

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

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

Sample Date: 7/9/18

Concrete Grade: **DM**

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

Dates Test Represents: 7/10/2018 through 7/16/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1475	8.79	2.69	49.2
26A	58-003	Stoneco	370	2.20	2.69	12.4
2NS	38-046	Chelsea	1150	6.95	2.65	38.4
<b>Total Wt</b>			<b>2995</b>	<b>17.95</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	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"	99.7	100.0	100.0	99.9	0.1	0.1
3/4"	84.0	100.0	100.0	92.1	7.7	7.9
1/2"	36.8	99.8	100.0	68.9	23.3	31.1
3/8"	16.8	89.8	100.0	57.8	11.1	42.2
#4	3.4	15.2	100.0	41.9	15.8	58.1
#8	1.4	5.6	86.0	34.4	7.5	65.6
#16	1.3	2.5	60.0	24.0	10.4	76.0
#30	1.1	1.6	40.0	16.1	7.9	83.9
#50	1.0	1.5	18.0	7.6	8.5	92.4
#100	0.9	1.2	4.0	2.1	5.5	97.9
LBW	0.6	1.0	0.8	0.7	1.4	99.3

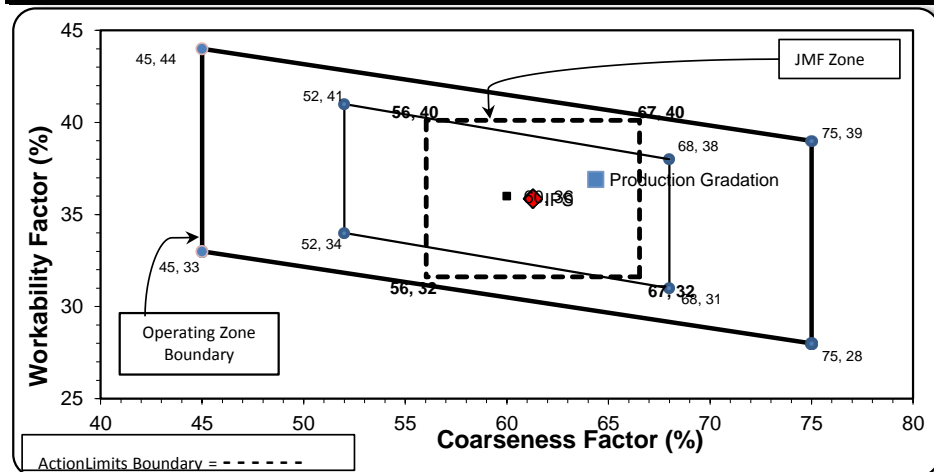
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>64</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>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-103**

Sample Date: 7/9/18

Concrete Grade: **DM**

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

Dates Test Represents: 7/10/2018 through 7/16/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1475	8.79	2.69	49.2
26A	58-003	Stoneco	370	2.20	2.69	12.4
2NS	38-046	Chelsea	1150	6.95	2.65	38.4
<b>Total Wt</b>			<b>2995</b>	<b>17.95</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"	99.7	100.0	100.0	99.9	0.1	0.1
3/4"	84.0	100.0	100.0	92.1	7.7	7.9
1/2"	36.8	99.8	100.0	68.9	23.3	31.1
3/8"	16.8	89.8	100.0	57.8	11.1	42.2
#4	3.4	15.2	100.0	41.9	15.8	58.1
#8	1.4	5.6	86.0	34.4	7.5	65.6
#16	1.3	2.5	60.0	24.0	10.4	76.0
#30	1.1	1.6	40.0	16.1	7.9	83.9
#50	1.0	1.5	18.0	7.6	8.5	92.4
#100	0.9	1.2	4.0	2.1	5.5	97.9
LBW	0.6	1.0	0.8	0.7	1.4	99.3

\*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.



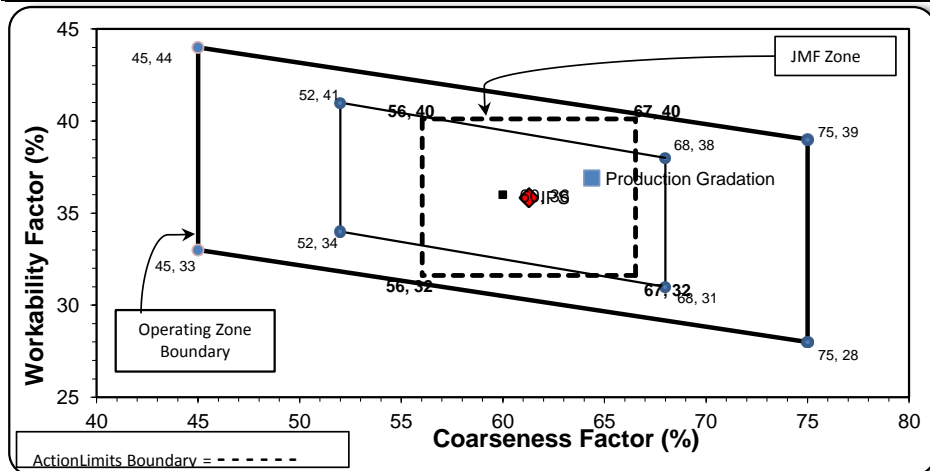
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>64</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>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: 7/9/18

Concrete Grade: **DM**

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

Dates Test Represents: 7/10/2018 through 7/16/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1375	8.41	2.62	46.6
26A	71-47	Presque Isle	375	2.29	2.62	12.7
2NS	95-13	Smelter Bay	1200	7.26	2.65	40.7
<b>Total Wt</b>			<b>2950</b>	<b>17.96</b>		<b>100.0</b>

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



**Superior Materials, LLC**  
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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"	91.3	93.5	100.0	95.1	4.9	4.9
1/2"	45.4	80.5	100.0	72.1	23.0	27.9
3/8"	25.4	80.5	100.0	62.8	9.3	37.3
#4	5.2	19.8	97.2	44.5	18.3	55.5
#8	2.7	6.3	84.4	36.4	8.1	63.6
#16	2.3	3.5	67.3	28.9	7.5	71.1
#30	2.2	2.9	47.2	20.6	8.3	79.4
#50	2.1	2.6	21.6	10.1	10.5	89.9
#100	1.9	2.4	6.6	3.9	6.2	96.1
LBW	1.5	1.8	1.2	1.4	2.5	98.6

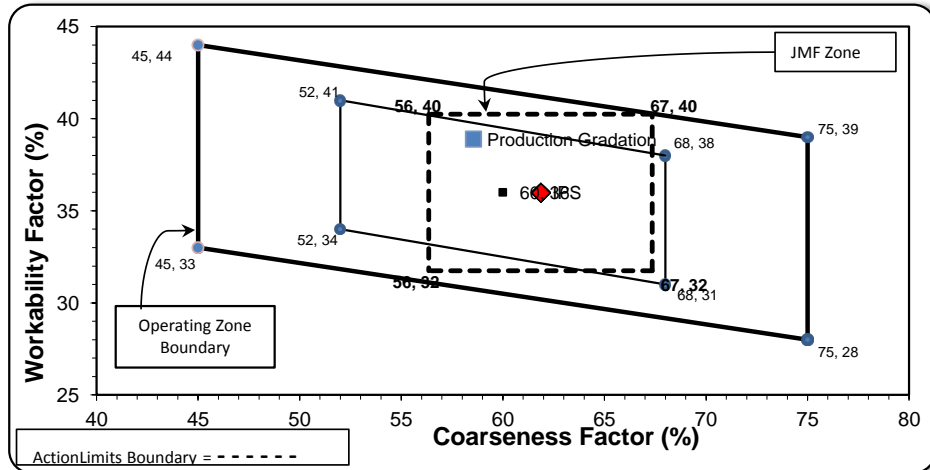
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>59</b>	<b>Workability Factor:</b>	<b>36</b>	<b>38.9</b>	<b>Coarseness Factor:</b>	<b>62</b>
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<b>Workability Factor:</b>	<b>36</b>
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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: 7/9/18

Concrete Grade: DM

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

Dates Test Represents: 7/10/2018 through 7/16/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1490	8.88	2.69	49.8
26A	58-003	Stoneco	250	1.49	2.69	8.4
2NS	81-93	Burmeister	1250	7.59	2.64	41.8
<b>Total Wt</b>			<b>2990</b>	<b>17.95</b>		<b>100.0</b>

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



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 Suite 500  
 Farmington Hills, MI 48336

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"	99.7	100.0	100.0	99.9	0.1	0.1
3/4"	84.0	100.0	100.0	92.0	7.8	8.0
1/2"	36.8	99.8	100.0	68.5	23.5	31.5
3/8"	16.8	89.8	100.0	57.7	10.8	42.3
#4	3.4	15.2	95.1	42.7	15.0	57.3
#8	1.4	5.6	79.5	34.4	8.3	65.6
#16	1.3	2.5	61.2	26.4	8.0	73.6
#30	1.1	1.6	42.0	18.2	8.2	81.8
#50	1.0	1.5	18.3	8.3	10.0	91.7
#100	0.9	1.2	3.9	2.2	6.1	97.8
LBW	0.6	1.0	1.0	0.8	1.4	99.2

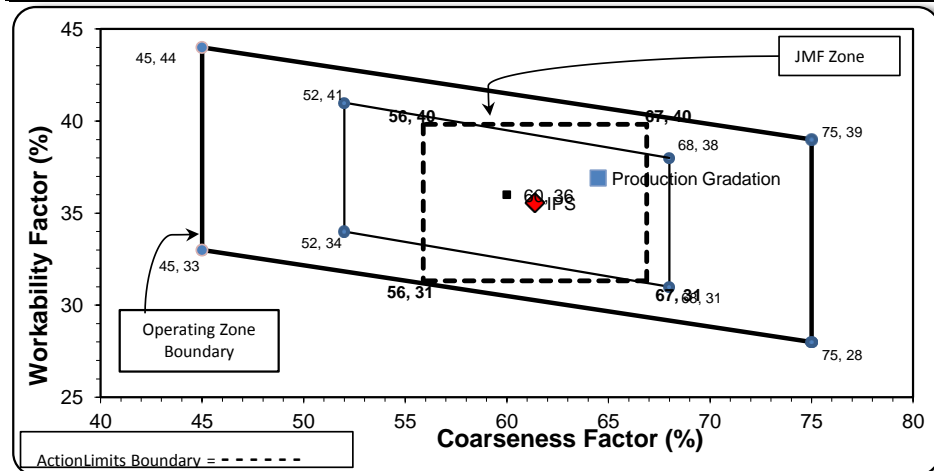
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	34	Adjusted WF	36.9
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Coarseness Factor:	61
Workability Factor:	36



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: 7/9/18

Concrete Grade: **DM**

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

Dates Test Represents: 7/10/2018 through 7/16/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1300	7.95	2.62	44.1
26A	71-47	Presque Isle	500	3.06	2.62	16.9
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%



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

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"	89.0	93.5	100.0	94.1	5.9	5.9
1/2"	42.3	80.5	100.0	71.3	22.8	28.7
3/8"	20.4	80.5	100.0	61.6	9.7	38.4
#4	3.0	19.8	97.0	42.5	19.1	57.5
#8	2.1	6.3	83.3	34.5	8.0	65.5
#16	1.9	3.5	67.7	27.8	6.6	72.2
#30	1.8	2.9	49.4	20.5	7.3	79.5
#50	1.7	2.6	21.5	9.6	11.0	90.4
#100	1.6	2.4	2.8	2.2	7.4	97.8
LBW	1.3	1.8	0.2	1.0	1.2	99.0

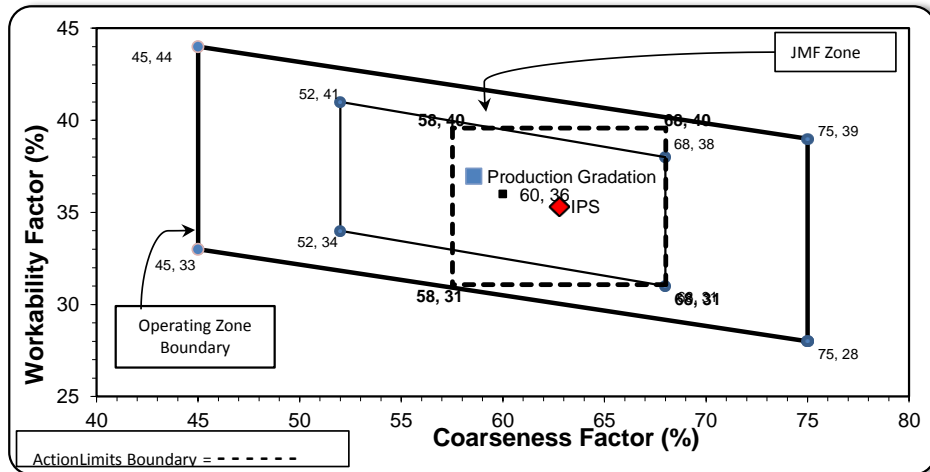
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2" 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>59</b>	<b>Workability Factor:</b>	<b>34</b>	<b>37.0</b>	<b>Coarseness Factor:</b>	<b>63</b>
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<b>Workability Factor:</b>	<b>35</b>
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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: 7/9/18

Concrete Grade: DM

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

Dates Test Represents: 7/10/2018 through 7/16/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1300	7.95	2.62	44.1
26A	71-47	Presque Isle	500	3.06	2.62	16.9
2NS	47-16	Buno Road	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"	89.0	93.5	100.0	94.1	5.9	5.9
1/2"	42.3	80.5	100.0	71.3	22.8	28.7
3/8"	20.4	80.5	100.0	61.6	9.7	38.4
#4	3.0	19.8	95.6	41.9	19.7	58.1
#8	2.1	6.3	85.1	35.2	6.8	64.8
#16	1.9	3.5	72.0	29.5	5.7	70.5
#30	1.8	2.9	52.3	21.7	7.8	78.3
#50	1.7	2.6	18.0	8.2	13.5	91.8
#100	1.6	2.4	2.4	2.0	6.2	98.0
LBW	1.3	1.8	0.5	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.



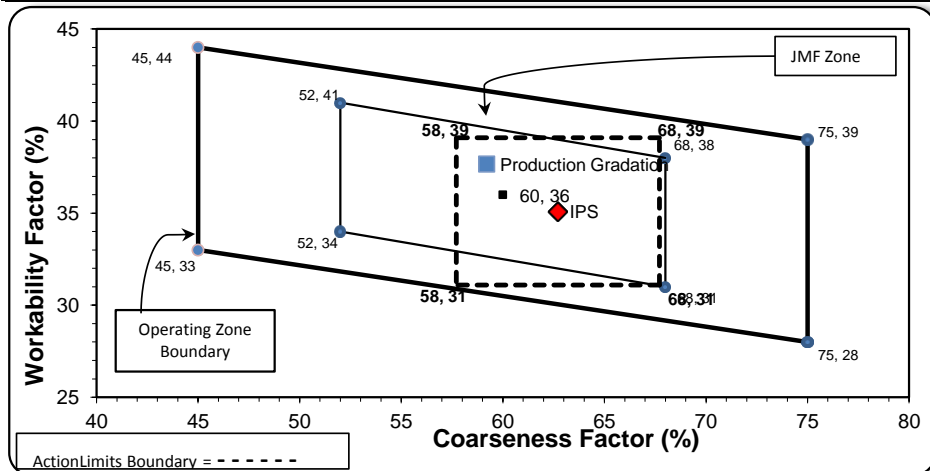
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>59</b>	<b>Workability Factor:</b>	<b>35</b>	<b>37.7</b>	<b>Coarseness Factor:</b>	<b>63</b>
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<b>Workability Factor:</b>	<b>35</b>
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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: