

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

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

Sample Date: 12/10/18

Concrete Grade: **DM**

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

Dates Test Represents: 12/11/2018 through 12/17/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.1
26A	58-003	Stoneco	375	2.23	2.69	12.5
2NS	47-16	Buno Rd	1120	6.77	2.65	37.4
<b>Total Wt</b>			<b>2995</b>	<b>17.94</b>		<b>100.0</b>

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

Sieve	6AA	26A	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"	99.6	100.0	100.0	99.8	0.2	0.2
3/4"	80.2	100.0	100.0	90.1	9.7	9.9
1/2"	43.8	99.8	100.0	71.8	18.3	28.2
3/8"	20.9	87.0	100.0	58.8	13.1	41.2
#4	4.1	24.7	96.0	41.0	17.7	59.0
#8	2.6	6.6	85.8	34.2	6.8	65.8
#16	2.0	3.1	72.3	28.4	5.8	71.6
#30	1.8	2.4	53.0	21.0	7.4	79.0
#50	1.8	2.2	18.2	8.0	13.0	92.0
#100	1.6	2.1	2.5	2.0	6.0	98.0
LBW	1.4	1.9	0.3	1.1	0.9	98.9



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

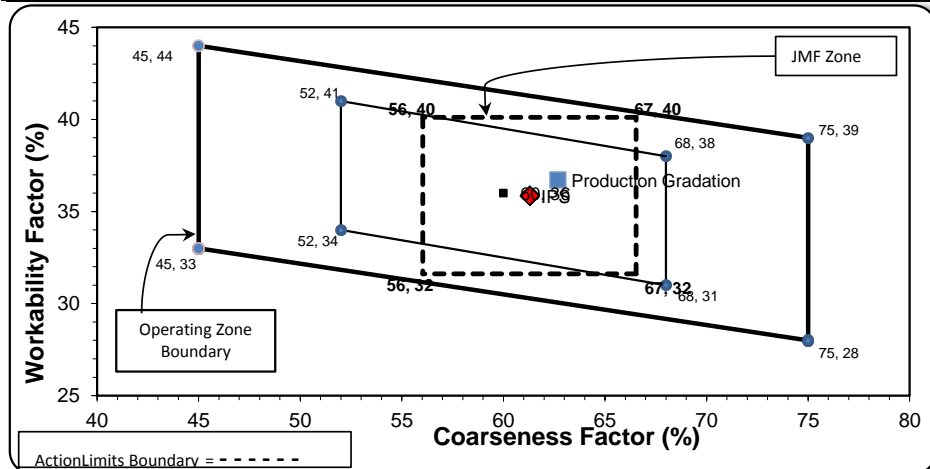
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>63</b>	<b>Workability Factor:</b>	<b>34</b>	<b>Adjusted WF</b>	<b>36.7</b>
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<b>Coarseness Factor:</b>	<b>61</b>
<b>Workability Factor:</b>	<b>36</b>



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.2	10.1	10.8
1/2"	70.7	18.5	29.3
3/8"	60.7	10.0	39.3
#4	44.4	16.3	55.6
#8	35.9	8.5	64.1
#16	27.3	8.6	72.7
#30	19.1	8.2	80.9
#50	7.4	11.7	92.6
#100	1.9	5.6	98.1
LBW	0.7	1.2	99.3

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

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

Sample Date: 12/10/18

Concrete Grade: **DM**

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

Dates Test Represents: 12/11/2018 through 12/17/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	50.8
26A	71-47	Presque Isle	300	1.83	2.62	10.2
2NS	95-13	Smelter Bay	1150	6.95	2.65	39.0
<b>Total Wt</b>			<b>2950</b>	<b>17.96</b>		<b>100.0</b>

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

Sieve	6AA	26A	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	87.8	100.0	100.0	93.8	6.2	6.2
1/2"	45.2	97.2	100.0	71.9	21.9	28.1
3/8"	25.7	80.1	100.0	60.2	11.7	39.8
#4	4.5	11.3	97.9	41.6	18.6	58.4
#8	2.1	2.6	84.9	34.4	7.2	65.6
#16	1.7	1.6	68.7	27.8	6.6	72.2
#30	1.6	1.4	48.2	19.7	8.1	80.3
#50	1.5	1.3	21.2	9.2	10.6	90.8
#100	1.4	1.2	4.9	2.7	6.4	97.3
LBW	1.2	1.0	1.4	1.3	1.5	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.



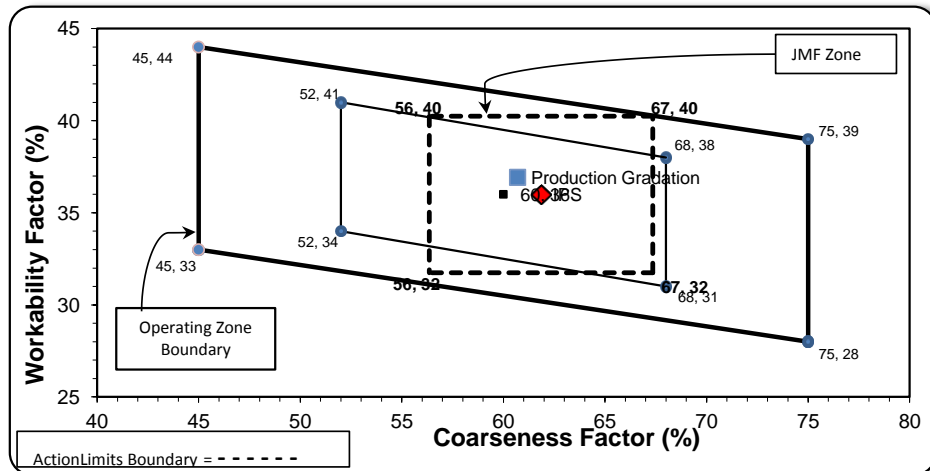
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>61</b>	<b>Workability Factor:</b>	<b>34</b>	<b>Adjusted WF</b>	<b>36.9</b>
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<b>Coarseness Factor:</b>	<b>62</b>
<b>Workability Factor:</b>	<b>36</b>



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	72.3	22.8	27.7
3/8"	60.4	11.8	39.6
#4	42.6	17.8	57.4
#8	36.0	6.6	64.0
#16	29.5	6.5	70.5
#30	20.3	9.2	79.7
#50	9.5	10.8	90.5
#100	3.4	6.1	96.6
LBW	1.3	2.1	98.7

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

**PLANT #:** **P-35**

Sample Date: 12/10/18

Concrete Grade: **DM**

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

Dates Test Represents: 12/11/2018 through 12/17/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.1
26A	58-003	Stoneco	375	2.23	2.69	12.5
2NS	47-16	Buno Rd	1120	6.77	2.65	37.4
<b>Total Wt</b>			<b>2995</b>	<b>17.94</b>		<b>100.0</b>

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

Sieve	6AA	26A	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"	99.6	100.0	100.0	99.8	0.2	0.2
3/4"	80.2	100.0	100.0	90.1	9.7	9.9
1/2"	43.8	99.8	100.0	71.8	18.3	28.2
3/8"	20.9	87.0	100.0	58.8	13.1	41.2
#4	4.1	24.7	96.0	41.0	17.7	59.0
#8	2.6	6.6	85.8	34.2	6.8	65.8
#16	2.0	3.1	72.3	28.4	5.8	71.6
#30	1.8	2.4	53.0	21.0	7.4	79.0
#50	1.8	2.2	18.2	8.0	13.0	92.0
#100	1.6	2.1	2.5	2.0	6.0	98.0
LBW	1.4	1.9	0.3	1.1	0.9	98.9



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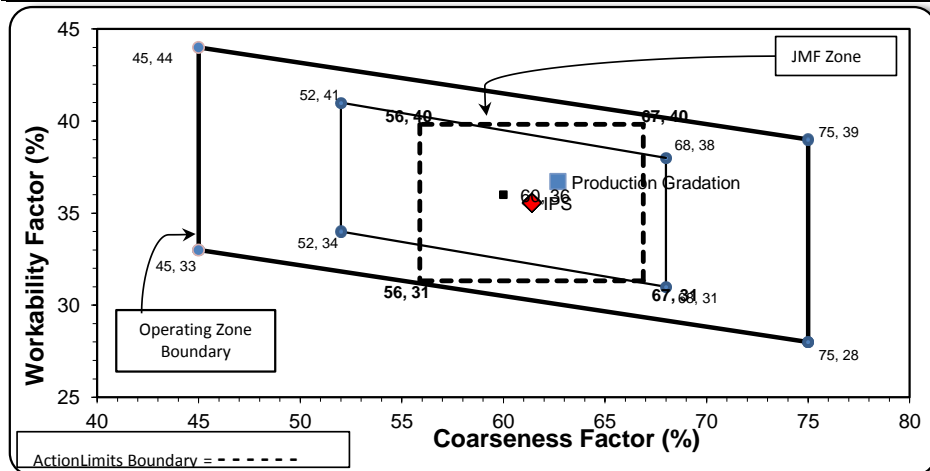
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>63</b>	<b>Workability Factor:</b>	<b>34</b>	<b>Adjusted WF</b>	<b>36.7</b>
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<b>Coarseness Factor:</b>	<b>61</b>
<b>Workability Factor:</b>	<b>36</b>



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.1	10.2	10.9
1/2"	70.5	18.6	29.5
3/8"	60.5	10.0	39.5
#4	44.1	16.4	55.9
#8	35.6	8.5	64.4
#16	27.7	7.9	72.3
#30	20.6	7.1	79.4
#50	8.7	11.8	91.3
#100	1.6	7.1	98.4
LBW	1.1	0.6	98.9

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

**PLANT #:** **P-36**

Sample Date: 12/10/18

Concrete Grade: **DM**

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

Dates Test Represents: 12/11/2018 through 12/17/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	47.5
26A	71-47	Presque Isle	400	2.45	2.62	13.6
2NS	63-92	AA Grange Hall	1150	6.95	2.65	39.0
<b>Total Wt</b>			<b>2950</b>	<b>17.96</b>		<b>100.0</b>

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

Sieve	6AA	26A	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	84.6	100.0	100.0	92.7	7.3	7.3
1/2"	35.5	97.2	100.0	69.0	23.7	31.0
3/8"	15.5	80.1	100.0	57.2	11.8	42.8
#4	1.8	11.3	97.6	40.4	16.8	59.6
#8	1.3	2.6	84.8	34.0	6.4	66.0
#16	1.2	1.6	68.6	27.5	6.5	72.5
#30	1.1	1.4	47.6	19.3	8.3	80.7
#50	1.1	1.3	18.6	7.9	11.3	92.1
#100	1.0	1.2	2.7	1.7	6.3	98.3
LBW	0.9	1.0	0.3	0.7	1.0	99.3



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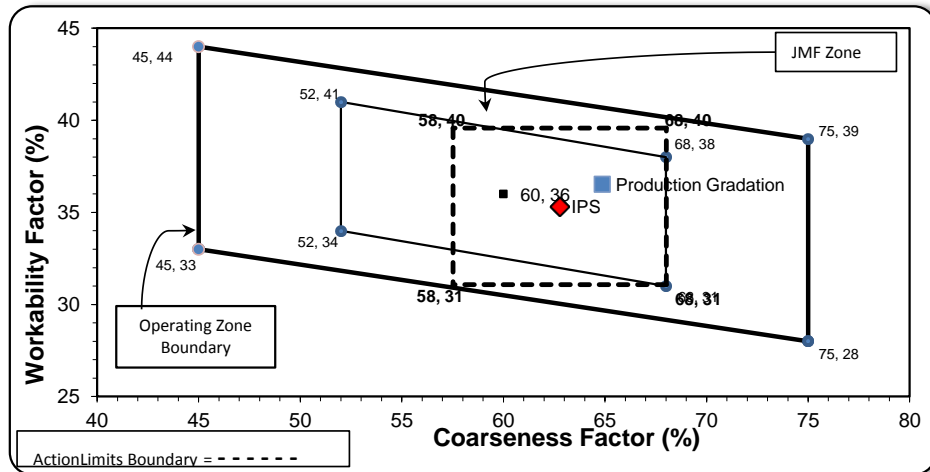
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>	<b>Workability Factor:</b>	<b>34</b>	<b>Adjusted WF</b>	<b>36.5</b>
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<b>Coarseness Factor:</b>	<b>63</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"	99.9	0.1	0.1
3/4"	89.1	10.8	10.9
1/2"	71.3	17.8	28.7
3/8"	59.4	11.9	40.6
#4	42.6	16.8	57.4
#8	35.3	7.3	64.7
#16	28.5	6.8	71.5
#30	20.9	7.6	79.1
#50	9.0	12.0	91.0
#100	1.7	7.3	98.3
LBW	0.7	1.0	99.3

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

**PLANT #:** **P-02**

Sample Date: 12/10/18

Concrete Grade: **DM**

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

Dates Test Represents: 12/11/2018 through 12/17/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	47.5
26A	71-47	Presque Isle	400	2.45	2.62	13.6
2NS	63-92	AA Grange Hall	1150	6.95	2.65	39.0
<b>Total Wt</b>			<b>2950</b>	<b>17.96</b>		<b>100.0</b>

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

Sieve	6AA	26A	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	84.6	100.0	100.0	92.7	7.3	7.3
1/2"	35.5	97.2	100.0	69.0	23.7	31.0
3/8"	15.5	80.1	100.0	57.2	11.8	42.8
#4	1.8	11.3	97.6	40.4	16.8	59.6
#8	1.3	2.6	84.8	34.0	6.4	66.0
#16	1.2	1.6	68.6	27.5	6.5	72.5
#30	1.1	1.4	47.6	19.3	8.3	80.7
#50	1.1	1.3	18.6	7.9	11.3	92.1
#100	1.0	1.2	2.7	1.7	6.3	98.3
LBW	0.9	1.0	0.3	0.7	1.0	99.3



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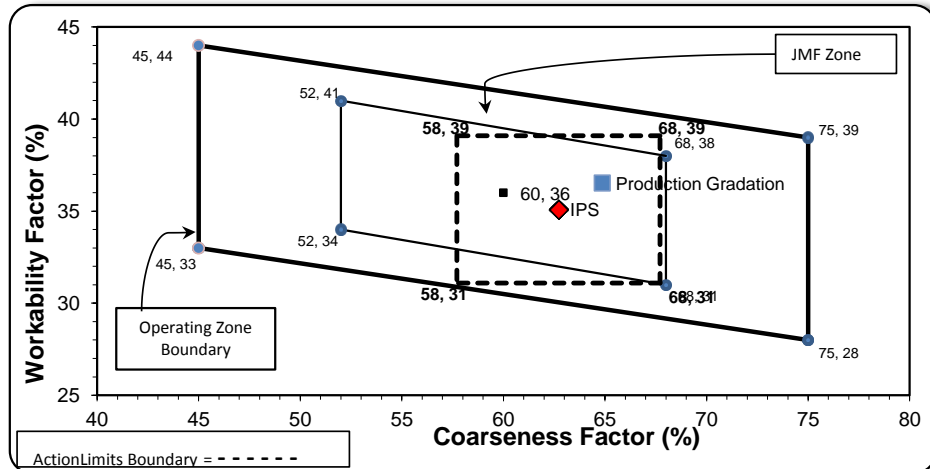
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>	<b>Workability Factor:</b>	<b>34</b>
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<b>Coarseness Factor:</b>	<b>63</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"	100.0	0.0	0.0
3/4"	95.1	4.9	4.9
1/2"	74.6	20.5	25.4
3/8"	59.3	15.3	40.7
#4	42.1	17.2	57.9
#8	35.1	7.1	64.9
#16	29.2	5.9	70.8
#30	21.9	7.3	78.1
#50	9.6	12.4	90.4
#100	2.4	7.2	97.6
LBW	0.9	1.5	99.1

PREPARED BY:  
 SM, LLC Technical Service

Approved By: