

# Aggregate Optimization Chart

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

Sample Date: 2/28/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 3/1/2022 through 3/7/2022

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%



**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"	97.6	100.0	100.0	99.2	0.8	0.8
1"	40.1	100.0	100.0	79.1	20.0	20.9
3/4"	9.1	98.8	100.0	68.0	11.1	32.0
1/2"	2.5	77.1	100.0	60.1	8.0	39.9
3/8"	2.0	51.5	100.0	53.2	6.8	46.8
#4	1.6	7.7	98.5	41.1	12.1	58.9
#8	1.5	2.8	83.3	33.8	7.3	66.2
#16	1.5	2.0	68.3	27.7	6.1	72.3
#30	1.4	1.7	53.3	21.8	6.0	78.2
#50	1.4	1.6	29.2	12.3	9.4	87.7
#100	1.3	1.6	7.3	3.7	8.6	96.3
LBW	1.2	1.4	0.6	1.0	2.7	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.

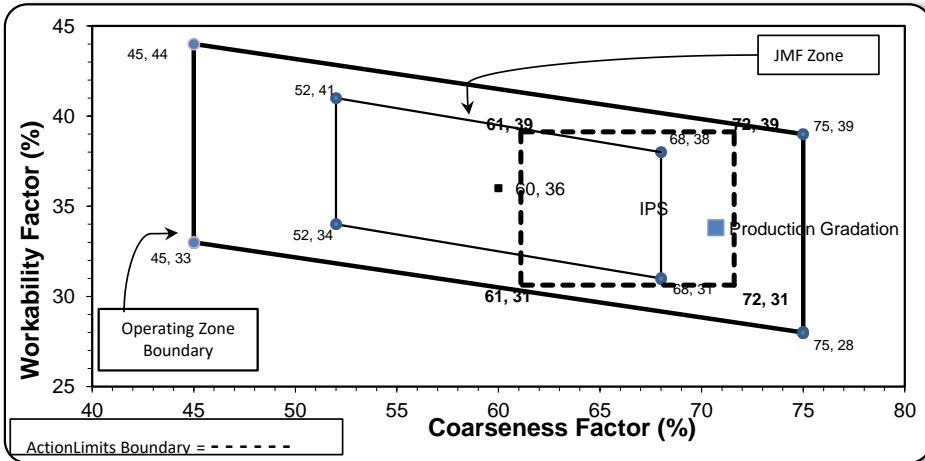
Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

<b>Coarseness Factor:</b>	<b>71</b>	<b>Workability Factor:</b>	<b>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: 2/28/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 3/1/2022 through 3/7/2022

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

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



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Suite 500  
Farmington Hills, MI 48336

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	58-003	Stoneco	1350	8.04	2.69	43.3
IA	58-003	Stoneco	620	3.69	2.69	19.9
2NS	63-114	Highland	1150	6.95	2.65	36.9
<b>Total Wt</b>			<b>3120</b>	<b>18.69</b>		<b>100.0</b>

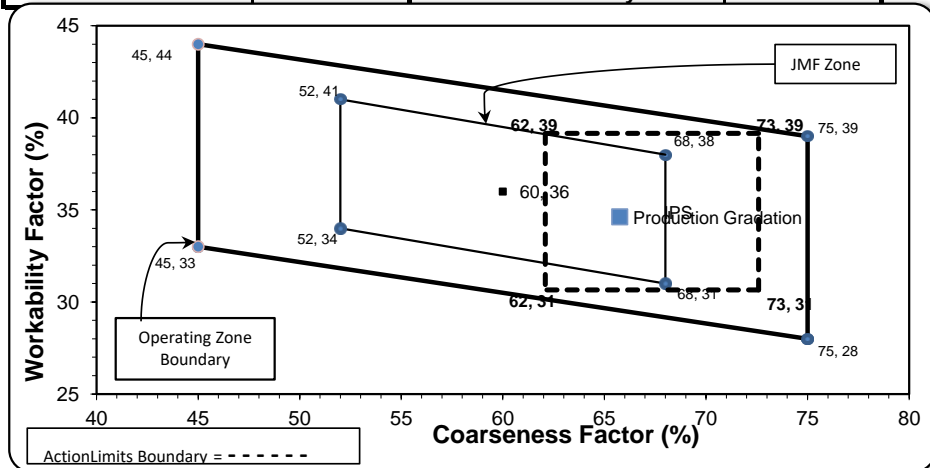
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	65.6	100.0	100.0	85.1	14.9	14.9
3/4"	35.4	100.0	100.0	72.0	13.1	28.0
1/2"	12.1	95.0	100.0	61.0	11.1	39.0
3/8"	7.9	84.2	100.0	57.0	4.0	43.0
#4	2.9	24.9	99.6	42.9	14.1	57.1
#8	2.1	7.9	87.2	34.6	8.3	65.4
#16	1.7	3.8	67.0	26.2	8.4	73.8
#30	1.6	2.8	47.0	18.6	7.6	81.4
#50	1.5	2.6	20.7	8.8	9.8	91.2
#100	1.3	2.5	4.1	2.6	6.2	97.4
LBW	1.2	2.2	0.6	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

<b>Coarseness Factor:</b>	<b>66</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: 2/28/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 3/1/2022 through 3/7/2022

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

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	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%



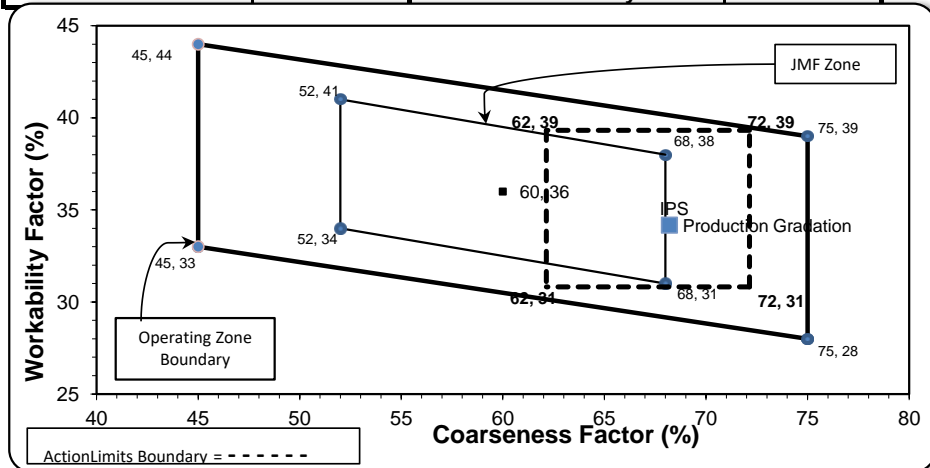
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.0	100.0	100.0	99.3	0.7	0.7
1"	49.0	100.0	100.0	83.1	16.3	16.9
3/4"	13.0	98.1	100.0	70.6	12.5	29.4
1/2"	3.4	76.5	100.0	61.8	8.8	38.2
3/8"	2.3	52.3	100.0	55.1	6.7	44.9
#4	1.9	12.6	97.7	43.7	11.4	56.3
#8	1.8	5.4	79.0	34.2	9.5	65.8
#16	1.7	3.6	62.6	27.0	7.2	73.0
#30	1.7	3.0	46.2	20.2	6.8	79.8
#50	1.6	2.7	23.0	10.6	9.6	89.4
#100	1.5	2.4	4.7	3.0	7.6	97.0
LBW	1.1	1.9	0.7	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

**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"	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

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 SM, LLC Technical Service

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# Aggregate Optimization Chart

**PLANT #:** **P-32**

Sample Date: 2/28/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 3/1/2022 through 3/7/2022

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	900	5.50	2.62	29.3
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%



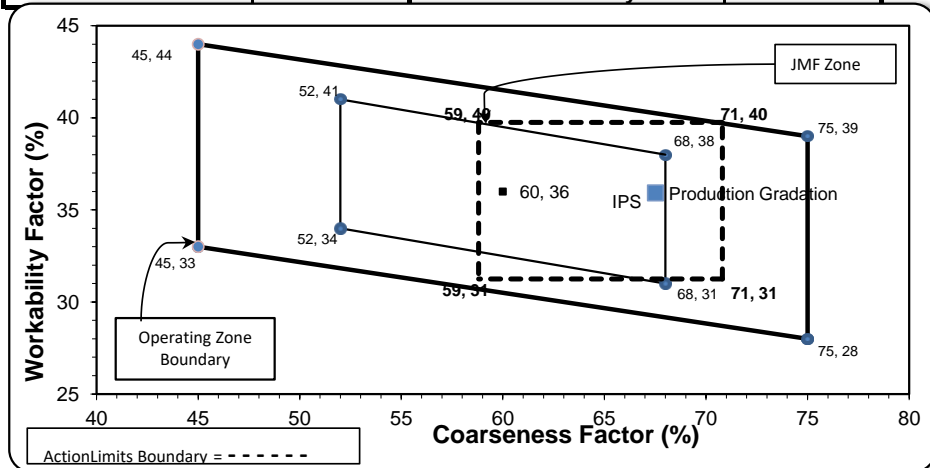
**Superior Materials, LLC**  
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.0	100.0	100.0	99.4	0.6	0.6
1"	49.0	100.0	100.0	84.7	14.7	15.3
3/4"	13.0	98.1	100.0	73.4	11.3	26.6
1/2"	3.4	76.5	100.0	64.2	9.2	35.8
3/8"	2.3	52.3	100.0	56.7	7.4	43.3
#4	1.9	12.6	95.8	43.3	13.5	56.7
#8	1.8	5.4	83.0	35.9	7.4	64.1
#16	1.7	3.6	67.6	29.1	6.8	70.9
#30	1.7	3.0	49.3	21.5	7.6	78.5
#50	1.6	2.7	24.4	11.2	10.3	88.8
#100	1.5	2.4	7.4	4.2	7.0	95.8
LBW	1.1	1.9	1.3	1.4	2.8	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

**Coarseness Factor:** **68**      **Workability Factor:** **36**



Initial Production Sample (IPS)

**Coarseness Factor:** **65**  
**Workability Factor:** **36**

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: 2/28/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 3/1/2022 through 3/7/2022

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	58-003	Stoneco	1380	8.22	2.69	44.2
IA	58-003	Stoneco	620	3.69	2.69	19.9
2NS	81-019	Pleasant Lake	1120	6.77	2.65	35.9
<b>Total Wt</b>			<b>3120</b>	<b>18.69</b>		<b>100.0</b>

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



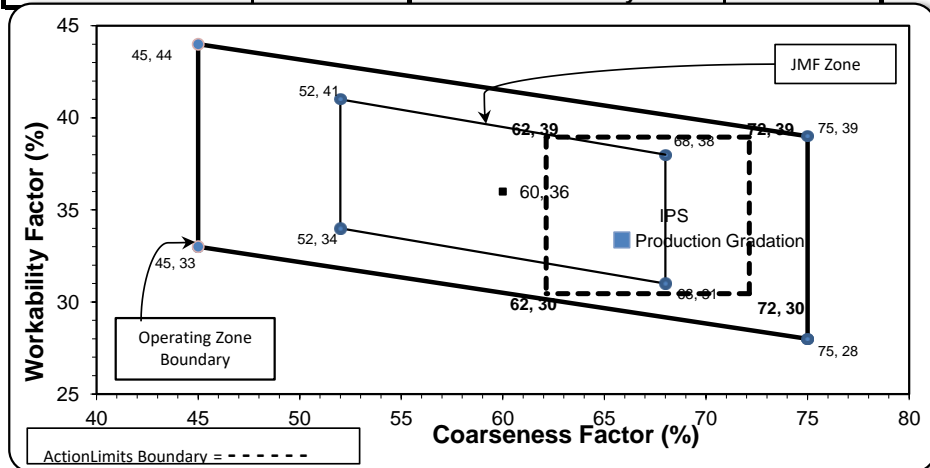
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
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 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	65.6	100.0	100.0	84.8	15.2	15.2
3/4"	35.4	100.0	100.0	71.4	13.4	28.6
1/2"	12.1	95.0	100.0	60.1	11.3	39.9
3/8"	7.9	84.2	100.0	56.1	4.0	43.9
#4	2.9	24.9	97.7	41.3	14.8	58.7
#8	2.1	7.9	86.0	33.4	7.9	66.6
#16	1.7	3.8	70.7	26.9	6.5	73.1
#30	1.6	2.8	52.4	20.1	6.8	79.9
#50	1.5	2.6	22.0	9.1	11.0	90.9
#100	1.3	2.5	4.5	2.7	6.4	97.3
LBW	1.2	2.2	1.7	1.6	1.1	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:** **66**      **Workability Factor:** **33**



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"	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-39**

Sample Date: 2/28/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 3/1/2022 through 3/7/2022

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

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	63-92	Grange Hall	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%



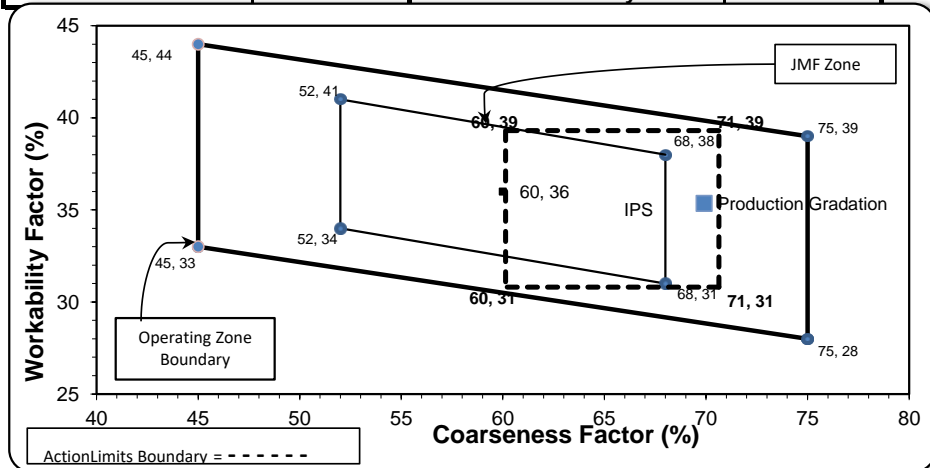
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.6	100.0	100.0	99.2	0.8	0.8
1"	40.1	100.0	100.0	80.1	19.1	19.9
3/4"	9.1	98.8	100.0	69.5	10.6	30.5
1/2"	2.5	77.1	100.0	61.6	7.8	38.4
3/8"	2.0	51.5	100.0	54.8	6.8	45.2
#4	1.6	7.7	97.7	42.3	12.5	57.7
#8	1.5	2.8	83.8	35.3	7.0	64.7
#16	1.5	2.0	67.3	28.4	6.9	71.6
#30	1.4	1.7	49.1	20.9	7.5	79.1
#50	1.4	1.6	21.8	9.8	11.1	90.2
#100	1.3	1.6	3.9	2.4	7.3	97.6
LBW	1.2	1.4	0.6	1.0	1.4	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

**Coarseness Factor:** **70**      **Workability Factor:** **35**



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: 2/28/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 3/1/2022 through 3/7/2022

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

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%



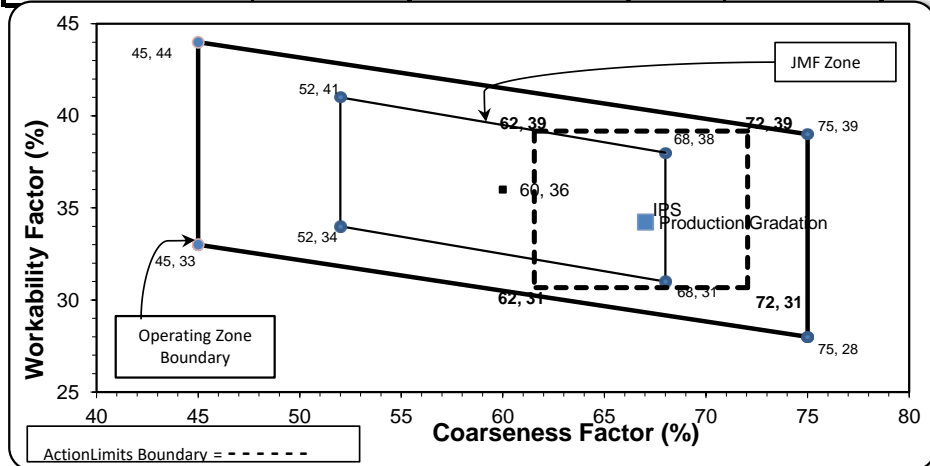
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.0	100.0	100.0	99.4	0.6	0.6
1"	49.0	100.0	100.0	83.9	15.5	16.1
3/4"	13.0	98.1	100.0	72.0	11.9	28.0
1/2"	3.4	76.5	100.0	63.0	9.0	37.0
3/8"	2.3	52.3	100.0	55.9	7.0	44.1
#4	1.9	12.6	97.7	43.9	12.1	56.1
#8	1.8	5.4	79.0	34.2	9.6	65.8
#16	1.7	3.6	62.6	27.0	7.2	73.0
#30	1.7	3.0	46.2	20.2	6.8	79.8
#50	1.6	2.7	23.0	10.6	9.6	89.4
#100	1.5	2.4	4.7	3.1	7.6	96.9
LBW	1.1	1.9	0.7	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

**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: