

Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-101**

Sample Date: 8/27/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 8/28/2018 through 9/3/2018

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"	98.5	100.0	100.0	99.5	0.5	0.5
1"	49.1	100.0	100.0	84.3	15.3	15.7
3/4"	18.8	98.5	100.0	74.5	9.8	25.5
1/2"	5.4	83.0	100.0	65.9	8.6	34.1
3/8"	2.8	54.5	100.0	57.0	8.9	43.0
#4	1.7	9.7	99.1	43.6	13.5	56.4
#8	1.4	3.8	80.6	34.3	9.3	65.7
#16	1.3	2.7	63.4	26.9	7.3	73.1
#30	1.3	2.4	47.6	20.4	6.5	79.6
#50	1.3	2.3	24.2	10.9	9.5	89.1
#100	1.2	2.1	6.4	3.6	7.3	96.4
LBW	1.1	1.9	0.9	1.2	2.3	98.8



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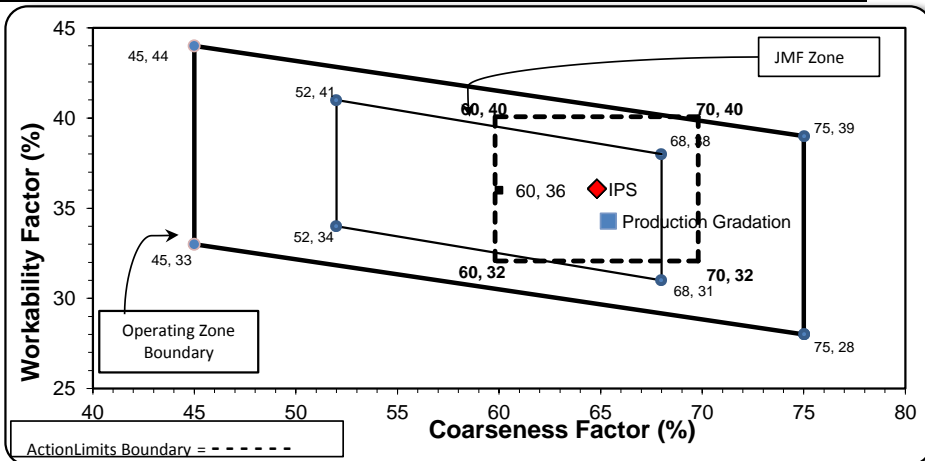
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	65	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, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-102**

Sample Date: 8/27/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 8/28/2018 through 9/3/2018

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"	65.0	100.0	100.0	84.6	15.4	15.4
3/4"	40.7	100.0	100.0	74.0	10.7	26.0
1/2"	11.5	92.6	100.0	59.8	14.1	40.2
3/8"	4.6	80.4	100.0	54.7	5.2	45.3
#4	1.9	27.7	100.0	44.2	10.5	55.8
#8	1.5	6.0	88.0	35.6	8.6	64.4
#16	1.2	2.2	64.0	25.5	10.0	74.5
#30	1.2	1.6	42.0	17.0	8.6	83.0
#50	1.1	1.5	24.0	10.0	7.0	90.0
#100	1.1	1.4	6.0	3.0	6.9	97.0
LBW	1.1	1.2	0.9	1.0	2.0	99.0

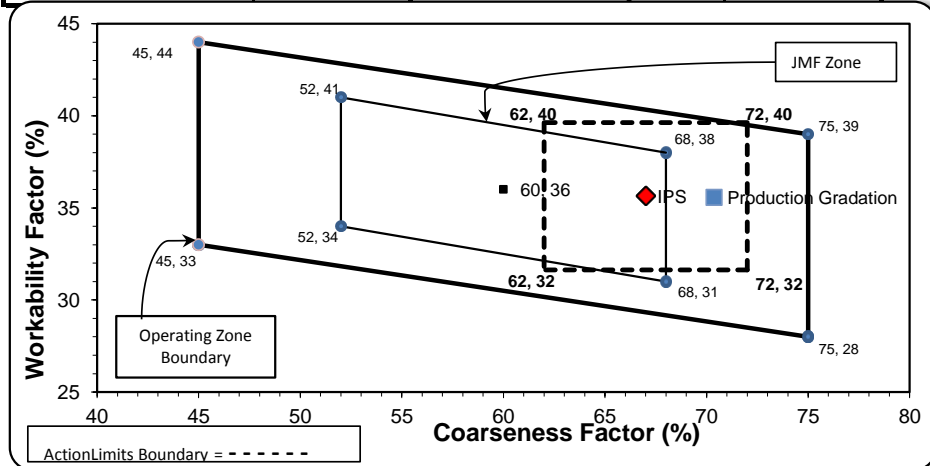


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: 70 **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

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Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-32**

Sample Date: 8/27/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 8/28/2018 through 9/3/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	820	5.02	2.62	26.7
IA	71-47	Presque Isle	1000	6.12	2.62	32.6
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"	94.8	100.0	100.0	98.6	1.4	1.4
1"	33.4	100.0	100.0	82.2	16.4	17.8
3/4"	6.0	98.5	100.0	74.4	7.8	25.6
1/2"	1.8	76.9	100.0	66.2	8.2	33.8
3/8"	1.6	49.5	100.0	57.3	9.0	42.7
#4	1.5	8.3	97.1	42.6	14.6	57.4
#8	1.5	3.2	83.6	35.5	7.2	64.5
#16	1.4	2.5	65.5	27.9	7.6	72.1
#30	1.4	2.3	43.5	18.8	9.0	81.2
#50	1.4	2.2	17.0	8.0	10.8	92.0
#100	1.3	2.1	3.6	2.5	5.5	97.5
LBW	1.0	1.7	0.9	1.2	1.3	98.8

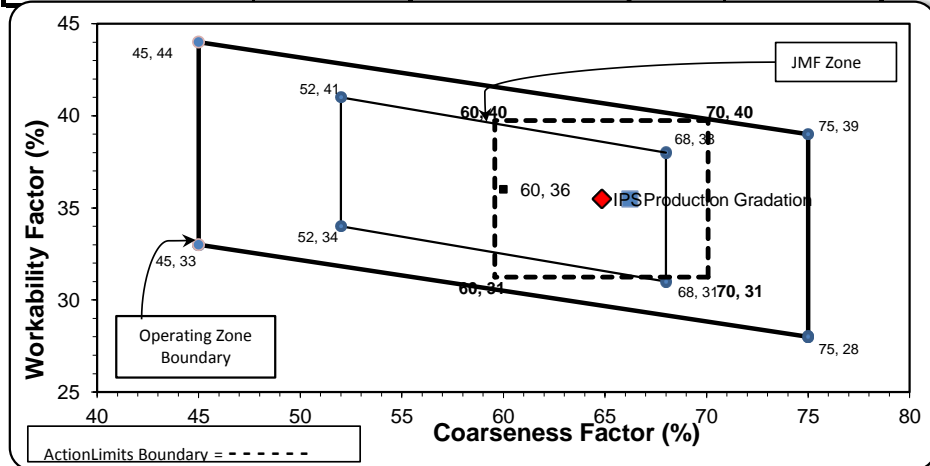


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must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



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

Production Gradation Report

PLANT #: **P-36**

Sample Date: 8/27/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 8/28/2018 through 9/3/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	820	5.02	2.62	26.7
IA	71-47	Presque Isle	1000	6.12	2.62	32.6
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"	94.8	100.0	100.0	98.6	1.4	1.4
1"	33.4	100.0	100.0	82.2	16.4	17.8
3/4"	6.0	98.5	100.0	74.4	7.8	25.6
1/2"	1.8	76.9	100.0	66.2	8.2	33.8
3/8"	1.6	49.5	100.0	57.3	9.0	42.7
#4	1.5	8.3	97.0	42.6	14.7	57.4
#8	1.5	3.2	83.0	35.2	7.4	64.8
#16	1.4	2.5	66.8	28.4	6.9	71.6
#30	1.4	2.3	48.2	20.7	7.6	79.3
#50	1.4	2.2	23.4	10.6	10.1	89.4
#100	1.3	2.1	3.9	2.6	8.0	97.4
LBW	1.0	1.7	0.4	1.0	1.6	99.0

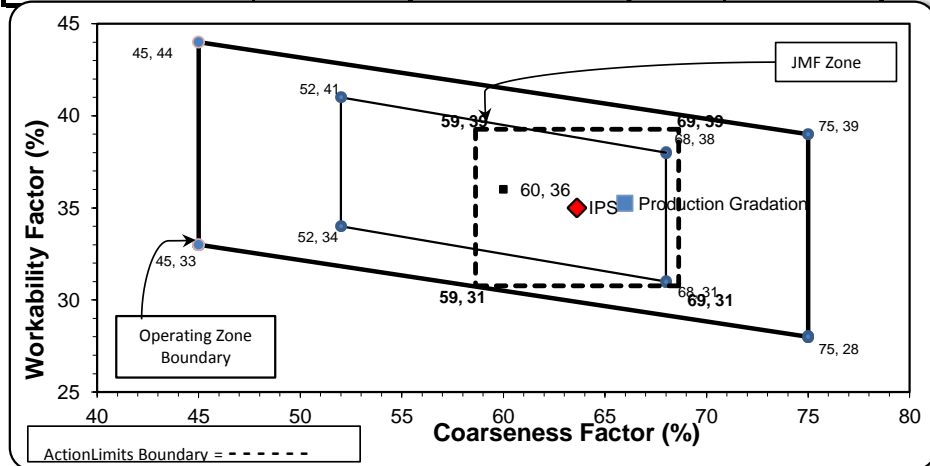


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: **66** 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"	84.6	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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Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-39**

Sample Date: 8/27/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 8/28/2018 through 9/3/2018

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"	98.5	100.0	100.0	99.5	0.5	0.5
1"	49.1	100.0	100.0	83.4	16.1	16.6
3/4"	18.8	98.5	100.0	73.2	10.2	26.8
1/2"	5.4	83.0	100.0	65.0	8.2	35.0
3/8"	2.8	54.5	100.0	57.2	7.8	42.8
#4	1.7	9.7	96.0	44.2	13.0	55.8
#8	1.4	3.8	78.4	35.1	9.1	64.9
#16	1.3	2.7	62.5	28.0	7.1	72.0
#30	1.3	2.4	47.7	21.5	6.4	78.5
#50	1.3	2.3	26.4	12.3	9.2	87.7
#100	1.2	2.1	7.3	4.0	8.3	96.0
LBW	1.1	1.9	0.8	1.2	2.9	98.8

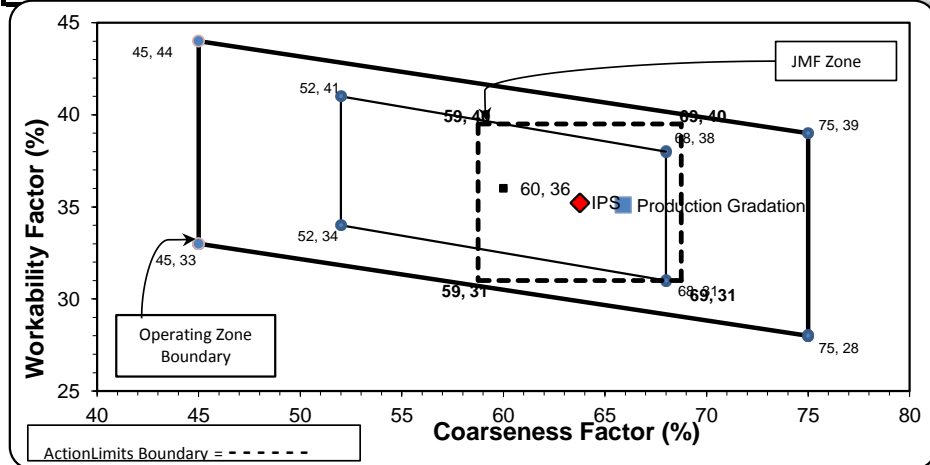


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must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

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Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-02**

Sample Date: 8/27/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 8/28/2018 through 9/3/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	820	5.02	2.62	26.7
IA	71-47	Presque Isle	1000	6.12	2.62	32.6
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"	94.8	100.0	100.0	98.6	1.4	1.4
1"	33.4	100.0	100.0	82.2	16.4	17.8
3/4"	6.0	98.5	100.0	74.4	7.8	25.6
1/2"	1.8	76.9	100.0	66.2	8.2	33.8
3/8"	1.6	49.5	100.0	57.3	9.0	42.7
#4	1.5	8.3	97.0	42.6	14.7	57.4
#8	1.5	3.2	83.0	35.2	7.4	64.8
#16	1.4	2.5	66.8	28.4	6.9	71.6
#30	1.4	2.3	48.2	20.7	7.6	79.3
#50	1.4	2.2	23.4	10.6	10.1	89.4
#100	1.3	2.1	3.9	2.6	8.0	97.4
LBW	1.0	1.7	0.4	1.0	1.6	99.0

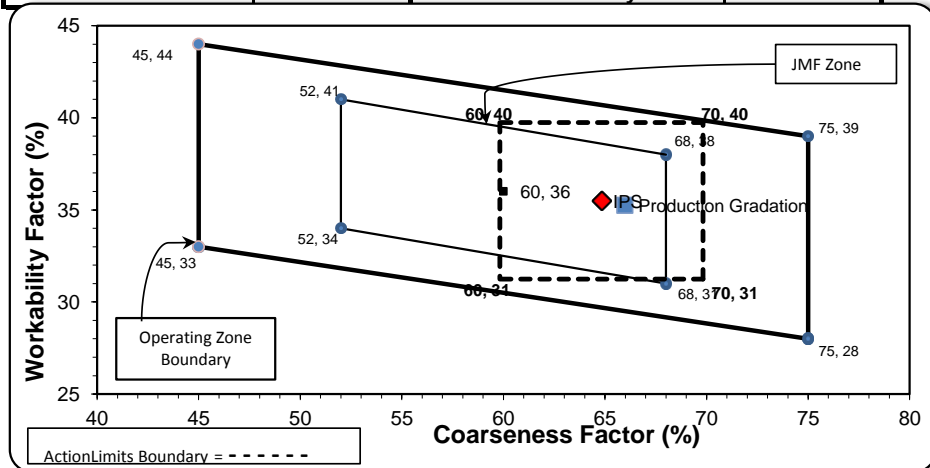


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must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



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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