

Aggregate Optimization Chart

PLANT #: **P-102**

Sample Date: 12/11/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 12/12/2023 through 12/18/2023

Contractor: _____

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	81-019	Pleasant Lake	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

<----- Verify this number is 100%



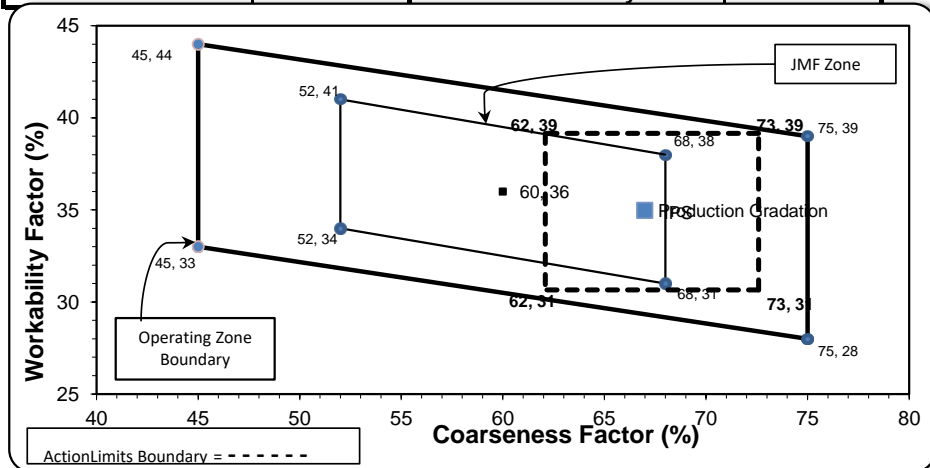
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

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"	62.7	100.0	100.0	83.6	16.4	16.4
3/4"	37.6	100.0	100.0	72.6	11.0	27.4
1/2"	16.7	93.2	100.0	62.2	10.4	37.8
3/8"	9.8	77.6	100.0	56.4	5.8	43.6
#4	2.7	17.3	98.8	42.2	14.2	57.8
#8	1.8	5.0	86.6	35.0	7.3	65.0
#16	1.5	3.2	67.7	27.3	7.7	72.7
#30	1.4	2.3	44.0	17.9	9.3	82.1
#50	1.4	2.0	14.6	6.6	11.4	93.4
#100	1.3	1.8	1.8	1.6	5.0	98.4
LBW	1.1	1.6	0.4	0.9	0.7	99.1

*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: 67
Workability Factor: 35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	85.5	14.5	14.5
3/4"	73.4	12.1	26.6
1/2"	61.0	12.4	39.0
3/8"	56.2	4.8	43.8
#4	43.1	13.1	56.9
#8	34.9	8.2	65.1
#16	29.4	5.5	70.6
#30	21.6	7.8	78.4
#50	8.1	13.4	91.9
#100	2.2	5.9	97.8
LBW	1.4	0.8	98.6

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: 12

Sample Date: 12/11/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 12/12/2023 through 12/18/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	800	4.89	2.62	26.1
2NS	63-115	Ray Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

<----- Verify this number is 100%



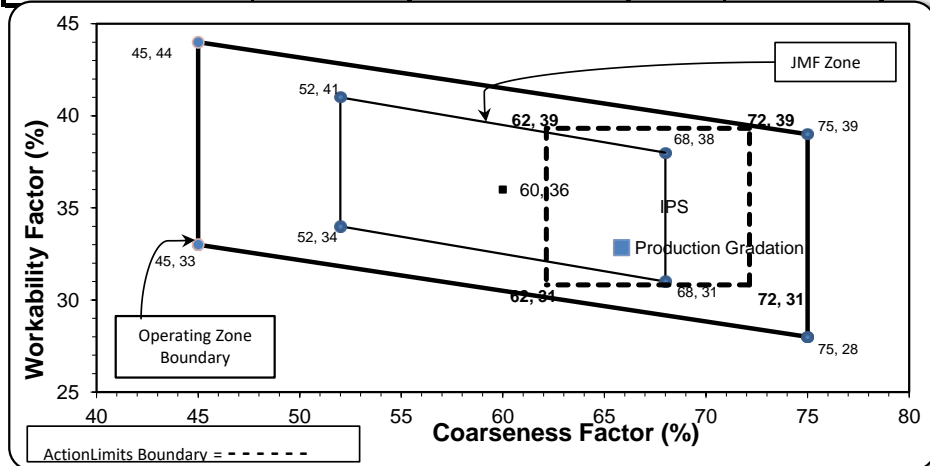
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.8	100.0	100.0	98.5	1.5	1.5
1"	26.2	100.0	100.0	74.3	24.3	25.7
3/4"	3.6	99.6	100.0	66.3	8.0	33.7
1/2"	1.8	85.4	100.0	62.0	4.3	38.0
3/8"	1.7	61.8	100.0	55.8	6.2	44.2
#4	1.6	10.1	96.7	41.0	14.8	59.0
#8	1.6	2.1	81.2	32.8	8.1	67.2
#16	1.6	1.5	64.8	26.3	6.6	73.7
#30	1.6	1.4	48.8	20.0	6.3	80.0
#50	1.6	1.4	26.2	11.2	8.8	88.8
#100	1.5	1.4	5.6	3.1	8.1	96.9
LBW	1.4	1.2	1.1	1.2	1.8	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.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: 66 **Workability Factor:** 33



Initial Production Sample (IPS)

Coarseness Factor: 67
Workability Factor: 35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.6	0.4	0.4
1"	83.9	15.7	16.1
3/4"	74.0	9.8	26.0
1/2"	63.7	10.3	36.3
3/8"	56.4	7.3	43.6
#4	43.0	13.4	57.0
#8	35.1	7.9	64.9
#16	29.0	6.1	71.0
#30	20.9	8.0	79.1
#50	8.1	12.8	91.9
#100	1.6	6.5	98.4
LBW	0.9	0.8	99.1

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P11**

Sample Date: 12/11/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 12/12/2023 through 12/18/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	800	4.89	2.62	26.1
2NS	95-013	Smelter Bay	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

<----- Verify this number is 100%



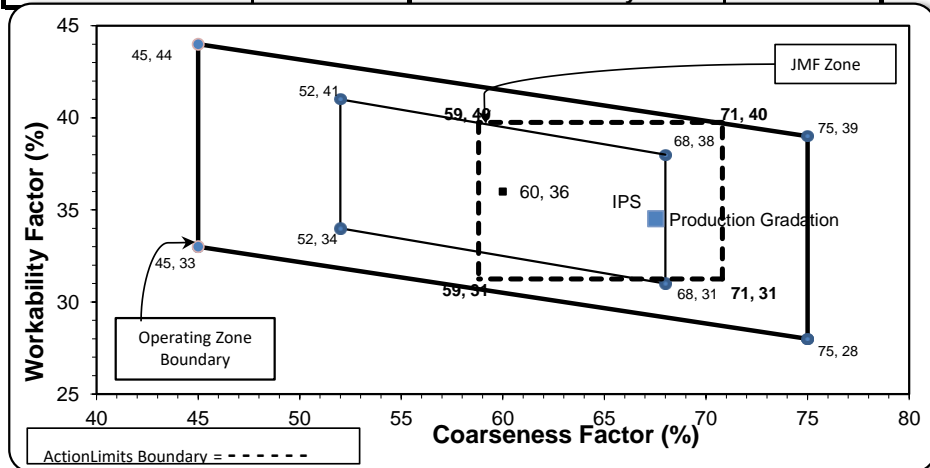
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 Suite 500
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.8	100.0	100.0	98.5	1.5	1.5
1"	26.2	100.0	100.0	74.3	24.3	25.7
3/4"	3.6	99.6	100.0	66.3	8.0	33.7
1/2"	1.8	85.4	100.0	62.0	4.3	38.0
3/8"	1.7	61.8	100.0	55.8	6.2	44.2
#4	1.6	10.1	96.3	40.8	15.0	59.2
#8	1.6	2.1	85.5	34.5	6.3	65.5
#16	1.6	1.5	70.7	28.6	5.9	71.4
#30	1.6	1.4	50.6	20.7	7.9	79.3
#50	1.6	1.4	23.7	10.2	10.5	89.8
#100	1.5	1.4	7.2	3.7	6.5	96.3
LBW	1.4	1.2	1.5	1.4	2.3	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.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: 68 **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"	99.0	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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Approved By:

Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 12/11/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 12/12/2023 through 12/18/2023

Contractor: _____

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	81-019	Pleasant Lake	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

<----- Verify this number is 100%



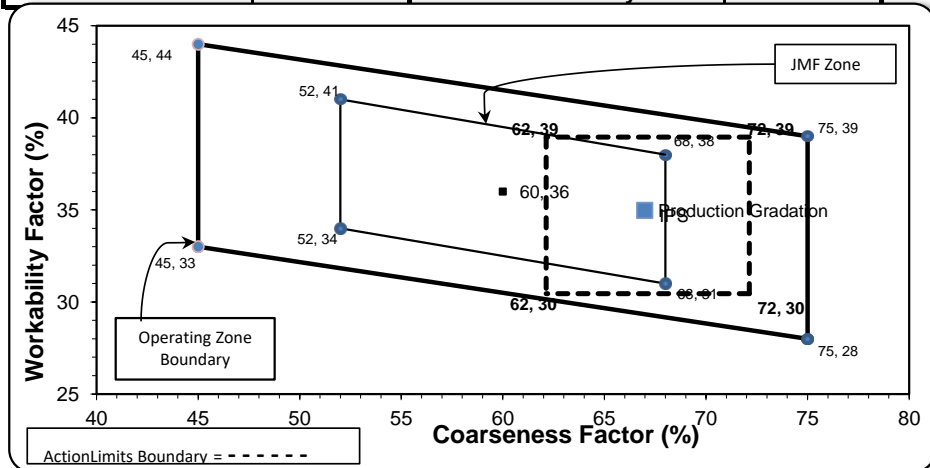
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	62.7	100.0	100.0	83.6	16.4	16.4
3/4"	37.6	100.0	100.0	72.6	11.0	27.4
1/2"	16.7	93.2	100.0	62.2	10.4	37.8
3/8"	9.8	77.6	100.0	56.4	5.8	43.6
#4	2.7	17.3	98.8	42.2	14.2	57.8
#8	1.8	5.0	86.6	35.0	7.3	65.0
#16	1.5	3.2	67.7	27.3	7.7	72.7
#30	1.4	2.3	44.0	17.9	9.3	82.1
#50	1.4	2.0	14.6	6.6	11.4	93.4
#100	1.3	1.8	1.8	1.6	5.0	98.4
LBW	1.1	1.6	0.4	0.9	0.7	99.1

*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: 67
Workability Factor: 35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	86.9	13.1	13.1
3/4"	76.1	10.8	23.9
1/2"	63.7	12.4	36.3
3/8"	56.2	7.5	43.8
#4	43.2	13.0	56.8
#8	34.7	8.5	65.3
#16	27.5	7.2	72.5
#30	20.6	7.0	79.4
#50	9.0	11.6	91.0
#100	2.1	6.9	97.9
LBW	1.0	1.1	99.0

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 12/11/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 12/12/2023 through 12/18/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	800	4.89	2.62	26.1
2NS	63-92	Grange Hall	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

<----- Verify this number is 100%



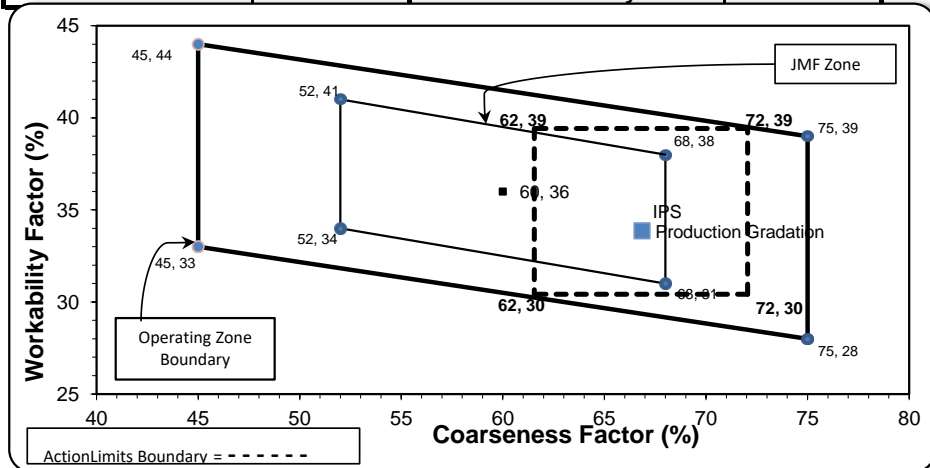
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 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.8	100.0	100.0	98.5	1.5	1.5
1"	26.2	100.0	100.0	74.3	24.3	25.7
3/4"	3.6	99.6	100.0	66.3	8.0	33.7
1/2"	1.8	85.4	100.0	62.0	4.3	38.0
3/8"	1.7	61.8	100.0	55.8	6.2	44.2
#4	1.6	10.1	97.2	41.2	14.6	58.8
#8	1.6	2.1	83.8	33.9	7.3	66.1
#16	1.6	1.5	69.2	28.0	5.9	72.0
#30	1.6	1.4	50.8	20.8	7.2	79.2
#50	1.6	1.4	20.2	8.8	12.0	91.2
#100	1.5	1.4	2.6	1.9	6.9	98.1
LBW	1.4	1.2	0.5	1.0	0.9	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:	67	Workability Factor:	34
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Initial Production Sample (IPS)

Coarseness Factor:	67
Workability Factor:	35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	85.0	15.0	15.0
3/4"	72.1	12.9	27.9
1/2"	64.5	7.6	35.5
3/8"	56.5	8.0	43.5
#4	42.7	13.8	57.3
#8	34.9	7.8	65.1
#16	29.0	5.9	71.0
#30	21.0	8.0	79.0
#50	8.2	12.8	91.8
#100	1.6	6.5	98.4
LBW	0.7	0.9	99.3

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-02**

Sample Date: 12/11/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 12/12/2023 through 12/18/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	800	4.89	2.62	26.1
2NS	63-115	Ray Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

<----- Verify this number is 100%



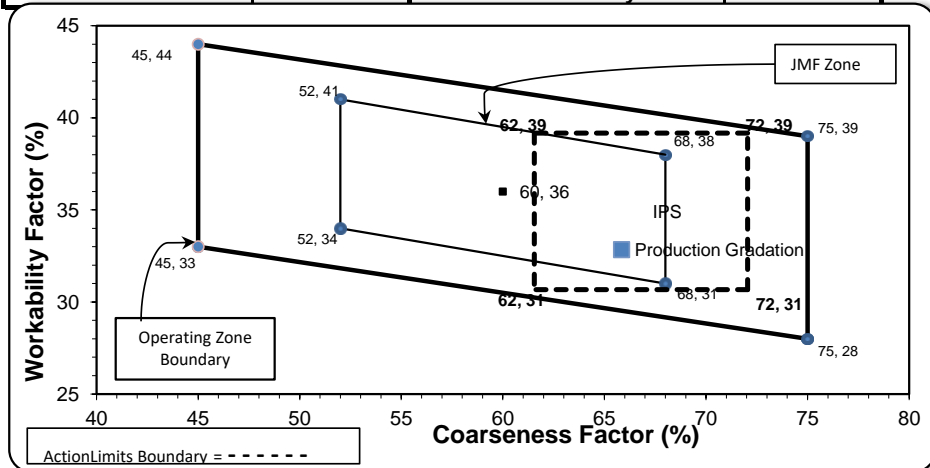
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.8	100.0	100.0	98.5	1.5	1.5
1"	26.2	100.0	100.0	74.3	24.3	25.7
3/4"	3.6	99.6	100.0	66.3	8.0	33.7
1/2"	1.8	85.4	100.0	62.0	4.3	38.0
3/8"	1.7	61.8	100.0	55.8	6.2	44.2
#4	1.6	10.1	96.7	41.0	14.8	59.0
#8	1.6	2.1	81.2	32.8	8.1	67.2
#16	1.6	1.5	64.8	26.3	6.6	73.7
#30	1.6	1.4	48.8	20.0	6.3	80.0
#50	1.6	1.4	26.2	11.2	8.8	88.8
#100	1.5	1.4	5.6	3.1	8.1	96.9
LBW	1.4	1.2	1.1	1.2	1.8	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.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: 66 **Workability Factor: 33**



Initial Production Sample (IPS)

Coarseness Factor: 67
Workability Factor: 35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	85.0	15.0	15.0
3/4"	72.3	12.7	27.7
1/2"	64.5	7.8	35.5
3/8"	56.5	8.0	43.5
#4	42.7	13.8	57.3
#8	34.9	7.8	65.1
#16	29.0	5.9	71.0
#30	21.0	8.0	79.0
#50	8.2	12.8	91.8
#100	1.6	6.5	98.4
LBW	0.7	0.9	99.3

PREPARED BY:
 SM, LLC Technical Service

Approved By: