1	21.8	9.7	10.4	90.3
#100	1.7	1.9	3.4	2.4	7.3	97.6
LBW	1.4	1.9	1.2	1.4	1.0	98.6

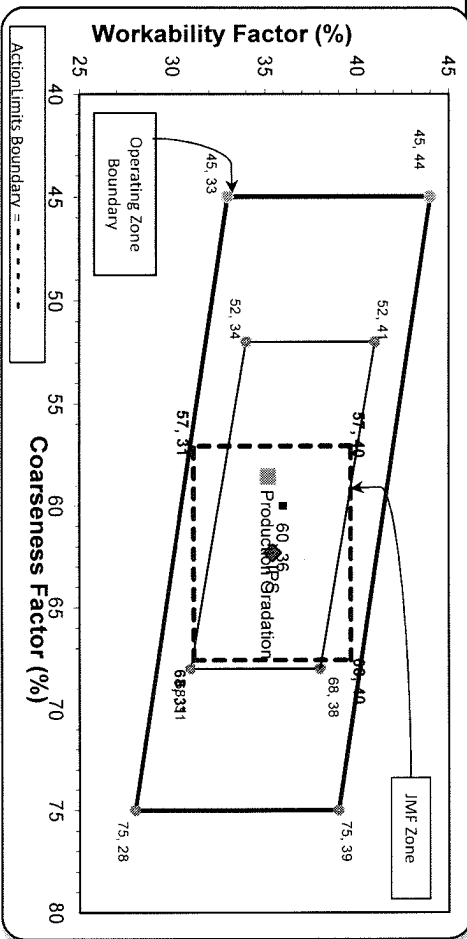


Superior Materials, LLC  
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Suite 500  
Farmington Hills, MI 48336

\*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. 1.5") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **59** Workability Factor: **35**



Initial Production Sample (IPS)

Coarseness Factor: **62** 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"	90.5	8.6	9.5
1/2"	69.8	20.7	30.2
3/8"	59.8	10.0	40.2
#4	42.2	17.6	57.8
#8	35.4	6.7	64.6
#16	28.8	6.7	71.2
#30	21.4	7.4	78.6
#50	8.8	12.6	91.2
#100	1.8	7.0	98.2
LBW	0.7	1.0	99.3

PREPARED BY:  
SM, LLC Technical Service

Approved By: \_\_\_\_\_



2470 Auburn Road  
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills  
Product 1051-6AA LS  
Period: 08/30/2020 - 09/05/2020

Name/Title Doug Storey / QC Technician  
Report Date 09/04/2020

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)	86.0	%	
	1/2" (12.5mm)	48.3	%	30-60
	3/8" (9.5mm)	26.7	%	
	#4 (4.75mm)	4.5	%	0-8
	#8 (2.36mm)	2.5	%	
	#16 (1.18mm)	2.1	%	
	#30 (.6mm)	2.0	%	
	#50 (.3mm)	1.8	%	
	#100 (.15mm)	1.7	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75µm)	1.4	%	0-2
	Total Moisture	2.68	%	



2470 Auburn Road  
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1067-26A Mod LS

Period: 08/30/2020 - 09/05/2020

Name/Title Doug Storey / QC Technician

Report Date 09/04/2020

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)	97.4	%	95-100
	3/8" (9.5mm)	83.4	%	60-95
	#4 (4.75mm)	18.5	%	5-30
	#8 (2.36mm)	5.4	%	0-12
	#16 (1.18mm)	2.8	%	
	#30 (.6mm)	2.3	%	
	#50 (.3mm)	2.1	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.7	%	0-3
	Total Moisture	2.24	%	



2470 Auburn Road  
Auburn Hills, MI 48432

**Plant** S36-Superior Auburn Hills  
**Product** 1022-2NS GR  
**Period:** 08/30/2020 - 09/05/2020

**Name/Title** Doug Storey / QC Technician  
**Report Date** 09/04/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.4	%	95-100
	#8 (2.36mm)	84.7	%	65-95
	#16 (1.18mm)	70.1	%	35-75
	#30 (.6mm)	47.9	%	20-55
	#50 (.3mm)	21.8	%	10-30
	#100 (.15mm)	3.4	%	0-10
	#200 (75µm)	1.2	%	
	FM	2.75		2.6-3
	Wash Loss (#200/75µm)	1.2	%	0-3
	Total Moisture	3.66	%	



# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-39**

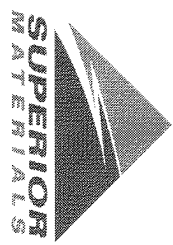
Sample Date: **8/31/20**

Dates Test Represents: **9/1/2020** through **9/7/2020**

Concrete Grade: **S2M**

Contractor: \_\_\_\_\_

MDOT No.: \_\_\_\_\_



**Superior Materials, LLC**  
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 Suite 500  
 Farmington Hills, MI 48336

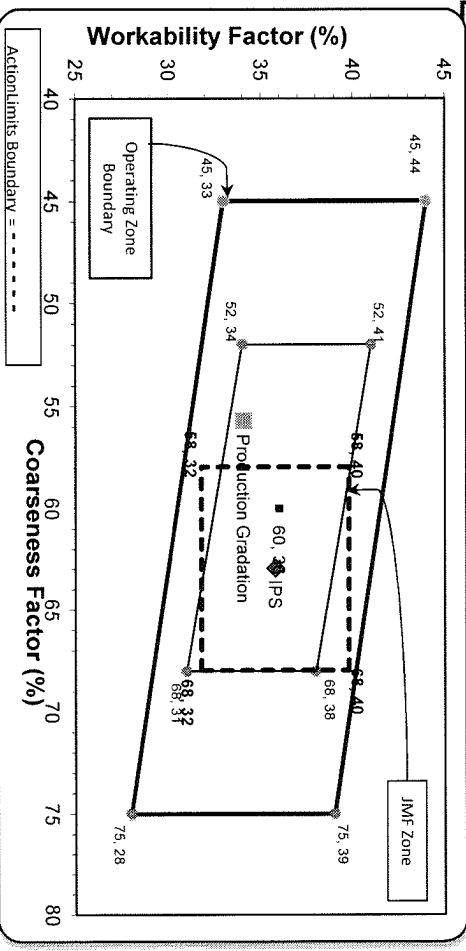
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
6AA	71-47	Presque Isle	1650	10.09	2.62	54.1
26A	71-47	Presque Isle	150	0.92	2.62	4.9
2NS	44-051	Krake Willis Rd	1250	7.56	2.65	41.0
<b>Total Wt</b>			<b>3050</b>	<b>18.57</b>		<b>100.0</b>

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"	99.5	100.0	100.0	99.7	0.3	0.3
3/4"	81.8	100.0	100.0	90.2	9.8	9.8
1/2"	52.5	95.5	100.0	74.1	25.9	25.9
3/8"	34.2	77.4	100.0	63.3	36.7	36.7
#4	7.2	16.2	96.4	44.2	55.8	55.8
#8	3.2	4.5	78.4	34.1	65.9	65.9
#16	2.7	2.6	63.9	27.8	72.2	72.2
#30	2.6	2.2	45.2	20.0	80.0	80.0
#50	2.5	2.1	22.0	10.5	89.5	89.5
#100	2.3	1.9	6.6	4.0	96.0	96.0
LBW	1.8	1.7	1.0	1.5	98.5	98.5

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **56** Workability Factor: **34**



Initial Production Sample (IPS)

Sieve	% 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"	89.8	10.2	10.2
1/2"	70.7	19.1	29.3
3/8"	59.6	11.1	40.4
#4	43.2	16.4	56.8
#8	35.8	7.4	64.2
#16	29.2	6.6	70.8
#30	21.4	7.8	78.6
#50	9.8	11.6	90.2
#100	3.7	6.1	96.3
LBW	1.2	2.5	98.8

Coarseness Factor: **63** Workability Factor: **36**

\*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.

PREPARED BY:  
 SM, LLC Technical Service

Approved By: \_\_\_\_\_



Plant S39-Superior Sterling Heights

Product 1051-6AA LS

Name/Title Doug Storey / QC Technician

Period: 08/30/2020 - 09/05/2020

Report Date 09/04/2020

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	99.5	%	95-100
	3/4" (19mm)	81.8	%	
	1/2" (12.5mm)	52.5	%	30-60
	3/8" (9.5mm)	34.2	%	
	#4 (4.75mm)	7.2	%	0-8
	#8 (2.36mm)	3.2	%	
	#16 (1.18mm)	2.7	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.5	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	1.80	%	
	Wash Loss (#200/75um)	1.6	%	0-2
	Total Moisture	3.58	%	



Plant S39-Superior Sterling Heights

Product 1067-26A Mod LS

Name/Title Doug Storey / QC Technician

Period: 08/30/2020 - 09/05/2020

Report Date 09/04/2020

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)	95.5	%	95-100
	3/8" (9.5mm)	77.4	%	60-95
	#4 (4.75mm)	16.2	%	5-30
	#8 (2.36mm)	4.5	%	0-12
	#16 (1.18mm)	2.6	%	
	#30 (.6mm)	2.2	%	
	#50 (.3mm)	2.1	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75um)	1.5	%	0-3
	Total Moisture	0.08	%	



**Plant** S39-Superior Sterling Heights

**Product** 1022-2NS GR

**Period:** 08/30/2020 - 09/05/2020

**Name/Title** Doug Storey / QC Technician

**Report Date** 09/04/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.4	%	95-100
	#8 (2.36mm)	78.4	%	65-95
	#16 (1.18mm)	63.9	%	35-75
	#30 (.6mm)	45.2	%	20-55
	#50 (.3mm)	22.0	%	10-30
	#100 (.15mm)	6.6	%	0-10
	#200 (75µm)	1.0	%	
	FM	2.88		2.6-3
	Wash Loss (#200/75µm)	1.0	%	0-3
	Total Moisture	3.88	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-103**

Sample Date: **8/31/20**

Dates Test Represents: **9/1/2020** through **9/17/2020**

Concrete Grade: **S2M**

Contractor: \_\_\_\_\_

MIDOT No.: \_\_\_\_\_

Aggr. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
6AA	58-003	Stoneco	1640	9.77	2.69	52.9
26A	58-003	Stoneco	250	1.49	2.69	8.1
2NS	63-114	Highland	1210	7.32	2.65	39.0
Total Wt:						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"	84.0	100.0	100.0	91.5	7.9	8.5
1/2"	42.3	100.0	100.0	69.4	22.1	30.6
3/8"	20.8	86.7	100.0	57.0	12.4	43.0
#4	4.7	16.8	99.0	42.5	14.5	57.5
#8	2.3	5.0	83.3	34.1	8.3	65.9
#16	1.8	2.8	63.7	26.0	8.1	74.0
#30	1.6	2.3	46.5	19.2	6.9	80.8
#50	1.5	2.1	22.3	9.7	9.5	90.3
#100	1.5	1.9	5.6	3.1	6.5	96.9
LBW	1.4	1.8	1.0	1.3	1.9	98.7

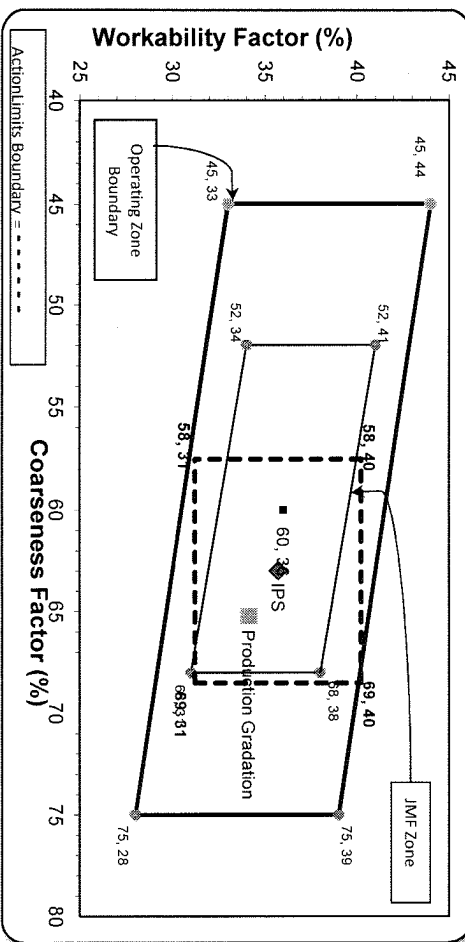
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max.  
 nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max.  
 nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when  
 a 2" max. size (nom. Max. 1.5") aggregate is used.

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



Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **65** Workability Factor: **34**



Initial Production Sample (IPS)

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.2	0.8	0.8
3/4"	90.9	8.3	9.1
1/2"	71.3	19.6	28.7
3/8"	59.5	11.8	40.5
#4	43.8	15.7	56.2
#8	35.7	8.1	64.3
#16	27.0	8.7	73.0
#30	18.6	8.4	81.4
#50	6.8	11.8	93.2
#100	1.4	5.4	98.6
LBW	0.6	0.8	99.4

PREPARED BY:  
 SM, LLC Technical Service

Approved BY:



Plant S103-Superior Brighton

Product 1051-6AA LS

Period: 08/30/2020 - 09/05/2020

Name/Title Doug Storey / QC Technician

Report Date 09/04/2020

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.9	%	95-100
	3/4" (19mm)	84.0	%	
	1/2" (12.5mm)	42.3	%	30-60
	3/8" (9.5mm)	20.8	%	
	#4 (4.75mm)	4.7	%	0-8
	#8 (2.36mm)	2.3	%	
	#16 (1.18mm)	1.8	%	
	#30 (.6mm)	1.6	%	
	#50 (.3mm)	1.5	%	
	#100 (.15mm)	1.5	%	
	#200 (75µm)	1.36	%	
	Wash Loss (#200/75um)	1.3	%	0-2
	Total Moisture	3.30	%	



Plant S103-Superior Brighton

Product 1067-26A Mod LS

Period: 08/30/2020 - 09/05/2020

Name/Title Doug Storey / QC Technician

Report Date 09/04/2020

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)	86.7	%	60-95
	#4 (4.75mm)	16.8	%	5-30
	#8 (2.36mm)	5.0	%	0-12
	#16 (1.18mm)	2.8	%	
	#30 (.6mm)	2.3	%	
	#50 (.3mm)	2.1	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.8	%	
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	3.55	%	



**Plant** S103-Superior Brighton  
**Product** 1022-2NS GR  
**Period:** 08/30/2020 - 09/05/2020

**Name/Title** Doug Storey / QC Technician  
**Report Date** 09/04/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	99.0	%	95-100
	#8 (2.36mm)	83.3	%	65-95
	#16 (1.18mm)	63.7	%	35-75
	#30 (.6mm)	46.5	%	20-55
	#50 (.3mm)	22.3	%	10-30
	#100 (.15mm)	5.6	%	0-10
	#200 (75µm)	1.0	%	
	FM	2.80		2.6-3
	Wash Loss (#200/75um)	0.8	%	0-3
	Total Moisture	3.38	%	