

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7 and DDD0K7E9

## Production Gradation Report

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

Sample Date: 4/17/17

Concrete Grade: **DM**

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

Dates Test Represents: 4/17/2017 to 4/23/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1300	7.95	2.62	44.1
26A	71-47	Presque Isle	370	2.26	2.62	12.5
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"	86.6	100.0	100.0	94.1	5.9	5.9
1/2"	32.7	95.1	100.0	69.7	24.4	30.3
3/8"	12.8	80.0	100.0	59.1	10.7	40.9
#4	2.2	7.9	97.0	44.0	15.0	56.0
#8	1.4	1.9	77.9	34.7	9.4	65.3
#16	1.3	1.2	60.8	27.1	7.6	72.9
#30	1.2	1.0	44.3	19.9	7.2	80.1
#50	1.2	1.0	21.7	10.1	9.8	89.9
#100	1.2	0.9	4.4	2.6	7.5	97.4
LBW	1.1	0.8	0.4	0.8	1.8	99.2



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 Suite 500  
 Farmington Hills, MI 48336

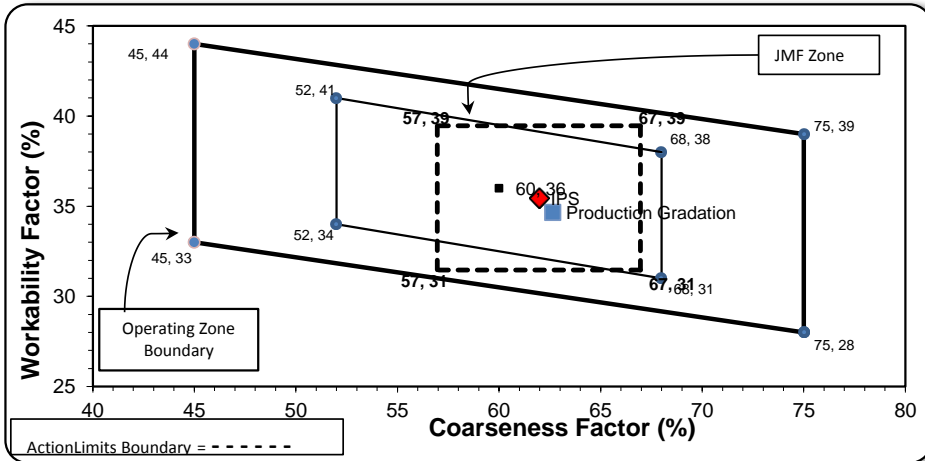
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2" 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>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: 4/17/17

Concrete Grade: DM

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

Dates Test Represents: 4/17/2017 to 4/23/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1470	8.76	2.69	49.2
26A	58-003	Stoneco	300	1.79	2.69	10.0
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"	99.9	100.0	100.0	100.0	0.0	0.0
3/4"	85.1	100.0	100.0	92.7	7.3	7.3
1/2"	46.0	99.9	100.0	73.4	19.2	26.6
3/8"	25.2	87.0	100.0	61.9	11.5	38.1
#4	4.6	22.8	99.1	45.0	16.9	55.0
#8	1.7	4.3	84.7	35.8	9.2	64.2
#16	2.3	2.2	67.6	28.9	6.9	71.1
#30	2.0	1.8	46.9	20.3	8.6	79.7
#50	1.7	1.5	16.8	7.8	12.5	92.2
#100	1.6	1.4	2.6	2.0	5.9	98.0
LBW	0.9	1.3	1.1	1.0	1.0	99.0

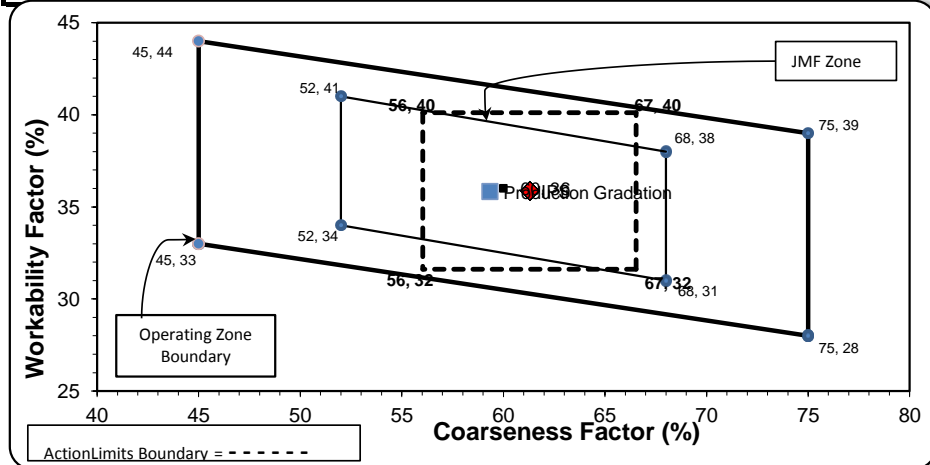


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\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained 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: 59**      **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: 4/17/17

Concrete Grade: DM

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

Dates Test Represents: 4/17/2017 to 4/23/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1530	9.11	2.69	51.2
26A	71-47	Presque Isle	230	1.41	2.62	7.7
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"	99.9	100.0	100.0	99.9	0.1	0.1
3/4"	85.1	100.0	100.0	92.4	7.6	7.6
1/2"	46.0	95.1	100.0	72.0	20.4	28.0
3/8"	25.2	80.0	100.0	60.2	11.8	39.8
#4	4.6	7.9	98.2	43.4	16.8	56.6
#8	1.7	1.9	86.1	36.4	6.9	63.6
#16	2.3	1.2	69.0	29.7	6.8	70.3
#30	2.0	1.0	48.1	20.9	8.8	79.1
#50	1.7	1.0	19.1	8.8	12.1	91.2
#100	1.6	0.9	2.5	1.9	6.9	98.1
LBW	0.9	0.8	0.3	0.6	1.3	99.4

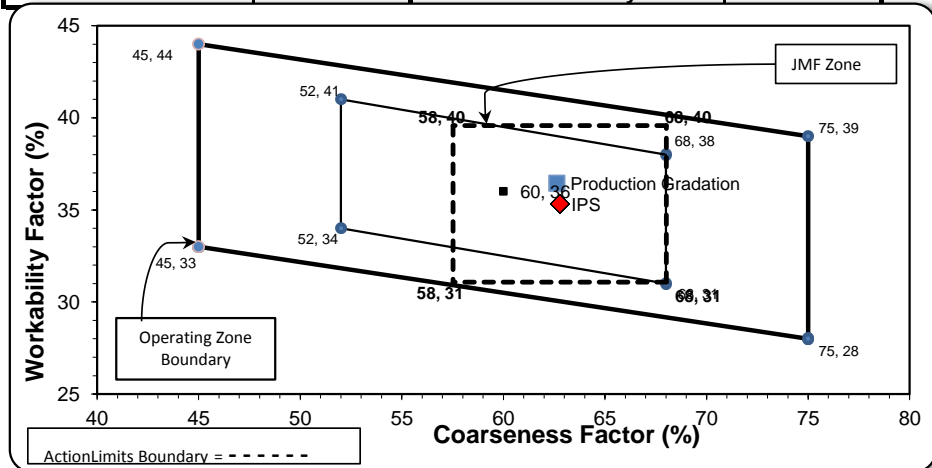
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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



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Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor: 63**      **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

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: 4/17/17

Concrete Grade: **DM**

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

Dates Test Represents: 4/17/2017 to 4/23/2017

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"	99.9	100.0	100.0	99.9	0.1	0.1
3/4"	85.1	100.0	100.0	92.4	7.5	7.6
1/2"	46.0	99.9	100.0	72.5	19.9	27.5
3/8"	25.2	87.0	100.0	60.9	11.7	39.1
#4	4.6	22.8	99.1	44.7	16.2	55.3
#8	1.7	4.3	84.7	35.8	8.9	64.2
#16	2.3	2.2	67.6	28.9	6.8	71.1
#30	2.0	1.8	46.9	20.3	8.6	79.7
#50	1.7	1.5	16.8	7.8	12.5	92.2
#100	1.6	1.4	2.6	2.0	5.9	98.0
LBW	0.9	1.3	1.1	1.0	1.0	99.0

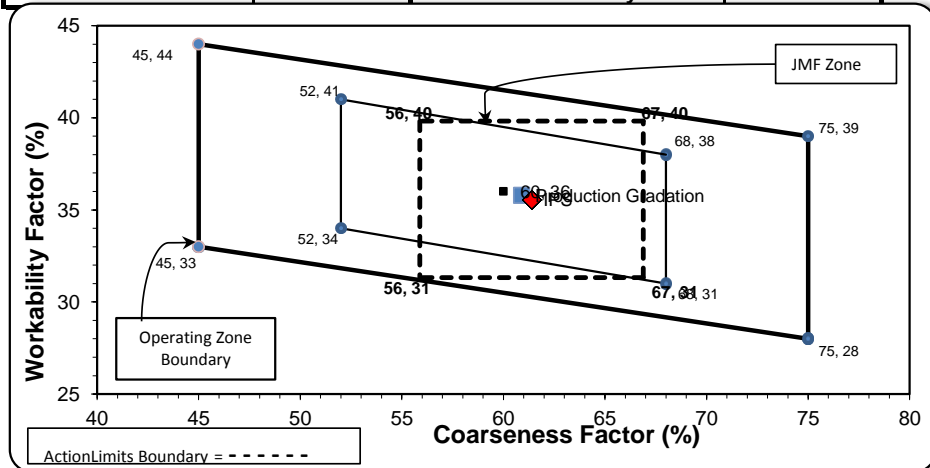
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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



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Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor:** **61**      **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: 4/17/17

Concrete Grade: **DM**

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

Dates Test Represents: 4/17/2017 to 4/23/2017

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1300	7.95	2.62	44.1
26A	71-47	Presque Isle	370	2.26	2.62	12.5
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"	86.6	100.0	100.0	94.1	5.9	5.9
1/2"	32.7	95.1	100.0	69.7	24.4	30.3
3/8"	12.8	80.0	100.0	59.1	10.7	40.9
#4	2.2	7.9	97.0	44.0	15.0	56.0
#8	1.4	1.9	77.9	34.7	9.4	65.3
#16	1.3	1.2	60.8	27.1	7.6	72.9
#30	1.2	1.0	44.3	19.9	7.2	80.1
#50	1.2	1.0	21.7	10.1	9.8	89.9
#100	1.2	0.9	4.4	2.6	7.5	97.4
LBW	1.1	0.8	0.4	0.8	1.8	99.2

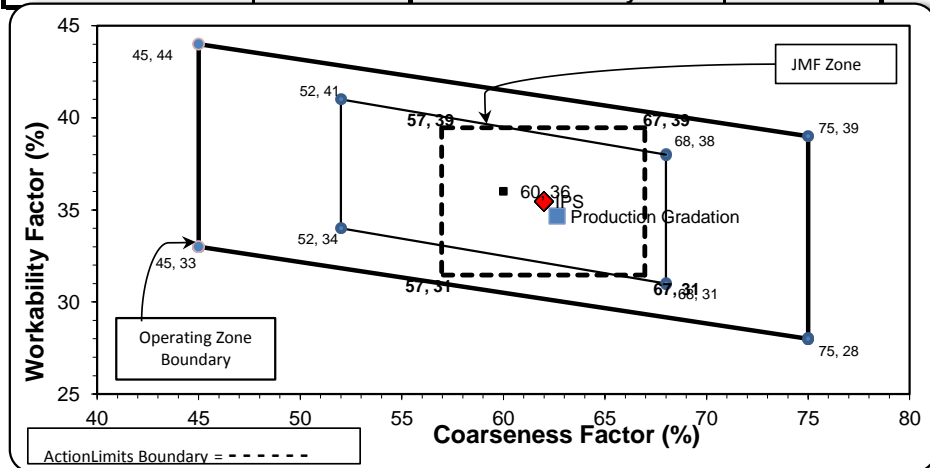
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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



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Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

**Coarseness Factor: 63**      **Workability Factor: 35**



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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