

# Aggregate Optimization Chart

MIX ID'S: DDS257E7, DDS257E5 and DDS257E8

Production Gradation Report

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

Sample Date: 8/28/17

Concrete Grade: **S2M**

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

Dates Test Represents: 8/28/2017 to 9/3/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1700	10.13	2.69	53.9
26A	58-003	Stoneco	155	0.92	2.69	4.9
2NS	81-93	Burmeister	1300	7.89	2.64	41.2
<b>Total Wt</b>			<b>3155</b>	<b>18.94</b>		<b>100.0</b>

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



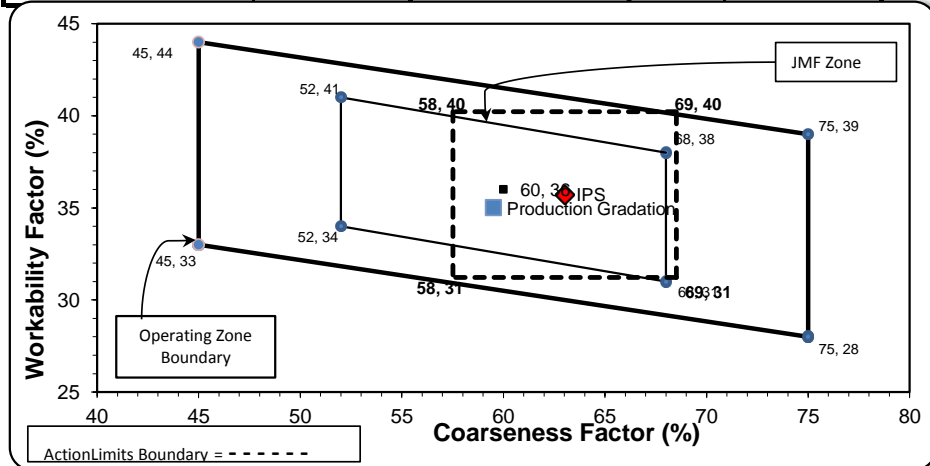
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	86.1	100.0	100.0	92.5	7.5	7.5
1/2"	49.7	99.6	100.0	72.9	19.6	27.1
3/8"	29.6	84.8	100.0	61.3	11.6	38.7
#4	4.2	23.7	96.6	43.2	18.1	56.8
#8	1.1	5.2	82.9	35.0	8.2	65.0
#16	0.5	2.4	68.2	28.5	6.5	71.5
#30	0.4	1.9	48.7	20.4	8.1	79.6
#50	0.4	1.6	18.6	8.0	12.4	92.0
#100	0.3	1.6	2.9	1.4	6.5	98.6
LBW	0.4	1.4	1.0	0.7	0.7	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>60</b>	<b>Workability Factor:</b>	<b>35</b>
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Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>63</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"	99.2	0.8	0.8
3/4"	90.9	8.3	9.1
1/2"	71.3	19.6	28.7
3/8"	59.5	11.8	40.5
#4	43.8	15.7	56.2
#8	35.7	8.1	64.3
#16	27.0	8.7	73.0
#30	18.6	8.4	81.4
#50	6.8	11.8	93.2
#100	1.4	5.4	98.6
LBW	0.6	0.8	99.4

PREPARED BY:  
 SM, LLC Technical Service

Approved BY:

# Aggregate Optimization Chart

MIX ID'S: DDS257E7 and DDS257E8

Production Gradation Report

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

Sample Date: 8/28/17

Concrete Grade: **S2M**

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

Dates Test Represents: 8/28/2017 to 9/3/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1550	9.48	2.62	49.8
26A	71-47	Presque Isle	300	1.83	2.62	9.6
2NS	95-13	Smelter Bay	1260	7.62	2.65	40.5
<b>Total Wt</b>			<b>3110</b>	<b>18.94</b>		<b>100.0</b>

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



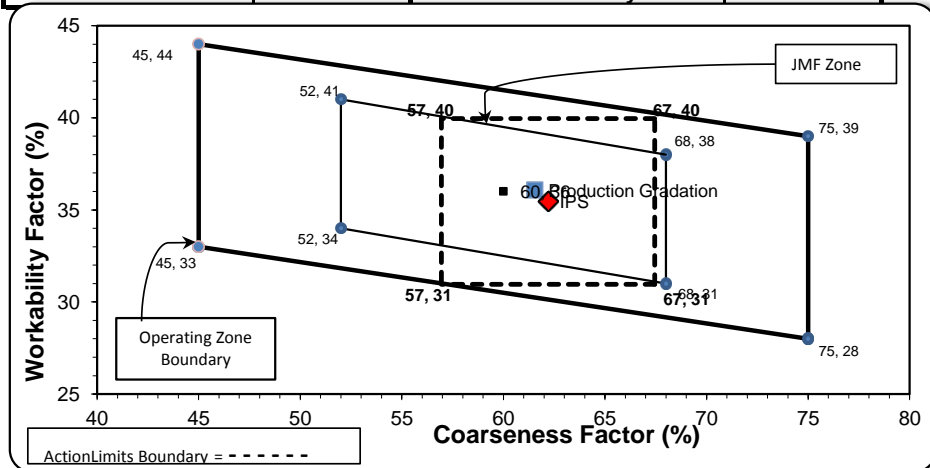
**Superior Materials, LLC**  
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 Farmington Hills, MI 48336

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"	91.6	100.0	100.0	95.8	4.2	4.2
1/2"	47.4	97.1	100.0	73.5	22.3	26.5
3/8"	24.3	83.2	100.0	60.7	12.9	39.3
#4	2.7	11.0	96.4	41.5	19.2	58.5
#8	1.7	2.7	86.3	36.1	5.4	63.9
#16	1.5	1.9	71.2	29.8	6.3	70.2
#30	1.4	1.7	50.1	21.2	8.6	78.8
#50	1.4	1.6	23.0	10.2	11.0	89.8
#100	1.3	1.6	6.2	3.3	6.9	96.7
LBW	1.2	1.5	1.5	1.4	2.0	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>62</b>	<b>Workability Factor:</b>	<b>36</b>
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Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>62</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"	94.0	6.0	6.0
1/2"	70.2	23.7	29.8
3/8"	59.9	10.4	40.1
#4	42.7	17.2	57.3
#8	35.5	7.2	64.5
#16	28.4	7.0	71.6
#30	19.2	9.2	80.8
#50	8.9	10.3	91.1
#100	3.1	5.9	96.9
LBW	1.4	1.7	98.6

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: WSN175E9

Production Gradation Report

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

Sample Date: 8/28/17

Concrete Grade: **S2M (SPECIAL, 5000 PSI)**

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

Dates Test Represents: 8/28/2017 to 9/3/2017

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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	86.1	100.0	100.0	92.4	7.6	7.6
1/2"	49.7	97.1	100.0	72.4	20.0	27.6
3/8"	29.6	83.2	100.0	60.8	11.7	39.2
#4	4.2	11.0	98.2	42.6	18.2	57.4
#8	1.1	2.7	87.2	36.0	6.6	64.0
#16	0.5	1.9	71.9	29.5	6.6	70.5
#30	0.4	1.7	50.8	20.9	8.6	79.1
#50	0.4	1.6	21.3	8.9	11.9	91.1
#100	0.3	1.6	2.8	1.4	7.5	98.6
LBW	0.4	1.5	0.3	0.4	1.0	99.6

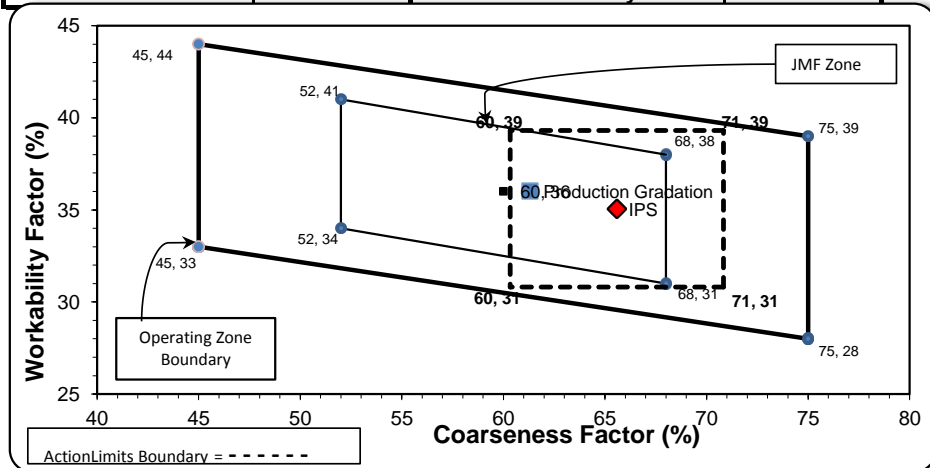
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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



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Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

<b>Coarseness Factor:</b>	<b>61</b>	<b>Workability Factor:</b>	<b>36</b>
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Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>66</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"	91.7	8.3	8.3
1/2"	66.8	24.8	33.2
3/8"	57.4	9.4	42.6
#4	43.0	14.4	57.0
#8	35.1	7.9	64.9
#16	28.0	7.1	72.0
#30	19.5	8.5	80.5
#50	8.1	11.4	91.9
#100	2.0	6.1	98.0
LBW	0.7	1.3	99.3

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDS257E7, DDS257E5 and DDS257E8

Production Gradation Report

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

Sample Date: 8/28/17

Concrete Grade: **S2M**

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

Dates Test Represents: 8/28/2017 to 9/3/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1700	10.13	2.69	53.9
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2NS	81-93	Burmeister	1300	7.89	2.64	41.2
<b>Total Wt</b>			<b>3155</b>	<b>18.94</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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	86.1	100.0	100.0	92.5	7.5	7.5
1/2"	49.7	99.6	100.0	72.9	19.6	27.1
3/8"	29.6	84.8	100.0	61.3	11.6	38.7
#4	4.2	23.7	96.6	43.2	18.1	56.8
#8	1.1	5.2	82.9	35.0	8.2	65.0
#16	0.5	2.4	68.2	28.5	6.5	71.5
#30	0.4	1.9	48.7	20.4	8.1	79.6
#50	0.4	1.6	18.6	8.0	12.4	92.0
#100	0.3	1.6	2.9	1.4	6.5	98.6
LBW	0.4	1.4	1.0	0.7	0.7	99.3

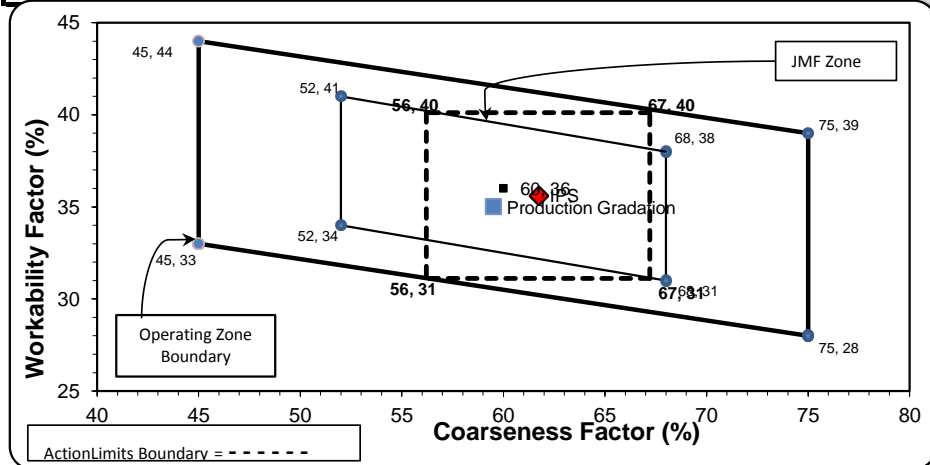


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Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor: 60**      **Workability Factor: 35**



Initial Production Sample (IPS)

Coarseness Factor: 62		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"	99.2	0.8	0.8
3/4"	91.1	8.1	8.9
1/2"	72.0	19.1	28.0
3/8"	60.3	11.7	39.7
#4	43.4	16.9	56.6
#8	35.6	7.8	64.4
#16	28.4	7.2	71.6
#30	21.8	6.7	78.2
#50	9.1	12.6	90.9
#100	1.7	7.4	98.3
LBW	1.1	0.6	98.9

PREPARED BY:  
 SM, LLC Technical Service

Approved By: