

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-32**

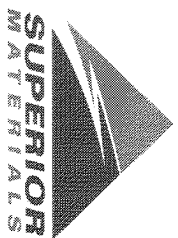
Sample Date: **7/20/20**

Dates Test Represents: **7/21/2020** through **7/27/2020**

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 %
GAA	71-47	Presque Isle	1820	11.13	2.62	59.7
26A	71-47	Presque Isle	0	0.00	2.62	0.0
2NS	95-013	Smelter Bay	1230	7.44	2.65	40.3
<b>Total Wt</b>			<b>3050</b>	<b>18.57</b>		<b>100.0</b>

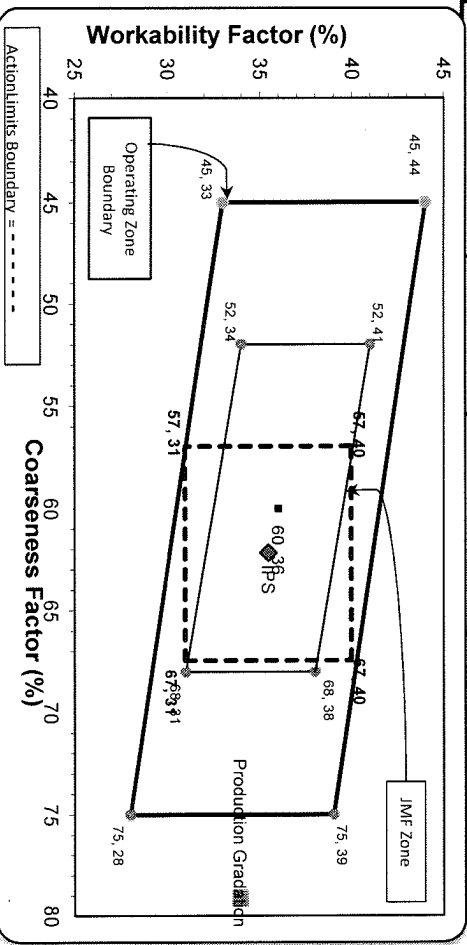
  

Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	97.6	100.0	100.0	98.6	1.4	1.4
3/4"	76.0	100.0	100.0	85.7	12.9	14.3
1/2"	31.0	97.9	100.0	58.8	26.9	41.2
3/8"	12.4	86.6	100.0	47.7	11.1	52.3
#4	1.9	27.8	96.6	40.1	7.6	59.9
#8	1.5	9.7	81.9	33.9	6.2	66.1
#16	1.4	5.1	65.5	27.3	6.7	72.7
#30	1.4	4.1	45.0	19.0	8.3	81.0
#50	1.3	3.7	19.1	8.5	10.5	91.5
#100	1.2	3.4	3.8	2.2	6.2	97.8
LBW	1.0	3.0	0.4	0.8	1.5	99.2

\*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  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **79** Workability Factor: **34**



Initial Production Sample (IPS)

Sieve	Coarseness Factor:	Workability Factor:	% Retained	Cumulative % Retained
2"	62	35	0.0	0.0
1.5"			0.0	0.0
1"			0.0	0.0
3/4"			6.0	6.0
1/2"			23.7	29.8
3/8"			10.4	40.1
#4			17.2	57.3
#8			7.2	64.5
#16			7.0	71.6
#30			9.2	80.8
#50			10.3	91.1
#100			5.9	96.9
LBW			1.7	98.6

PREPARED BY:  
SM, LLC Technical Service

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

Plant 958-JMT

Product 1054-6AA LS PI

Name/Title Doug Storey / QC Technician

Period: 07/19/2020 - 07/25/2020

Report Date 07/24/2020

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)	76.0	%	
	1/2" (12.5mm)	31.0	%	30-60
	3/8" (9.5mm)	12.4	%	
	#4 (4.75mm)	1.9	%	0-8
	#8 (2.36mm)	1.5	%	
	#16 (1.18mm)	1.4	%	
	#30 (.6mm)	1.4	%	
	#50 (.3mm)	1.3	%	
	#100 (.15mm)	1.2	%	
	#200 (75µm)	1.0	%	
	Wash Loss (#200/75um)	0.9	%	0-2
	Total Moisture	2.0	%	

Plant 958-JMT

Product 1067-26A Mod LS

Name/Title Doug Storey / QC Technician

Period: 07/19/2020 - 07/25/2020

Report Date 07/24/2020

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)	97.9	%	95-100
	3/8" (9.5mm)	86.6	%	60-95
	#4 (4.75mm)	27.8	%	5-30
	#8 (2.36mm)	9.7	%	0-12
	#16 (1.18mm)	5.1	%	
	#30 (.6mm)	4.1	%	
	#50 (.3mm)	3.7	%	
	#100 (.15mm)	3.4	%	
	#200 (75µm)	3.0	%	
	Wash Loss (#200/75um)	2.8	%	0-3
	Total Moisture	3.6	%	

# Edw. C. Levy Co.

8911 W. Jefferson  
Detroit, 48209  
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**Plant** 958-JMT

**Product** 1022-2NS GR - Smelter Bay

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

**Period:** 07/19/2020 - 07/25/2020

**Report Date** 07/24/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.6	%	95-100
	#8 (2.36mm)	81.9	%	65-95
	#16 (1.18mm)	65.5	%	35-75
	#30 (.6mm)	45.0	%	20-55
	#50 (.3mm)	19.1	%	10-30
	#100 (.15mm)	3.8	%	0-10
	#200 (75µm)	0.4	%	
	FM	2.88		2.6-3
	Wash Loss (#200/75um)	0.4	%	0-3
	Total Moisture	9.3	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-36**

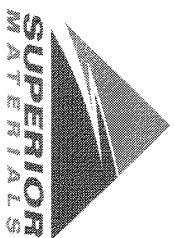
Sample Date: **7/20/20**

Dates Test Represents: **7/21/2020** through **7/27/2020**

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	1550	9.48	2.62	50.8
26A	71-47	Presque Isle	300	1.83	2.62	9.8
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"	98.8	100.0	100.0	99.4	0.6	0.6
3/4"	85.6	100.0	100.0	92.7	6.7	7.3
1/2"	50.2	97.0	100.0	74.4	18.3	25.6
3/8"	33.0	86.0	100.0	64.6	9.8	35.4
#4	7.1	25.9	97.0	44.3	20.3	55.7
#8	2.9	8.9	83.8	35.3	9.0	64.7
#16	2.4	4.6	67.7	28.3	7.0	71.7
#30	2.3	3.8	49.4	21.0	7.3	79.0
#50	2.3	3.5	21.3	9.9	11.1	90.1
#100	2.1	3.3	2.7	2.5	7.4	97.5
LBW	1.9	3.0	0.5	1.5	1.0	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

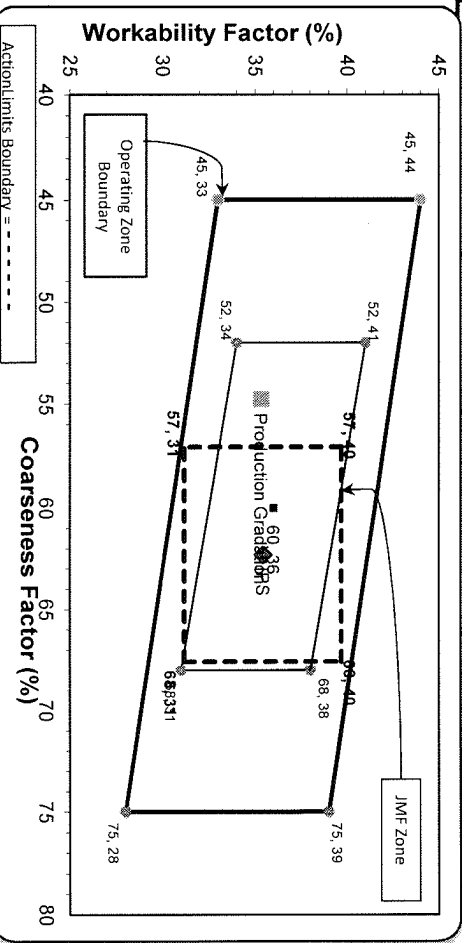
Initial Production Sample (IPS)

Coarseness Factor: **62**

Workability Factor: **35**

Coarseness Factor: **55**

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

Name/Title Doug Storey / QC Technician

Period: 07/19/2020 - 07/25/2020

Report Date 07/24/2020

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.8	%	95-100
	3/4" (19mm)	85.6	%	
	1/2" (12.5mm)	50.2	%	30-60
	3/8" (9.5mm)	33.0	%	
	#4 (4.75mm)	7.1	%	0-8
	#8 (2.36mm)	2.9	%	
	#16 (1.18mm)	2.4	%	
	#30 (.6mm)	2.3	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.1	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	3.78	%	
AASHTO T11	-#200 (75um)	1.89	%	



2470 Auburn Road  
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1067-26A Mod LS

Name/Title Doug Storey / QC Technician

Period: 07/19/2020 - 07/25/2020

Report Date 07/24/2020

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)	97.0	%	95-100
	3/8" (9.5mm)	86.0	%	60-95
	#4 (4.75mm)	25.9	%	5-30
	#8 (2.36mm)	8.9	%	0-12
	#16 (1.18mm)	4.6	%	
	#30 (.6mm)	3.8	%	
	#50 (.3mm)	3.5	%	
	#100 (.15mm)	3.3	%	
	#200 (75µm)	3.0	%	
	Wash Loss (#200/75um)	2.9	%	0-3
	Total Moisture	2.67	%	



2470 Auburn Road  
Auburn Hills, MI 48432

**Plant** S36-Superior Auburn Hills

**Product** 1022-2NS GR

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

**Period:** 07/19/2020 - 07/25/2020

**Report Date** 07/24/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.0	%	95-100
	#8 (2.36mm)	83.8	%	65-95
	#16 (1.18mm)	67.7	%	35-75
	#30 (.6mm)	49.4	%	20-55
	#50 (.3mm)	21.3	%	10-30
	#100 (.15mm)	2.7	%	0-10
	#200 (75µm)	0.5	%	
	FM	2.78		2.6-3
	Wash Loss (#200/75um)	0.4	%	0-3
	Total Moisture	3.55	%	



# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-39**

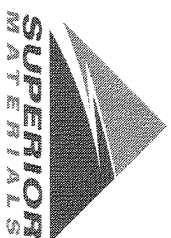
Sample Date: **7/20/20**

Dates Test Represents: **7/21/2020** through **7/27/2020**

Concrete Grade: **S2M**

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

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



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

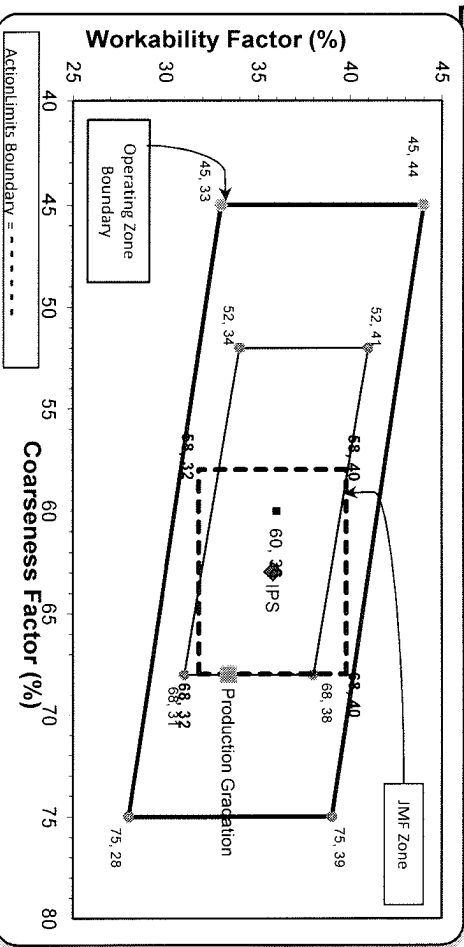
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
GAA	71-47	Presque Isle	1650	10.09	2.62	54.1
26A	71-47	Presque Isle	150	0.92	2.62	4.9
NNS	44-051	Krake Willis Rd	1250	7.56	2.65	41.0
<b>Total Wt</b>			<b>3050</b>	<b>18.57</b>		<b>100.0</b>

Sieve	% Retained	Cumulative % Retained
2"	0.0	0.0
1.5"	0.0	0.0
1"	1.0	1.0
3/4"	10.7	11.7
1/2"	22.5	34.2
3/8"	11.1	45.3
#4	12.4	57.7
#8	8.9	66.6
#16	6.4	73.0
#30	6.4	79.4
#50	9.2	88.6
#100	7.6	96.2
LBW	2.0	98.2

\*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: **68** Workability Factor: **33**



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"	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**

PREPARED BY:  
SM, LLC Technical Service

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



Plant S39-Superior Sterling Heights

Product 1051-6AA LS

Name/Title Doug Storey / QC Technician

Period: 07/19/2020 - 07/25/2020

Report Date 07/24/2020

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.2	%	95-100
	3/4" (19mm)	78.4	%	
	1/2" (12.5mm)	36.9	%	30-60
	3/8" (9.5mm)	17.4	%	
	#4 (4.75mm)	3.1	%	0-8
	#8 (2.36mm)	2.4	%	
	#16 (1.18mm)	2.2	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.55	%	
	Wash Loss (#200/75um)	1.4	%	0-2
	Total Moisture	3.10	%	



Plant S39-Superior Sterling Heights

Product 1067-26A Mod LS

Name/Title Doug Storey / QC Technician

Period: 07/19/2020 - 07/25/2020

Report Date 07/24/2020

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)	98.2	%	95-100
	3/8" (9.5mm)	88.0	%	60-95
	#4 (4.75mm)	26.7	%	5-30
	#8 (2.36mm)	7.6	%	0-12
	#16 (1.18mm)	3.8	%	
	#30 (.6mm)	3.0	%	
	#50 (.3mm)	2.8	%	
	#100 (.15mm)	2.7	%	
	#200 (75µm)	2.4	%	
	Wash Loss (#200/75um)	2.2	%	0-3
	Total Moisture	3.54	%	



Plant S39-Superior Sterling Heights

Product 1022-2NS GR

Name/Title Doug Storey / QC Technician

Period: 07/19/2020 - 07/25/2020

Report Date 07/24/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	95.9	%	95-100
	#8 (2.36mm)	77.4	%	65-95
	#16 (1.18mm)	62.5	%	35-75
	#30 (.6mm)	47.2	%	20-55
	#50 (.3mm)	24.8	%	10-30
	#100 (.15mm)	6.4	%	0-10
	#200 (75µm)	1.9	%	
	FM	2.86		2.6-3
	Wash Loss (#200/75um)	1.9	%	0-3
	Total Moisture	4.27	%	