

Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-101**

Sample Date: 10/22/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/23/2018 through 10/29/2018

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%

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"	46.9	100.0	100.0	83.6	15.9	16.4
3/4"	12.8	99.1	100.0	72.8	10.8	27.2
1/2"	2.6	77.5	100.0	63.5	9.3	36.5
3/8"	1.6	53.0	100.0	56.2	7.3	43.8
#4	1.3	11.5	99.0	43.9	12.3	56.1
#8	1.2	3.7	83.0	35.2	8.8	64.8
#16	1.1	2.6	66.5	28.1	7.1	71.9
#30	1.1	2.3	49.2	21.0	7.1	79.0
#50	1.1	2.2	23.2	10.4	10.6	89.6
#100	1.1	2.1	5.2	3.1	7.3	96.9
LBW	1.0	1.9	0.9	1.2	1.8	98.8

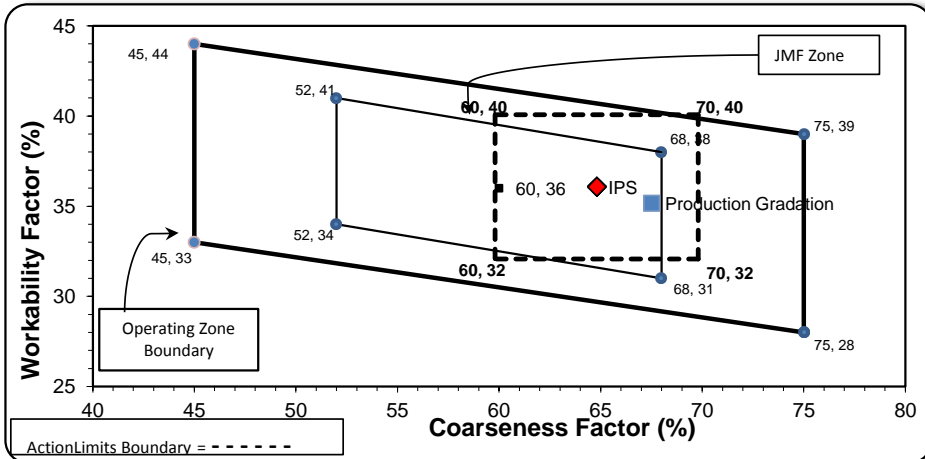


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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:	35
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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: 10/22/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/23/2018 through 10/29/2018

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	38-046	Chelsea	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"	68.2	100.0	100.0	86.0	14.0	14.0
3/4"	32.3	100.0	100.0	70.3	15.8	29.7
1/2"	14.2	93.2	100.0	61.1	9.1	38.9
3/8"	7.5	83.8	100.0	56.5	4.6	43.5
#4	3.0	22.9	100.0	43.8	12.7	56.2
#8	2.5	7.8	89.0	36.7	7.1	63.3
#16	2.2	3.7	63.0	25.8	10.9	74.2
#30	2.1	2.7	40.0	16.8	9.1	83.2
#50	2.0	2.4	20.0	9.0	7.8	91.0
#100	1.9	2.2	5.0	3.1	5.8	96.9
LBW	1.8	1.6	0.9	1.4	1.7	98.6

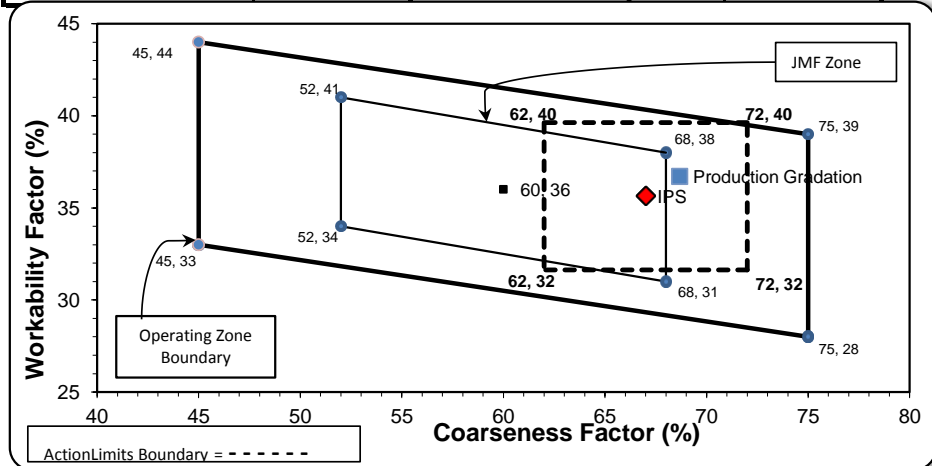


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: **69** Workability Factor: **37**



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 and DDP154E8

Production Gradation Report

PLANT #: **P-12**

Sample Date: 10/22/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/23/2018 through 10/29/2018

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	63-92	AA Grange Hall	1250	7.56	2.65	40.7
Total Wt			3075	18.72		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"	98.4	100.0	100.0	99.5	0.5	0.5
1"	46.9	100.0	100.0	83.6	15.9	16.4
3/4"	12.8	99.1	100.0	72.8	10.8	27.2
1/2"	2.6	77.5	100.0	63.5	9.3	36.5
3/8"	1.6	53.0	100.0	56.2	7.3	43.8
#4	1.3	11.5	97.2	43.2	13.0	56.8
#8	1.2	3.7	84.1	35.6	7.6	64.4
#16	1.1	2.6	69.0	29.1	6.5	70.9
#30	1.1	2.3	50.8	21.6	7.5	78.4
#50	1.1	2.2	23.3	10.4	11.2	89.6
#100	1.1	2.1	3.4	2.3	8.1	97.7
LBW	1.0	1.9	0.3	1.0	1.3	99.0

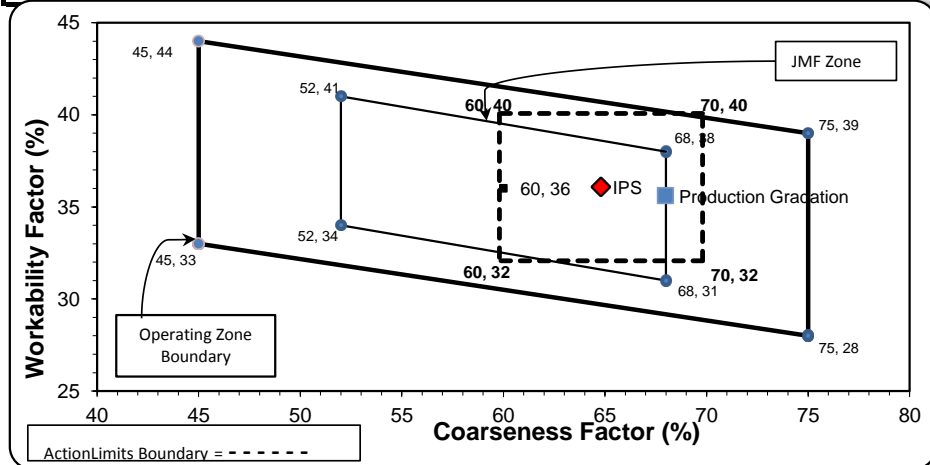


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: 10/22/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/23/2018 through 10/29/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	920	5.63	2.62	30.0
IA	71-47	Presque Isle	900	5.50	2.62	29.3
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"	98.7	100.0	100.0	99.6	0.4	0.4
1"	56.7	100.0	100.0	87.0	12.6	13.0
3/4"	12.5	96.8	100.0	72.8	14.2	27.2
1/2"	3.7	76.3	100.0	64.2	8.6	35.8
3/8"	2.7	49.2	100.0	55.9	8.2	44.1
#4	1.9	10.2	96.6	42.9	13.1	57.1
#8	1.8	3.7	83.7	35.7	7.2	64.3
#16	1.8	2.7	66.1	28.2	7.5	71.8
#30	1.8	2.4	44.5	19.4	8.9	80.6
#50	1.7	2.3	17.7	8.4	11.0	91.6
#100	1.6	2.1	3.7	2.6	5.8	97.4
LBW	1.2	1.6	0.9	1.2	1.4	98.8

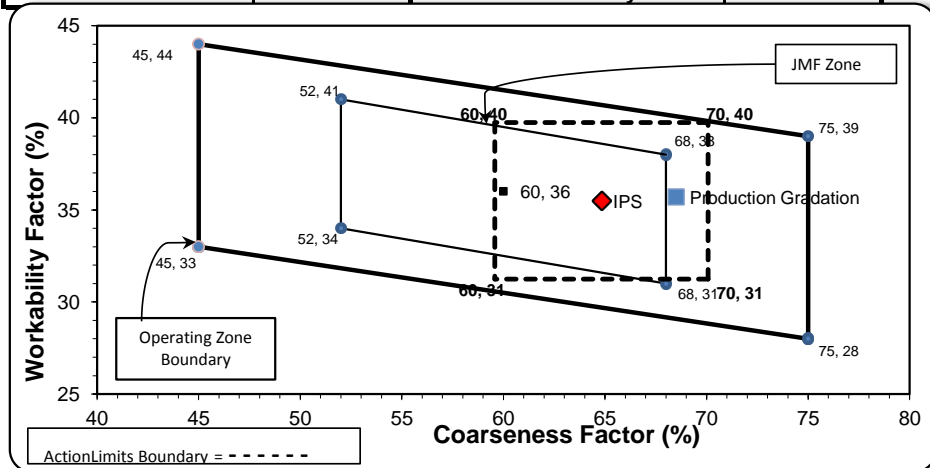


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: 69 **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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 SM, LLC Technical Service

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Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: P-36

Sample Date: 10/22/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/23/2018 through 10/29/2018

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%



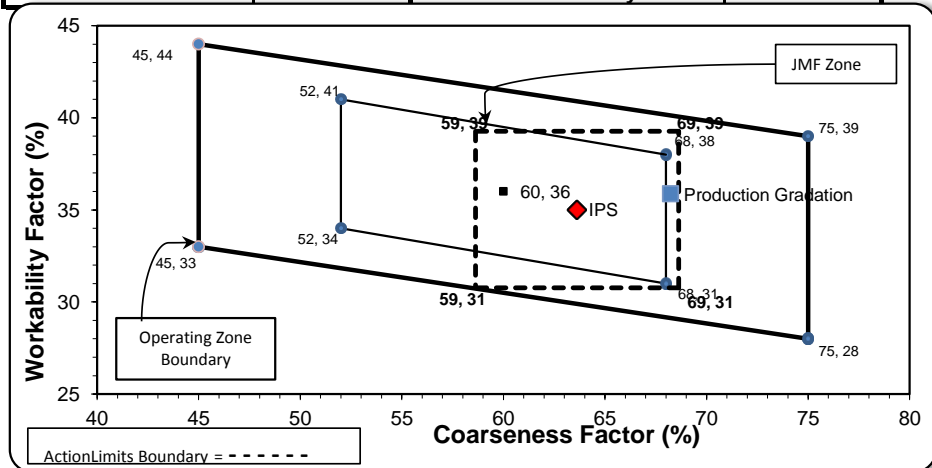
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.7	100.0	100.0	99.6	0.4	0.4
1"	56.7	100.0	100.0	87.3	12.3	12.7
3/4"	12.5	96.8	100.0	73.4	13.9	26.6
1/2"	3.7	76.3	100.0	64.7	8.7	35.3
3/8"	2.7	49.2	100.0	56.3	8.4	43.7
#4	1.9	10.2	97.2	43.2	13.1	56.8
#8	1.8	3.7	84.1	35.9	7.3	64.1
#16	1.8	2.7	69.0	29.4	6.4	70.6
#30	1.8	2.4	50.8	21.9	7.5	78.1
#50	1.7	2.3	23.3	10.7	11.3	89.3
#100	1.6	2.1	3.4	2.5	8.2	97.5
LBW	1.2	1.6	0.3	1.0	1.5	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.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	68	Workability Factor:	36
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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: 10/22/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/23/2018 through 10/29/2018

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%

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"	46.9	100.0	100.0	82.7	16.8	17.3
3/4"	12.8	99.1	100.0	71.4	11.3	28.6
1/2"	2.6	77.5	100.0	62.8	8.6	37.2
3/8"	1.6	53.0	100.0	56.5	6.3	43.5
#4	1.3	11.5	95.8	44.4	12.0	55.6
#8	1.2	3.7	78.1	34.9	9.5	65.1
#16	1.1	2.6	61.6	27.5	7.4	72.5
#30	1.1	2.3	47.6	21.4	6.1	78.6
#50	1.1	2.2	27.0	12.5	8.9	87.5
#100	1.1	2.1	5.9	3.4	9.1	96.6
LBW	1.0	1.9	0.4	1.0	2.4	99.0

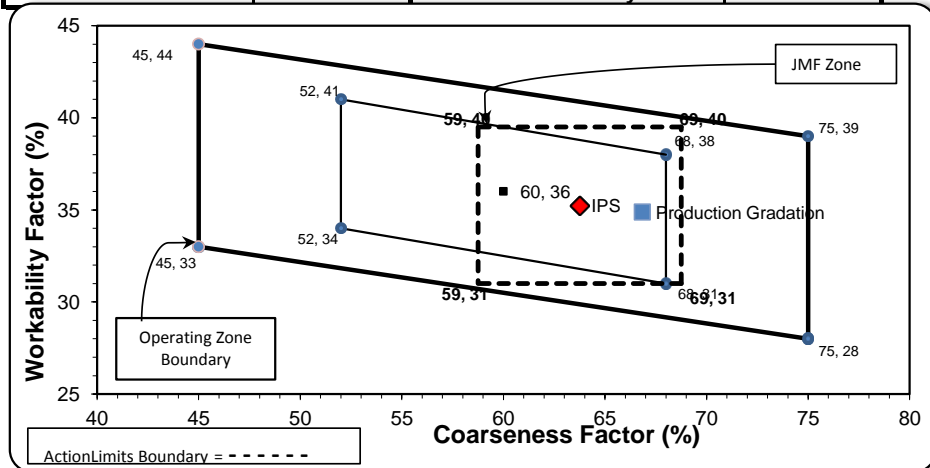


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: **67** 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

Approved By:

Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-O2**

Sample Date: 10/22/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/23/2018 through 10/29/2018

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"	98.7	100.0	100.0	99.6	0.4	0.4
1"	56.7	100.0	100.0	87.3	12.3	12.7
3/4"	12.5	96.8	100.0	73.4	13.9	26.6
1/2"	3.7	76.3	100.0	64.7	8.7	35.3
3/8"	2.7	49.2	100.0	56.3	8.4	43.7
#4	1.9	10.2	97.2	43.2	13.1	56.8
#8	1.8	3.7	84.1	35.9	7.3	64.1
#16	1.8	2.7	69.0	29.4	6.4	70.6
#30	1.8	2.4	50.8	21.9	7.5	78.1
#50	1.7	2.3	23.3	10.7	11.3	89.3
#100	1.6	2.1	3.4	2.5	8.2	97.5
LBW	1.2	1.6	0.3	1.0	1.5	99.0

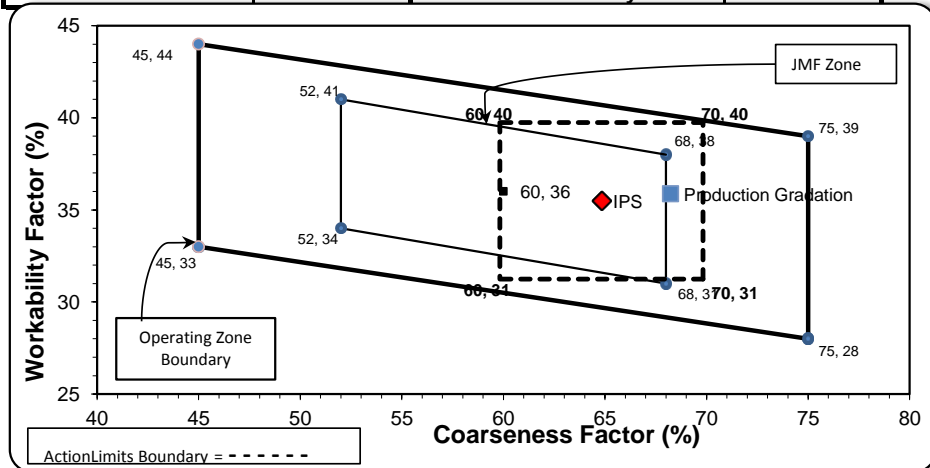


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must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