

# Aggregate Optimization Chart

MIX ID'S: DDS257E7 and DDS257E8

Production Gradation Report

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

Sample Date: 7/16/18

Concrete Grade: **S2M**

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

Dates Test Represents: 7/17/2018 through 7/23/2018

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%



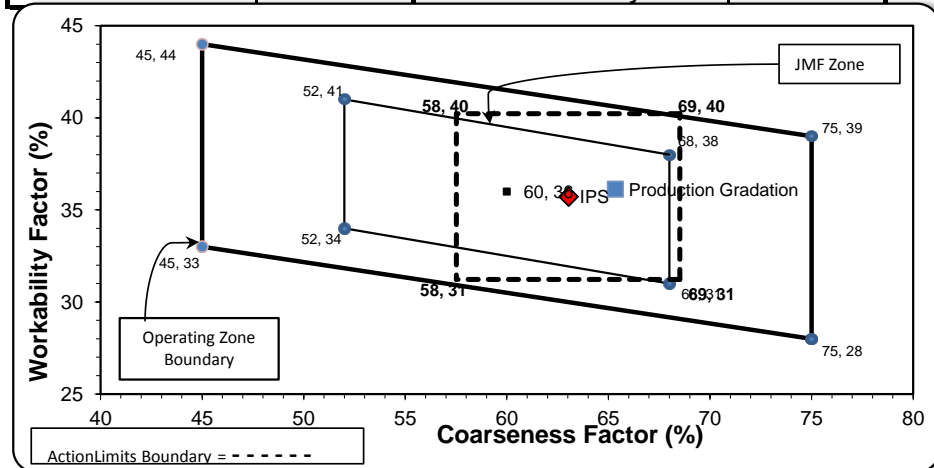
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

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"	99.6	100.0	100.0	99.8	0.2	0.2
3/4"	77.1	100.0	100.0	89.1	10.7	10.9
1/2"	36.8	99.6	100.0	69.9	19.2	30.1
3/8"	16.4	83.8	100.0	58.3	11.7	41.7
#4	2.8	21.2	100.0	43.9	14.4	56.1
#8	1.3	6.5	87.0	36.1	7.8	63.9
#16	0.8	2.8	62.0	25.5	10.7	74.5
#30	0.6	1.8	42.0	17.3	8.2	82.7
#50	0.6	1.6	21.0	8.9	8.4	91.1
#100	0.4	1.5	5.0	2.4	6.5	97.6
LBW	0.7	1.2	0.8	0.8	1.6	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

<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"	99.2	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: 7/16/18

Concrete Grade: **S2M**

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

Dates Test Represents: 7/17/2018 through 7/23/2018

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%



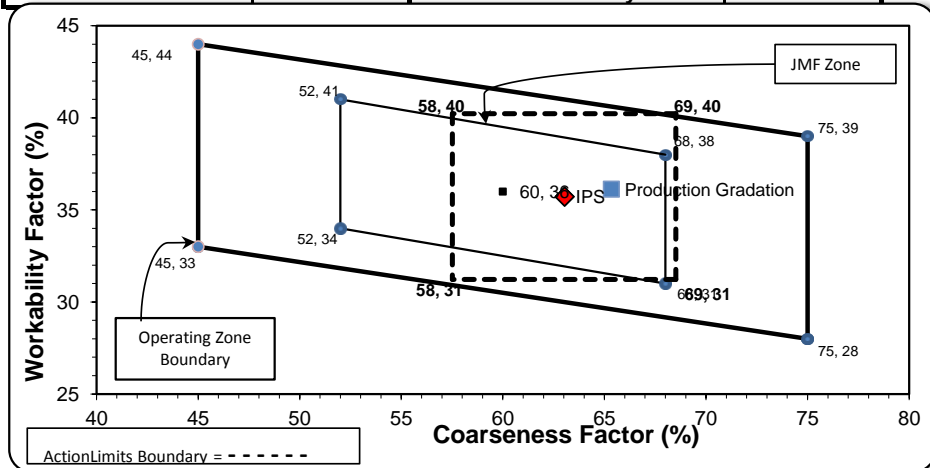
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 Suite 500  
 Farmington Hills, MI 48336

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"	99.6	100.0	100.0	99.8	0.2	0.2
3/4"	77.1	100.0	100.0	89.1	10.7	10.9
1/2"	36.8	99.6	100.0	69.9	19.2	30.1
3/8"	16.4	83.8	100.0	58.3	11.7	41.7
#4	2.8	21.2	100.0	43.9	14.4	56.1
#8	1.3	6.5	87.0	36.1	7.8	63.9
#16	0.8	2.8	62.0	25.5	10.7	74.5
#30	0.6	1.8	42.0	17.3	8.2	82.7
#50	0.6	1.6	21.0	8.9	8.4	91.1
#100	0.4	1.5	5.0	2.4	6.5	97.6
LBW	0.7	1.2	0.8	0.8	1.6	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

<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"	99.2	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: 7/16/18

Concrete Grade: **S2M**

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

Dates Test Represents: 7/17/2018 through 7/23/2018

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%



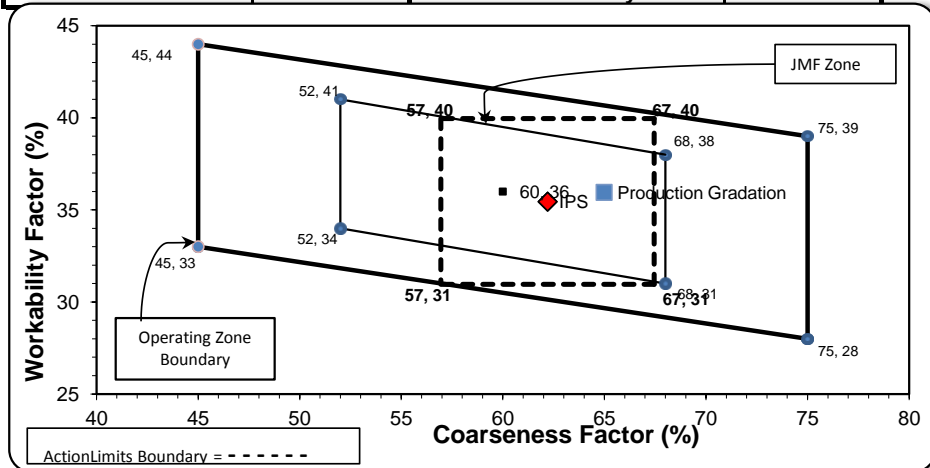
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Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	91.9	100.0	100.0	95.7	4.3	4.3
1/2"	48.6	95.6	100.0	72.5	23.2	27.5
3/8"	23.4	83.1	100.0	58.4	14.1	41.6
#4	2.6	21.0	97.2	42.6	15.8	57.4
#8	1.6	6.4	84.4	36.0	6.6	64.0
#16	1.4	3.6	67.3	28.7	7.3	71.3
#30	1.4	2.9	47.2	20.3	8.3	79.7
#50	1.3	2.7	21.6	9.7	10.6	90.3
#100	1.3	2.4	6.6	3.5	6.2	96.5
LBW	1.0	2.0	1.2	1.1	2.4	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.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

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



Intial Production Sample (IPS)

Coarseness Factor: **62**  
 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"	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: 7/16/18

Concrete Grade: **S2M**

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

Dates Test Represents: 7/17/2018 through 7/23/2018

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"	84.5	100.0	100.0	92.8	7.2	7.2
1/2"	36.2	95.6	100.0	69.7	23.1	30.3
3/8"	14.1	83.1	100.0	57.7	12.0	42.3
#4	1.9	21.0	97.0	42.6	15.1	57.4
#8	1.3	6.4	83.8	35.1	7.5	64.9
#16	1.2	3.6	69.3	28.9	6.2	71.1
#30	1.2	2.9	52.9	22.2	6.7	77.8
#50	1.1	2.7	26.6	11.6	10.6	88.4
#100	1.1	2.4	4.5	2.6	8.9	97.4
LBW	1.0	2.0	0.2	0.8	1.8	99.2

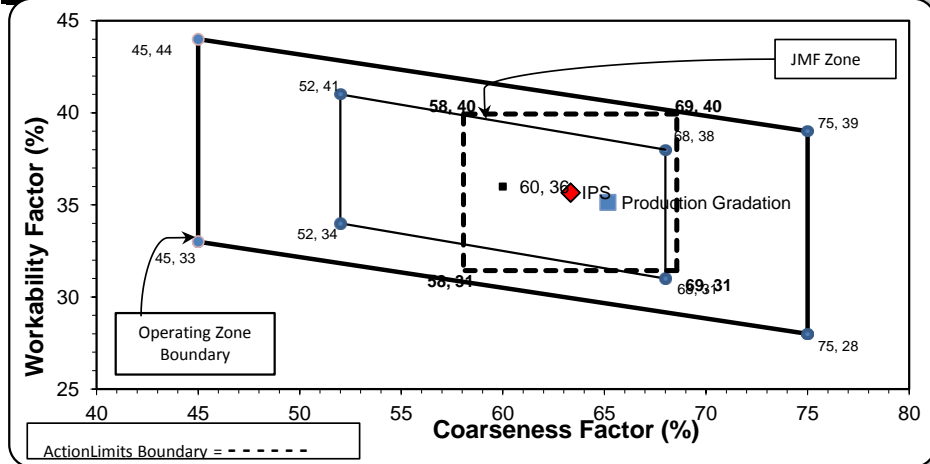
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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



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Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor:** **65**      **Workability Factor:** **35**



Initial Production Sample (IPS)

**Coarseness Factor:** **63**  
**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"	95.6	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: 7/16/18

Concrete Grade: **S2M**

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

Dates Test Represents: 7/17/2018 through 7/23/2018

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%



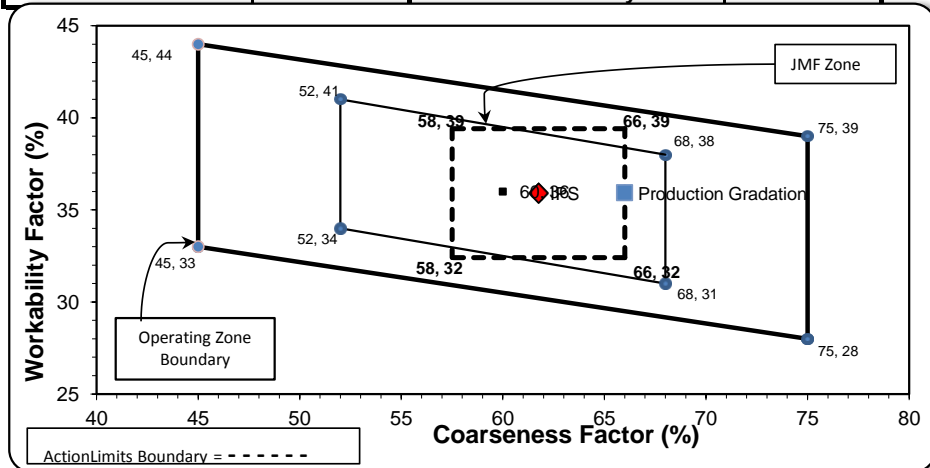
**Superior Materials, LLC**  
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 Suite 500  
 Farmington Hills, MI 48336

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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	84.5	100.0	100.0	92.8	7.2	7.2
1/2"	36.2	95.6	100.0	69.7	23.1	30.3
3/8"	14.1	83.1	100.0	57.7	12.0	42.3
#4	1.9	21.0	96.3	42.4	15.4	57.6
#8	1.3	6.4	85.8	35.9	6.4	64.1
#16	1.2	3.6	72.1	30.0	5.9	70.0
#30	1.2	2.9	52.4	22.0	8.0	78.0
#50	1.1	2.7	18.6	8.3	13.7	91.7
#100	1.1	2.4	2.4	1.8	6.6	98.2
LBW	1.0	2.0	0.4	0.9	0.9	99.1

\*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:** **66**      **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: