

Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-101**

Sample Date: 7/30/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/31/2018 through 8/6/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	875	5.35	2.62	28.5
2NS	75-051	Mid-Michigan	1250	7.53	2.66	40.7
Total Wt			3075	18.69		100.0

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



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 30701 W. 10 Mile Rd.
 Suite 500
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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"	98.4	100.0	100.0	99.5	0.5	0.5
1"	49.2	100.0	100.0	84.3	15.2	15.7
3/4"	19.2	99.2	100.0	74.8	9.5	25.2
1/2"	8.9	81.6	100.0	66.6	8.2	33.4
3/8"	7.2	59.1	100.0	59.7	6.9	40.3
#4	4.2	11.6	99.2	44.9	14.8	55.1
#8	2.8	3.6	80.2	34.5	10.4	65.5
#16	2.4	2.4	60.0	25.8	8.7	74.2
#30	2.3	2.0	41.9	18.3	7.5	81.7
#50	2.2	1.9	19.4	9.1	9.2	90.9
#100	2.0	1.8	4.9	3.1	6.0	96.9
LBW	1.8	1.6	0.8	1.3	1.8	98.7

*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.

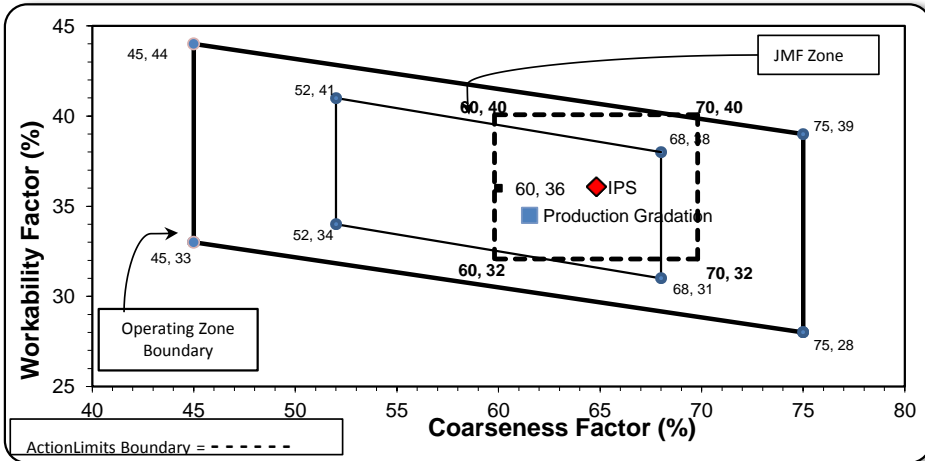
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	62	Workability Factor:	34
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Initial Production Sample (IPS)

Coarseness Factor:	65
Workability Factor:	36

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: 7/30/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/31/2018 through 8/6/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1350	8.04	2.69	43.3
IA	58-003	Stoneco	570	3.40	2.69	18.3
2NS	38-046	Chelsea	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



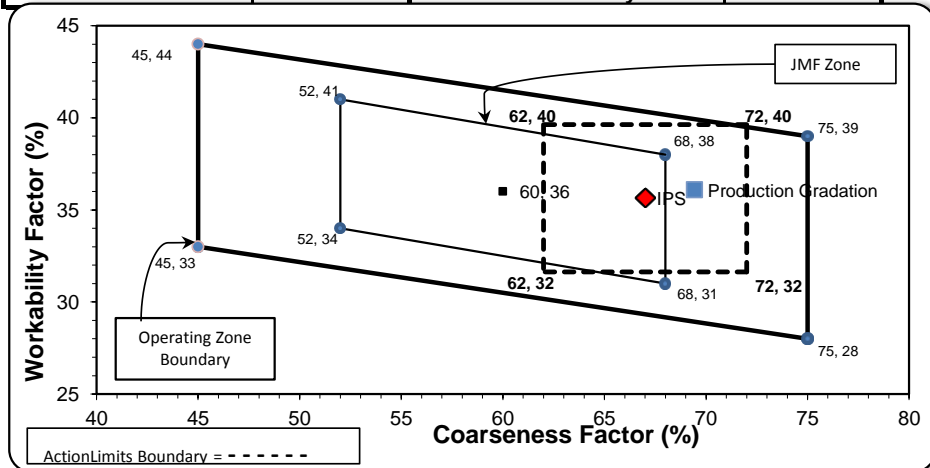
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 Suite 500
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	58.5	100.0	100.0	82.0	18.0	18.0
3/4"	46.0	100.0	100.0	76.6	5.4	23.4
1/2"	16.4	93.5	100.0	62.6	14.0	37.4
3/8"	5.0	82.1	100.0	55.6	7.0	44.4
#4	2.9	22.1	100.0	43.8	11.9	56.2
#8	1.8	5.9	89.0	36.1	7.7	63.9
#16	1.5	2.9	65.0	26.2	9.9	73.8
#30	1.3	2.2	46.0	18.7	7.5	81.3
#50	1.1	2.0	27.0	11.2	7.4	88.8
#100	1.0	1.8	7.0	3.5	7.8	96.5
LBW	0.9	1.6	1.2	1.1	2.3	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: 69 **Workability Factor: 36**



Initial Production Sample (IPS)

Coarseness Factor: 67
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"	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:
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Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-36**

Sample Date: 7/30/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/31/2018 through 8/6/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	870	5.32	2.62	28.3
2NS	63-92	AA Grange Hall	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

<----- 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"	94.5	100.0	100.0	98.3	1.7	1.7
1"	48.6	100.0	100.0	84.1	14.2	15.9
3/4"	14.5	100.0	100.0	73.5	10.6	26.5
1/2"	2.6	77.6	100.0	63.5	10.0	36.5
3/8"	1.9	52.5	100.0	56.2	7.3	43.8
#4	1.3	9.4	97.4	42.7	13.5	57.3
#8	1.3	3.0	84.7	35.7	7.0	64.3
#16	1.2	2.2	69.8	29.4	6.3	70.6
#30	1.2	2.0	52.3	22.2	7.2	77.8
#50	1.2	1.9	24.6	10.9	11.3	89.1
#100	1.1	1.8	3.8	2.4	8.5	97.6
LBW	0.9	1.3	0.3	0.8	1.6	99.2

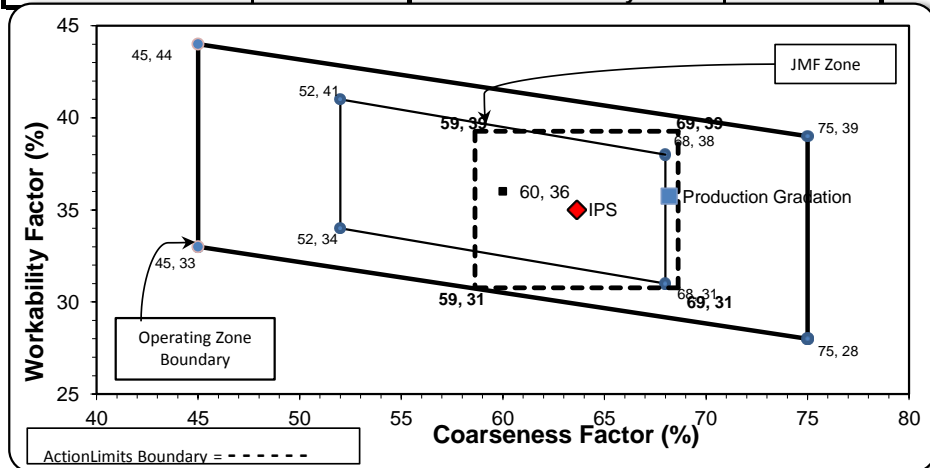


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: **68** **Workability Factor:** **36**



Initial Production Sample (IPS)

Coarseness Factor: **64**
Workability Factor: **35**

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

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 SM, LLC Technical Service

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Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-39**

Sample Date: 7/30/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/31/2018 through 8/6/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1000	6.12	2.62	32.6
IA	71-47	Presque Isle	750	4.59	2.62	24.4
2NS	63-115	Ray Road	1320	7.98	2.65	43.0
Total Wt			3070	18.69		100.0

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



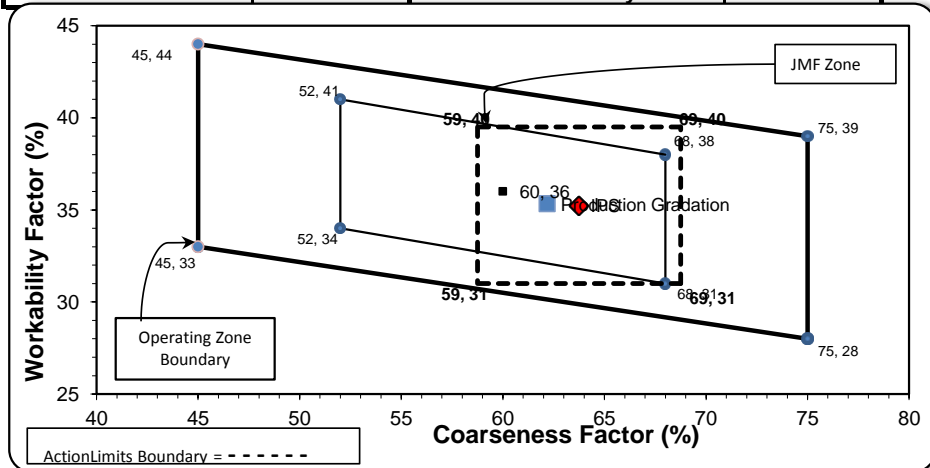
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.4	100.0	100.0	99.5	0.5	0.5
1"	49.2	100.0	100.0	83.5	16.0	16.5
3/4"	19.2	99.2	100.0	73.5	10.0	26.5
1/2"	8.9	81.6	100.0	65.8	7.7	34.2
3/8"	7.2	59.1	100.0	59.8	6.1	40.2
#4	4.2	11.6	96.0	45.5	14.3	54.5
#8	2.8	3.6	78.0	35.3	10.1	64.7
#16	2.4	2.4	61.2	27.7	7.6	72.3
#30	2.3	2.0	45.8	20.9	6.8	79.1
#50	2.2	1.9	23.8	11.4	9.5	88.6
#100	2.0	1.8	6.4	3.8	7.6	96.2
LBW	1.8	1.6	0.7	1.3	2.6	98.7

*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:** **35**



Initial Production Sample (IPS)

Coarseness Factor: **64**
Workability Factor: **35**

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	0.6	0.6
1"	84.3	15.1	15.7
3/4"	73.9	10.4	26.1
1/2"	65.7	8.2	34.3
3/8"	58.7	7.0	41.3
#4	45.1	13.6	54.9
#8	35.3	9.8	64.7
#16	28.1	7.2	71.9
#30	21.2	6.9	78.8
#50	10.1	11.1	89.9
#100	3.1	7.0	96.9
LBW	1.4	1.7	98.6

PREPARED BY:
 SM, LLC Technical Service

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Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-02**

Sample Date: 7/30/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/31/2018 through 8/6/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	870	5.32	2.62	28.3
2NS	47-16	Buno Road	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



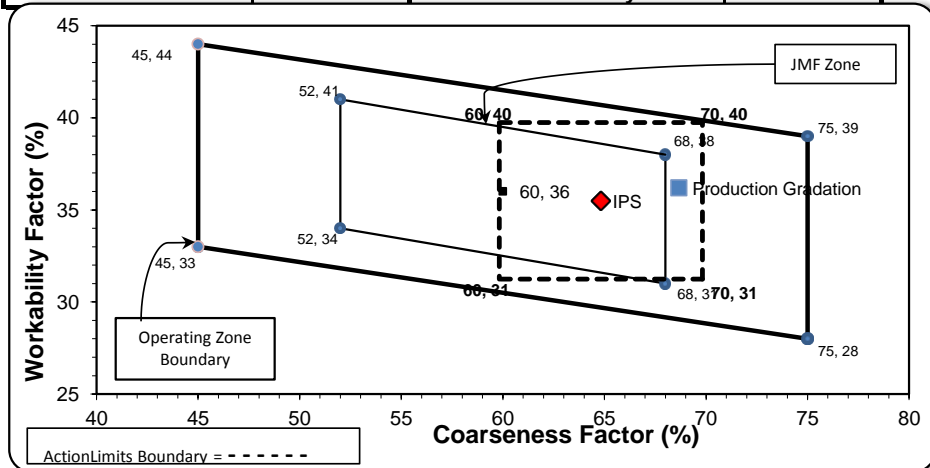
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 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.5	100.0	100.0	98.3	1.7	1.7
1"	48.6	100.0	100.0	84.1	14.2	15.9
3/4"	14.5	100.0	100.0	73.5	10.6	26.5
1/2"	2.6	77.6	100.0	63.5	10.0	36.5
3/8"	1.9	52.5	100.0	56.2	7.3	43.8
#4	1.3	9.4	96.3	42.3	13.9	57.7
#8	1.3	3.0	85.8	36.2	6.1	63.8
#16	1.2	2.2	71.8	30.2	6.0	69.8
#30	1.2	2.0	52.5	22.3	7.9	77.7
#50	1.2	1.9	20.8	9.4	12.9	90.6
#100	1.1	1.8	3.0	2.1	7.3	97.9
LBW	0.9	1.3	0.4	0.8	1.3	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

Coarseness Factor:	69	Workability Factor:	36
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Initial Production Sample (IPS)

Coarseness Factor:	65		
Workability Factor:	35		
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: