

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-32**

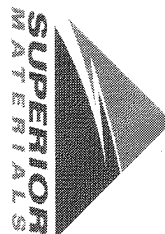
Sample Date: **7/13/20**

Dates Test Represents: **7/14/2020** through **7/20/2020**

Concrete Grade: **DM**

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

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



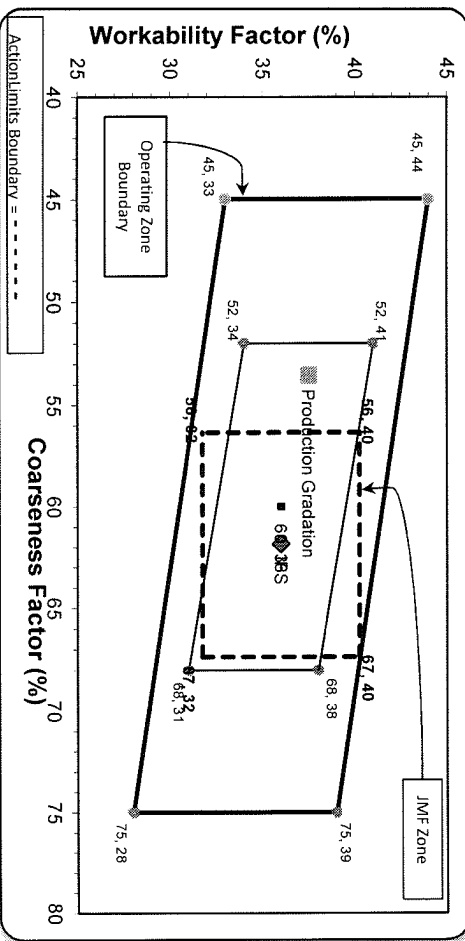
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1450	8.87	2.62	49.9
26A	71-47	Presque Isle	305	1.87	2.62	10.5
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
<b>Total Wt</b>			<b>2905</b>	<b>17.69</b>		<b>100.0</b>

Sieve	% Retained	Cumulative % Retained
2"	0.0	0.0
1.5"	0.0	0.0
1"	0.5	0.5
3/4"	5.0	5.5
1/2"	17.8	23.3
3/8"	11.5	34.8
#4	21.3	56.1
#8	8.9	65.0
#16	7.4	72.4
#30	7.7	80.0
#50	9.9	90.0
#100	6.9	96.8
LBW	1.8	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.

Production Gradation	<input checked="" type="radio"/> Batch Plant Gradations	<input type="radio"/> Aggregate Supplier Gradations
Coarseness Factor:	<b>54</b>	Workability Factor: <b>35</b>
Adjusted WF		<b>37.5</b>



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

PREPARED BY:  
 SM, LLC Technical Service

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

# Edw. C. Levy Co.

## Basic Quality Statistical Summary Report

**Plant** 958-JMT  
**Product** 1054-6AA LS PI  
**Specification** 6AA LS PI Spec  
**Period** 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	1	100.0			
1 1/2" (37.5mm)	1	100.0			100-100
1" (25mm)	1	98.7			95-100
3/4" (19mm)	1	89.1			
1/2" (12.5mm)	1	54.3			30-60
3/8" (9.5mm)	1	32.6			
#4 (4.75mm)	1	5.5			0-8
#8 (2.36mm)	1	2.4			
#16 (1.18mm)	1	2.0			
#30 (.6mm)	1	1.9			
#50 (.3mm)	1	1.8			
#100 (.15mm)	1	1.7			
#200 (75µm)	1	1.5			
Pan	1	0.0			
Wash Loss (#200/75um)	1	1.4			0-2
Total Moisture	1	3.1			

# Edw. C. Levy Co.

## Basic Quality Statistical Summary Report

Plant 958-JMT  
Product 1067-26A Mod LS  
Specification 26A Mod LS Spec  
Period 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	1	100.0			
1 1/2" (37.5mm)	1	100.0			
1" (25mm)	1	100.0			
3/4" (19mm)	1	100.0			100-100
1/2" (12.5mm)	1	97.0			95-100
3/8" (9.5mm)	1	87.3			60-95
#4 (4.75mm)	1	27.5			5-30
#8 (2.36mm)	1	9.4			0-12
#16 (1.18mm)	1	4.7			
#30 (.6mm)	1	3.8			
#50 (.3mm)	1	3.5			
#100 (.15mm)	1	3.3			
#200 (75µm)	1	3.0			
Pan	1	0.0			
Wash Loss (#200/75um)	1	2.8			0-3
Total Moisture	1	3.3			

# Edw. C. Levy Co.

## Basic Quality Statistical Summary Report

**Plant** 958-JMT  
**Product** 1022-2NS GR - Smelter Bay  
**Specification** 2NS GR Spec  
**Period** 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
3/8" (9.5mm)	1	100.0			100-100
#4 (4.75mm)	1	95.5			95-100
#8 (2.36mm)	1	82.7			65-95
#16 (1.18mm)	1	65.9			35-75
#30 (.6mm)	1	46.8			20-55
#50 (.3mm)	1	22.0		18-28	10-30
#100 (.15mm)	1	5.2			0-10
#200 (75µm)	1	1.1			
Pan	1	0.0			
FM	1	2.82		2.7-2.9	2.6-3
Wash Loss (#200/75um)	1	0.9			0-3
Total Moisture	1	5.2			

# Aggregate Optimization Chart

# Production Gradation Report

**PLANT #:** P-36

**Sample Date:** 7/13/20

**Dates Test Represents:** 7/14/2020

through 7/20/2020

**Concrete Grade:** DM

**Contractor:**

**MDOT No.:**

Aggr. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
6AA	71-47	Presque Isle	1505	9.21	2.62	51.8
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
<b>Total Wt:</b>			<b>2905</b>	<b>17.69</b>		<b>100.0</b>

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"	99.0	100.0	100.0	99.5	0.5	0.5
3/4"	81.0	100.0	100.0	90.2	9.8	9.8
1/2"	50.0	98.0	100.0	73.9	26.1	26.1
3/8"	33.0	88.0	100.0	64.0	36.0	36.0
#4	7.0	28.0	97.0	43.2	56.8	56.8
#8	4.0	8.0	83.0	34.3	65.7	65.7
#16	2.8	3.7	68.0	27.6	72.4	72.4
#30	2.6	2.9	48.0	19.8	80.2	80.2
#50	2.6	2.6	19.6	9.0	91.0	91.0
#100	2.3	2.3	3.5	2.8	97.2	97.2
LBW	2.0	2.0	0.8	1.5	98.5	98.5

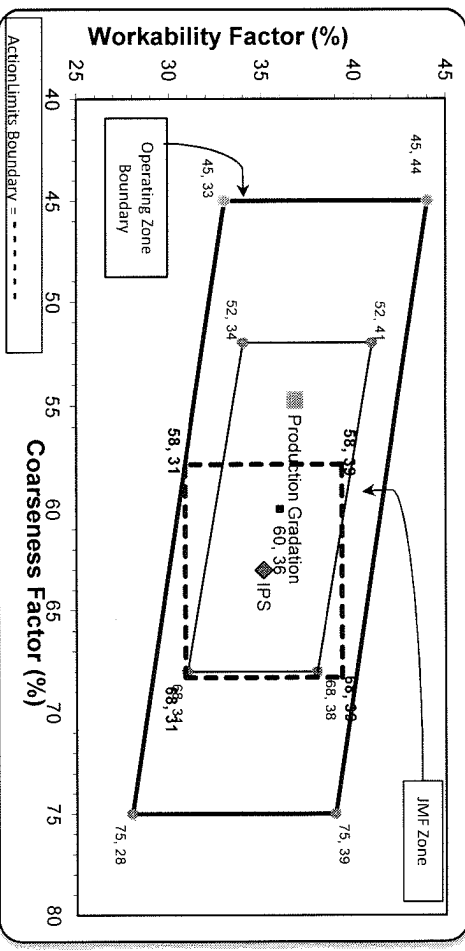
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max.  
 nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max.  
 nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when  
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

**Production Gradation**  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor:** 55      **Workability Factor:** 34      **Adjusted WF:** 36.8

**Initial Production Sample (IPS)**

Sieve	Coarseness Factor:	Workability Factor:	% Retained	Cumulative % Retained
2"	63	35	0.0	0.0
1.5"			0.0	0.0
1"			0.9	0.9
3/4"			8.8	9.7
1/2"			21.1	30.8
3/8"			59.1	40.9
#4			17.3	58.2
#8			35.1	64.9
#16			28.5	71.5
#30			21.2	78.8
#50			8.7	91.3
#100			1.8	98.2
LBW			1.0	99.3



PREPARED BY:  
SM, LLC Technical Service

Approved By:

*[Signature]*



# Basic Quality Statistical Summary Report

**Plant** S36-Superior Auburn Hills  
**Product** 1051-6AA LS  
**Specification** 6AA LS  
**Period** 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	2	100.0	0.00		
1 1/2" (37.5mm)	2	100.0	0.00		100-100
1" (25mm)	2	98.8	1.70		95-100
3/4" (19mm)	2	81.4	0.57		
1/2" (12.5mm)	2	50.2	8.77		30-60
3/8" (9.5mm)	2	32.7	7.21		
#4 (4.75mm)	2	6.7	2.40		0-8
#8 (2.36mm)	2	3.6	2.12		
#16 (1.18mm)	2	2.8	1.34		
#30 (.6mm)	2	2.6	1.34		
#50 (.3mm)	2	2.6	1.20		
#100 (.15mm)	2	2.3	1.13		
#200 (75µm)	2	2.0	1.06		
Pan	2	0.0	0.00		
Wash Loss (#200/75um)	2	2.0	1.06		0-2
Total Moisture	2	4.18	0.106		



## Basic Quality Statistical Summary Report

**Plant** S36-Superior Auburn Hills  
**Product** 1067-26A Mod LS  
**Specification** 26A LS Spec  
**Period** 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	2	100.0	0.00		
1 1/2" (37.5mm)	2	100.0	0.00		
1" (25mm)	2	100.0	0.00		
3/4" (19mm)	2	100.0	0.00		100-100
1/2" (12.5mm)	2	98.2	0.00		95-100
3/8" (9.5mm)	2	87.7	0.00		60-95
#4 (4.75mm)	2	28.2	0.00		5-30
#8 (2.36mm)	2	8.1	0.00		0-12
#16 (1.18mm)	2	3.7	0.00		
#30 (.6mm)	2	2.9	0.00		
#50 (.3mm)	2	2.6	0.00		
#100 (.15mm)	2	2.3	0.00		
#200 (75µm)	2	2.0	0.00		
Pan	2	0.0	0.00		
Wash Loss (#200/75um)	2	2.0	0.00		0-3
Total Moisture	2	1.36	0.000		



## Basic Quality Statistical Summary Report

**Plant** S36-Superior Auburn Hills  
**Product** 1022-2NS GR  
**Specification** 2NS GR Spec  
**Period** 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
3/8" (9.5mm)	2	100.0	0.00		100-100
#4 (4.75mm)	2	97.2	0.00		95-100
#8 (2.36mm)	2	83.4	0.00		65-95
#16 (1.18mm)	2	67.7	0.00		35-75
#30 (.6mm)	2	48.4	0.00	40-50	20-55
#50 (.3mm)	2	19.6	0.00		10-30
#100 (.15mm)	2	3.5	0.00		0-10
#200 (75µm)	2	0.9	0.00		
Pan	2	0.0	0.00		
FM	2	2.80	0.000	2.7-2.9	2.6-3
Wash Loss (#200/75um)	2	0.8	0.00		0-3
Total Moisture	2	3.49	0.000		



# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-39**

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

Sample Date: **7/13/20**

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

Dates Test Represents: **7/14/2020** through **7/20/2020**

Concrete Grade: **DM**

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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	44-051	Krake Willis Rd	1150	6.95	2.65	39.6
Total Wt						17.69
						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"	96.0	100.0	100.0	97.8	2.2	2.2
3/4"	74.0	100.0	100.0	85.6	14.4	14.4
1/2"	38.0	99.0	100.0	65.7	34.3	34.3
3/8"	21.0	92.0	100.0	55.9	44.1	44.1
#4	4.0	29.0	95.0	41.3	58.7	58.7
#8	2.5	9.0	78.0	32.7	67.3	67.3
#16	2.3	3.8	64.0	26.8	73.2	73.2
#30	2.2	2.9	50.0	21.2	78.8	78.8
#50	2.1	2.6	27.0	12.0	88.0	88.0
#100	2.0	2.4	7.5	4.2	95.8	95.8
LBW	1.7	2.1	1.5	1.6	98.4	98.4

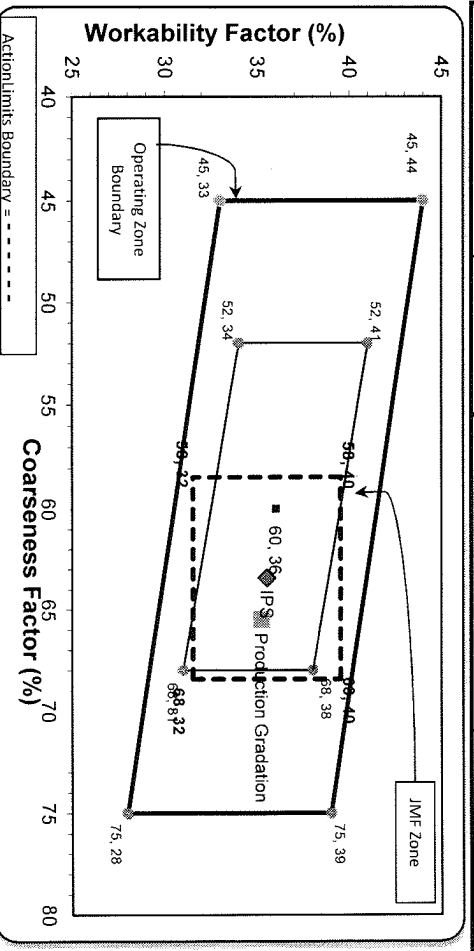
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max.  
 nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max.  
 nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when  
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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

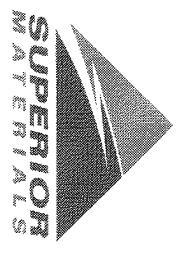
Coarseness Factor: **65** Workability Factor: **33** Adjusted WF: **35.2**

Initial Production Sample (IPS)

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"	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



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PREPARED BY:  
 SM, LLC Technical Service

Approved By:



## Basic Quality Statistical Summary Report

**Plant** S39-Superior Sterling Heights  
**Product** 1051-6AA LS  
**Specification** 6AA LS  
**Period** 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	1	100.0			
1 1/2" (37.5mm)	1	100.0			100-100
1" (25mm)	1	95.7			95-100
3/4" (19mm)	1	74.1			
1/2" (12.5mm)	1	37.6			30-60
3/8" (9.5mm)	1	20.5			
#4 (4.75mm)	1	3.9			0-8
#8 (2.36mm)	1	2.5			
#16 (1.18mm)	1	2.3			
#30 (.6mm)	1	2.2			
#50 (.3mm)	1	2.1			
#100 (.15mm)	1	2.0			
#200 (75µm)	1	1.81			
Pan	1	0.00			
Wash Loss (#200/75um)	1	1.7			0-2
Total Moisture	1	2.48			



## Basic Quality Statistical Summary Report

**Plant** S39-Superior Sterling Heights  
**Product** 1067-26A Mod LS  
**Specification** 26A LS Spec  
**Period** 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	1	100.0			
1 1/2" (37.5mm)	1	100.0			
1" (25mm)	1	100.0			
3/4" (19mm)	1	100.0			100-100
1/2" (12.5mm)	1	98.8			95-100
3/8" (9.5mm)	1	91.5			60-95
#4 (4.75mm)	1	29.0			5-30
#8 (2.36mm)	1	8.8			0-12
#16 (1.18mm)	1	3.8			
#30 (.6mm)	1	2.9			
#50 (.3mm)	1	2.6			
#100 (.15mm)	1	2.4			
#200 (75µm)	1	2.2			
Pan	1	0.0			
Wash Loss (#200/75µm)	1	2.1			0-3
Total Moisture	1	3.04			



## Basic Quality Statistical Summary Report

**Plant** S39-Superior Sterling Heights  
**Product** 1022-2NS GR  
**Specification** 2NS GR Spec  
**Period** 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
3/8" (9.5mm)	1	100.0			100-100
#4 (4.75mm)	1	95.4			95-100
#8 (2.36mm)	1	78.3			65-95
#16 (1.18mm)	1	64.0			35-75
#30 (.6mm)	1	50.4		40-50	20-55
#50 (.3mm)	1	27.0			10-30
#100 (.15mm)	1	7.5			0-10
#200 (75µm)	1	1.9			
Pan	1	0.0			
FM	1	2.77		2.7-2.9	2.6-3
Wash Loss (#200/75um)	1	1.5			0-3
Total Moisture	1	4.41			

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-102**

Sample Date: **7/13/20**

Dates Test Represents: **7/14/2020** through **7/20/2020**

Concrete Grade: **DM**

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
6AA	58-003	Stoneco	1500	8.94	2.69	50.8
26A	58-003	Stoneco	305	1.82	2.69	10.3
2NS	63-114	Highland	1150	6.95	2.65	38.9
Total Wt:						17.71
						100.0

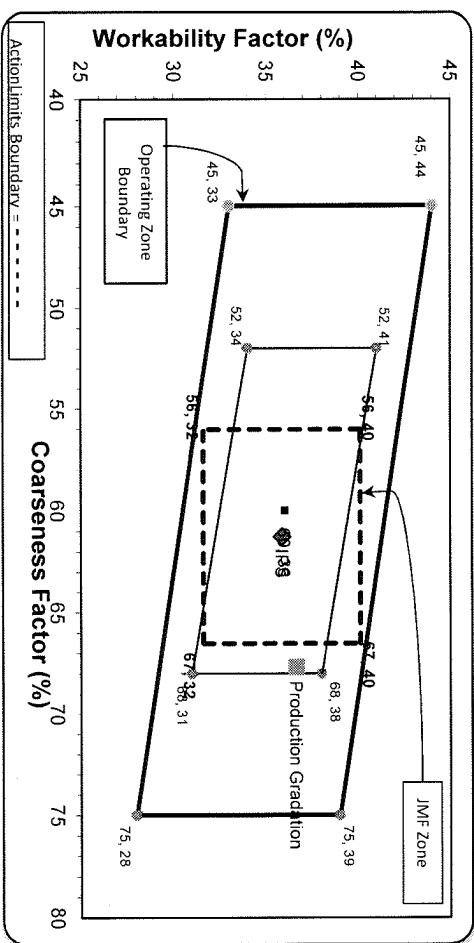
<----- Verify this number is 100%

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"	99.0	100.0	100.0	99.5	0.5	0.5
3/4"	72.0	100.0	100.0	85.8	13.7	14.2
1/2"	31.0	100.0	100.0	65.0	20.8	35.0
3/8"	15.0	86.0	100.0	55.4	9.6	44.6
#4	3.0	15.0	99.0	41.6	13.8	58.4
#8	2.0	4.0	84.0	34.1	7.5	65.9
#16	1.3	2.6	62.0	25.1	9.1	74.9
#30	1.2	2.1	44.0	17.9	7.1	82.1
#50	1.1	2.0	20.0	8.5	9.4	91.5
#100	1.1	1.9	4.3	2.4	6.1	97.6
LBW	0.9	1.8	0.5	0.8	1.6	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. 1.5") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

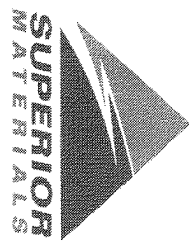
Coarseness Factor: **68** Workability Factor: **34** Adjusted WF: **36.6**



Sieve	Coarseness Factor:	Workability Factor:	Adjusted WF
2"	100.0	100.0	0.0
1.5"	100.0	100.0	0.0
1"	99.3	100.0	0.7
3/4"	89.2	100.0	10.8
1/2"	70.7	100.0	18.5
3/8"	60.7	100.0	29.3
#4	44.4	100.0	39.3
#8	35.9	100.0	55.6
#16	27.3	100.0	64.1
#30	19.1	100.0	72.7
#50	7.4	100.0	80.9
#100	1.9	100.0	92.6
LBW	0.7	100.0	98.1

PREPARED BY:  
SM, LLC Technical Service

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



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



## Basic Quality Statistical Summary Report

**Plant** S102-Superior Novi  
**Product** 1051-6AA LS  
**Specification** 6AA LS  
**Period** 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	1	100.0			
1 1/2" (37.5mm)	1	100.0			100-100
1" (25mm)	1	99.3			95-100
3/4" (19mm)	1	72.4			
1/2" (12.5mm)	1	31.4			30-60
3/8" (9.5mm)	1	14.7			
#4 (4.75mm)	1	3.2			0-8
#8 (2.36mm)	1	1.7			
#16 (1.18mm)	1	1.3			
#30 (.6mm)	1	1.2			
#50 (.3mm)	1	1.1			
#100 (.15mm)	1	1.1			
#200 (75µm)	1	1.01			
Pan	1	0.00			
Wash Loss (#200/75um)	1	0.9			0-2
Total Moisture	1	3.40			



## Basic Quality Statistical Summary Report

**Plant** S102-Superior Novi  
**Product** 1067-26A Mod LS  
**Specification** 26A Mod LS Spec  
**Period** 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	1	100.0			
1 1/2" (37.5mm)	1	100.0			
1" (25mm)	1	100.0			
3/4" (19mm)	1	100.0			100-100
1/2" (12.5mm)	1	100.0			95-100
3/8" (9.5mm)	1	86.0			60-95
#4 (4.75mm)	1	15.0			5-30
#8 (2.36mm)	1	4.4			0-12
#16 (1.18mm)	1	2.6			
#30 (.6mm)	1	2.1			
#50 (.3mm)	1	2.0			
#100 (.15mm)	1	1.9			
#200 (75µm)	1	1.9			
Pan	1	0.0			
Wash Loss (#200/75um)	1	1.8			0-3
Total Moisture	1	3.93			



## Basic Quality Statistical Summary Report

**Plant** S102-Superior Novi  
**Product** 1022-2NS GR  
**Specification** 2NS GR Spec  
**Period** 07/12/2020 - 07/18/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
3/8" (9.5mm)	1	100.0			100-100
#4 (4.75mm)	1	99.1			95-100
#8 (2.36mm)	1	83.7			65-95
#16 (1.18mm)	1	62.1			35-75
#30 (.6mm)	1	44.3		40-50	20-55
#50 (.3mm)	1	19.8			10-30
#100 (.15mm)	1	4.3			0-10
#200 (75µm)	1	0.9			
Pan	1	0.0			
FM	1	2.87		2.7-2.9	2.6-3
Wash Loss (#200/75um)	1	0.5			0-3
Total Moisture	1	5.04			