

# Aggregate Optimization Chart

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

Sample Date: 6/1/20 Concrete Grade: **P1M**  
 Dates Test Represents: 6/2/2020 through 6/8/2020

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

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%



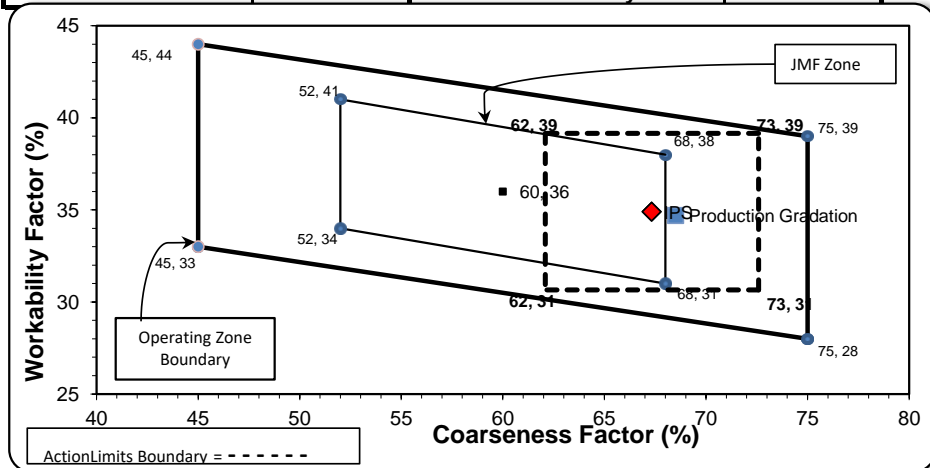
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	66.2	100.0	100.0	84.6	15.4	15.4
3/4"	35.8	100.0	100.0	70.8	13.8	29.2
1/2"	18.6	90.1	100.0	61.4	9.4	38.6
3/8"	10.3	75.6	100.0	55.3	6.1	44.7
#4	3.8	25.0	99.4	44.0	11.3	56.0
#8	2.9	5.2	84.6	34.7	9.3	65.3
#16	2.4	1.9	67.8	27.5	7.2	72.5
#30	2.1	1.4	50.5	20.6	6.9	79.4
#50	1.9	1.3	21.6	9.4	11.2	90.6
#100	1.7	1.2	4.2	2.6	6.8	97.4
LBW	1.6	1.0	0.4	1.0	1.5	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>68</b>	<b>Workability Factor:</b>	<b>35</b>
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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"	85.5	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: 6/1/20 Concrete Grade: **P1M**  
 Dates Test Represents: 6/2/2020 through 6/8/2020

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	900	5.50	2.62	29.3
IA	71-47	Presque Isle	920	5.63	2.62	30.0
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%



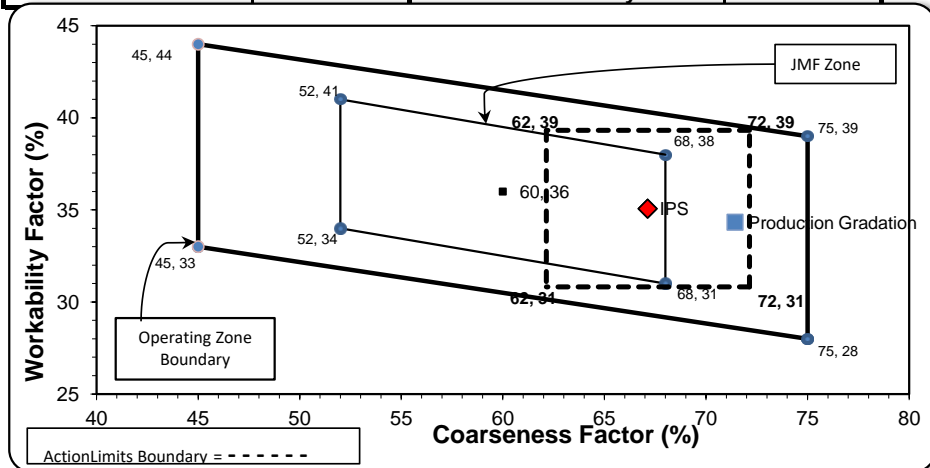
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	99.1	100.0	100.0	99.7	0.3	0.3
1"	39.7	100.0	100.0	82.3	17.4	17.7
3/4"	11.0	95.5	100.0	72.6	9.8	27.4
1/2"	3.5	73.6	100.0	63.8	8.8	36.2
3/8"	2.9	38.5	100.0	53.1	10.7	46.9
#4	2.6	7.0	98.6	43.0	10.1	57.0
#8	2.4	3.0	80.4	34.3	8.7	65.7
#16	2.2	2.1	62.5	26.7	7.6	73.3
#30	2.1	1.8	46.5	20.1	6.6	79.9
#50	1.9	1.7	24.2	10.9	9.2	89.1
#100	1.8	1.4	5.5	3.2	7.7	96.8
LBW	1.5	0.9	0.5	0.9	2.3	99.1

\*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:** **71** **Workability Factor:** **34**



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"	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: 6/1/20

Concrete Grade: **P1M**

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

Dates Test Represents: 6/2/2020 through 6/8/2020

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	675	4.13	2.62	22.0
IA	71-47	Presque Isle	1100	6.73	2.62	35.8
2NS	95-013	Smelter Bay	1300	7.86	2.65	42.3
<b>Total Wt</b>			<b>3075</b>	<b>18.72</b>		<b>100.0</b>

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



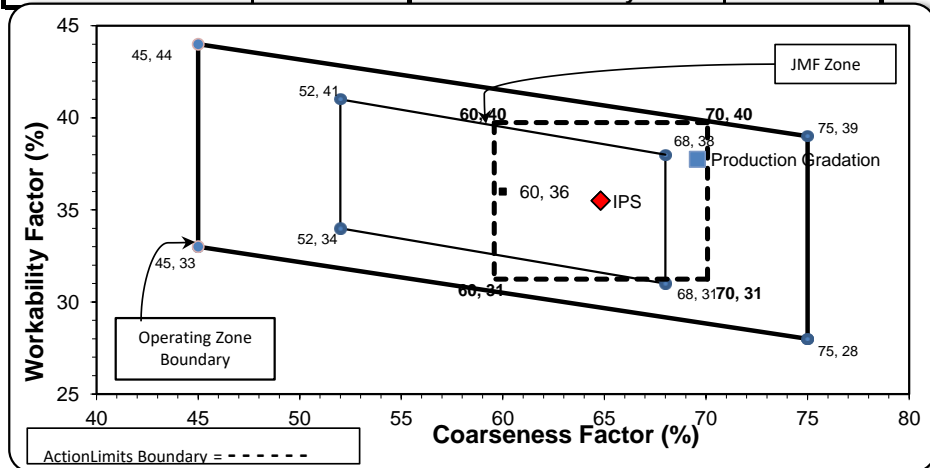
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	99.1	100.0	100.0	99.8	0.2	0.2
1"	39.7	100.0	100.0	86.8	13.0	13.2
3/4"	11.0	95.5	100.0	78.9	7.9	21.1
1/2"	3.5	73.6	100.0	69.4	9.5	30.6
3/8"	2.9	38.5	100.0	56.7	12.7	43.3
#4	2.6	7.0	96.3	43.8	12.9	56.2
#8	2.4	3.0	85.5	37.7	6.0	62.3
#16	2.2	2.1	71.7	31.5	6.2	68.5
#30	2.1	1.8	51.3	22.8	8.8	77.2
#50	1.9	1.7	20.9	9.9	12.9	90.1
#100	1.8	1.4	5.2	3.1	6.8	96.9
LBW	1.5	0.9	1.3	1.2	1.9	98.8

\*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>38</b>
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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: 6/1/20

Concrete Grade: **P1M**

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

Dates Test Represents: 6/2/2020 through 6/8/2020

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	775	4.74	2.62	25.2
IA	71-47	Presque Isle	1095	6.70	2.62	35.7
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%



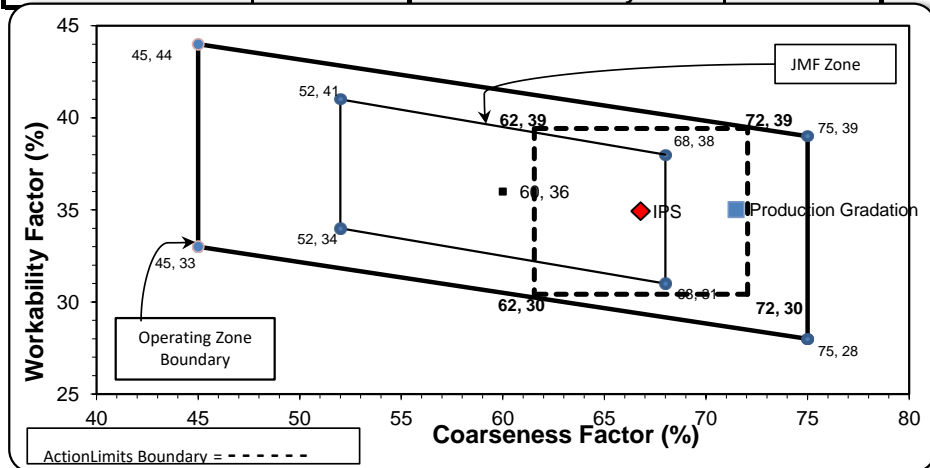
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	99.1	100.0	100.0	99.8	0.2	0.2
1"	39.7	100.0	100.0	84.8	15.0	15.2
3/4"	11.0	95.5	100.0	75.9	8.9	24.1
1/2"	3.5	73.6	100.0	66.2	9.7	33.8
3/8"	2.9	38.5	100.0	53.6	12.7	46.4
#4	2.6	7.0	97.5	41.3	12.3	58.7
#8	2.4	3.0	85.3	35.0	6.2	65.0
#16	2.2	2.1	71.3	29.2	5.8	70.8
#30	2.1	1.8	51.4	21.3	7.9	78.7
#50	1.9	1.7	22.7	10.0	11.3	90.0
#100	1.8	1.4	2.8	2.0	7.9	98.0
LBW	1.5	0.9	0.7	1.0	1.1	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>71</b>	<b>Workability Factor:</b>	<b>35</b>
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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: 6/1/20 Concrete Grade: **P1M**  
 Dates Test Represents: 6/2/2020 through 6/8/2020

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

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%



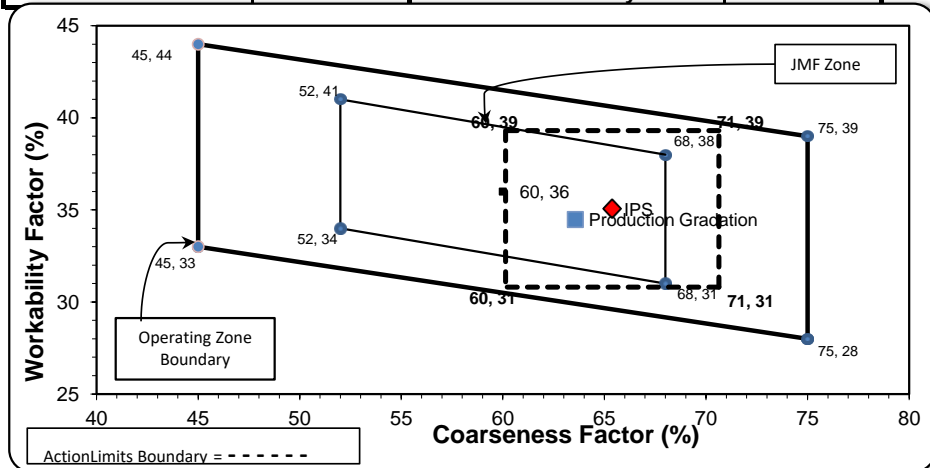
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	43.8	100.0	100.0	81.7	18.3	18.3
3/4"	14.1	99.6	100.0	71.9	9.8	28.1
1/2"	3.2	86.7	100.0	64.8	7.1	35.2
3/8"	2.4	64.4	100.0	58.4	6.4	41.6
#4	1.9	16.5	95.4	43.1	15.3	56.9
#8	1.7	6.0	81.2	34.5	8.6	65.5
#16	1.7	3.1	66.3	27.8	6.7	72.2
#30	1.6	2.6	50.6	21.3	6.4	78.7
#50	1.5	2.3	25.1	11.1	10.2	88.9
#100	1.4	2.2	7.5	4.0	7.1	96.0
LBW	1.2	1.9	0.8	1.2	2.8	98.8

\*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:** **34**



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: 6/1/20 Concrete Grade: **P1M**  
 Dates Test Represents: 6/2/2020 through 6/8/2020

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	900	5.50	2.62	29.3
IA	71-47	Presque Isle	920	5.63	2.62	30.0
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%



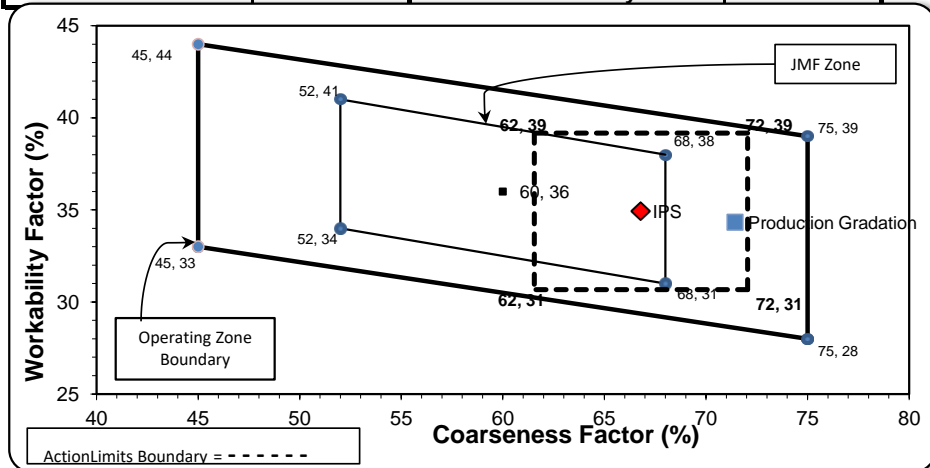
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
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 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	99.1	100.0	100.0	99.7	0.3	0.3
1"	39.7	100.0	100.0	82.3	17.4	17.7
3/4"	11.0	95.5	100.0	72.6	9.8	27.4
1/2"	3.5	73.6	100.0	63.8	8.8	36.2
3/8"	2.9	38.5	100.0	53.1	10.7	46.9
#4	2.6	7.0	98.6	43.0	10.1	57.0
#8	2.4	3.0	80.4	34.3	8.7	65.7
#16	2.2	2.1	62.5	26.7	7.6	73.3
#30	2.1	1.8	46.5	20.1	6.6	79.9
#50	1.9	1.7	24.2	10.9	9.2	89.1
#100	1.8	1.4	5.5	3.2	7.7	96.8
LBW	1.5	0.9	0.5	0.9	2.3	99.1

\*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>
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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: