

# Aggregate Optimization Chart

**PLANT #:** **P-102**

Sample Date: 6/15/20

Concrete Grade: **P1M**

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

Dates Test Represents: 6/16/2020 through 6/22/2020

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	58-003	Stoneco	1420	8.46	2.69	45.5
IA	58-003	Stoneco	500	2.98	2.69	16.0
2NS	63-114	Highland	1200	7.26	2.65	38.5
<b>Total Wt</b>			<b>3120</b>	<b>18.70</b>		<b>100.0</b>

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



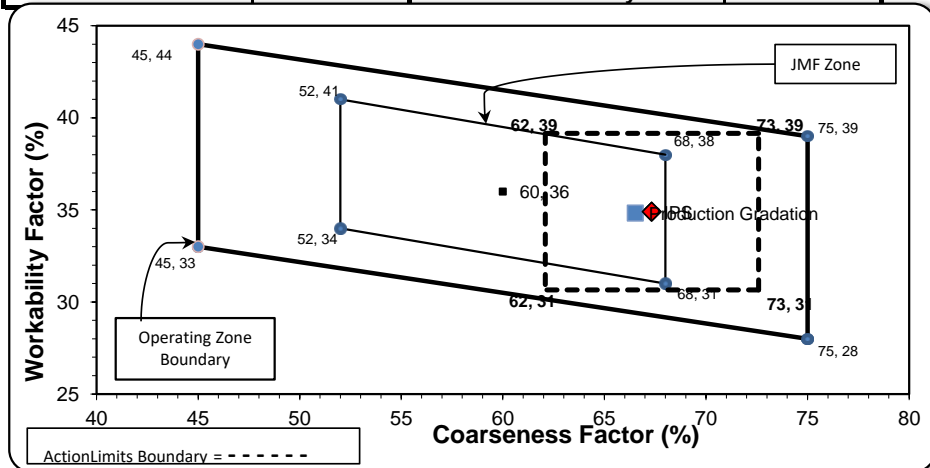
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	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"	67.1	100.0	100.0	85.0	15.0	15.0
3/4"	43.0	100.0	100.0	74.1	11.0	25.9
1/2"	18.5	88.2	100.0	61.0	13.0	39.0
3/8"	11.3	81.4	100.0	56.6	4.4	43.4
#4	2.7	26.2	99.4	43.7	13.0	56.3
#8	1.9	5.8	85.9	34.8	8.8	65.2
#16	1.7	1.5	69.2	27.6	7.2	72.4
#30	1.5	1.1	50.5	20.3	7.3	79.7
#50	1.4	1.0	18.8	8.0	12.3	92.0
#100	1.4	0.8	3.3	2.0	6.0	98.0
LBW	1.2	0.6	0.3	0.8	1.3	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:** **67**      **Workability Factor:** **35**



Initial Production Sample (IPS)

**Coarseness Factor:** **67**  
**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"	85.5	14.5	14.5
3/4"	73.4	12.1	26.6
1/2"	61.0	12.4	39.0
3/8"	56.2	4.8	43.8
#4	43.1	13.1	56.9
#8	34.9	8.2	65.1
#16	29.4	5.5	70.6
#30	21.6	7.8	78.4
#50	8.1	13.4	91.9
#100	2.2	5.9	97.8
LBW	1.4	0.8	98.6

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** P-12

Sample Date: 6/15/20

Concrete Grade: P1M

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

Dates Test Represents: 6/16/2020 through 6/22/2020

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	750	4.59	2.62	24.4
IA	71-47	Presque Isle	1070	6.54	2.62	34.9
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
<b>Total Wt</b>			<b>3070</b>	<b>18.69</b>		<b>100.0</b>

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



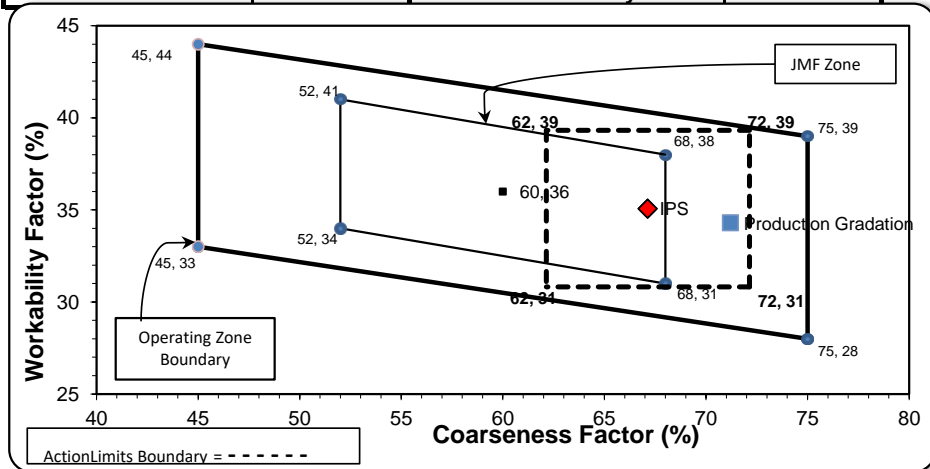
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.5	0.5	0.5
1"	30.2	100.0	100.0	82.9	16.5	17.1
3/4"	11.4	97.0	100.0	77.3	5.6	22.7
1/2"	5.6	62.4	100.0	63.8	13.5	36.2
3/8"	4.4	32.8	100.0	53.2	10.6	46.8
#4	2.8	6.4	98.3	42.9	10.3	57.1
#8	2.2	3.2	80.2	34.3	8.6	65.7
#16	2.0	2.4	62.9	26.9	7.4	73.1
#30	2.0	2.2	47.2	20.5	6.5	79.5
#50	1.9	2.0	24.7	11.2	9.3	88.8
#100	1.8	1.6	5.7	3.3	7.9	96.7
LBW	1.6	1.2	0.6	1.1	2.3	98.9

\*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

<b>Coarseness Factor:</b>	<b>71</b>	<b>Workability Factor:</b>	<b>34</b>
---------------------------	-----------	----------------------------	-----------



Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>67</b>		
<b>Workability Factor:</b>	<b>35</b>		
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.6	0.4	0.4
1"	83.9	15.7	16.1
3/4"	74.0	9.8	26.0
1/2"	63.7	10.3	36.3
3/8"	56.4	7.3	43.6
#4	43.0	13.4	57.0
#8	35.1	7.9	64.9
#16	29.0	6.1	71.0
#30	20.9	8.0	79.1
#50	8.1	12.8	91.9
#100	1.6	6.5	98.4
LBW	0.9	0.8	99.1

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** P-32

Sample Date: 6/15/20

Concrete Grade: P1M

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

Dates Test Represents: 6/16/2020 through 6/22/2020

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	450	2.75	2.62	14.7
IA	71-47	Presque Isle	1420	8.69	2.62	46.3
2NS	95-013	Smelter Bay	1200	7.26	2.65	39.1
<b>Total Wt</b>			<b>3070</b>	<b>18.70</b>		<b>100.0</b>

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



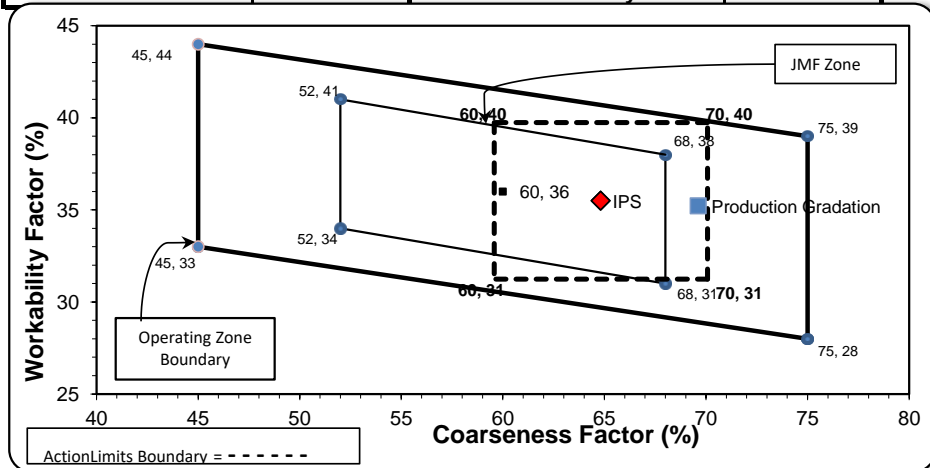
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.7	0.3	0.3
1"	30.2	100.0	100.0	89.8	9.9	10.2
3/4"	11.4	97.0	100.0	85.6	4.1	14.4
1/2"	5.6	62.4	100.0	68.8	16.9	31.2
3/8"	4.4	32.8	100.0	54.9	13.9	45.1
#4	2.8	6.4	97.1	41.3	13.6	58.7
#8	2.2	3.2	85.5	35.2	6.1	64.8
#16	2.0	2.4	70.1	28.8	6.4	71.2
#30	2.0	2.2	49.2	20.5	8.3	79.5
#50	1.9	2.0	21.6	9.6	10.9	90.4
#100	1.8	1.6	6.2	3.4	6.2	96.6
LBW	1.6	1.2	1.4	1.3	2.1	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  Batch Plant Gradations  Aggregate Supplier Gradations

<b>Coarseness Factor:</b>	<b>70</b>	<b>Workability Factor:</b>	<b>35</b>
---------------------------	-----------	----------------------------	-----------



Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>		
<b>Workability Factor:</b>	<b>35</b>		
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	0.6	0.6
1"	84.0	15.3	16.0
3/4"	73.5	10.5	26.5
1/2"	65.2	8.2	34.8
3/8"	58.2	7.1	41.8
#4	44.1	14.1	55.9
#8	35.5	8.6	64.5
#16	29.1	6.4	70.9
#30	21.9	7.3	78.1
#50	9.6	12.2	90.4
#100	2.6	7.1	97.4
LBW	1.0	1.6	99.0

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** **P-36**

Sample Date: 6/15/20

Concrete Grade: **P1M**

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

Dates Test Represents: 6/16/2020 through 6/22/2020

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	450	2.75	2.62	14.7
IA	71-47	Presque Isle	1420	8.69	2.62	46.3
2NS	63-92	Grange Hall	1200	7.26	2.65	39.1
<b>Total Wt</b>			<b>3070</b>	<b>18.70</b>		<b>100.0</b>

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



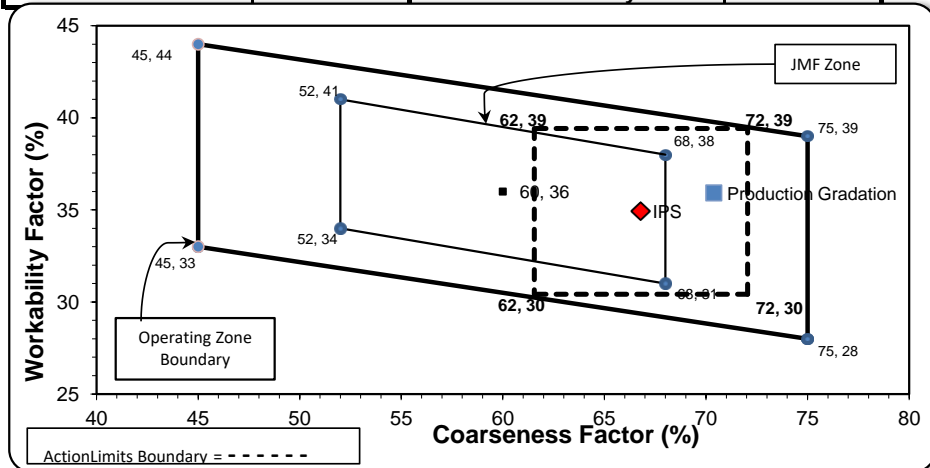
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.7	0.3	0.3
1"	30.2	100.0	100.0	89.8	9.9	10.2
3/4"	11.4	97.0	100.0	85.6	4.1	14.4
1/2"	5.6	62.4	100.0	68.8	16.9	31.2
3/8"	4.4	32.8	100.0	54.9	13.9	45.1
#4	2.8	6.4	97.9	41.6	13.3	58.4
#8	2.2	3.2	87.3	35.9	5.7	64.1
#16	2.0	2.4	73.3	30.1	5.9	69.9
#30	2.0	2.2	50.1	20.9	9.2	79.1
#50	1.9	2.0	17.8	8.2	12.7	91.8
#100	1.8	1.6	2.0	1.8	6.4	98.2
LBW	1.6	1.2	0.6	1.0	0.8	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  Batch Plant Gradations  Aggregate Supplier Gradations

<b>Coarseness Factor:</b>	<b>70</b>	<b>Workability Factor:</b>	<b>36</b>
---------------------------	-----------	----------------------------	-----------



Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>67</b>
<b>Workability Factor:</b>	<b>35</b>

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	85.0	15.0	15.0
3/4"	72.1	12.9	27.9
1/2"	64.5	7.6	35.5
3/8"	56.5	8.0	43.5
#4	42.7	13.8	57.3
#8	34.9	7.8	65.1
#16	29.0	5.9	71.0
#30	21.0	8.0	79.0
#50	8.2	12.8	91.8
#100	1.6	6.5	98.4
LBW	0.7	0.9	99.3

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** **P-39**

Sample Date: 6/15/20

Concrete Grade: **P1M**

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

Dates Test Represents: 6/16/2020 through 6/22/2020

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1000	6.12	2.62	32.6
IA	71-47	Presque Isle	850	5.20	2.62	27.7
2NS	44-051	Krake Willis Rd	1220	7.38	2.65	39.7
<b>Total Wt</b>			<b>3070</b>	<b>18.69</b>		<b>100.0</b>

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



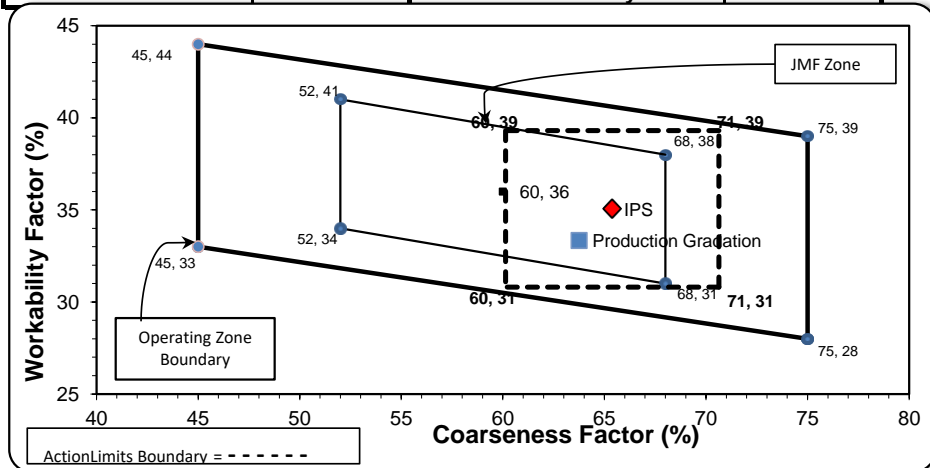
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.7	100.0	100.0	99.3	0.7	0.7
1"	40.7	100.0	100.0	80.7	18.6	19.3
3/4"	12.0	100.0	100.0	71.3	9.3	28.7
1/2"	2.6	83.1	100.0	63.6	7.7	36.4
3/8"	2.0	61.8	100.0	57.5	6.1	42.5
#4	1.6	17.0	95.9	43.3	14.2	56.7
#8	1.5	6.4	78.2	33.3	10.0	66.7
#16	1.4	3.6	64.4	27.0	6.3	73.0
#30	1.4	3.0	48.6	20.6	6.4	79.4
#50	1.4	2.7	23.7	10.6	10.0	89.4
#100	1.3	2.6	7.5	4.1	6.5	95.9
LBW	1.1	2.3	1.7	1.7	2.5	98.3

\*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 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:** **64**      **Workability Factor:** **33**



Intial Production Sample (IPS)

**Coarseness Factor:** **65**  
**Workability Factor:** **35**

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.6	0.4	0.4
1"	83.9	15.7	16.1
3/4"	74.1	9.8	25.9
1/2"	64.3	9.7	35.7
3/8"	57.5	6.8	42.5
#4	44.5	13.1	55.5
#8	35.1	9.4	64.9
#16	27.9	7.2	72.1
#30	21.7	6.2	78.3
#50	12.6	9.1	87.4
#100	3.5	9.1	96.5
LBW	1.2	2.4	98.8

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** P-02

Sample Date: 6/15/20

Concrete Grade: P1M

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

Dates Test Represents: 6/16/2020 through 6/22/2020

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	750	4.59	2.62	24.4
IA	71-47	Presque Isle	1070	6.54	2.62	34.9
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
<b>Total Wt</b>			<b>3070</b>	<b>18.69</b>		<b>100.0</b>

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



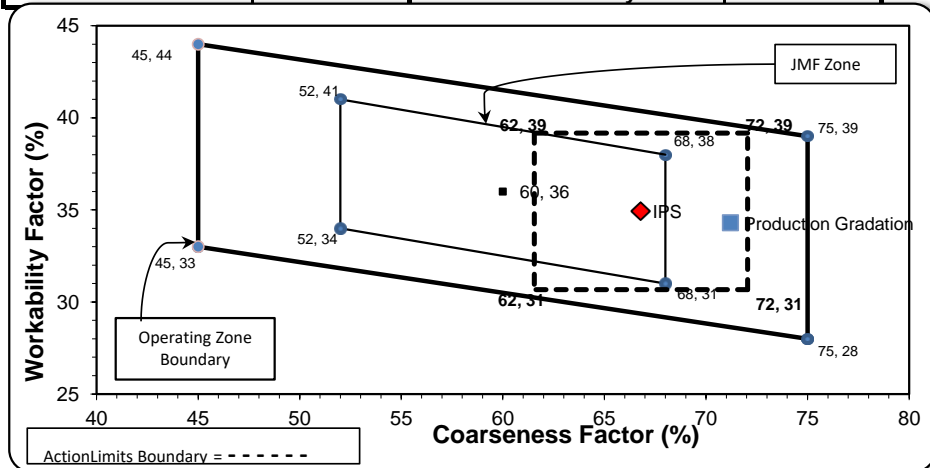
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.5	0.5	0.5
1"	30.2	100.0	100.0	82.9	16.5	17.1
3/4"	11.4	97.0	100.0	77.3	5.6	22.7
1/2"	5.6	62.4	100.0	63.8	13.5	36.2
3/8"	4.4	32.8	100.0	53.2	10.6	46.8
#4	2.8	6.4	98.3	42.9	10.3	57.1
#8	2.2	3.2	80.2	34.3	8.6	65.7
#16	2.0	2.4	62.9	26.9	7.4	73.1
#30	2.0	2.2	47.2	20.5	6.5	79.5
#50	1.9	2.0	24.7	11.2	9.3	88.8
#100	1.8	1.6	5.7	3.3	7.9	96.7
LBW	1.6	1.2	0.6	1.1	2.3	98.9

\*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

<b>Coarseness Factor:</b>	<b>71</b>	<b>Workability Factor:</b>	<b>34</b>
---------------------------	-----------	----------------------------	-----------



Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>67</b>
<b>Workability Factor:</b>	<b>35</b>

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	85.0	15.0	15.0
3/4"	72.3	12.7	27.7
1/2"	64.5	7.8	35.5
3/8"	56.5	8.0	43.5
#4	42.7	13.8	57.3
#8	34.9	7.8	65.1
#16	29.0	5.9	71.0
#30	21.0	8.0	79.0
#50	8.2	12.8	91.8
#100	1.6	6.5	98.4
LBW	0.7	0.9	99.3

PREPARED BY:  
 SM, LLC Technical Service

Approved By: