

# Aggregate Optimization Chart

MIX ID'S: DDS257E7 and DDS257E8

Production Gradation Report

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

Sample Date: 7/23/18

Concrete Grade: **S2M**

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

Dates Test Represents: 7/24/2018 through 7/30/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	12.7
2NS	38-046	Chelsea	1260	7.62	2.65	39.9
<b>Total Wt</b>			<b>3160</b>	<b>18.94</b>		<b>100.0</b>

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



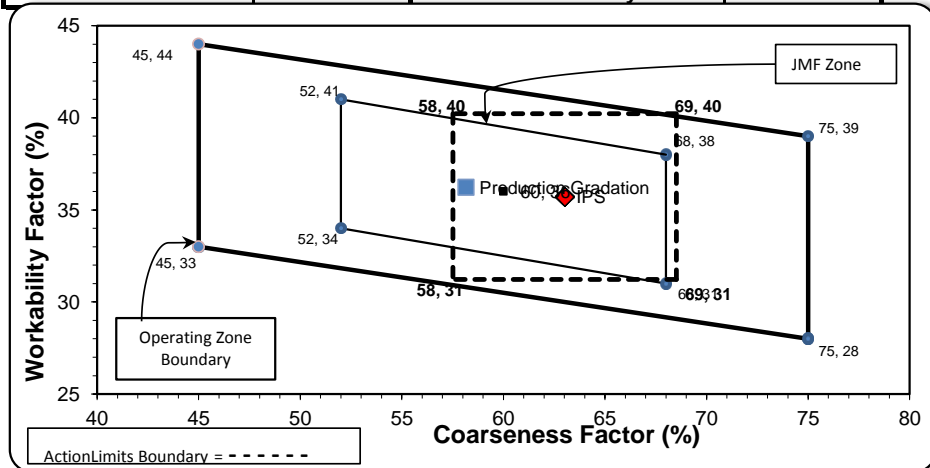
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	99.8	100.0	100.0	99.9	0.1	0.1
3/4"	86.8	100.0	100.0	93.7	6.2	6.3
1/2"	45.3	99.6	100.0	74.0	19.8	26.0
3/8"	24.6	89.7	100.0	62.9	11.1	37.1
#4	4.7	20.7	100.0	44.7	18.2	55.3
#8	2.0	7.8	86.0	36.2	8.5	63.8
#16	1.9	3.5	64.0	26.9	9.4	73.1
#30	1.6	2.5	45.0	19.0	7.8	81.0
#50	1.4	2.2	25.0	10.9	8.1	89.1
#100	1.4	2.1	6.0	3.3	7.6	96.7
LBW	1.0	1.9	1.1	1.2	2.2	98.8

\*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>58</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"	99.2	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-103**

Sample Date: 7/23/18

Concrete Grade: **S2M**

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

Dates Test Represents: 7/24/2018 through 7/30/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	12.7
2NS	38-046	Chelsea	1260	7.62	2.65	39.9
<b>Total Wt</b>			<b>3160</b>	<b>18.94</b>		<b>100.0</b>

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



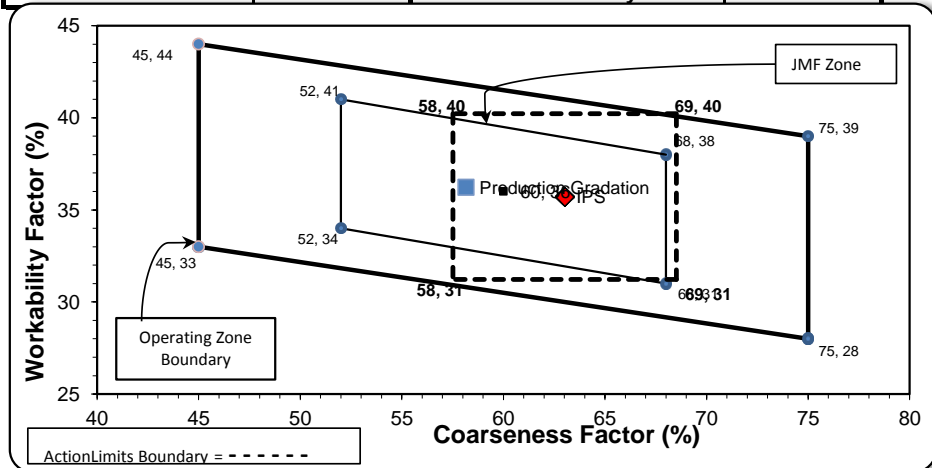
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 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	99.8	100.0	100.0	99.9	0.1	0.1
3/4"	86.8	100.0	100.0	93.7	6.2	6.3
1/2"	45.3	99.6	100.0	74.0	19.8	26.0
3/8"	24.6	89.7	100.0	62.9	11.1	37.1
#4	4.7	20.7	100.0	44.7	18.2	55.3
#8	2.0	7.8	86.0	36.2	8.5	63.8
#16	1.9	3.5	64.0	26.9	9.4	73.1
#30	1.6	2.5	45.0	19.0	7.8	81.0
#50	1.4	2.2	25.0	10.9	8.1	89.1
#100	1.4	2.1	6.0	3.3	7.6	96.7
LBW	1.0	1.9	1.1	1.2	2.2	98.8

\*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>58</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"	99.2	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: 7/23/18

Concrete Grade: **S2M**

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

Dates Test Represents: 7/24/2018 through 7/30/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1650	10.09	2.62	53.1
26A	71-47	Presque Isle	180	1.10	2.62	5.8
2NS	95-13	Smelter Bay	1280	7.74	2.65	41.2
<b>Total Wt</b>			<b>3110</b>	<b>18.93</b>		<b>100.0</b>

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



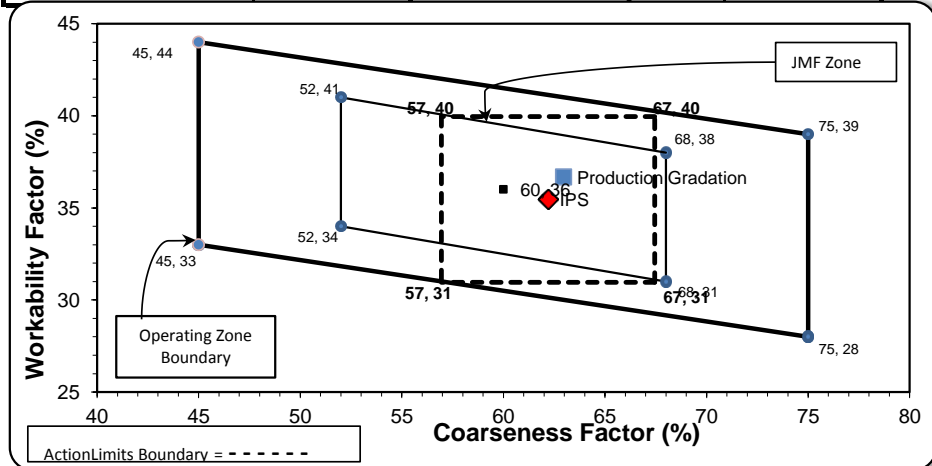
**Superior Materials, LLC**  
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Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	90.8	100.0	100.0	95.1	4.9	4.9
1/2"	51.4	97.0	100.0	74.0	21.1	26.0
3/8"	26.5	84.8	100.0	60.1	13.9	39.9
#4	5.8	24.5	96.6	44.3	15.9	55.7
#8	4.0	8.2	82.8	36.7	7.6	63.3
#16	3.4	4.2	65.4	29.0	7.7	71.0
#30	3.0	3.2	44.6	20.1	8.8	79.9
#50	2.5	2.9	18.5	9.1	11.0	90.9
#100	2.3	2.6	4.4	3.2	5.9	96.8
LBW	1.7	2.1	0.8	1.4	1.8	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>63</b>	<b>Workability Factor:</b>	<b>37</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"	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: DDS257E7 and DDS257E8

Production Gradation Report

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

Sample Date: 7/23/18

Concrete Grade: **S2M**

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

Dates Test Represents: 7/24/2018 through 7/30/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1450	8.87	2.62	46.6
26A	71-47	Presque Isle	410	2.51	2.62	13.2
2NS	63-92	AA Grange Hall	1250	7.56	2.65	40.2
<b>Total Wt</b>			<b>3110</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"	88.6	100.0	100.0	94.7	5.3	5.3
1/2"	44.0	97.0	100.0	73.5	21.2	26.5
3/8"	16.9	84.8	100.0	59.3	14.2	40.7
#4	1.8	24.5	96.8	43.0	16.3	57.0
#8	1.3	8.2	82.6	34.9	8.1	65.1
#16	1.1	4.2	67.2	28.1	6.8	71.9
#30	1.1	3.2	49.4	20.8	7.3	79.2
#50	1.1	2.9	23.5	10.3	10.4	89.7
#100	1.0	2.6	3.3	2.1	8.2	97.9
LBW	0.9	2.1	0.2	0.8	1.4	99.2

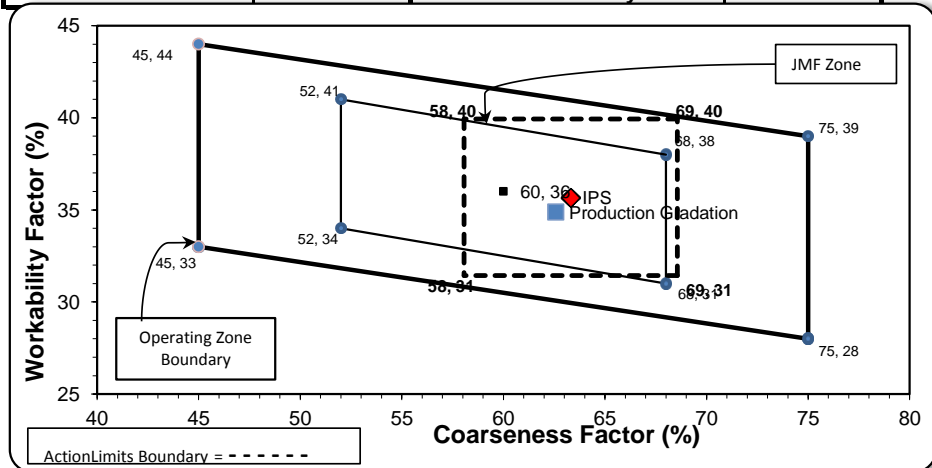


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\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained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

<b>Coarseness Factor:</b>	<b>63</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"	100.0	0.0	0.0
3/4"	95.6	4.4	4.4
1/2"	73.1	22.6	26.9
3/8"	59.3	13.8	40.7
#4	42.8	16.5	57.2
#8	35.7	7.1	64.3
#16	28.9	6.8	71.1
#30	20.7	8.2	79.3
#50	9.9	10.8	90.1
#100	2.1	7.8	97.9
LBW	0.9	1.2	99.1

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDS257E7 and DDS257E8

Production Gradation Report

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

Sample Date: 7/23/18

Concrete Grade: **S2M**

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

Dates Test Represents: 7/24/2018 through 7/30/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1450	8.87	2.62	46.6
26A	71-47	Presque Isle	410	2.51	2.62	13.2
2NS	47-16	Buno Road	1250	7.56	2.65	40.2
<b>Total Wt</b>			<b>3110</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"	88.6	100.0	100.0	94.7	5.3	5.3
1/2"	44.0	97.0	100.0	73.5	21.2	26.5
3/8"	16.9	84.8	100.0	59.3	14.2	40.7
#4	1.8	24.5	96.3	42.8	16.5	57.2
#8	1.3	8.2	85.8	36.2	6.6	63.8
#16	1.1	4.2	72.1	30.0	6.1	70.0
#30	1.1	3.2	52.4	22.0	8.0	78.0
#50	1.1	2.9	18.6	8.4	13.6	91.6
#100	1.0	2.6	2.4	1.8	6.6	98.2
LBW	0.9	2.1	0.4	0.9	0.9	99.1

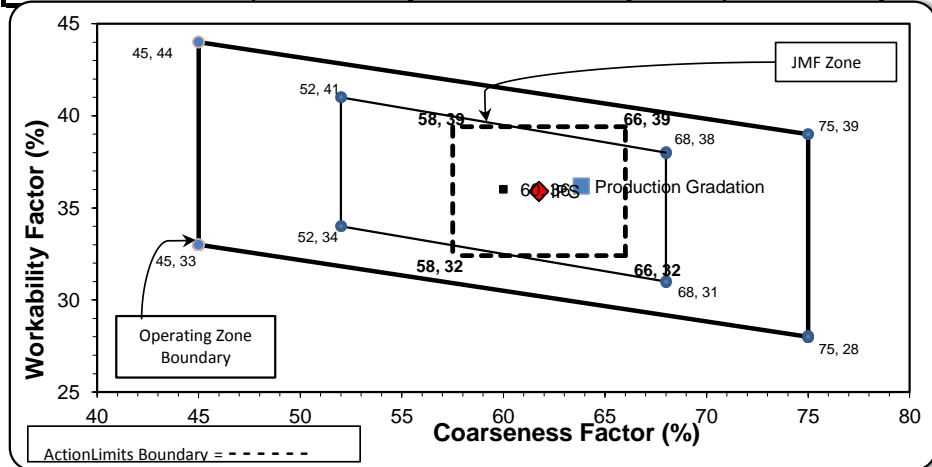


**Superior Materials, LLC**  
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\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 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: 64**      **Workability Factor: 36**



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"	100.0	0.0	0.0
3/4"	95.8	4.2	4.2
1/2"	74.1	21.7	25.9
3/8"	60.4	13.7	39.6
#4	41.7	18.8	58.3
#8	35.9	5.8	64.1
#16	30.6	5.3	69.4
#30	23.0	7.6	77.0
#50	9.5	13.5	90.5
#100	2.2	7.3	97.8
LBW	0.9	1.2	99.1

PREPARED BY:  
 SM, LLC Technical Service

Approved By: