

# Aggregate Optimization Chart

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

Sample Date: 4/4/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/5/2022 through 4/11/2022

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"	97.8	100.0	100.0	99.2	0.8	0.8
1"	47.2	100.0	100.0	81.6	17.6	18.4
3/4"	12.7	98.4	100.0	69.2	12.4	30.8
1/2"	2.9	80.6	100.0	61.1	8.1	38.9
3/8"	2.2	58.9	100.0	55.2	5.9	44.8
#4	1.9	13.0	98.5	42.6	12.7	57.4
#8	1.7	3.8	83.3	34.1	8.4	65.9
#16	1.6	2.2	68.3	27.8	6.3	72.2
#30	1.6	2.0	53.3	21.9	5.9	78.1
#50	1.5	1.8	29.2	12.4	9.5	87.6
#100	1.4	1.7	7.3	3.8	8.6	96.2
LBW	1.2	1.6	0.6	1.1	2.7	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

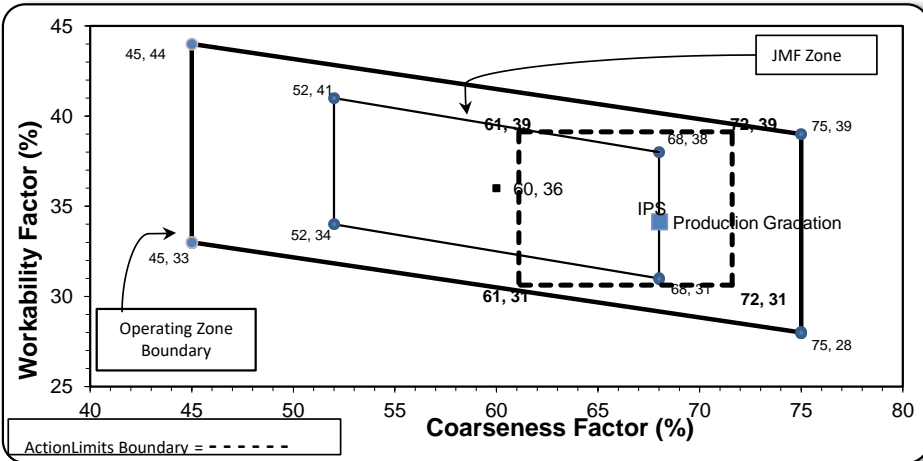
<b>Coarseness Factor:</b>	<b>68</b>	<b>Workability Factor:</b>	<b>34</b>
---------------------------	-----------	----------------------------	-----------

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: 4/4/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/5/2022 through 4/11/2022

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	58-003	Stoneco	1450	8.64	2.69	46.5
IA	58-003	Stoneco	520	3.10	2.69	16.7
2NS	81-019	Pleasant Lake	1150	6.95	2.65	36.9
<b>Total Wt</b>			<b>3120</b>	<b>18.69</b>		<b>100.0</b>

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



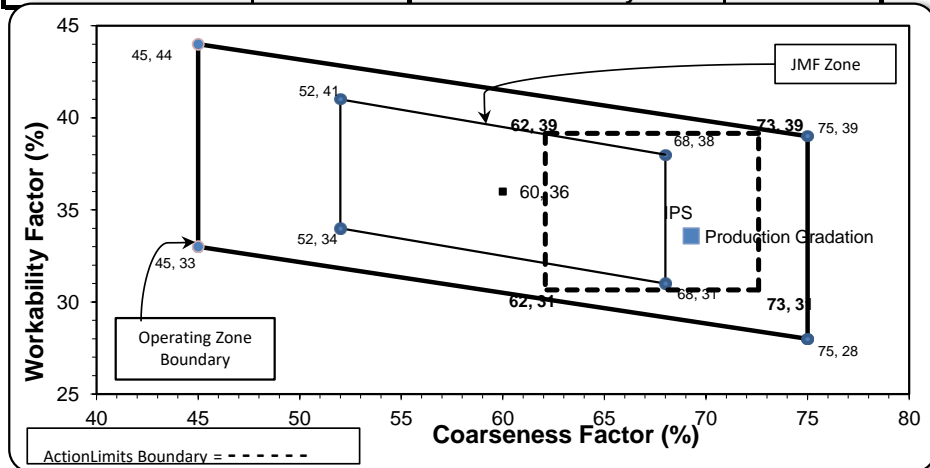
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	64.7	100.0	100.0	83.6	16.4	16.4
3/4"	50.7	100.0	100.0	77.1	6.5	22.9
1/2"	16.4	94.1	100.0	60.2	16.9	39.8
3/8"	7.4	82.2	100.0	54.0	6.2	46.0
#4	2.6	27.2	99.4	42.4	11.6	57.6
#8	2.0	6.9	85.5	33.6	8.8	66.4
#16	1.7	3.4	67.7	26.3	7.3	73.7
#30	1.5	2.8	48.8	19.2	7.2	80.8
#50	1.4	2.5	23.8	9.8	9.3	90.2
#100	1.3	2.4	6.5	3.4	6.4	96.6
LBW	1.2	2.0	2.0	1.6	1.8	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:** 69      **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

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** **P-12**

Sample Date: 4/4/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/5/2022 through 4/11/2022

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%



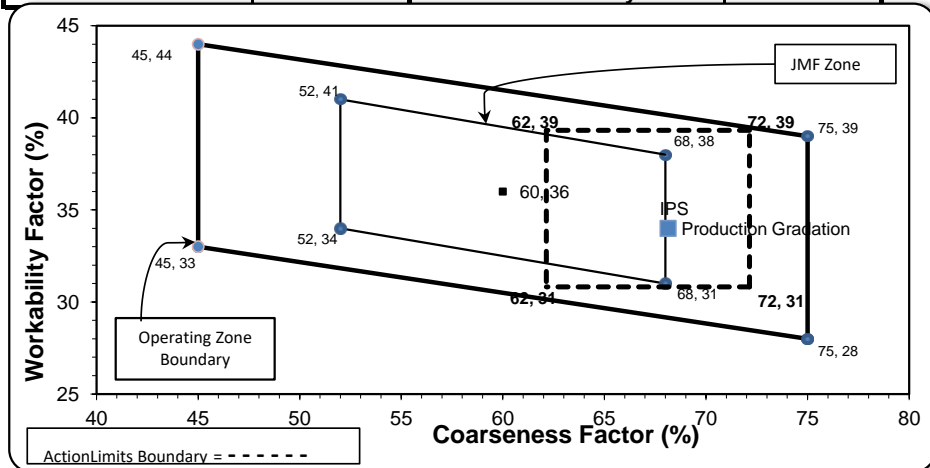
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.2	100.0	100.0	99.4	0.6	0.6
1"	52.0	100.0	100.0	84.1	15.3	15.9
3/4"	11.1	97.8	100.0	69.9	14.2	30.1
1/2"	4.7	75.1	100.0	61.8	8.0	38.2
3/8"	3.8	50.1	100.0	55.0	6.8	45.0
#4	2.5	10.4	97.0	43.0	12.0	57.0
#8	2.2	3.6	79.4	34.0	9.0	66.0
#16	2.0	2.6	63.2	27.1	6.9	72.9
#30	1.9	2.4	47.4	20.6	6.5	79.4
#50	1.8	2.2	27.8	12.5	8.1	87.5
#100	1.6	1.9	5.0	3.1	9.4	96.9
LBW	0.7	1.2	0.8	0.9	2.2	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:** **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

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

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

Sample Date: 4/4/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/5/2022 through 4/11/2022

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	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%



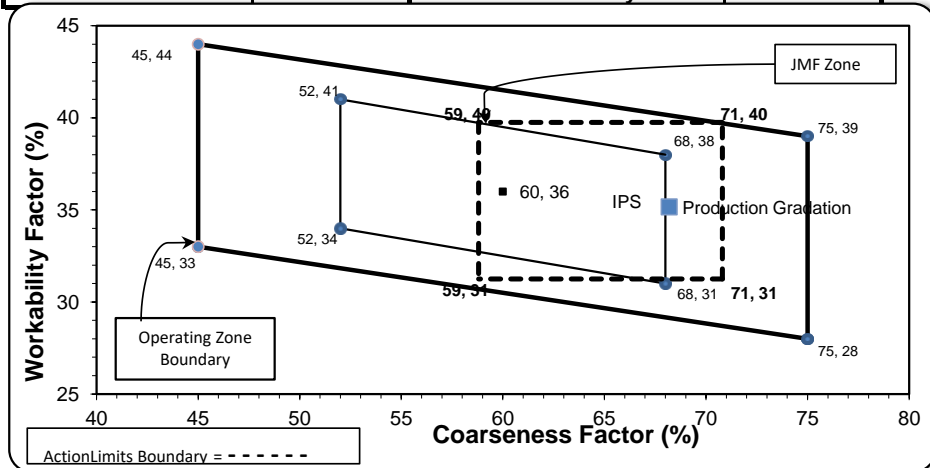
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.2	100.0	100.0	99.4	0.6	0.6
1"	52.0	100.0	100.0	84.8	14.6	15.2
3/4"	11.1	97.8	100.0	71.3	13.5	28.7
1/2"	4.7	75.1	100.0	63.0	8.3	37.0
3/8"	3.8	50.1	100.0	55.8	7.2	44.2
#4	2.5	10.4	95.4	42.5	13.3	57.5
#8	2.2	3.6	82.2	35.2	7.4	64.8
#16	2.0	2.6	67.6	28.9	6.3	71.1
#30	1.9	2.4	48.9	21.2	7.7	78.8
#50	1.8	2.2	24.4	11.1	10.1	88.9
#100	1.6	1.9	7.4	4.0	7.1	96.0
LBW	0.7	1.2	1.8	1.3	2.8	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  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor: 68**      **Workability Factor: 35**



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: 4/4/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/5/2022 through 4/11/2022

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

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	58-003	Stoneco	1450	8.64	2.69	46.5
IA	58-003	Stoneco	520	3.10	2.69	16.7
2NS	81-019	Pleasant Lake	1150	6.95	2.65	36.9
<b>Total Wt</b>			<b>3120</b>	<b>18.69</b>		<b>100.0</b>

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



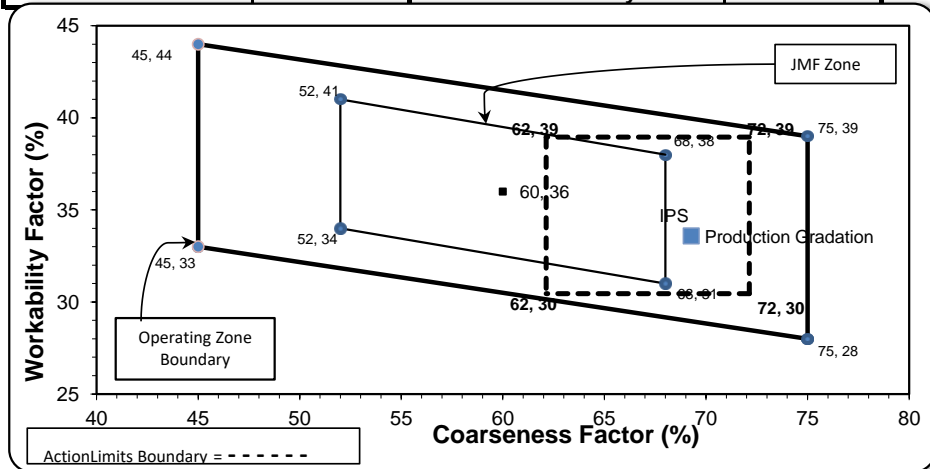
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	64.7	100.0	100.0	83.6	16.4	16.4
3/4"	50.7	100.0	100.0	77.1	6.5	22.9
1/2"	16.4	94.1	100.0	60.2	16.9	39.8
3/8"	7.4	82.2	100.0	54.0	6.2	46.0
#4	2.6	27.2	99.4	42.4	11.6	57.6
#8	2.0	6.9	85.5	33.6	8.8	66.4
#16	1.7	3.4	67.7	26.3	7.3	73.7
#30	1.5	2.8	48.8	19.2	7.2	80.8
#50	1.4	2.5	23.8	9.8	9.3	90.2
#100	1.3	2.4	6.5	3.4	6.4	96.6
LBW	1.2	2.0	2.0	1.6	1.8	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:** **69**      **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"	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: 4/4/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/5/2022 through 4/11/2022

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	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%



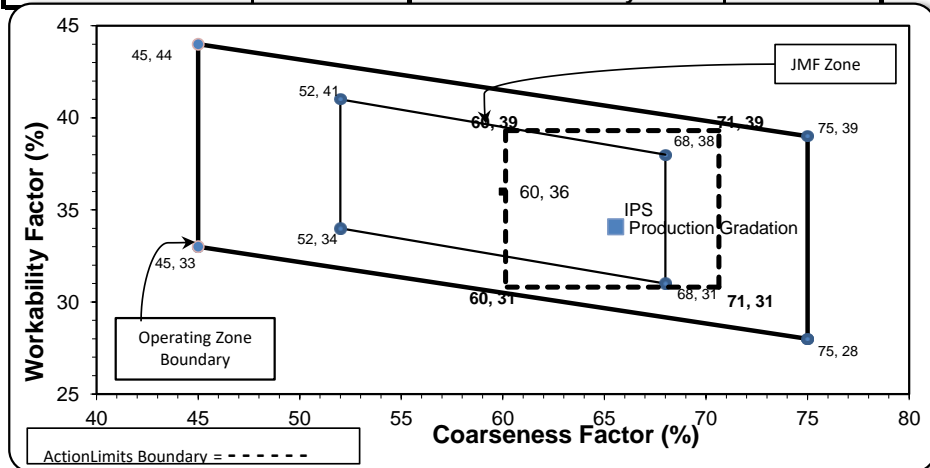
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.3	0.7	0.7
1"	47.2	100.0	100.0	82.5	16.8	17.5
3/4"	12.7	98.4	100.0	70.6	11.9	29.4
1/2"	2.9	80.6	100.0	62.7	7.9	37.3
3/8"	2.2	58.9	100.0	56.8	5.9	43.2
#4	1.9	13.0	96.4	43.3	13.5	56.7
#8	1.7	3.8	79.9	34.1	9.2	65.9
#16	1.6	2.2	64.4	27.3	6.8	72.7
#30	1.6	2.0	47.5	20.4	6.9	79.6
#50	1.5	1.8	22.3	10.0	10.3	90.0
#100	1.4	1.7	5.9	3.3	6.7	96.7
LBW	1.2	1.6	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

**Coarseness Factor:** **66**      **Workability Factor:** **34**



Initial 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: 4/4/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/5/2022 through 4/11/2022

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%



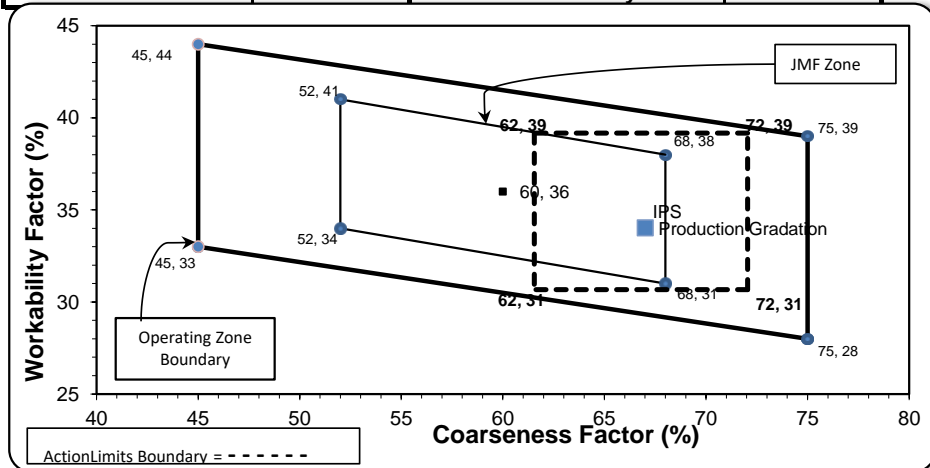
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.2	100.0	100.0	99.4	0.6	0.6
1"	52.0	100.0	100.0	84.8	14.6	15.2
3/4"	11.1	97.8	100.0	71.3	13.5	28.7
1/2"	4.7	75.1	100.0	63.0	8.3	37.0
3/8"	3.8	50.1	100.0	55.8	7.2	44.2
#4	2.5	10.4	97.0	43.2	12.6	56.8
#8	2.2	3.6	79.4	34.0	9.1	66.0
#16	2.0	2.6	63.2	27.1	6.9	72.9
#30	1.9	2.4	47.4	20.6	6.5	79.4
#50	1.8	2.2	27.8	12.5	8.1	87.5
#100	1.6	1.9	5.0	3.1	9.4	96.9
LBW	0.7	1.2	0.8	0.9	2.2	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:** **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: