

# Aggregate Optimization Chart

**PLANT #:** **P-101**

Sample Date: 5/15/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 5/16/2023 through 5/22/2023

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	800	4.89	2.62	26.1
2NS	75-051	Mid Michigan	1200	7.23	2.66	39.1
<b>Total Wt</b>			<b>3070</b>	<b>18.67</b>		<b>100.0</b>

<---- Verify this number is 100%

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	99.2	0.8	0.8
1"	48.9	100.0	100.0	82.2	17.0	17.8
3/4"	14.2	98.5	100.0	69.7	12.5	30.3
1/2"	3.2	83.2	100.0	61.9	7.8	38.1
3/8"	2.4	63.7	100.0	56.5	5.4	43.5
#4	2.2	17.3	97.3	43.3	13.2	56.7
#8	2.2	4.5	82.1	34.0	9.3	66.0
#16	2.1	2.7	66.8	27.5	6.5	72.5
#30	2.0	2.3	50.7	21.1	6.4	78.9
#50	2.0	2.1	23.2	10.3	10.8	89.7
#100	1.8	1.9	6.7	3.7	6.6	96.3
LBW	1.6	1.7	1.3	1.5	2.2	98.5



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\*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.

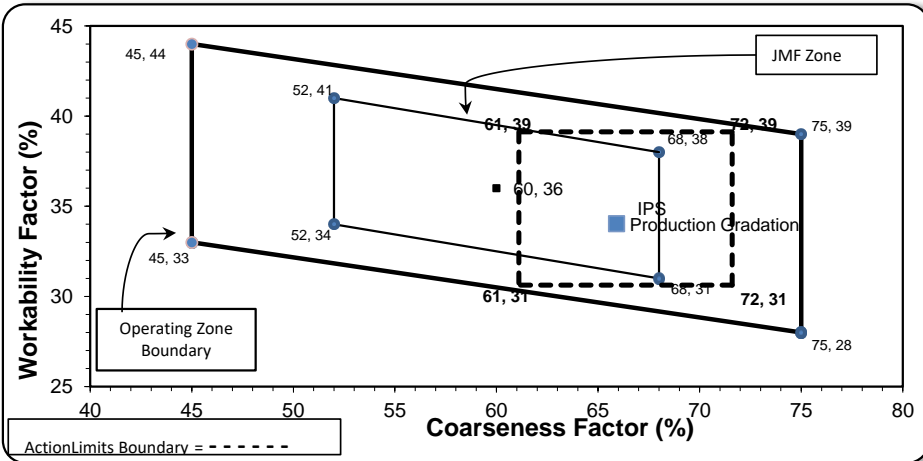
Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

<b>Coarseness Factor:</b>	<b>66</b>	<b>Workability Factor:</b>	<b>34</b>
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Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>66</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"	84.3	15.3	15.7
3/4"	74.8	9.6	25.2
1/2"	64.3	10.4	35.7
3/8"	56.8	7.5	43.2
#4	43.0	13.8	57.0
#8	34.9	8.1	65.1
#16	26.4	8.5	73.6
#30	19.9	6.5	80.1
#50	10.4	9.5	89.6
#100	3.4	7.0	96.6
LBW	1.2	2.2	98.8



PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

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

Sample Date: 5/15/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 5/16/2023 through 5/22/2023

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	550	3.28	2.69	17.6
2NS	81-019	Pleasant Lake	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%



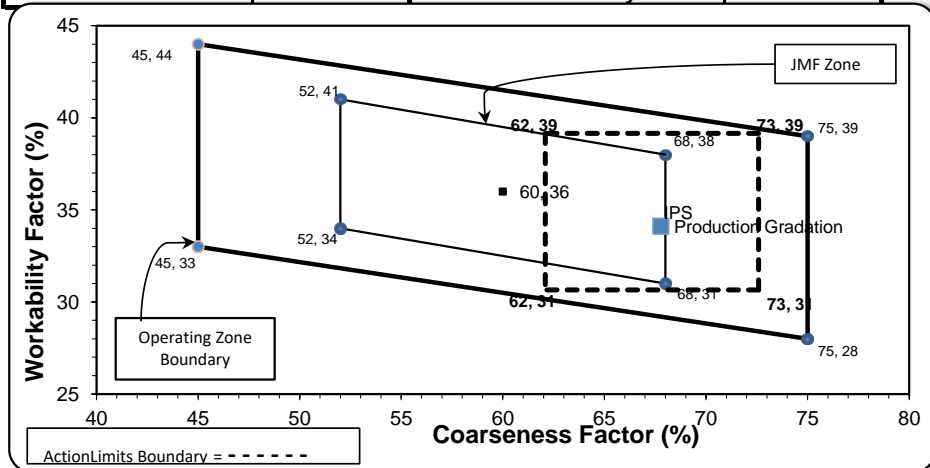
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 Suite 500  
 Farmington Hills, MI 48336

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"	57.6	100.0	100.0	81.4	18.6	18.6
3/4"	32.5	100.0	100.0	70.4	11.0	29.6
1/2"	14.9	91.8	100.0	61.2	9.2	38.8
3/8"	9.4	72.4	100.0	55.4	5.8	44.6
#4	2.9	18.9	98.8	42.6	12.7	57.4
#8	1.7	3.2	85.3	34.1	8.5	65.9
#16	1.4	1.8	67.4	26.9	7.3	73.1
#30	1.4	1.4	46.5	18.7	8.1	81.3
#50	1.4	1.3	21.7	9.2	9.6	90.8
#100	1.2	1.2	5.8	3.0	6.2	97.0
LBW	1.1	1.0	1.1	1.1	1.9	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>68</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"	85.5	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-103**

Sample Date: 5/15/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 5/16/2023 through 5/22/2023

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	550	3.28	2.69	17.6
2NS	81-019	Pleasant Lake	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%

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"	57.6	100.0	100.0	81.4	18.6	18.6
3/4"	32.5	100.0	100.0	70.4	11.0	29.6
1/2"	14.9	91.8	100.0	61.2	9.2	38.8
3/8"	9.4	72.4	100.0	55.4	5.8	44.6
#4	2.9	18.9	98.8	42.6	12.7	57.4
#8	1.7	3.2	85.3	34.1	8.5	65.9
#16	1.4	1.8	67.4	26.9	7.3	73.1
#30	1.4	1.4	46.5	18.7	8.1	81.3
#50	1.4	1.3	21.7	9.2	9.6	90.8
#100	1.2	1.2	5.8	3.0	6.2	97.0
LBW	1.1	1.0	1.1	1.1	1.9	98.9

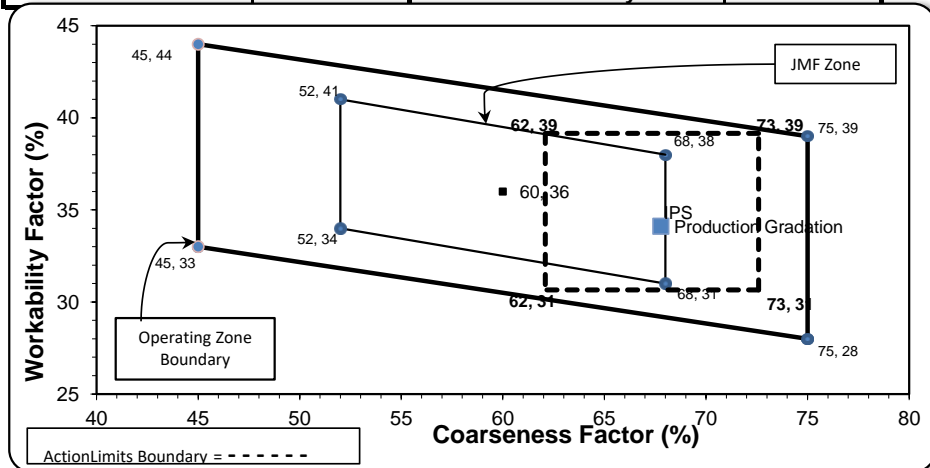
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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



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Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor:** **68**      **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"	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

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 SM, LLC Technical Service

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# Aggregate Optimization Chart

**PLANT #:** 14

Sample Date: 5/15/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 5/16/2023 through 5/22/2023

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	58-003	Stoneco	1320	7.86	2.69	42.3
IA	58-003	Stoneco	600	3.57	2.69	19.2
2NS	19-04	Schlegel	1200	7.20	2.67	38.5
<b>Total Wt</b>			<b>3120</b>	<b>18.64</b>		<b>100.0</b>

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



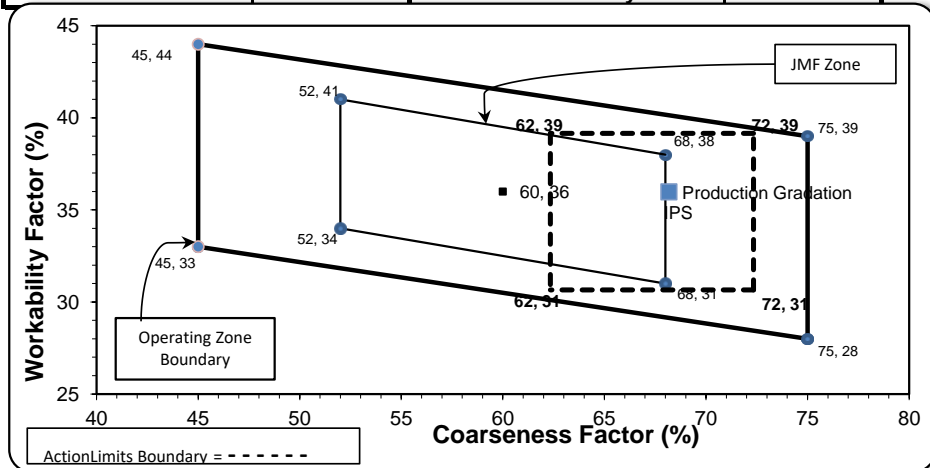
**Builders Redi-Mix**  
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	57.6	100.0	100.0	82.1	17.9	17.9
3/4"	32.5	100.0	100.0	71.4	10.6	28.6
1/2"	14.9	91.8	100.0	62.4	9.0	37.6
3/8"	9.4	72.4	100.0	56.4	6.1	43.6
#4	2.9	18.9	99.9	43.3	13.1	56.7
#8	1.7	3.2	90.1	36.0	7.3	64.0
#16	1.4	1.8	69.4	27.6	8.4	72.4
#30	1.4	1.4	44.5	18.0	9.7	82.0
#50	1.4	1.3	14.3	6.3	11.6	93.7
#100	1.2	1.2	2.7	1.8	4.6	98.2
LBW	1.1	1.0	0.2	0.7	1.0	99.3

\*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

<b>Coarseness Factor:</b>	<b>68</b>	<b>Workability Factor:</b>	<b>36</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:  
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Approved By:

# Aggregate Optimization Chart

**PLANT #:** 12

Sample Date: 5/15/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 5/16/2023 through 5/22/2023

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	750	4.59	2.62	24.4
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%



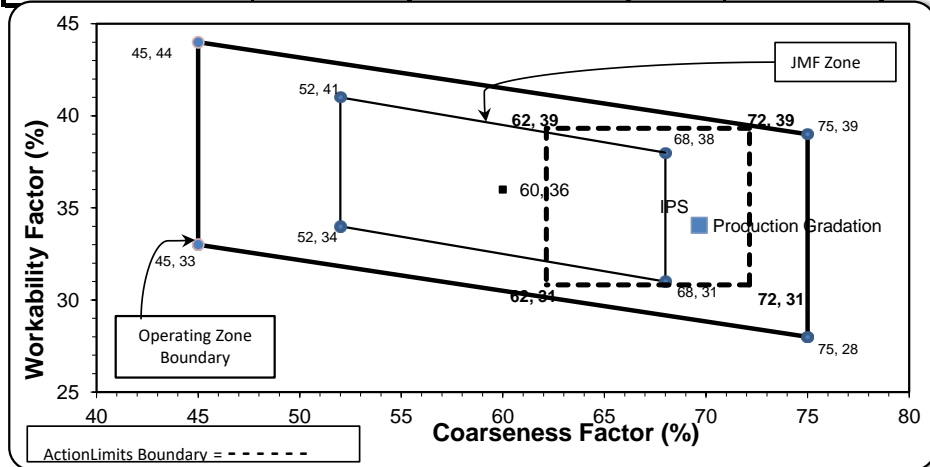
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 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.8	100.0	100.0	99.6	0.4	0.4
1"	37.4	100.0	100.0	78.2	21.4	21.8
3/4"	8.6	99.1	100.0	67.9	10.3	32.1
1/2"	2.4	75.9	100.0	60.1	7.8	39.9
3/8"	2.1	51.6	100.0	54.1	6.0	45.9
#4	1.9	10.0	96.6	42.4	11.6	57.6
#8	1.8	3.5	80.0	34.1	8.4	65.9
#16	1.8	2.6	64.0	27.3	6.7	72.7
#30	1.8	2.4	48.2	20.8	6.5	79.2
#50	1.7	2.3	25.1	11.4	9.5	88.6
#100	1.6	2.1	3.9	2.7	8.7	97.3
LBW	1.3	1.8	0.5	1.1	1.6	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

**Coarseness Factor:** 70      **Workability Factor:** 34



Intial 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 #:** P11

Sample Date: 5/15/23

Concrete Grade: P1M, 3500HP

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

Dates Test Represents: 5/16/2023 through 5/22/2023

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	870	5.32	2.62	28.3
IA	71-47	Presque Isle	950	5.81	2.62	30.9
2NS	95-013	Smelter Bay	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%



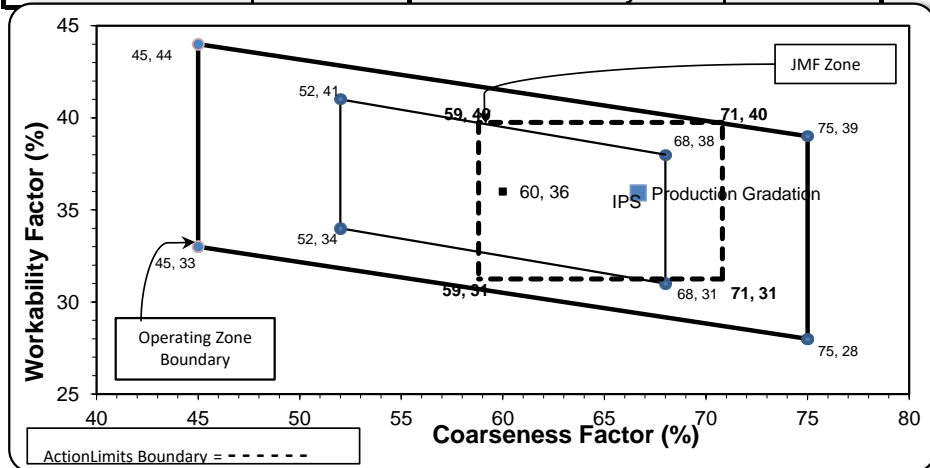
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 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.8	100.0	100.0	99.7	0.3	0.3
1"	37.4	100.0	100.0	82.3	17.4	17.7
3/4"	8.6	99.1	100.0	73.8	8.4	26.2
1/2"	2.4	75.9	100.0	64.9	8.9	35.1
3/8"	2.1	51.6	100.0	57.3	7.6	42.7
#4	1.9	10.0	96.9	43.1	14.2	56.9
#8	1.8	3.5	84.3	35.9	7.2	64.1
#16	1.8	2.6	68.7	29.3	6.6	70.7
#30	1.8	2.4	48.6	21.0	8.2	79.0
#50	1.7	2.3	23.1	10.6	10.4	89.4
#100	1.6	2.1	6.7	3.8	6.8	96.2
LBW	1.3	1.8	1.1	1.4	2.5	98.6

\*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>67</b>	<b>Workability Factor:</b>	<b>36</b>
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Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>		
<b>Workability Factor:</b>	<b>36</b>		
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.0	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-32**

Sample Date: 5/15/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 5/16/2023 through 5/22/2023

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
CA	71-47	Presque Isle	870	5.32	2.62	28.3
IA	71-47	Presque Isle	950	5.81	2.62	30.9
2NS	95-013	Smelter Bay	1250	7.56	2.65	40.7
<b>Total Wt</b>			<b>3070</b>	<b>18.69</b>		<b>100.0</b>

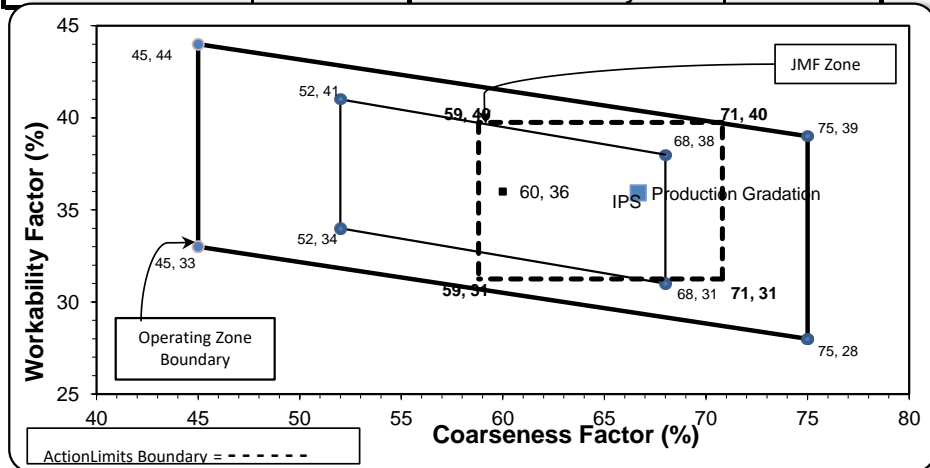
<----- Verify this number is 100%

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.8	100.0	100.0	99.7	0.3	0.3
1"	37.4	100.0	100.0	82.3	17.4	17.7
3/4"	8.6	99.1	100.0	73.8	8.4	26.2
1/2"	2.4	75.9	100.0	64.9	8.9	35.1
3/8"	2.1	51.6	100.0	57.3	7.6	42.7
#4	1.9	10.0	96.9	43.1	14.2	56.9
#8	1.8	3.5	84.3	35.9	7.2	64.1
#16	1.8	2.6	68.7	29.3	6.6	70.7
#30	1.8	2.4	48.6	21.0	8.2	79.0
#50	1.7	2.3	23.1	10.6	10.4	89.4
#100	1.6	2.1	6.7	3.8	6.8	96.2
LBW	1.3	1.8	1.1	1.4	2.5	98.6

\*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>67</b>	<b>Workability Factor:</b>	<b>36</b>
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Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>		
<b>Workability Factor:</b>	<b>36</b>		
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.0	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-35**

Sample Date: 5/15/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 5/16/2023 through 5/22/2023

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
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	550	3.28	2.69	17.6
2NS	81-019	Pleasant Lake	1200	7.26	2.65	38.5
<b>Total Wt</b>			<b>3120</b>	<b>18.70</b>		<b>100.0</b>

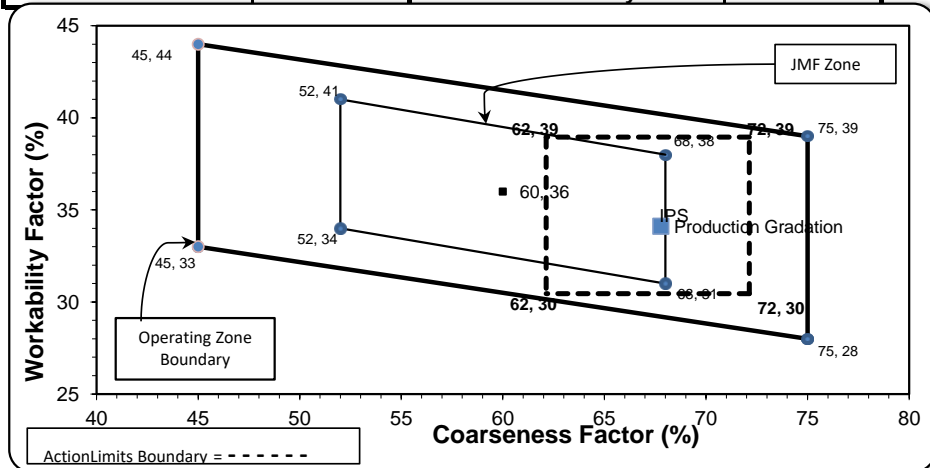
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	57.6	100.0	100.0	81.4	18.6	18.6
3/4"	32.5	100.0	100.0	70.4	11.0	29.6
1/2"	14.9	91.8	100.0	61.2	9.2	38.8
3/8"	9.4	72.4	100.0	55.4	5.8	44.6
#4	2.9	18.9	98.8	42.6	12.7	57.4
#8	1.7	3.2	85.3	34.1	8.5	65.9
#16	1.4	1.8	67.4	26.9	7.3	73.1
#30	1.4	1.4	46.5	18.7	8.1	81.3
#50	1.4	1.3	21.7	9.2	9.6	90.8
#100	1.2	1.2	5.8	3.0	6.2	97.0
LBW	1.1	1.0	1.1	1.1	1.9	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>68</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"	86.9	13.1	13.1
3/4"	76.1	10.8	23.9
1/2"	63.7	12.4	36.3
3/8"	56.2	7.5	43.8
#4	43.2	13.0	56.8
#8	34.7	8.5	65.3
#16	27.5	7.2	72.5
#30	20.6	7.0	79.4
#50	9.0	11.6	91.0
#100	2.1	6.9	97.9
LBW	1.0	1.1	99.0

PREPARED BY:  
SM, LLC Technical Service

Approved By:



# Aggregate Optimization Chart

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

Sample Date: 5/15/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 5/16/2023 through 5/22/2023

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	920	5.63	2.62	30.0
IA	71-47	Presque Isle	950	5.81	2.62	30.9
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%



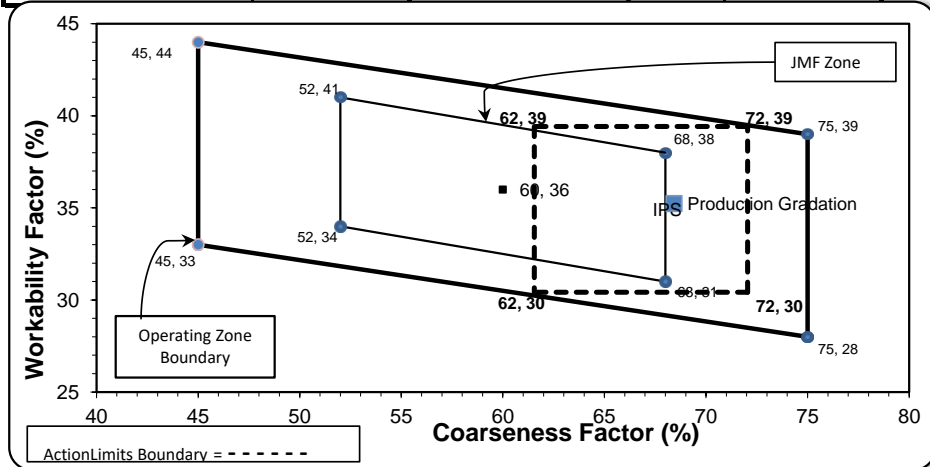
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.8	100.0	100.0	99.6	0.4	0.4
1"	37.4	100.0	100.0	81.2	18.4	18.8
3/4"	8.6	99.1	100.0	72.3	8.9	27.7
1/2"	2.4	75.9	100.0	63.3	9.0	36.7
3/8"	2.1	51.6	100.0	55.7	7.6	44.3
#4	1.9	10.0	97.7	41.9	13.8	58.1
#8	1.8	3.5	86.0	35.2	6.6	64.8
#16	1.8	2.6	71.7	29.4	5.9	70.6
#30	1.8	2.4	50.7	21.1	8.3	78.9
#50	1.7	2.3	22.2	9.9	11.2	90.1
#100	1.6	2.1	3.8	2.6	7.3	97.4
LBW	1.3	1.8	0.7	1.2	1.4	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:** **68**      **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"	85.0	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: 5/15/23

Concrete Grade: **P1M, 3500HP**

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

Dates Test Represents: 5/16/2023 through 5/22/2023

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1020	6.24	2.62	33.2
IA	71-47	Presque Isle	800	4.89	2.62	26.1
2NS	44-051	Krake Willis 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%



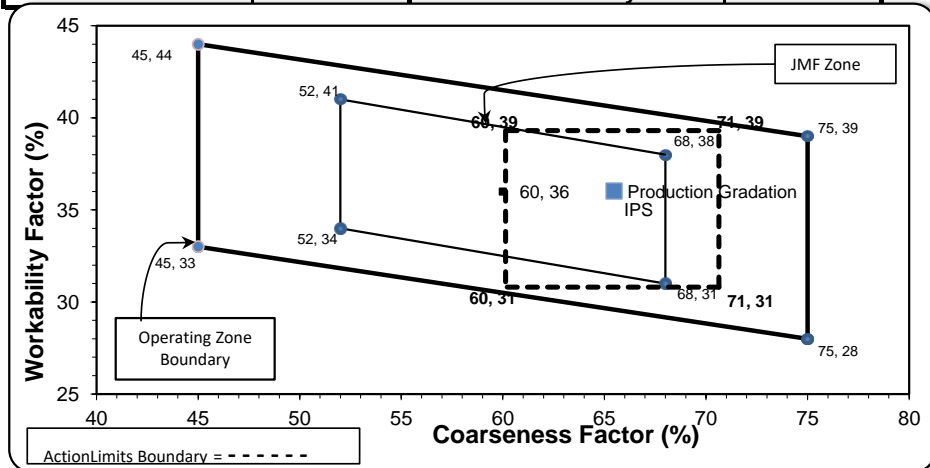
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.7	100.0	100.0	99.2	0.8	0.8
1"	48.9	100.0	100.0	83.0	16.2	17.0
3/4"	14.2	98.5	100.0	71.1	11.9	28.9
1/2"	3.2	83.2	100.0	63.5	7.6	36.5
3/8"	2.4	63.7	100.0	58.1	5.3	41.9
#4	2.2	17.3	97.0	44.7	13.4	55.3
#8	2.2	4.5	83.8	36.0	8.7	64.0
#16	2.1	2.7	68.6	29.3	6.7	70.7
#30	2.0	2.3	50.2	21.7	7.6	78.3
#50	2.0	2.1	22.4	10.3	11.4	89.7
#100	1.8	1.9	5.4	3.3	7.0	96.7
LBW	1.6	1.7	1.0	1.4	1.9	98.6

\*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>65</b>	<b>Workability Factor:</b>	<b>36</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"	99.6	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: 5/15/23

Concrete Grade: **P1M, 3500HP**

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

Dates Test Represents: 5/16/2023 through 5/22/2023

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	970	5.93	2.62	31.6
IA	71-47	Presque Isle	850	5.20	2.62	27.7
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%



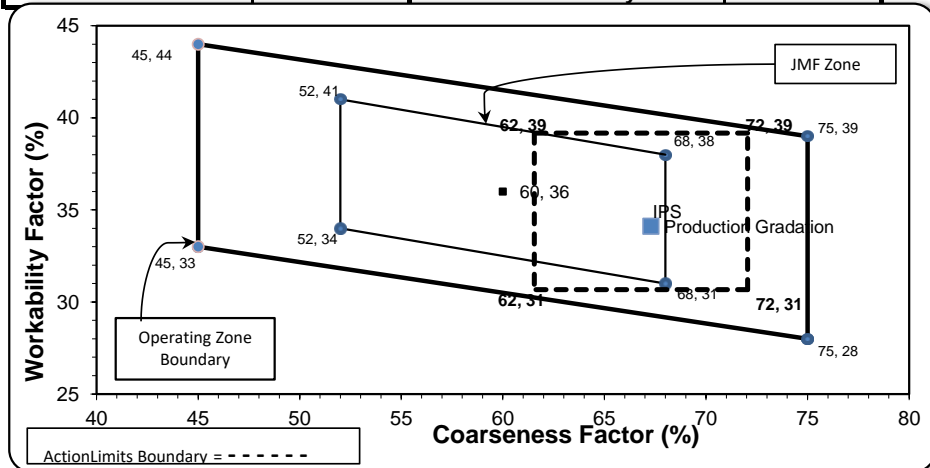
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.8	100.0	100.0	99.6	0.4	0.4
1"	37.4	100.0	100.0	80.2	19.4	19.8
3/4"	8.6	99.1	100.0	70.9	9.3	29.1
1/2"	2.4	75.9	100.0	62.5	8.4	37.5
3/8"	2.1	51.6	100.0	55.7	6.8	44.3
#4	1.9	10.0	96.6	42.7	13.0	57.3
#8	1.8	3.5	80.0	34.1	8.6	65.9
#16	1.8	2.6	64.0	27.3	6.8	72.7
#30	1.8	2.4	48.2	20.9	6.5	79.1
#50	1.7	2.3	25.1	11.4	9.5	88.6
#100	1.6	2.1	3.9	2.7	8.7	97.3
LBW	1.3	1.8	0.5	1.1	1.6	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

**Coarseness Factor:** **67**      **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"	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: