

# Aggregate Optimization Chart

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

Sample Date: 11/13/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/14/2023 through 11/20/2023

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%



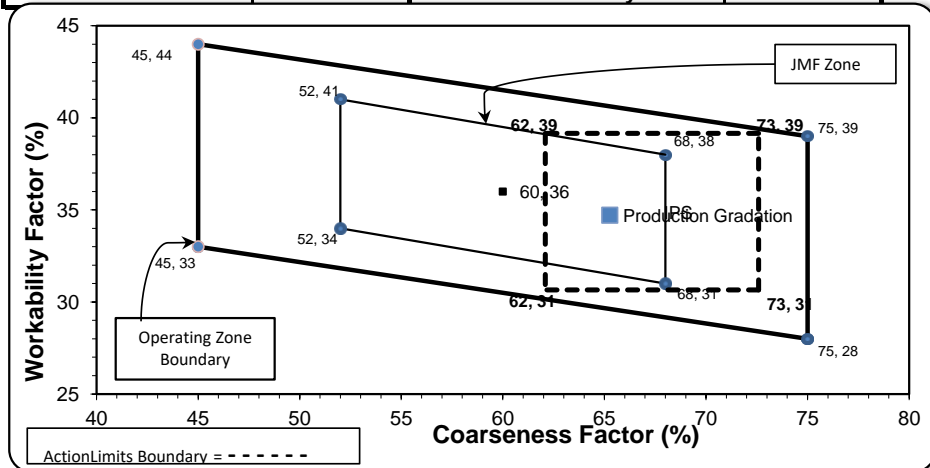
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	61.8	100.0	100.0	83.2	16.8	16.8
3/4"	33.1	100.0	100.0	70.6	12.6	29.4
1/2"	17.2	92.2	100.0	62.3	8.4	37.7
3/8"	10.0	82.5	100.0	57.4	4.9	42.6
#4	3.4	22.0	98.2	43.1	14.3	56.9
#8	2.4	7.9	83.9	34.7	8.4	65.3
#16	2.0	4.2	67.4	27.5	7.2	72.5
#30	1.9	2.9	49.1	20.2	7.3	79.8
#50	1.8	2.3	25.3	10.9	9.3	89.1
#100	1.7	1.9	7.3	3.9	7.0	96.1
LBW	1.5	1.3	1.5	1.5	2.4	98.5

\*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>35</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"	85.5	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 #:** 12

Sample Date: 11/13/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/14/2023 through 11/20/2023

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	850	5.20	2.62	27.7
2NS	63-115	Ray Rd	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%



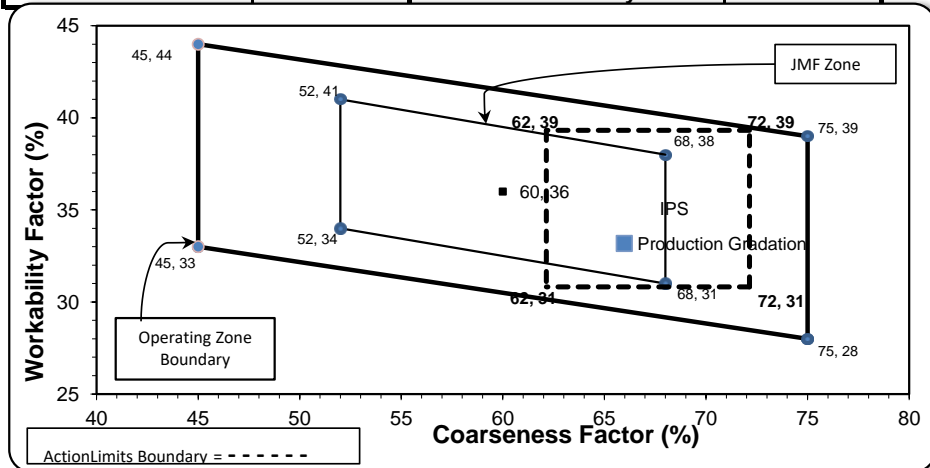
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.7	100.0	100.0	99.2	0.8	0.8
1"	48.5	100.0	100.0	82.9	16.3	17.1
3/4"	13.9	99.0	100.0	71.1	11.8	28.9
1/2"	3.6	81.4	100.0	62.8	8.3	37.2
3/8"	2.4	57.9	100.0	55.9	6.9	44.1
#4	1.9	13.0	96.2	41.8	14.1	58.2
#8	1.9	4.2	80.3	33.2	8.7	66.8
#16	1.9	3.1	65.1	26.9	6.2	73.1
#30	1.8	2.8	49.5	20.7	6.2	79.3
#50	1.8	2.6	26.5	11.7	9.0	88.3
#100	1.7	2.4	6.3	3.7	8.0	96.3
LBW	1.3	1.8	0.8	1.2	2.4	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:** 66      **Workability Factor:** 33



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: 11/13/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/14/2023 through 11/20/2023

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	870	5.32	2.62	28.3
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%



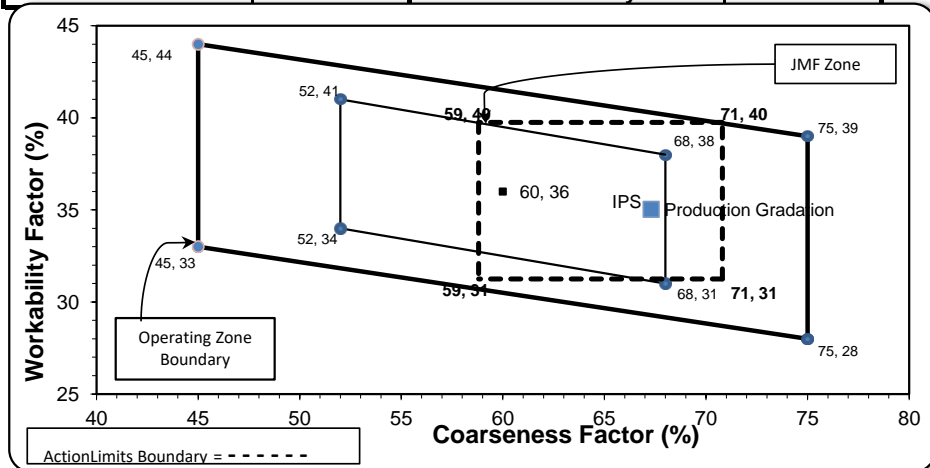
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.7	100.0	100.0	99.3	0.7	0.7
1"	48.5	100.0	100.0	83.2	16.0	16.8
3/4"	13.9	99.0	100.0	71.7	11.6	28.3
1/2"	3.6	81.4	100.0	63.3	8.3	36.7
3/8"	2.4	57.9	100.0	56.3	7.1	43.7
#4	1.9	13.0	95.9	41.8	14.5	58.2
#8	1.9	4.2	85.0	35.0	6.8	65.0
#16	1.9	3.1	70.9	29.2	5.8	70.8
#30	1.8	2.8	51.7	21.6	7.6	78.4
#50	1.8	2.6	25.6	11.3	10.3	88.7
#100	1.7	2.4	7.7	4.2	7.1	95.8
LBW	1.3	1.8	1.8	1.6	2.6	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:** 67      **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-32**

Sample Date: 11/13/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/14/2023 through 11/20/2023

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	870	5.32	2.62	28.3
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%



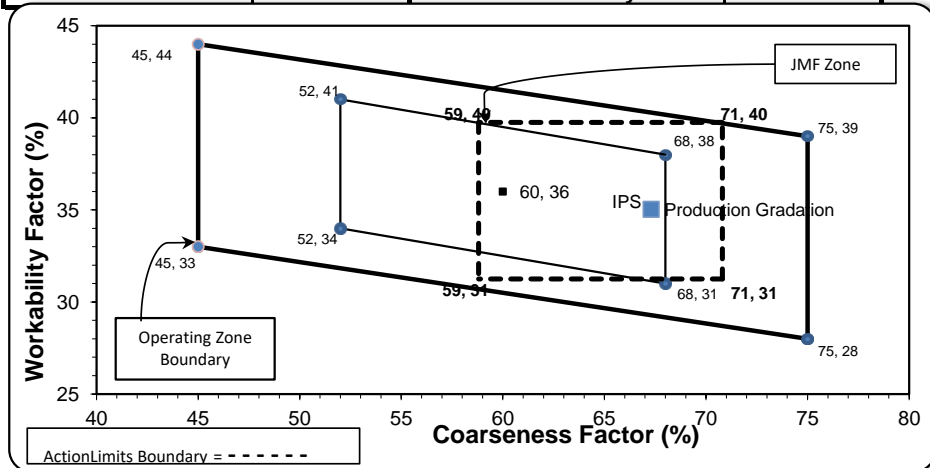
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.7	100.0	100.0	99.3	0.7	0.7
1"	48.5	100.0	100.0	83.2	16.0	16.8
3/4"	13.9	99.0	100.0	71.7	11.6	28.3
1/2"	3.6	81.4	100.0	63.3	8.3	36.7
3/8"	2.4	57.9	100.0	56.3	7.1	43.7
#4	1.9	13.0	95.9	41.8	14.5	58.2
#8	1.9	4.2	85.0	35.0	6.8	65.0
#16	1.9	3.1	70.9	29.2	5.8	70.8
#30	1.8	2.8	51.7	21.6	7.6	78.4
#50	1.8	2.6	25.6	11.3	10.3	88.7
#100	1.7	2.4	7.7	4.2	7.1	95.8
LBW	1.3	1.8	1.8	1.6	2.6	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:** 67      **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: 11/13/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/14/2023 through 11/20/2023

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%



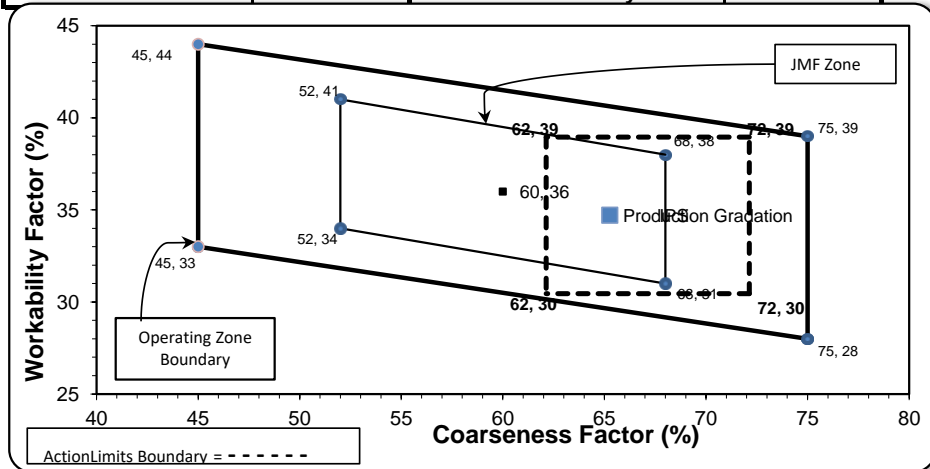
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	61.8	100.0	100.0	83.2	16.8	16.8
3/4"	33.1	100.0	100.0	70.6	12.6	29.4
1/2"	17.2	92.2	100.0	62.3	8.4	37.7
3/8"	10.0	82.5	100.0	57.4	4.9	42.6
#4	3.4	22.0	98.2	43.1	14.3	56.9
#8	2.4	7.9	83.9	34.7	8.4	65.3
#16	2.0	4.2	67.4	27.5	7.2	72.5
#30	1.9	2.9	49.1	20.2	7.3	79.8
#50	1.8	2.3	25.3	10.9	9.3	89.1
#100	1.7	1.9	7.3	3.9	7.0	96.1
LBW	1.5	1.3	1.5	1.5	2.4	98.5

\*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>35</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"	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: 11/13/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/14/2023 through 11/20/2023

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	870	5.32	2.62	28.3
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%



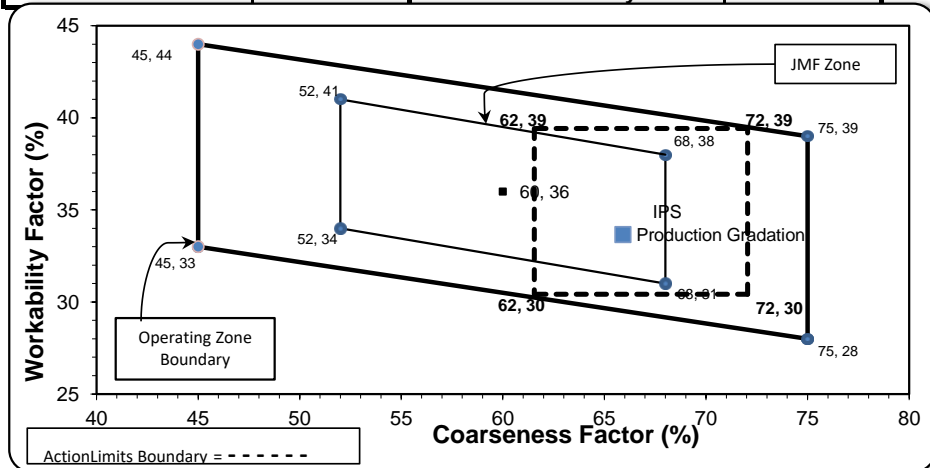
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.7	100.0	100.0	99.3	0.7	0.7
1"	48.5	100.0	100.0	83.2	16.0	16.8
3/4"	13.9	99.0	100.0	71.7	11.6	28.3
1/2"	3.6	81.4	100.0	63.3	8.3	36.7
3/8"	2.4	57.9	100.0	56.3	7.1	43.7
#4	1.9	13.0	96.0	41.8	14.5	58.2
#8	1.9	4.2	81.5	33.7	8.2	66.3
#16	1.9	3.1	66.6	27.5	6.1	72.5
#30	1.8	2.8	47.4	19.9	7.6	80.1
#50	1.8	2.6	20.8	9.5	10.5	90.5
#100	1.7	2.4	3.6	2.6	6.8	97.4
LBW	1.3	1.8	0.6	1.2	1.5	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>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"	72.1	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-O2**

Sample Date: 11/13/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/14/2023 through 11/20/2023

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	850	5.20	2.62	27.7
2NS	63-115	Ray Rd	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%



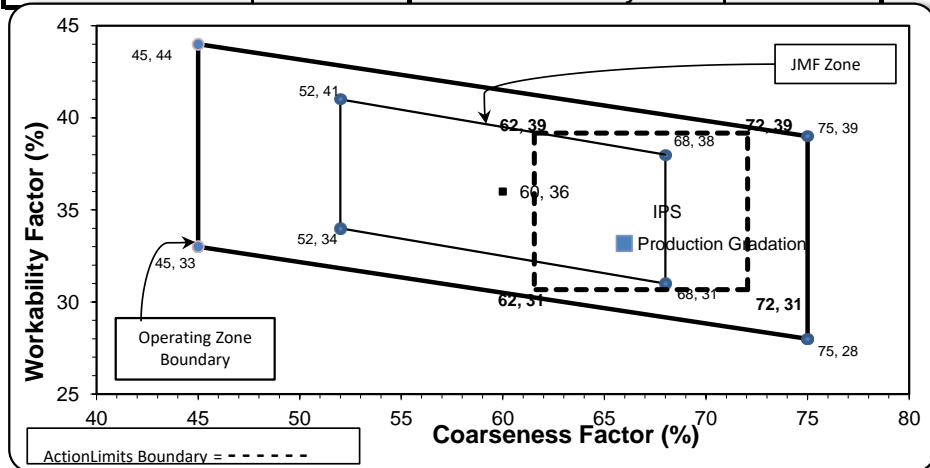
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.7	100.0	100.0	99.2	0.8	0.8
1"	48.5	100.0	100.0	82.9	16.3	17.1
3/4"	13.9	99.0	100.0	71.1	11.8	28.9
1/2"	3.6	81.4	100.0	62.8	8.3	37.2
3/8"	2.4	57.9	100.0	55.9	6.9	44.1
#4	1.9	13.0	96.2	41.8	14.1	58.2
#8	1.9	4.2	80.3	33.2	8.7	66.8
#16	1.9	3.1	65.1	26.9	6.2	73.1
#30	1.8	2.8	49.5	20.7	6.2	79.3
#50	1.8	2.6	26.5	11.7	9.0	88.3
#100	1.7	2.4	6.3	3.7	8.0	96.3
LBW	1.3	1.8	0.8	1.2	2.4	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>33</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: