

Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-101**

Sample Date: 12/10/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/11/2018 through 12/17/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	875	5.35	2.62	28.5
IA	71-47	Presque Isle	950	5.81	2.62	30.9
2NS	75-051	Mid-Michigan	1250	7.53	2.66	40.7
Total Wt			3075	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"	96.7	100.0	100.0	99.1	0.9	0.9
1"	41.1	100.0	100.0	83.2	15.8	16.8
3/4"	9.3	98.4	100.0	73.7	9.5	26.3
1/2"	3.0	77.2	100.0	65.4	8.3	34.6
3/8"	2.3	49.8	100.0	56.7	8.7	43.3
#4	1.7	9.5	98.6	43.5	13.2	56.5
#8	1.5	4.1	84.8	36.2	7.3	63.8
#16	1.5	2.9	69.7	29.7	6.5	70.3
#30	1.4	2.5	52.1	22.3	7.3	77.7
#50	1.3	2.3	22.8	10.3	12.0	89.7
#100	1.2	2.1	3.8	2.5	7.8	97.5
LBW	1.1	1.9	0.6	1.1	1.4	98.9



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 Suite 500
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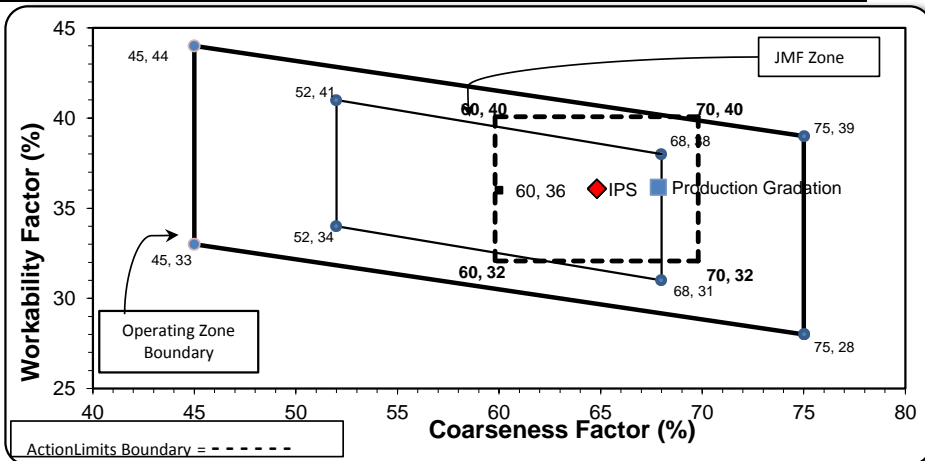
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	68	Workability Factor:	36
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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, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-102**

Sample Date: 12/10/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/11/2018 through 12/17/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	550	3.28	2.69	17.6
2NS	47-16	Buno Rd	1200	7.26	2.65	38.5
Total Wt			3120	18.70		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"	100.0	100.0	100.0	100.0	0.0	0.0
1"	64.0	100.0	100.0	84.2	15.8	15.8
3/4"	37.8	100.0	100.0	72.7	11.5	27.3
1/2"	16.5	93.8	100.0	62.2	10.4	37.8
3/8"	8.9	82.9	100.0	57.0	5.3	43.0
#4	3.0	25.0	96.0	42.6	14.3	57.4
#8	1.8	6.7	85.8	35.0	7.7	65.0
#16	1.5	2.8	72.3	29.0	6.0	71.0
#30	1.3	2.1	53.0	21.3	7.6	78.7
#50	1.2	1.8	18.2	7.8	13.5	92.2
#100	1.2	1.7	2.5	1.8	6.1	98.2
LBW	1.1	1.5	0.3	0.9	0.9	99.1

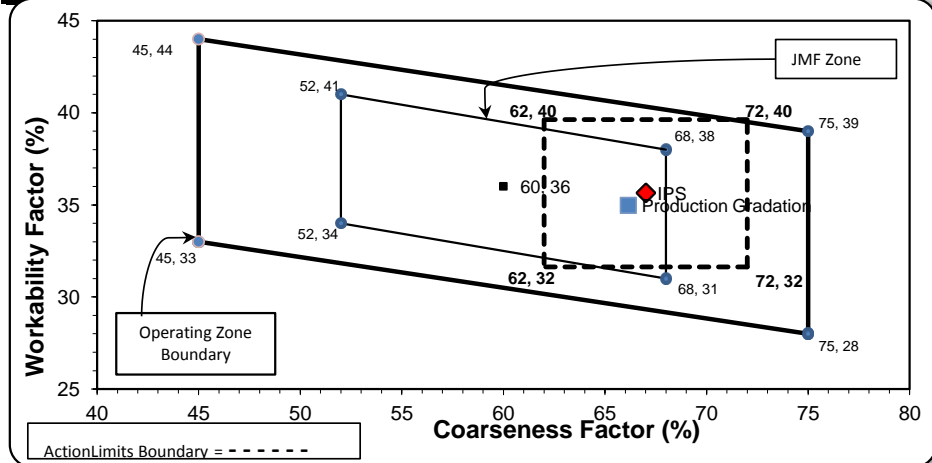


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: **66** Workability Factor: **35**



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

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Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-12**

Sample Date: 12/10/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/11/2018 through 12/17/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	900	5.50	2.62	29.3
IA	71-47	Presque Isle	920	5.63	2.62	30.0
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"	96.7	100.0	100.0	99.0	1.0	1.0
1"	41.1	100.0	100.0	82.7	16.3	17.3
3/4"	9.3	98.4	100.0	72.9	9.8	27.1
1/2"	3.0	77.2	100.0	64.7	8.2	35.3
3/8"	2.3	49.8	100.0	56.3	8.4	43.7
#4	1.7	9.5	97.6	43.1	13.2	56.9
#8	1.5	4.1	84.8	36.2	6.9	63.8
#16	1.5	2.9	68.6	29.2	7.0	70.8
#30	1.4	2.5	47.6	20.5	8.7	79.5
#50	1.3	2.3	18.6	8.6	11.9	91.4
#100	1.2	2.1	2.7	2.1	6.6	97.9
LBW	1.1	1.9	0.3	1.0	1.1	99.0

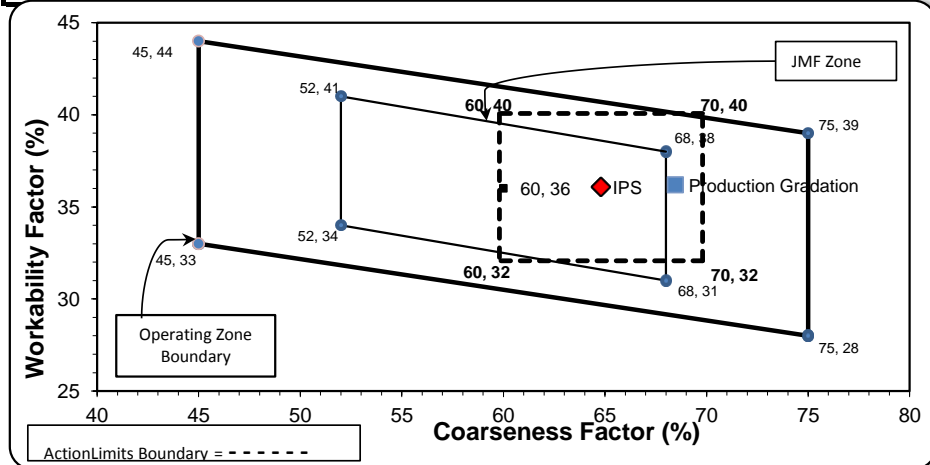


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must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



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

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Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-32**

Sample Date: 12/10/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/11/2018 through 12/17/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	900	5.50	2.62	29.3
IA	71-47	Presque Isle	920	5.63	2.62	30.0
2NS	95-13	Smelter Bay	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"	96.4	100.0	100.0	98.9	1.1	1.1
1"	38.2	100.0	100.0	81.9	17.1	18.1
3/4"	7.8	99.6	100.0	72.9	9.0	27.1
1/2"	3.3	82.8	100.0	66.5	6.4	33.5
3/8"	2.7	53.2	100.0	57.5	9.0	42.5
#4	2.0	8.5	97.9	43.0	14.5	57.0
#8	1.8	3.0	84.9	36.0	7.0	64.0
#16	1.8	2.1	68.7	29.1	6.9	70.9
#30	1.7	1.9	48.2	20.7	8.4	79.3
#50	1.6	1.8	21.2	9.6	11.1	90.4
#100	1.3	1.6	4.9	2.9	6.8	97.1
LBW	1.2	1.5	1.4	1.4	1.5	98.6

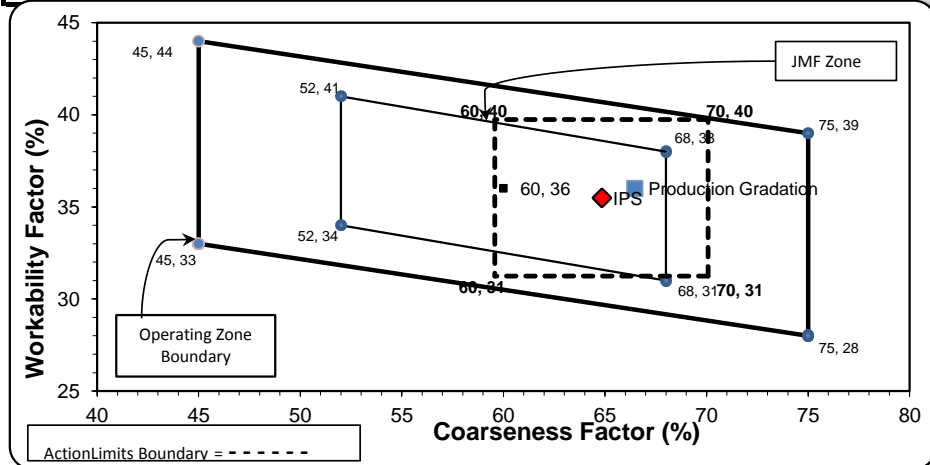
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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



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Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: 66 **Workability Factor: 36**



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

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Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-36**

Sample Date: 12/10/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/11/2018 through 12/17/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	850	5.20	2.62	27.7
IA	71-47	Presque Isle	970	5.93	2.62	31.6
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"	96.4	100.0	100.0	99.0	1.0	1.0
1"	38.2	100.0	100.0	82.9	16.1	17.1
3/4"	7.8	99.6	100.0	74.3	8.5	25.7
1/2"	3.3	82.8	100.0	67.8	6.6	32.2
3/8"	2.7	53.2	100.0	58.3	9.5	41.7
#4	2.0	8.5	97.6	43.0	15.3	57.0
#8	1.8	3.0	84.8	36.0	7.0	64.0
#16	1.8	2.1	68.6	29.1	6.9	70.9
#30	1.7	1.9	47.6	20.5	8.6	79.5
#50	1.6	1.8	18.6	8.6	11.9	91.4
#100	1.3	1.6	2.7	2.0	6.6	98.0
LBW	1.2	1.5	0.3	0.9	1.0	99.1

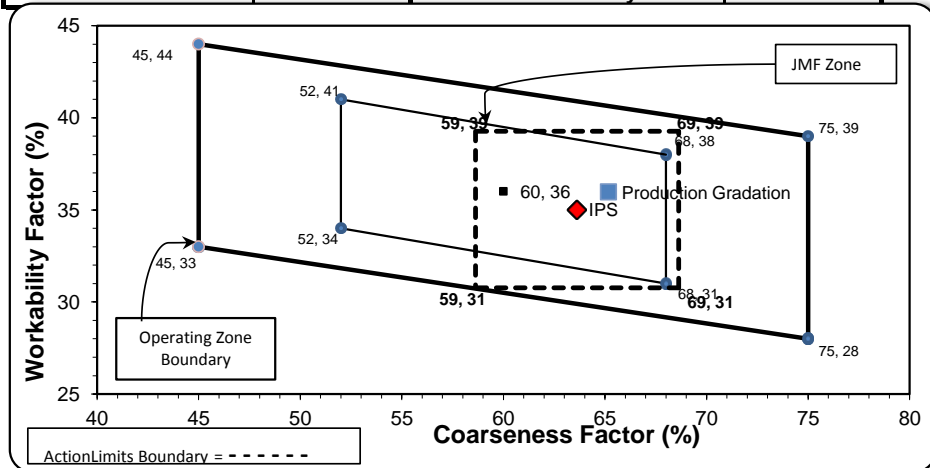


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: **65** 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

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-39**

Sample Date: 12/10/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/11/2018 through 12/17/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	900	5.50	2.62	29.3
IA	71-47	Presque Isle	850	5.20	2.62	27.7
2NS	63-115	Ray Road	1320	7.98	2.65	43.0
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"	96.7	100.0	100.0	99.0	1.0	1.0
1"	41.1	100.0	100.0	82.7	16.3	17.3
3/4"	9.3	98.4	100.0	73.0	9.8	27.0
1/2"	3.0	77.2	100.0	65.3	7.7	34.7
3/8"	2.3	49.8	100.0	57.5	7.8	42.5
#4	1.7	9.5	96.7	44.7	12.8	55.3
#8	1.5	4.1	79.4	35.7	9.0	64.3
#16	1.5	2.9	61.5	27.7	8.0	72.3
#30	1.4	2.5	43.5	19.8	7.9	80.2
#50	1.3	2.3	19.7	9.5	10.3	90.5
#100	1.2	2.1	4.1	2.7	6.8	97.3
LBW	1.1	1.9	0.5	1.1	1.6	98.9

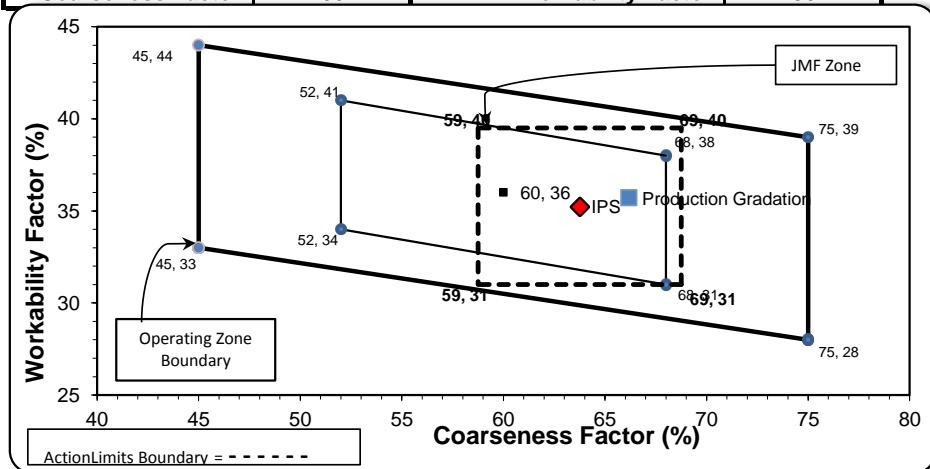


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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:	66	Workability Factor:	36
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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"	84.3	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

Approved By:

Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-02**

Sample Date: 12/10/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/11/2018 through 12/17/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	850	5.20	2.62	27.7
IA	71-47	Presque Isle	970	5.93	2.62	31.6
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"	96.4	100.0	100.0	99.0	1.0	1.0
1"	38.2	100.0	100.0	82.9	16.1	17.1
3/4"	7.8	99.6	100.0	74.3	8.5	25.7
1/2"	3.3	82.8	100.0	67.8	6.6	32.2
3/8"	2.7	53.2	100.0	58.3	9.5	41.7
#4	2.0	8.5	97.6	43.0	15.3	57.0
#8	1.8	3.0	84.8	36.0	7.0	64.0
#16	1.8	2.1	68.6	29.1	6.9	70.9
#30	1.7	1.9	47.6	20.5	8.6	79.5
#50	1.6	1.8	18.6	8.6	11.9	91.4
#100	1.3	1.6	2.7	2.0	6.6	98.0
LBW	1.2	1.5	0.3	0.9	1.0	99.1

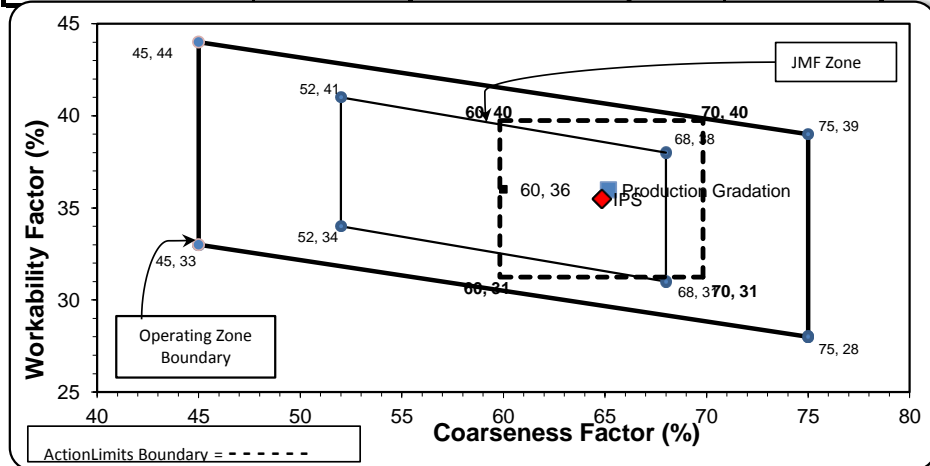


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: **65** Workability Factor: **36**



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: