

# Aggregate Optimization Chart

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

Sample Date: 1/27/20

Concrete Grade: **P1M**

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

Dates Test Represents: 1/28/2020 through 2/3/2020

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	900	5.50	2.62	29.3
IA	71-47	Presque Isle	900	5.50	2.62	29.3
2NS	63-115	Ray Rd	1270	7.68	2.65	41.4
<b>Total Wt</b>			<b>3070</b>	<b>18.69</b>		<b>100.0</b>

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



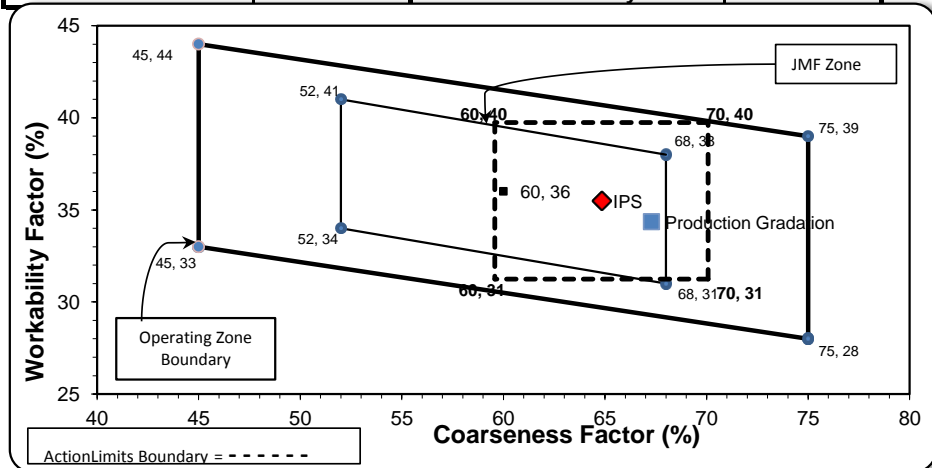
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.2	100.0	100.0	99.2	0.8	0.8
1"	44.2	100.0	100.0	83.6	15.5	16.4
3/4"	11.2	98.2	100.0	73.4	10.2	26.6
1/2"	3.6	74.8	100.0	64.4	9.1	35.6
3/8"	2.7	46.6	100.0	55.8	8.5	44.2
#4	2.2	10.2	95.8	43.3	12.6	56.7
#8	2.1	5.0	78.0	34.3	8.9	65.7
#16	2.1	4.3	61.4	27.3	7.1	72.7
#30	2.0	3.7	46.9	21.1	6.2	78.9
#50	1.9	3.5	25.3	12.0	9.0	88.0
#100	1.9	3.2	5.6	3.8	8.2	96.2
LBW	1.2	2.5	0.8	1.4	2.4	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>34</b>
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Initial Production Sample (IPS)

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	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-36**

Sample Date: 1/27/20

Concrete Grade: **P1M**

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

Dates Test Represents: 1/28/2020 through 2/3/2020

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	850	5.20	2.62	27.7
IA	71-47	Presque Isle	1020	6.24	2.62	33.2
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%



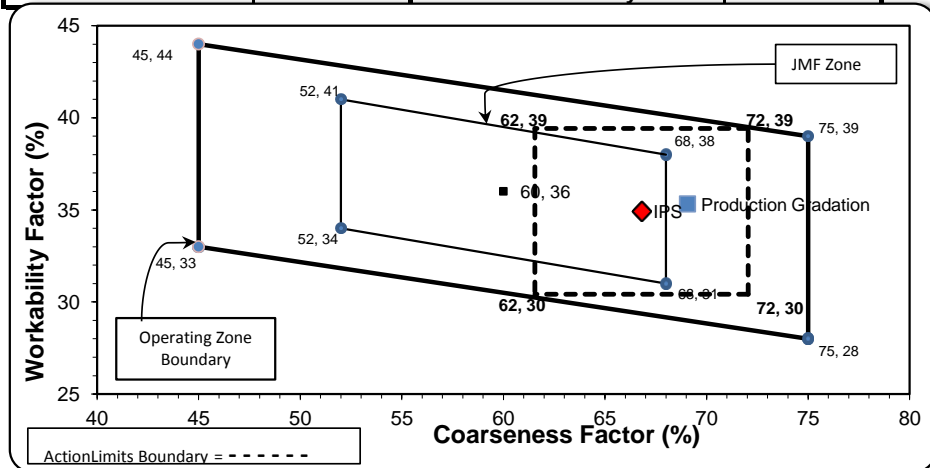
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 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.2	100.0	100.0	99.2	0.8	0.8
1"	44.2	100.0	100.0	84.6	14.7	15.4
3/4"	11.2	98.2	100.0	74.8	9.7	25.2
1/2"	3.6	74.8	100.0	64.9	9.9	35.1
3/8"	2.7	46.6	100.0	55.3	9.6	44.7
#4	2.2	10.2	97.3	42.0	13.3	58.0
#8	2.1	5.0	84.6	35.3	6.7	64.7
#16	2.1	4.3	69.5	29.2	6.1	70.8
#30	2.0	3.7	51.2	21.8	7.4	78.2
#50	1.9	3.5	22.2	10.4	11.4	89.6
#100	1.9	3.2	3.7	3.0	7.3	97.0
LBW	1.2	2.5	0.3	1.3	1.8	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

<b>Coarseness Factor:</b>	<b>69</b>	<b>Workability Factor:</b>	<b>35</b>
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Initial Production Sample (IPS)

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: 1/27/20

Concrete Grade: **P1M**

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

Dates Test Represents: 1/28/2020 through 2/3/2020

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	850	5.20	2.62	27.7
2NS	63-92	Grange Hall	1220	7.38	2.65	39.7
<b>Total Wt</b>			<b>3070</b>	<b>18.69</b>		<b>100.0</b>

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



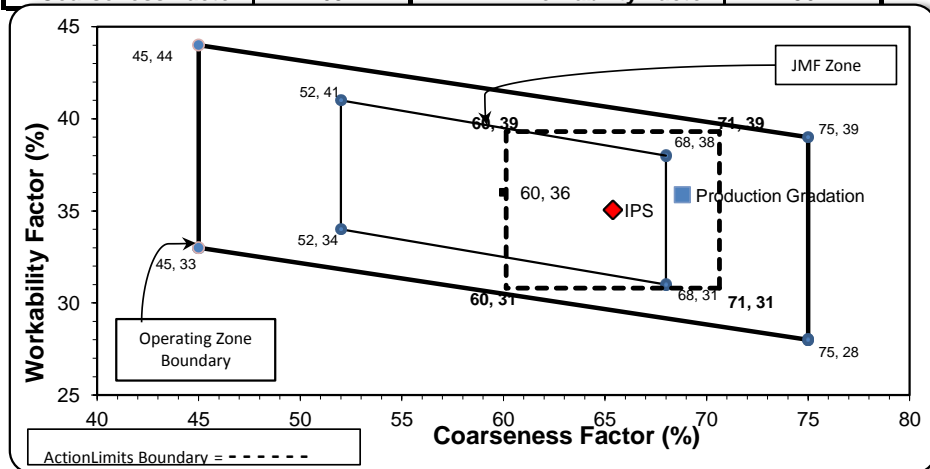
**Superior Materials, LLC**  
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.9	100.0	100.0	99.3	0.7	0.7
1"	43.8	100.0	100.0	81.7	17.6	18.3
3/4"	15.8	98.1	100.0	72.0	9.6	28.0
1/2"	4.5	78.0	100.0	62.8	9.2	37.2
3/8"	3.1	54.6	100.0	55.9	6.9	44.1
#4	2.1	15.6	97.3	43.7	12.2	56.3
#8	1.8	6.0	84.6	35.9	7.8	64.1
#16	1.7	3.6	69.5	29.2	6.7	70.8
#30	1.6	2.8	51.2	21.6	7.5	78.4
#50	1.5	2.5	22.2	10.0	11.6	90.0
#100	1.4	2.3	3.7	2.6	7.4	97.4
LBW	1.3	2.1	0.3	1.1	1.4	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>69</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: 1/27/20

Concrete Grade: P1M

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

Dates Test Represents: 1/28/2020 through 2/3/2020

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	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%



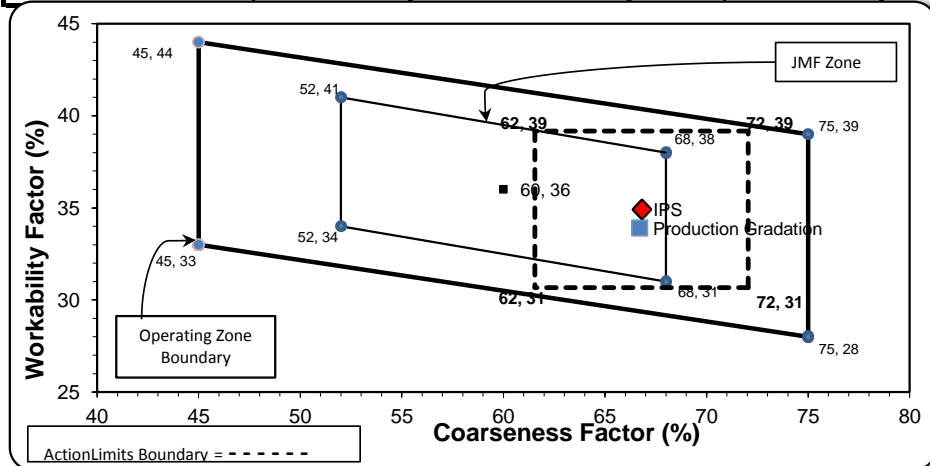
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.2	100.0	100.0	99.2	0.8	0.8
1"	44.2	100.0	100.0	84.2	15.0	15.8
3/4"	11.2	98.2	100.0	74.3	9.9	25.7
1/2"	3.6	74.8	100.0	64.9	9.4	35.1
3/8"	2.7	46.6	100.0	55.9	9.0	44.1
#4	2.2	10.2	95.8	42.8	13.1	57.2
#8	2.1	5.0	78.0	33.9	8.9	66.1
#16	2.1	4.3	61.4	26.9	7.0	73.1
#30	2.0	3.7	46.9	20.8	6.1	79.2
#50	1.9	3.5	25.3	11.9	8.9	88.1
#100	1.9	3.2	5.6	3.8	8.1	96.2
LBW	1.2	2.5	0.8	1.4	2.4	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>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"	72.3	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: