

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7 and DDD0K7E9

## Production Gradation Report

**PLANT #:** **P-101**

Sample Date: 5/15/17

Concrete Grade: **DM**

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

Dates Test Represents: 5/15/2017 to 5/21/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	50.8
26A	71-47	Presque Isle	170	1.04	2.62	5.8
2NS	63-115	Ray Road	1280	7.74	2.65	43.4
<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"	90.4	100.0	100.0	95.1	4.9	4.9
1/2"	48.6	97.3	100.0	73.7	21.4	26.3
3/8"	26.6	82.6	100.0	61.7	12.0	38.3
#4	3.8	10.4	97.7	44.9	16.8	55.1
#8	2.0	2.1	79.2	35.5	9.4	64.5
#16	1.6	1.4	59.4	26.7	8.8	73.3
#30	1.6	1.3	42.9	19.5	7.2	80.5
#50	1.5	1.3	21.4	10.1	9.4	89.9
#100	1.5	1.2	4.3	2.7	7.4	97.3
LBW	1.3	1.1	0.5	0.9	1.8	99.1

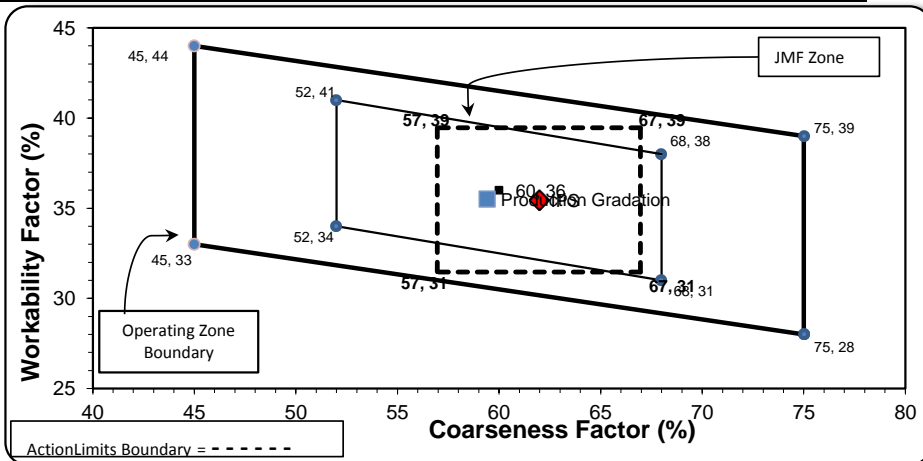
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

<b>Coarseness Factor:</b>	<b>59</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"	95.0	5.0	5.0
1/2"	70.5	24.5	29.5
3/8"	60.0	10.5	40.0
#4	44.4	15.6	55.6
#8	35.5	9.0	64.5
#16	28.5	7.0	71.5
#30	21.5	7.0	78.5
#50	10.2	11.3	89.8
#100	3.1	7.1	96.9
LBW	1.3	1.8	98.7



PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7 and DDD0K7E9

Production Gradation Report

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

Sample Date: 5/15/17

Concrete Grade: DM

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

Dates Test Represents: 5/15/2017 to 5/21/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1520	9.06	2.69	50.8
26A	58-003	Stoneco	250	1.49	2.69	8.4
2NS	81-93	Burmeister	1220	7.41	2.64	40.8
<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"	99.8	100.0	100.0	99.9	0.1	0.1
3/4"	80.0	100.0	100.0	89.8	10.1	10.2
1/2"	44.5	100.0	100.0	71.8	18.0	28.2
3/8"	23.8	85.3	100.0	60.0	11.8	40.0
#4	2.6	24.0	99.0	43.7	16.3	56.3
#8	0.9	5.8	84.9	35.6	8.1	64.4
#16	0.7	2.8	68.2	28.4	7.2	71.6
#30	0.6	2.2	47.4	19.8	8.6	80.2
#50	0.6	2.0	17.4	7.6	12.3	92.4
#100	0.5	1.9	3.1	1.7	5.9	98.3
LBW	0.4	1.7	1.1	0.8	0.9	99.2

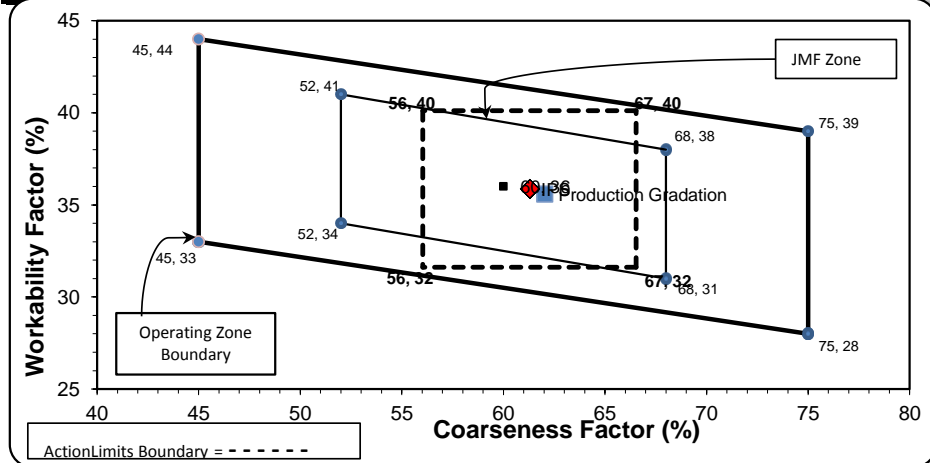


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\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained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

**Coarseness Factor: 62**      **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"	89.2	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-36**

Sample Date: 5/15/17

Concrete Grade: DM

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

Dates Test Represents: 5/15/2017 to 5/21/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1560	9.29	2.69	52.2
26A	71-47	Presque Isle	200	1.22	2.62	6.7
2NS	63-92	AA Grange Hall	1230	7.44	2.65	41.1
<b>Total Wt</b>			<b>2990</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"	99.8	100.0	100.0	99.9	0.1	0.1
3/4"	80.0	100.0	100.0	89.6	10.3	10.4
1/2"	44.5	97.3	100.0	70.9	18.7	29.1
3/8"	23.8	82.6	100.0	59.1	11.8	40.9
#4	2.6	10.4	97.8	42.3	16.8	57.7
#8	0.9	2.1	85.0	35.6	6.7	64.4
#16	0.7	1.4	68.6	28.7	6.9	71.3
#30	0.6	1.3	47.2	19.8	8.9	80.2
#50	0.6	1.3	18.9	8.2	11.6	91.8
#100	0.5	1.2	2.6	1.4	6.8	98.6
LBW	0.4	1.1	0.3	0.4	1.0	99.6

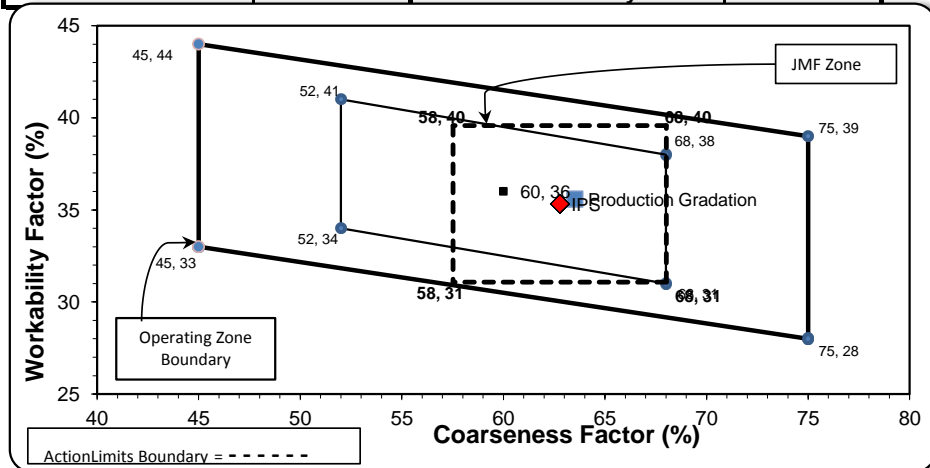


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 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

<b>Coarseness Factor:</b>	<b>64</b>	<b>Workability Factor:</b>	<b>36</b>
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Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>63</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"	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 and DDD0K7E9

Production Gradation Report

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

Sample Date: 5/15/17

Concrete Grade: **DM**

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

Dates Test Represents: 5/15/2017 to 5/21/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1520	9.06	2.69	50.8
26A	58-003	Stoneco	250	1.49	2.69	8.4
2NS	81-93	Burmeister	1220	7.41	2.64	40.8
<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"	99.8	100.0	100.0	99.9	0.1	0.1
3/4"	80.0	100.0	100.0	89.8	10.1	10.2
1/2"	44.5	100.0	100.0	71.8	18.0	28.2
3/8"	23.8	85.3	100.0	60.0	11.8	40.0
#4	2.6	24.0	99.0	43.7	16.3	56.3
#8	0.9	5.8	84.9	35.6	8.1	64.4
#16	0.7	2.8	68.2	28.4	7.2	71.6
#30	0.6	2.2	47.4	19.8	8.6	80.2
#50	0.6	2.0	17.4	7.6	12.3	92.4
#100	0.5	1.9	3.1	1.7	5.9	98.3
LBW	0.4	1.7	1.1	0.8	0.9	99.2

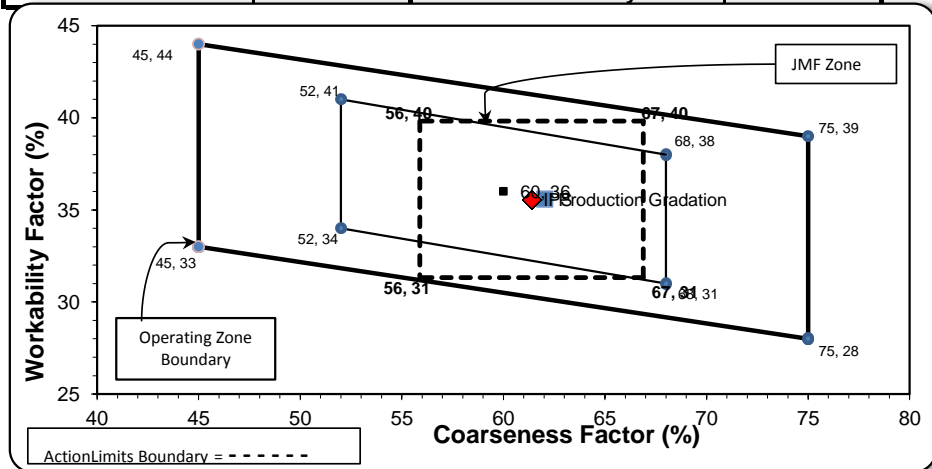


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 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor: 62**      **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

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7 and DDD0K7E9

Production Gradation Report

**PLANT #:** **P-39**

Sample Date: 5/15/17

Concrete Grade: **DM**

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

Dates Test Represents: 5/15/2017 to 5/21/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	50.8
26A	71-47	Presque Isle	170	1.04	2.62	5.8
2NS	63-115	Ray Road	1280	7.74	2.65	43.4
<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"	90.4	100.0	100.0	95.1	4.9	4.9
1/2"	48.6	97.3	100.0	73.7	21.4	26.3
3/8"	26.6	82.6	100.0	61.7	12.0	38.3
#4	3.8	10.4	97.7	44.9	16.8	55.1
#8	2.0	2.1	79.2	35.5	9.4	64.5
#16	1.6	1.4	59.4	26.7	8.8	73.3
#30	1.6	1.3	42.9	19.5	7.2	80.5
#50	1.5	1.3	21.4	10.1	9.4	89.9
#100	1.5	1.2	4.3	2.7	7.4	97.3
LBW	1.3	1.1	0.5	0.9	1.8	99.1

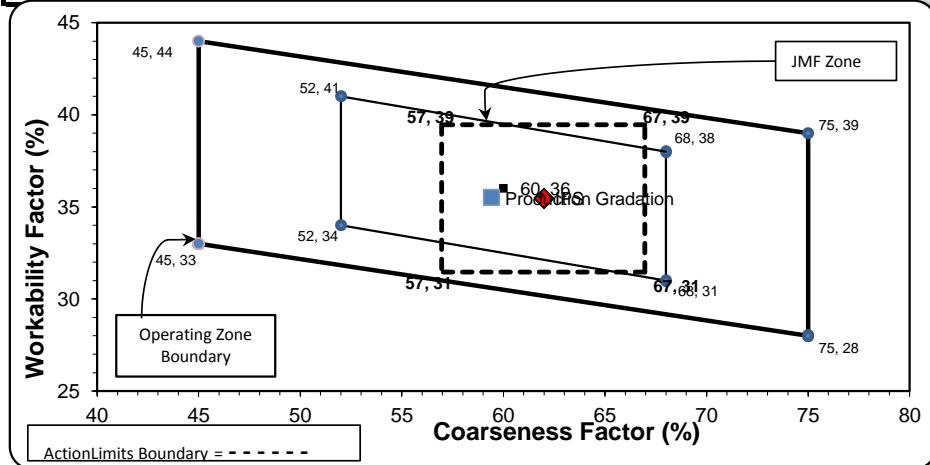


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 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor: 59**      **Workability Factor: 36**



Initial 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"	95.0	5.0	5.0
1/2"	70.5	24.5	29.5
3/8"	60.0	10.5	40.0
#4	44.4	15.6	55.6
#8	35.5	9.0	64.5
#16	28.5	7.0	71.5
#30	21.5	7.0	78.5
#50	10.2	11.3	89.8
#100	3.1	7.1	96.9
LBW	1.3	1.8	98.7

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