

Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-101**

Sample Date: 10/8/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/9/2018 through 10/15/2018

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"	97.2	100.0	100.0	99.1	0.9	0.9
1"	42.4	100.0	100.0	82.2	16.9	17.8
3/4"	9.7	98.8	100.0	71.8	10.4	28.2
1/2"	2.2	78.3	100.0	63.6	8.2	36.4
3/8"	1.8	51.2	100.0	55.8	7.8	44.2
#4	1.6	7.6	99.0	42.9	12.9	57.1
#8	1.4	2.9	82.0	34.6	8.3	65.4
#16	1.4	2.0	64.8	27.3	7.2	72.7
#30	1.4	1.8	47.4	20.2	7.1	79.8
#50	1.3	1.7	22.6	10.1	10.1	89.9
#100	1.2	1.6	5.5	3.1	7.0	96.9
LBW	1.1	1.4	0.8	1.1	2.0	98.9



Superior Materials, LLC
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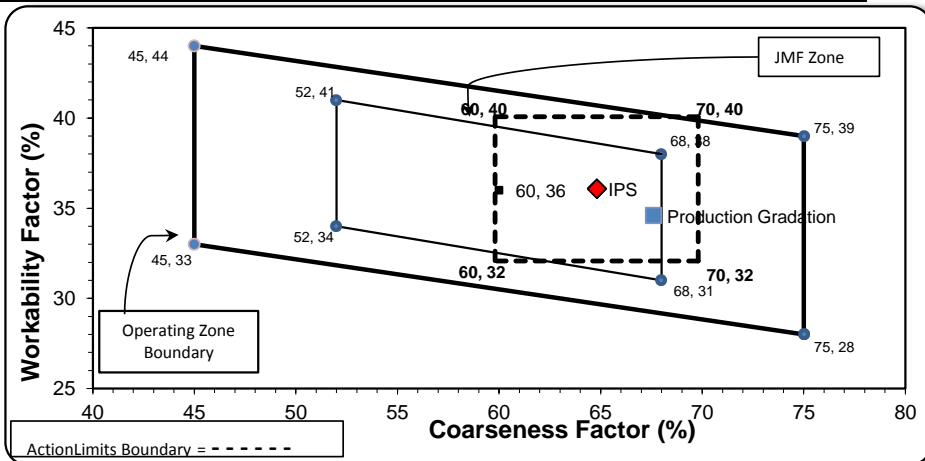
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (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: 10/8/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/9/2018 through 10/15/2018

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"	60.8	100.0	100.0	82.8	17.2	17.2
3/4"	40.8	100.0	100.0	74.0	8.8	26.0
1/2"	16.7	95.0	100.0	62.5	11.5	37.5
3/8"	7.6	84.7	100.0	56.7	5.8	43.3
#4	3.2	24.7	100.0	44.2	12.5	55.8
#8	2.5	8.0	89.0	36.7	7.5	63.3
#16	2.0	3.6	66.0	26.9	9.8	73.1
#30	1.9	2.8	46.0	19.0	7.9	81.0
#50	1.8	2.5	25.0	10.8	8.2	89.2
#100	1.7	2.4	6.0	3.5	7.4	96.5
LBW	1.6	2.2	0.8	1.4	2.1	98.6

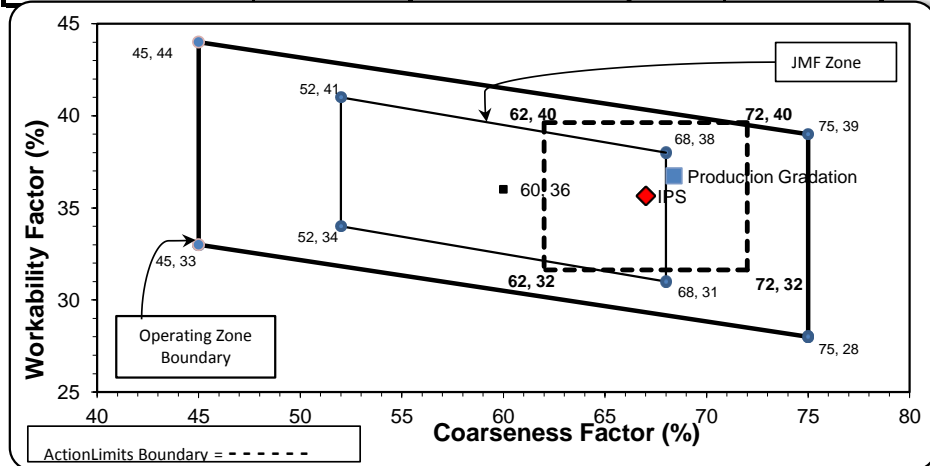


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must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

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Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: **P-32**

Sample Date: 10/8/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/9/2018 through 10/15/2018

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"	95.3	100.0	100.0	98.7	1.3	1.3
1"	31.6	100.0	100.0	81.7	17.0	18.3
3/4"	7.0	98.2	100.0	74.6	7.2	25.4
1/2"	2.3	78.7	100.0	67.0	7.6	33.0
3/8"	2.0	49.5	100.0	57.4	9.6	42.6
#4	1.9	7.3	97.7	42.7	14.7	57.3
#8	1.9	2.3	86.1	36.3	6.4	63.7
#16	1.9	1.9	68.8	29.1	7.2	70.9
#30	1.9	1.7	46.6	20.0	9.1	80.0
#50	1.9	1.6	19.4	8.9	11.1	91.1
#100	1.8	1.5	4.2	2.7	6.2	97.3
LBW	1.6	0.9	1.0	1.1	1.6	98.9

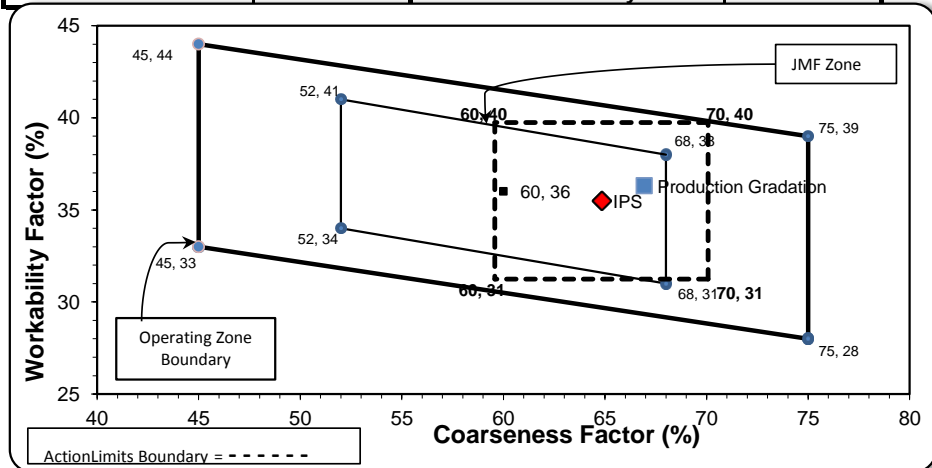


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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: 67 **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: 10/8/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/9/2018 through 10/15/2018

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"	95.3	100.0	100.0	98.7	1.3	1.3
1"	31.6	100.0	100.0	81.7	17.0	18.3
3/4"	7.0	98.2	100.0	74.6	7.2	25.4
1/2"	2.3	78.7	100.0	67.0	7.6	33.0
3/8"	2.0	49.5	100.0	57.4	9.6	42.6
#4	1.9	7.3	97.4	42.5	14.8	57.5
#8	1.9	2.3	83.7	35.3	7.2	64.7
#16	1.9	1.9	68.0	28.8	6.5	71.2
#30	1.9	1.7	50.8	21.7	7.1	78.3
#50	1.9	1.6	24.1	10.8	10.9	89.2
#100	1.8	1.5	4.1	2.6	8.2	97.4
LBW	1.6	0.9	0.3	0.8	1.8	99.2

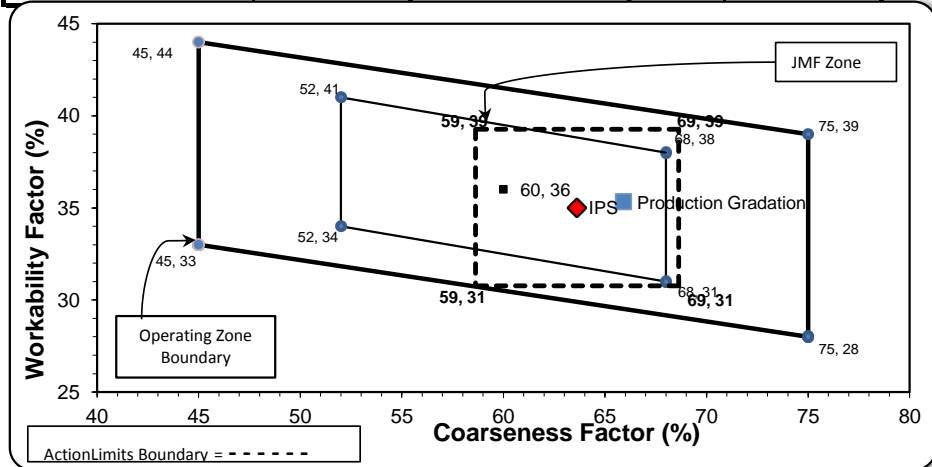


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must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

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/9/2018 through 10/15/2018

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"	97.2	100.0	100.0	99.1	0.9	0.9
1"	42.4	100.0	100.0	81.2	17.9	18.8
3/4"	9.7	98.8	100.0	70.3	10.9	29.7
1/2"	2.2	78.3	100.0	62.8	7.5	37.2
3/8"	1.8	51.2	100.0	56.1	6.8	43.9
#4	1.6	7.6	96.1	43.7	12.4	56.3
#8	1.4	2.9	78.7	35.0	8.7	65.0
#16	1.4	2.0	62.4	27.8	7.2	72.2
#30	1.4	1.8	48.1	21.6	6.2	78.4
#50	1.3	1.7	25.8	11.9	9.6	88.1
#100	1.2	1.6	4.1	2.5	9.4	97.5
LBW	1.1	1.4	0.4	0.9	1.7	99.1

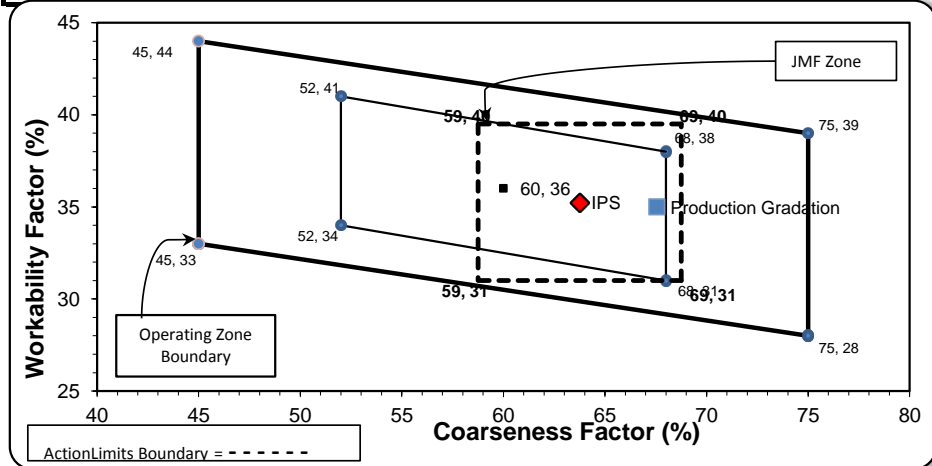


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must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

Aggregate Optimization Chart

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

Production Gradation Report

PLANT #: P-02

Sample Date: 10/8/18

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 10/9/2018 through 10/15/2018

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"	95.3	100.0	100.0	98.7	1.3	1.3
1"	31.6	100.0	100.0	81.7	17.0	18.3
3/4"	7.0	98.2	100.0	74.6	7.2	25.4
1/2"	2.3	78.7	100.0	67.0	7.6	33.0
3/8"	2.0	49.5	100.0	57.4	9.6	42.6
#4	1.9	7.3	97.4	42.5	14.8	57.5
#8	1.9	2.3	83.7	35.3	7.2	64.7
#16	1.9	1.9	68.0	28.8	6.5	71.2
#30	1.9	1.7	50.8	21.7	7.1	78.3
#50	1.9	1.6	24.1	10.8	10.9	89.2
#100	1.8	1.5	4.1	2.6	8.2	97.4
LBW	1.6	0.9	0.3	0.8	1.8	99.2

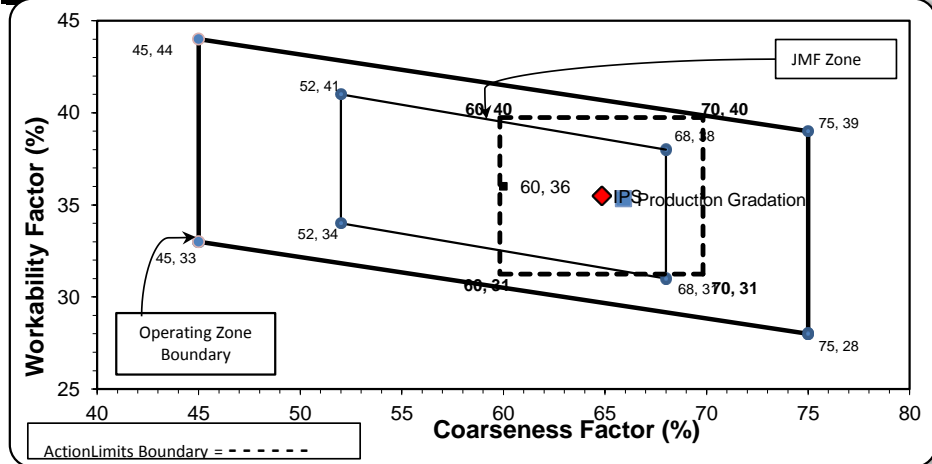


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must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

Approved By: