

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7 and DDD0K7E9

Production Gradation Report

**PLANT #:** **P-103**

Sample Date: 9/4/17

Concrete Grade: **DM**

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

Dates Test Represents: 9/4/2017 to 9/10/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	53.5
26A	58-003	Stoneco	150	0.89	2.69	5.0
2NS	81-93	Burmeister	1240	7.53	2.64	41.5
<b>Total Wt</b>			<b>2990</b>	<b>17.95</b>		<b>100.0</b>

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



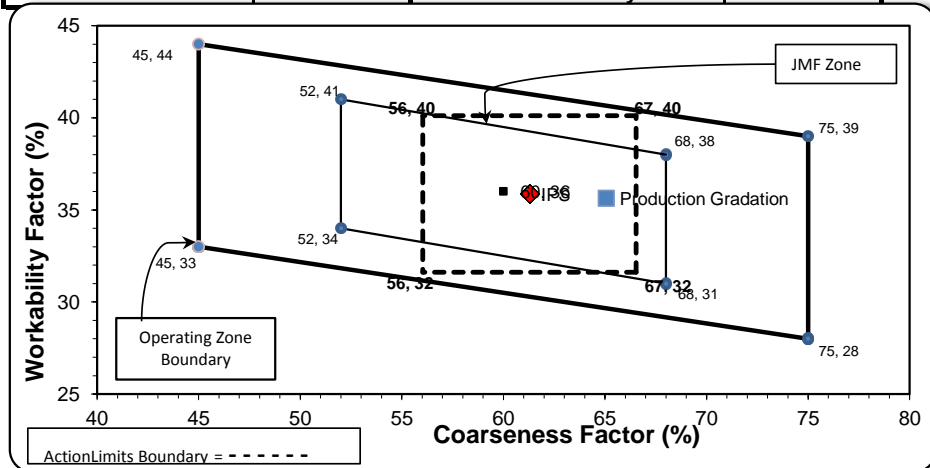
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	99.9	100.0	100.0	99.9	0.1	0.1
3/4"	82.3	100.0	100.0	90.5	9.4	9.5
1/2"	43.8	99.6	100.0	69.9	20.6	30.1
3/8"	22.9	87.4	100.0	58.1	11.8	41.9
#4	4.0	11.7	96.8	42.9	15.2	57.1
#8	1.2	2.1	84.1	35.6	7.2	64.4
#16	1.8	1.1	70.0	30.0	5.6	70.0
#30	1.6	0.9	51.0	22.1	8.0	77.9
#50	1.4	0.8	19.8	9.0	13.1	91.0
#100	1.2	0.7	3.1	2.0	7.0	98.0
LBW	0.5	0.5	0.9	0.7	1.3	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

<b>Coarseness Factor:</b>	<b>65</b>	<b>Workability Factor:</b>	<b>36</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"	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 and DDD0K7E9

Production Gradation Report

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

Sample Date: 9/4/17

Concrete Grade: **DM**

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

Dates Test Represents: 9/4/2017 to 9/10/2017

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	350	2.14	2.62	11.9
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%

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"	87.9	100.0	100.0	94.3	5.7	5.7
1/2"	37.8	97.7	100.0	70.2	24.0	29.8
3/8"	17.9	86.4	100.0	59.4	10.8	40.6
#4	2.4	14.0	96.4	42.0	17.4	58.0
#8	1.6	3.4	86.3	36.3	5.7	63.7
#16	1.4	2.1	71.8	30.1	6.1	69.9
#30	1.4	1.9	50.9	21.6	8.5	78.4
#50	1.3	1.8	23.2	10.3	11.3	89.7
#100	1.3	1.7	7.0	3.7	6.6	96.3
LBW	1.2	1.6	1.6	1.4	2.3	98.6

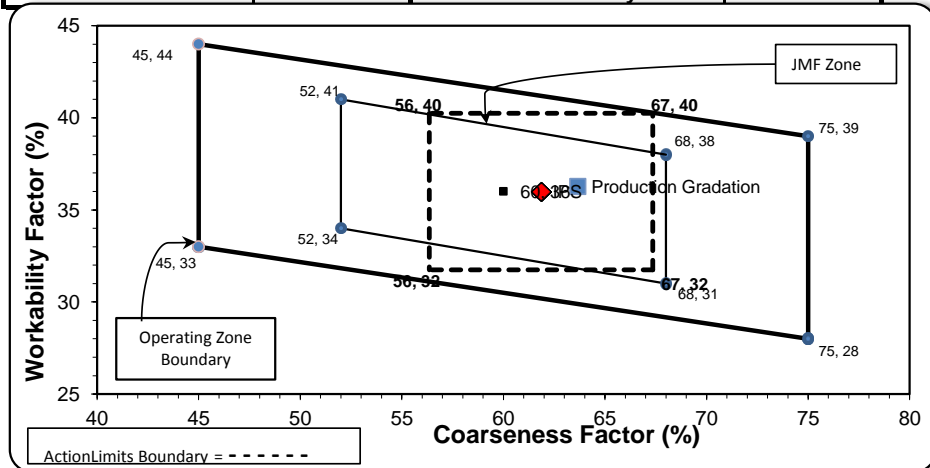
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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



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Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor:** **64**      **Workability Factor:** **36**



Initial Production Sample (IPS)

<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 and DDD0K7E9

Production Gradation Report

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

Sample Date: 9/4/17

Concrete Grade: **DM**

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

Dates Test Represents: 9/4/2017 to 9/10/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1630	9.71	2.69	54.5
26A	71-47	Presque Isle	150	0.92	2.62	5.0
2NS	63-92	AA Grange Hall	1210	7.32	2.65	40.5
<b>Total Wt</b>			<b>2990</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"	99.9	100.0	100.0	99.9	0.1	0.1
3/4"	82.3	100.0	100.0	90.4	9.6	9.6
1/2"	43.8	97.7	100.0	69.2	21.1	30.8
3/8"	22.9	86.4	100.0	57.3	12.0	42.7
#4	4.0	14.0	98.1	42.6	14.7	57.4
#8	1.2	3.4	86.4	35.8	6.8	64.2
#16	1.8	2.1	71.0	29.8	6.0	70.2
#30	1.6	1.9	50.6	21.4	8.4	78.6
#50	1.4	1.8	20.9	9.3	12.1	90.7
#100	1.2	1.7	3.1	2.0	7.3	98.0
LBW	0.5	1.6	0.3	0.5	1.5	99.5

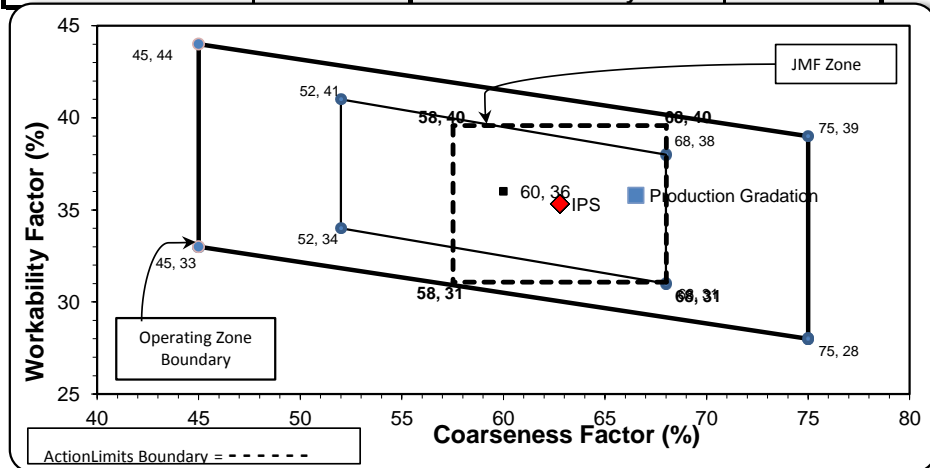


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\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained 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

**Coarseness Factor: 67**      **Workability Factor: 36**



Initial Production Sample (IPS)

Coarseness Factor: 63		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"	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

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Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7 and DDD0K7E9

Production Gradation Report

**PLANT #:** **P-38**

Sample Date: 9/4/17

Concrete Grade: **DM**

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

Dates Test Represents: 9/4/2017 to 9/10/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	53.5
26A	58-003	Stoneco	150	0.89	2.69	5.0
2NS	81-93	Burmeister	1240	7.53	2.64	41.5
<b>Total Wt</b>			<b>2990</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"	99.9	100.0	100.0	99.9	0.1	0.1
3/4"	82.3	100.0	100.0	90.5	9.4	9.5
1/2"	43.8	99.6	100.0	69.9	20.6	30.1
3/8"	22.9	87.4	100.0	58.1	11.8	41.9
#4	4.0	11.7	96.8	42.9	15.2	57.1
#8	1.2	2.1	84.1	35.6	7.2	64.4
#16	1.8	1.1	70.0	30.0	5.6	70.0
#30	1.6	0.9	51.0	22.1	8.0	77.9
#50	1.4	0.8	19.8	9.0	13.1	91.0
#100	1.2	0.7	3.1	2.0	7.0	98.0
LBW	0.5	0.5	0.9	0.7	1.3	99.3

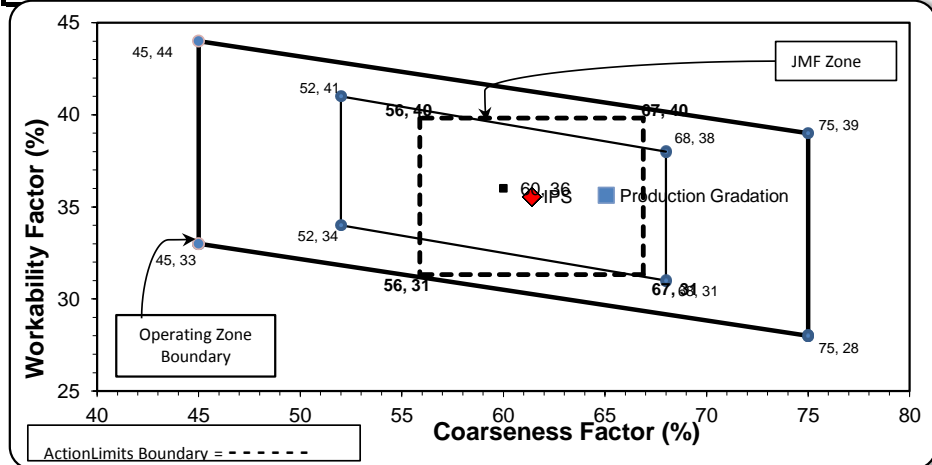


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 \*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor: 65**      **Workability Factor: 36**



Initial Production Sample (IPS)

**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

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