

Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-101**

Sample Date: 10/29/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

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"	98.1	100.0	100.0	99.4	0.6	0.6
1"	50.5	100.0	100.0	84.7	14.7	15.3
3/4"	17.0	100.0	100.0	74.4	10.3	25.6
1/2"	5.2	82.1	100.0	65.6	8.7	34.4
3/8"	3.0	58.6	100.0	58.3	7.4	41.7
#4	1.9	13.2	98.8	44.5	13.7	55.5
#8	1.5	4.6	82.4	35.3	9.2	64.7
#16	1.4	3.2	65.4	27.9	7.3	72.1
#30	1.4	2.9	47.8	20.7	7.2	79.3
#50	1.4	2.7	22.1	10.2	10.5	89.8
#100	1.3	2.5	4.9	3.1	7.1	96.9
LBW	1.2	2.3	0.9	1.4	1.7	98.6

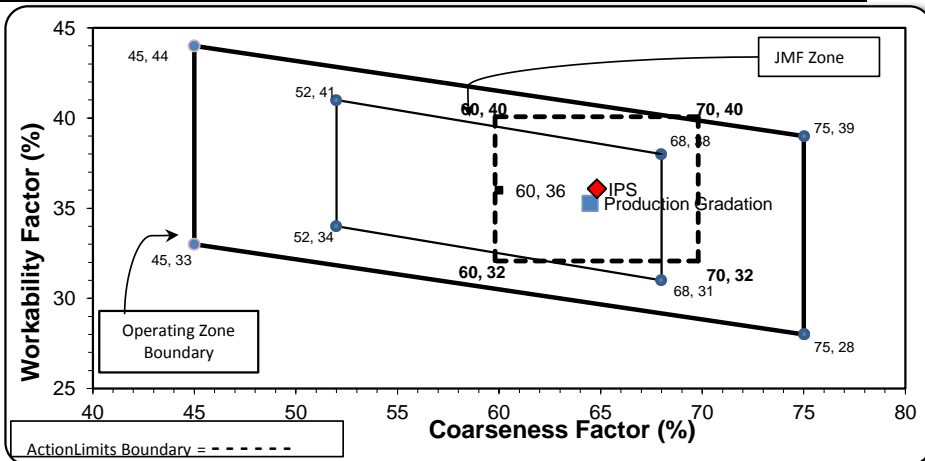


Superior Materials, LLC
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 Suite 500
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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at 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: 64 **Workability Factor: 35**



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: 10/29/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

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"	64.5	100.0	100.0	84.4	15.6	15.6
3/4"	36.6	100.0	100.0	72.2	12.3	27.8
1/2"	15.4	94.1	100.0	61.8	10.3	38.2
3/8"	7.6	84.2	100.0	56.6	5.2	43.4
#4	3.1	23.8	100.0	44.0	12.6	56.0
#8	2.5	7.9	88.0	36.3	7.7	63.7
#16	2.1	3.6	64.0	26.2	10.2	73.8
#30	2.0	2.8	42.0	17.5	8.6	82.5
#50	1.9	2.4	22.0	9.7	7.8	90.3
#100	1.8	2.3	5.0	3.1	6.6	96.9
LBW	1.7	1.9	0.8	1.4	1.7	98.6

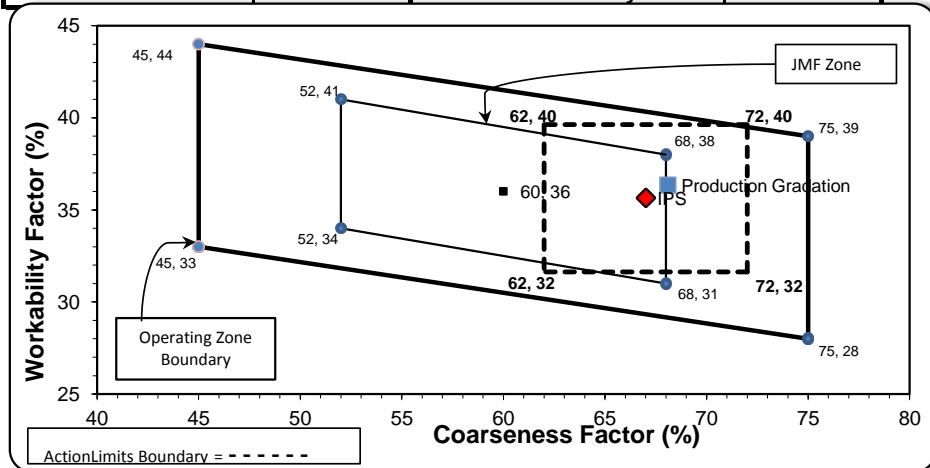
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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



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Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: 68 **Workability Factor: 36**



Initial Production Sample (IPS)

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: 10/29/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

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"	98.1	100.0	100.0	99.4	0.6	0.6
1"	50.5	100.0	100.0	84.7	14.7	15.3
3/4"	17.0	100.0	100.0	74.4	10.3	25.6
1/2"	5.2	82.1	100.0	65.6	8.7	34.4
3/8"	3.0	58.6	100.0	58.3	7.4	41.7
#4	1.9	13.2	97.2	43.9	14.4	56.1
#8	1.5	4.6	84.5	36.1	7.7	63.9
#16	1.4	3.2	69.4	29.6	6.6	70.4
#30	1.4	2.9	51.2	22.1	7.5	77.9
#50	1.4	2.7	23.6	10.8	11.3	89.2
#100	1.3	2.5	3.9	2.7	8.1	97.3
LBW	1.2	2.3	0.4	1.2	1.5	98.8

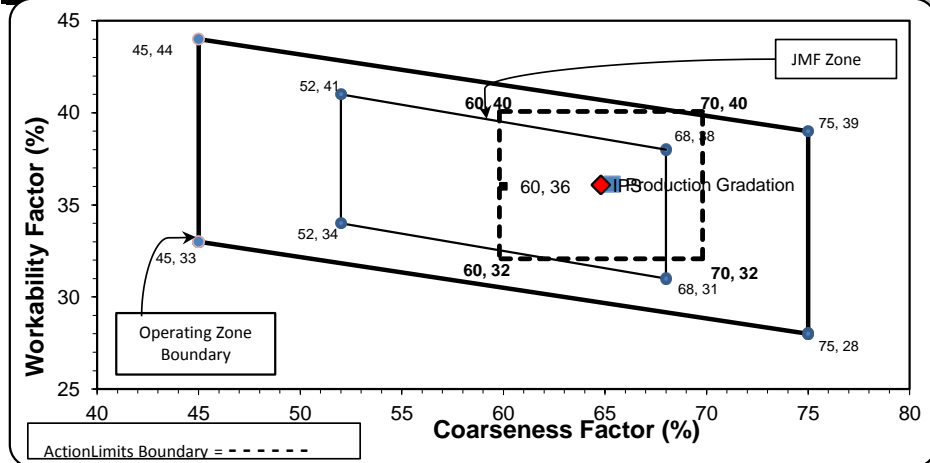


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 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (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: 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: 10/29/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

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"	100.0	100.0	100.0	100.0	0.0	0.0
1"	52.0	100.0	100.0	85.6	14.4	14.4
3/4"	10.1	99.2	100.0	72.8	12.8	27.2
1/2"	2.5	80.5	100.0	65.1	7.8	34.9
3/8"	1.9	52.4	100.0	56.6	8.4	43.4
#4	1.7	9.4	97.4	42.9	13.7	57.1
#8	1.7	3.5	85.2	36.2	6.7	63.8
#16	1.6	2.5	69.0	29.3	6.9	70.7
#30	1.6	2.1	48.5	20.8	8.5	79.2
#50	1.5	1.9	20.7	9.4	11.4	90.6
#100	1.4	1.8	3.5	2.4	7.1	97.6
LBW	1.1	1.6	0.4	1.0	1.4	99.0

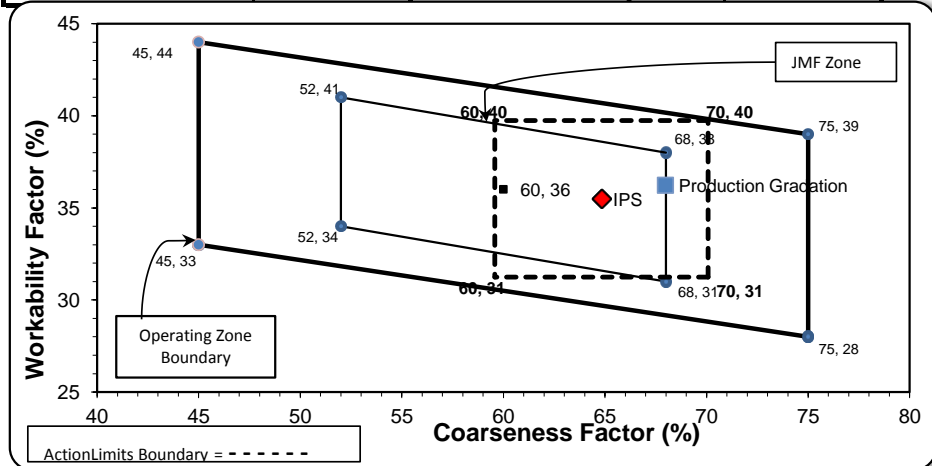


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must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

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Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-36**

Sample Date: 10/29/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

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	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"	100.0	100.0	100.0	100.0	0.0	0.0
1"	52.0	100.0	100.0	85.6	14.4	14.4
3/4"	10.1	99.2	100.0	72.8	12.8	27.2
1/2"	2.5	80.5	100.0	65.1	7.8	34.9
3/8"	1.9	52.4	100.0	56.6	8.4	43.4
#4	1.7	9.4	97.2	42.8	13.8	57.2
#8	1.7	3.5	84.5	35.9	6.9	64.1
#16	1.6	2.5	69.4	29.5	6.5	70.5
#30	1.6	2.1	51.2	21.9	7.5	78.1
#50	1.5	1.9	23.6	10.6	11.3	89.4
#100	1.4	1.8	3.9	2.5	8.1	97.5
LBW	1.1	1.6	0.4	1.0	1.6	99.0

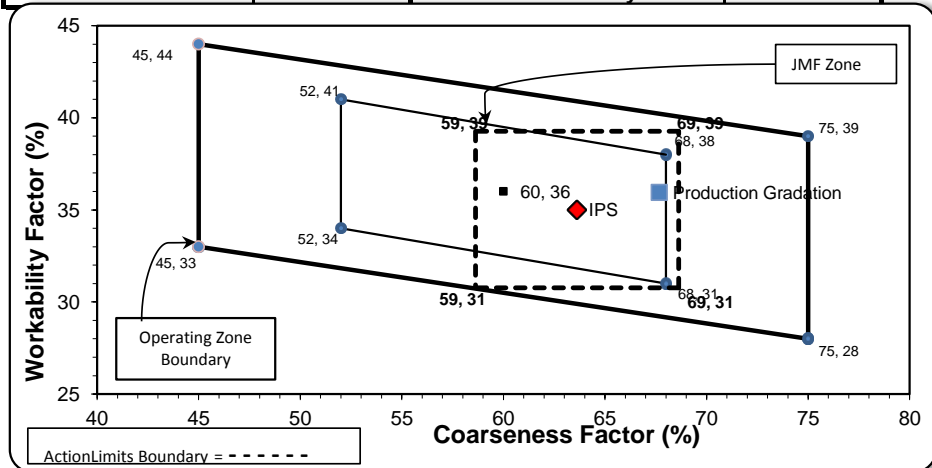


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: 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: 10/29/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

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"	98.1	100.0	100.0	99.4	0.6	0.6
1"	50.5	100.0	100.0	83.9	15.5	16.1
3/4"	17.0	100.0	100.0	73.0	10.9	27.0
1/2"	5.2	82.1	100.0	64.7	8.2	35.3
3/8"	3.0	58.6	100.0	58.3	6.5	41.7
#4	1.9	13.2	96.4	45.3	13.0	54.7
#8	1.5	4.6	78.8	35.5	9.8	64.5
#16	1.4	3.2	61.2	27.6	7.9	72.4
#30	1.4	2.9	46.1	21.0	6.6	79.0
#50	1.4	2.7	25.5	12.1	8.9	87.9
#100	1.3	2.5	5.8	3.5	8.6	96.5
LBW	1.2	2.3	0.5	1.2	2.4	98.8

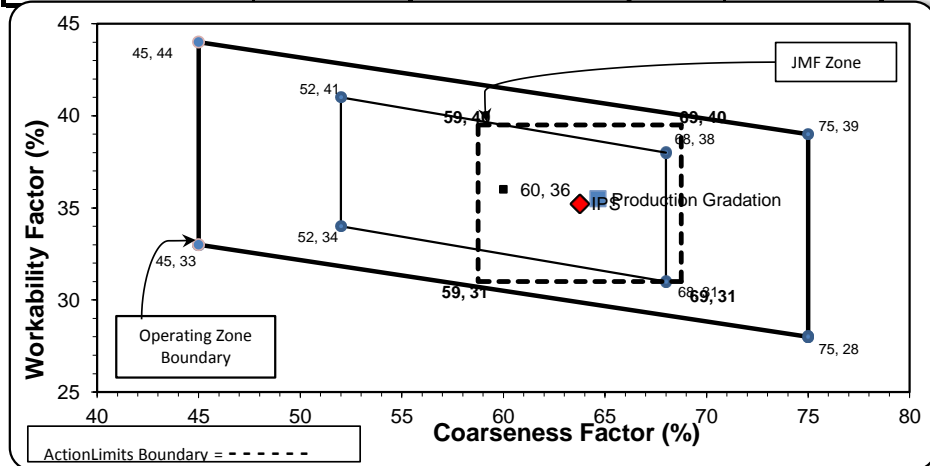
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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



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Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: **65** 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: 10/29/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

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	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"	100.0	100.0	100.0	100.0	0.0	0.0
1"	52.0	100.0	100.0	85.6	14.4	14.4
3/4"	10.1	99.2	100.0	72.8	12.8	27.2
1/2"	2.5	80.5	100.0	65.1	7.8	34.9
3/8"	1.9	52.4	100.0	56.6	8.4	43.4
#4	1.7	9.4	97.2	42.8	13.8	57.2
#8	1.7	3.5	84.5	35.9	6.9	64.1
#16	1.6	2.5	69.4	29.5	6.5	70.5
#30	1.6	2.1	51.2	21.9	7.5	78.1
#50	1.5	1.9	23.6	10.6	11.3	89.4
#100	1.4	1.8	3.9	2.5	8.1	97.5
LBW	1.1	1.6	0.4	1.0	1.6	99.0

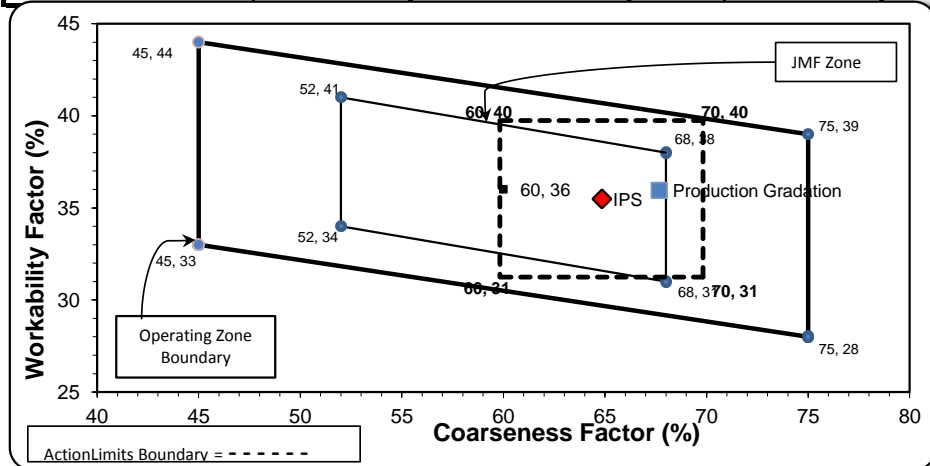


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must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