

# Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP164E7 and DDP164E8

Production Gradation Report

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

Sample Date: 5/28/18

Concrete Grade: **P1M**

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

Dates Test Represents: 5/29/2018 to 6/4/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1100	6.73	2.62	35.8
IA	71-47	Presque Isle	650	3.98	2.62	21.2
2NS	63-115	Ray Road	1320	7.98	2.65	43.0
<b>Total Wt</b>			<b>3070</b>	<b>18.69</b>		<b>100.0</b>

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

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.3	100.0	100.0	99.4	0.6	0.6
1"	49.3	100.0	100.0	81.8	17.6	18.2
3/4"	16.9	100.0	100.0	70.2	11.6	29.8
1/2"	6.3	90.4	100.0	64.4	5.8	35.6
3/8"	4.1	67.6	100.0	58.8	5.6	41.2
#4	2.8	15.3	96.4	45.7	13.1	54.3
#8	2.5	5.6	77.2	35.3	10.4	64.7
#16	2.3	3.3	58.7	26.8	8.5	73.2
#30	2.3	2.8	43.2	20.0	6.8	80.0
#50	2.1	2.6	23.6	11.5	8.5	88.5
#100	2.0	2.4	6.8	4.1	7.3	95.9
LBW	1.5	2.1	0.6	1.2	2.9	98.8

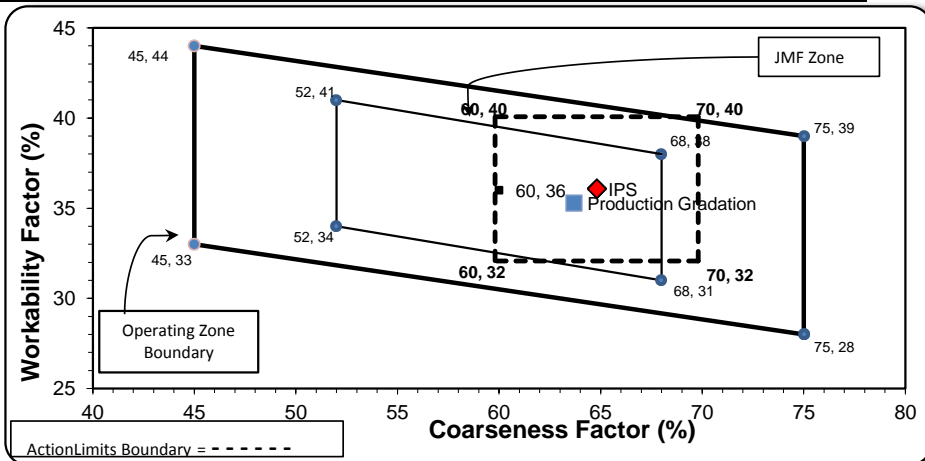


**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

\*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>64</b>	<b>Workability Factor:</b>	<b>35</b>
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Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>		
<b>Workability Factor:</b>	<b>36</b>		
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.3	0.7	0.7
1"	83.6	15.7	16.4
3/4"	73.0	10.6	27.0
1/2"	65.1	7.9	34.9
3/8"	58.6	6.5	41.4
#4	45.8	12.8	54.2
#8	36.1	9.7	63.9
#16	28.8	7.3	71.2
#30	21.7	7.1	78.3
#50	10.3	11.4	89.7
#100	3.1	7.2	96.9
LBW	1.3	1.8	98.7

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP164E7 and DDP164E8

Production Gradation Report

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

Sample Date: 5/28/18

Concrete Grade: **P1M**

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

Dates Test Represents: 5/29/2018 to 6/4/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	58-003	Stoneco	1275	7.60	2.69	40.9
IA	58-003	Stoneco	645	3.84	2.69	20.7
2NS	38-046	Chelsea	1200	7.26	2.65	38.5
<b>Total Wt</b>			<b>3120</b>	<b>18.70</b>		<b>100.0</b>

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



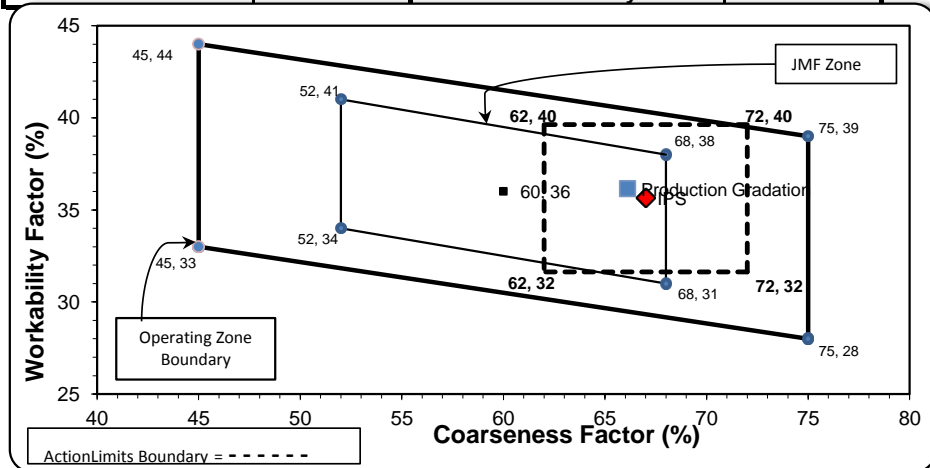
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 Farmington Hills, MI 48336

Sieve	CA	IA	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"	67.5	100.0	100.0	86.7	13.3	13.3
3/4"	33.1	100.0	100.0	72.7	14.1	27.3
1/2"	13.7	95.0	100.0	63.7	9.0	36.3
3/8"	6.5	80.6	100.0	57.8	5.9	42.2
#4	2.3	27.7	100.0	45.1	12.7	54.9
#8	1.6	6.1	89.0	36.1	9.0	63.9
#16	1.3	2.1	67.0	26.7	9.4	73.3
#30	1.2	1.5	46.0	18.5	8.2	81.5
#50	1.1	1.4	23.0	9.6	8.9	90.4
#100	1.0	1.3	3.0	1.8	7.8	98.2
LBW	0.9	1.2	0.8	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

<b>Coarseness Factor:</b>	<b>66</b>	<b>Workability Factor:</b>	<b>36</b>
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Initial Production Sample (IPS)

<b>Coarseness Factor:</b>		<b>67</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"	87.2	12.8	12.8
3/4"	76.6	10.6	23.4
1/2"	64.4	12.2	35.6
3/8"	56.9	7.6	43.1
#4	44.1	12.7	55.9
#8	35.6	8.5	64.4
#16	27.7	8.0	72.3
#30	19.5	8.2	80.5
#50	7.8	11.6	92.2
#100	2.3	5.6	97.7
LBW	0.6	1.6	99.4

PREPARED BY:

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP164E7 and DDP164E8

Production Gradation Report

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

Sample Date: 5/28/18

Concrete Grade: **P1M**

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

Dates Test Represents: 5/29/2018 to 6/4/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	900	5.50	2.62	29.3
2NS	63-92	AA Grange Hall	1220	7.38	2.65	39.7
<b>Total Wt</b>			<b>3070</b>	<b>18.69</b>		<b>100.0</b>

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



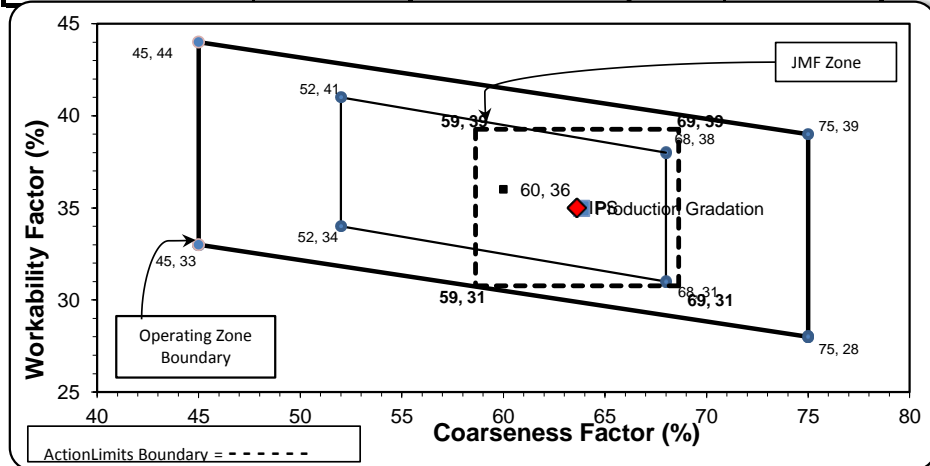
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.3	100.0	100.0	99.2	0.8	0.8
1"	39.8	100.0	100.0	81.4	17.8	18.6
3/4"	13.3	98.9	100.0	72.8	8.5	27.2
1/2"	5.0	82.0	100.0	65.3	7.5	34.7
3/8"	3.8	59.9	100.0	58.5	6.9	41.5
#4	3.0	11.4	97.3	42.9	15.5	57.1
#8	2.5	3.2	83.7	35.0	8.0	65.0
#16	2.4	2.3	67.7	28.3	6.7	71.7
#30	2.2	2.1	47.8	20.3	8.0	79.7
#50	2.0	2.0	21.6	9.8	10.5	90.2
#100	1.9	1.9	2.8	2.3	7.5	97.7
LBW	1.6	1.7	0.2	1.1	1.2	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: 64**      **Workability Factor: 35**



Initial Production Sample (IPS)

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	0.6	0.6
1"	84.6	14.7	15.4
3/4"	74.4	10.3	25.6
1/2"	66.0	8.4	34.0
3/8"	58.7	7.4	41.3
#4	44.6	14.0	55.4
#8	35.0	9.6	65.0
#16	27.6	7.4	72.4
#30	19.5	8.1	80.5
#50	8.6	11.0	91.4
#100	2.0	6.6	98.0
LBW	0.9	1.1	99.1

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDP154E7 and DDP154E8

Production Gradation Report

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

Sample Date: 5/28/18

Concrete Grade: **P1M**

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

Dates Test Represents: 5/29/2018 to 6/4/2018

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.6
IA	71-47	Presque Isle	950	5.81	2.62	30.6
2NS	47-16	Buno Road	1200	7.26	2.65	38.7
<b>Total Wt</b>			<b>3100</b>	<b>18.88</b>		<b>100.0</b>

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



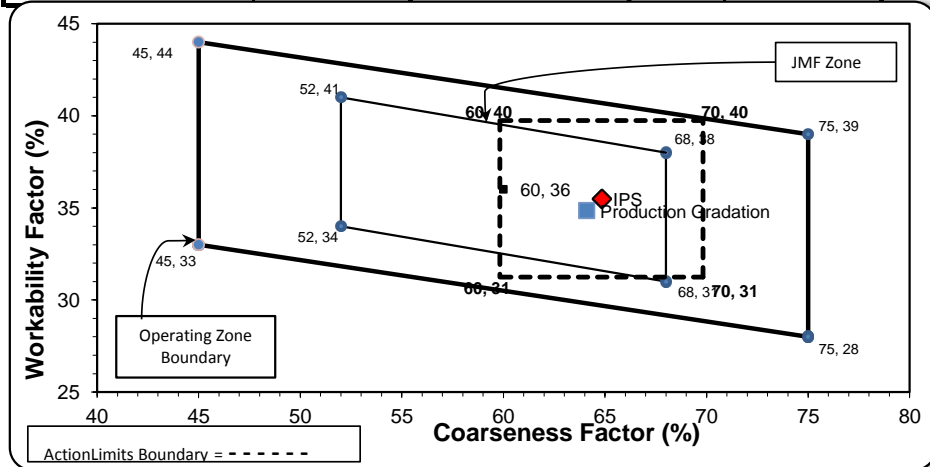
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.3	100.0	100.0	99.2	0.8	0.8
1"	39.8	100.0	100.0	81.6	17.6	18.4
3/4"	13.3	98.9	100.0	73.1	8.5	26.9
1/2"	5.0	82.0	100.0	65.4	7.7	34.6
3/8"	3.8	59.9	100.0	58.2	7.1	41.8
#4	3.0	11.4	95.7	41.5	16.8	58.5
#8	2.5	3.2	85.5	34.8	6.6	65.2
#16	2.4	2.3	73.0	29.7	5.1	70.3
#30	2.2	2.1	54.3	22.3	7.4	77.7
#50	2.0	2.0	20.9	9.3	13.0	90.7
#100	1.9	1.9	3.0	2.3	7.0	97.7
LBW	1.6	1.7	0.3	1.1	1.2	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

<b>Coarseness Factor:</b>	<b>64</b>	<b>Workability Factor:</b>	<b>35</b>
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Initial Production Sample (IPS)

<b>Coarseness Factor:</b>		<b>65</b>	
<b>Workability Factor:</b>		<b>35</b>	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	0.6	0.6
1"	84.0	15.3	16.0
3/4"	73.5	10.5	26.5
1/2"	65.2	8.2	34.8
3/8"	58.2	7.1	41.8
#4	44.1	14.1	55.9
#8	35.5	8.6	64.5
#16	29.1	6.4	70.9
#30	21.9	7.3	78.1
#50	9.6	12.2	90.4
#100	2.6	7.1	97.4
LBW	1.0	1.6	99.0

PREPARED BY:  
 SM, LLC Technical Service

Approved By: