

# Aggregate Optimization Chart

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

Sample Date: 11/27/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/28/2023 through 12/4/2023

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%



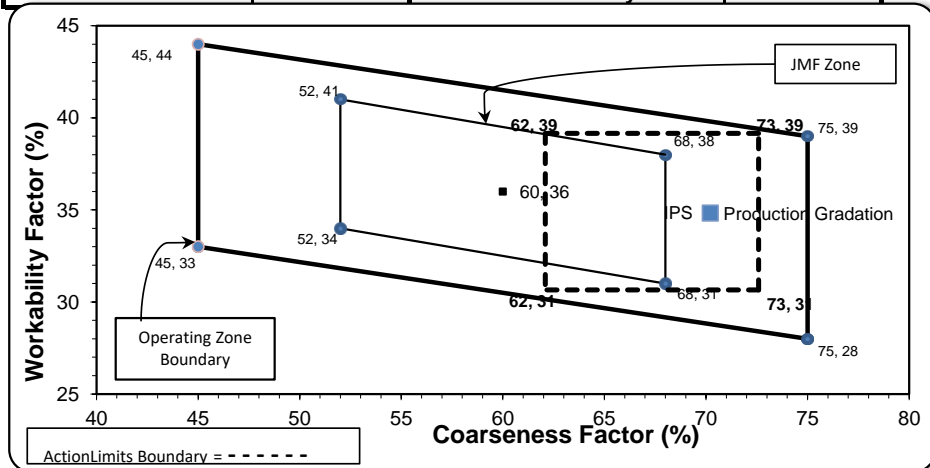
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	57.1	100.0	100.0	81.2	18.8	18.8
3/4"	36.1	100.0	100.0	71.9	9.2	28.1
1/2"	10.4	93.2	100.0	59.5	12.5	40.5
3/8"	5.5	75.8	100.0	54.2	5.2	45.8
#4	1.9	18.0	98.3	41.8	12.4	58.2
#8	1.8	5.2	86.1	34.8	7.0	65.2
#16	1.6	3.8	69.0	27.9	6.9	72.1
#30	1.5	2.4	47.1	19.2	8.7	80.8
#50	1.4	2.1	18.3	8.0	11.2	92.0
#100	1.3	2.1	3.1	2.1	5.9	97.9
LBW	1.2	1.9	0.6	1.1	1.0	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:** **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"	85.5	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: 11/27/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/28/2023 through 12/4/2023

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%



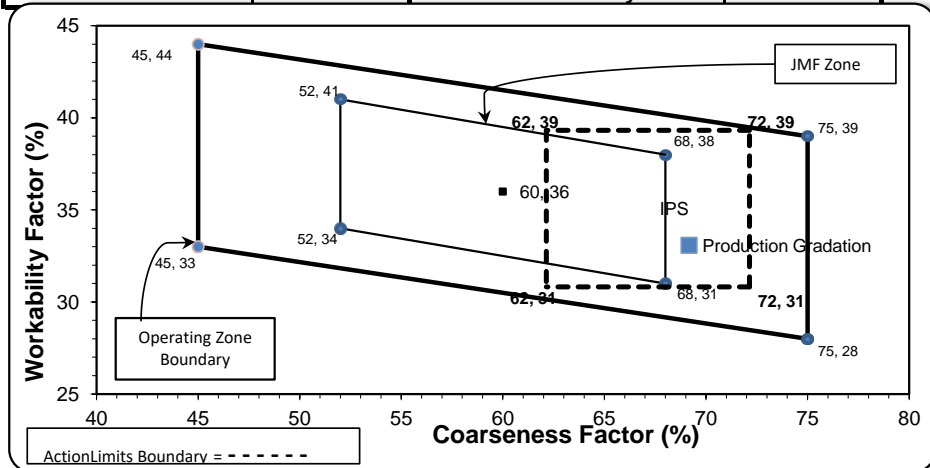
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.2	100.0	100.0	98.4	1.6	1.6
1"	33.5	100.0	100.0	77.9	20.5	22.1
3/4"	5.2	98.6	100.0	68.1	9.8	31.9
1/2"	2.5	76.2	100.0	61.0	7.1	39.0
3/8"	2.1	50.3	100.0	53.7	7.3	46.3
#4	1.9	9.1	96.8	41.0	12.7	59.0
#8	1.8	3.1	80.9	33.1	7.9	66.9
#16	1.7	2.3	64.1	26.3	6.8	73.7
#30	1.6	2.2	47.7	19.8	6.5	80.2
#50	1.6	2.1	24.6	10.7	9.1	89.3
#100	1.5	2.0	5.4	3.2	7.6	96.8
LBW	1.4	1.8	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:** 69      **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"	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: 11/27/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/28/2023 through 12/4/2023

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%



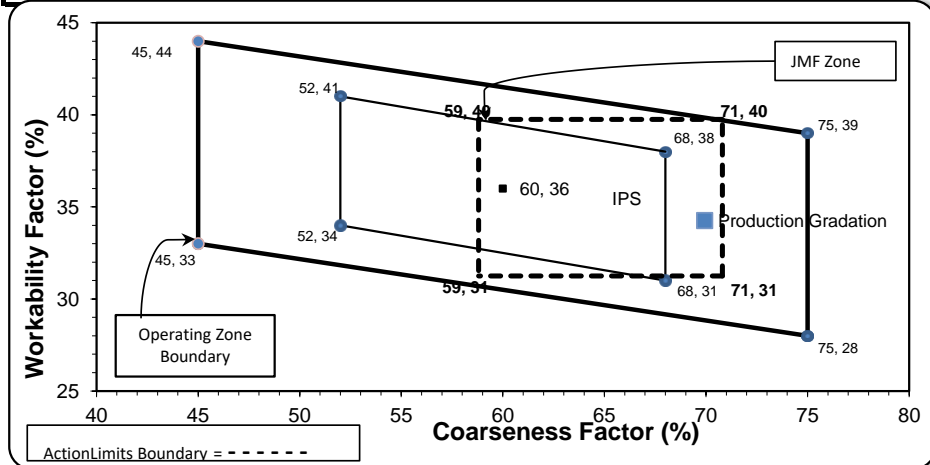
**Superior Materials, LLC**  
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.2	100.0	100.0	98.4	1.6	1.6
1"	33.5	100.0	100.0	78.3	20.1	21.7
3/4"	5.2	98.6	100.0	68.7	9.6	31.3
1/2"	2.5	76.2	100.0	61.5	7.2	38.5
3/8"	2.1	50.3	100.0	54.0	7.5	46.0
#4	1.9	9.1	95.7	40.6	13.4	59.4
#8	1.8	3.1	83.9	34.3	6.3	65.7
#16	1.7	2.3	68.9	28.1	6.1	71.9
#30	1.6	2.2	49.5	20.5	7.6	79.5
#50	1.6	2.1	24.0	10.5	10.0	89.5
#100	1.5	2.0	7.3	3.9	6.6	96.1
LBW	1.4	1.8	1.9	1.7	2.2	98.3

\*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

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



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

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 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

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

Sample Date: 11/27/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/28/2023 through 12/4/2023

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

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



**Superior Materials, LLC**  
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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>

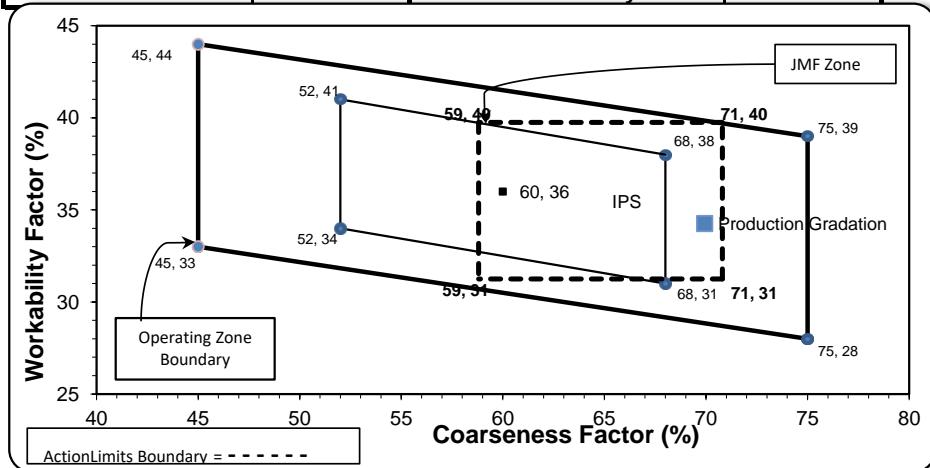
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.2	100.0	100.0	98.4	1.6	1.6
1"	33.5	100.0	100.0	78.3	20.1	21.7
3/4"	5.2	98.6	100.0	68.7	9.6	31.3
1/2"	2.5	76.2	100.0	61.5	7.2	38.5
3/8"	2.1	50.3	100.0	54.0	7.5	46.0
#4	1.9	9.1	95.7	40.6	13.4	59.4
#8	1.8	3.1	83.9	34.3	6.3	65.7
#16	1.7	2.3	68.9	28.1	6.1	71.9
#30	1.6	2.2	49.5	20.5	7.6	79.5
#50	1.6	2.1	24.0	10.5	10.0	89.5
#100	1.5	2.0	7.3	3.9	6.6	96.1
LBW	1.4	1.8	1.9	1.7	2.2	98.3

\*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>70</b>	<b>Workability Factor:</b>	<b>34</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: 11/27/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/28/2023 through 12/4/2023

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%



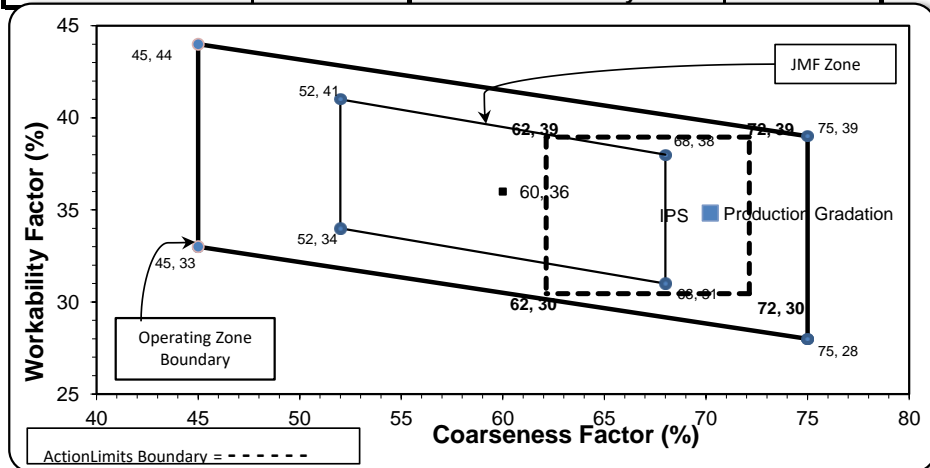
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	57.1	100.0	100.0	81.2	18.8	18.8
3/4"	36.1	100.0	100.0	71.9	9.2	28.1
1/2"	10.4	93.2	100.0	59.5	12.5	40.5
3/8"	5.5	75.8	100.0	54.2	5.2	45.8
#4	1.9	18.0	98.3	41.8	12.4	58.2
#8	1.8	5.2	86.1	34.8	7.0	65.2
#16	1.6	3.8	69.0	27.9	6.9	72.1
#30	1.5	2.4	47.1	19.2	8.7	80.8
#50	1.4	2.1	18.3	8.0	11.2	92.0
#100	1.3	2.1	3.1	2.1	5.9	97.9
LBW	1.2	1.9	0.6	1.1	1.0	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:** **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"	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: 11/27/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/28/2023 through 12/4/2023

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%



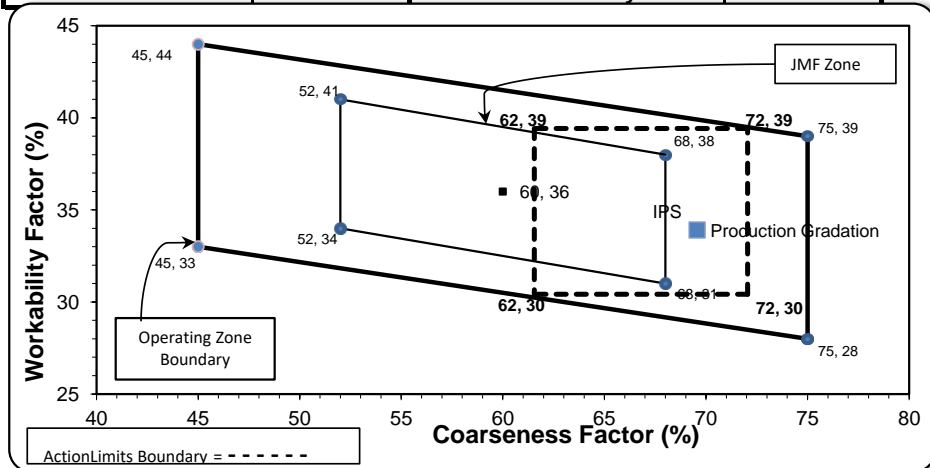
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.2	100.0	100.0	98.4	1.6	1.6
1"	33.5	100.0	100.0	78.3	20.1	21.7
3/4"	5.2	98.6	100.0	68.7	9.6	31.3
1/2"	2.5	76.2	100.0	61.5	7.2	38.5
3/8"	2.1	50.3	100.0	54.0	7.5	46.0
#4	1.9	9.1	97.3	41.2	12.8	58.8
#8	1.8	3.1	83.0	33.9	7.3	66.1
#16	1.7	2.3	67.6	27.6	6.3	72.4
#30	1.6	2.2	49.6	20.5	7.1	79.5
#50	1.6	2.1	21.7	9.6	10.9	90.4
#100	1.5	2.0	3.3	2.3	7.3	97.7
LBW	1.4	1.8	0.6	1.2	1.1	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>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"	72.1	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-02**

Sample Date: 11/27/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/28/2023 through 12/4/2023

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%



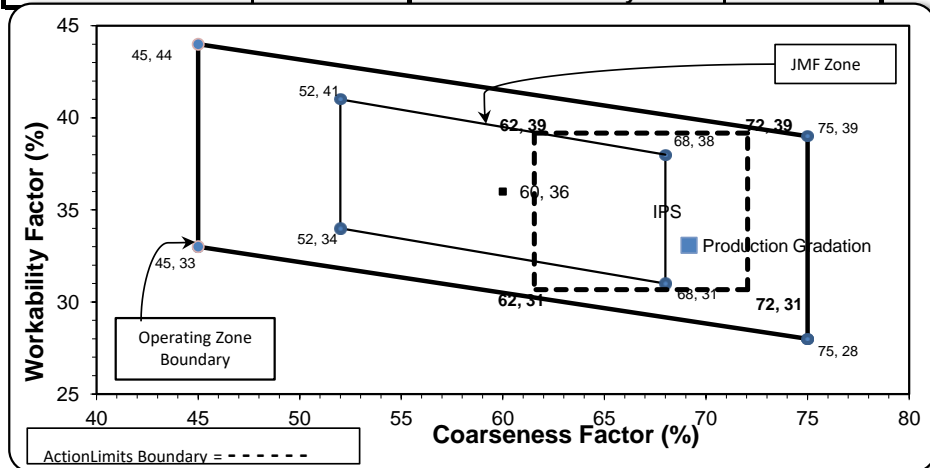
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.2	100.0	100.0	98.4	1.6	1.6
1"	33.5	100.0	100.0	77.9	20.5	22.1
3/4"	5.2	98.6	100.0	68.1	9.8	31.9
1/2"	2.5	76.2	100.0	61.0	7.1	39.0
3/8"	2.1	50.3	100.0	53.7	7.3	46.3
#4	1.9	9.1	96.8	41.0	12.7	59.0
#8	1.8	3.1	80.9	33.1	7.9	66.9
#16	1.7	2.3	64.1	26.3	6.8	73.7
#30	1.6	2.2	47.7	19.8	6.5	80.2
#50	1.6	2.1	24.6	10.7	9.1	89.3
#100	1.5	2.0	5.4	3.2	7.6	96.8
LBW	1.4	1.8	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:** 69      **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"	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: