

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 12/14/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/15/2020 through 12/21/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	970	5.93	2.62	31.6
IA	71-47	Presque Isle	900	5.50	2.62	29.3
2NS	75-051	Mid-Michigan	1200	7.23	2.66	39.1
Total Wt			3070	18.67		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"	48.0	100.0	100.0	83.6	16.4	16.4
3/4"	15.6	99.6	100.0	73.2	10.4	26.8
1/2"	2.6	86.0	100.0	65.1	8.1	34.9
3/8"	2.1	62.7	100.0	58.1	7.0	41.9
#4	1.9	18.0	98.8	44.5	13.6	55.5
#8	1.8	5.3	83.9	34.9	9.6	65.1
#16	1.8	2.9	67.7	27.9	7.0	72.1
#30	1.7	2.5	49.5	20.6	7.3	79.4
#50	1.6	2.4	23.1	10.2	10.4	89.8
#100	1.5	2.3	3.9	2.7	7.6	97.3
LBW	1.3	2.1	0.5	1.2	1.5	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

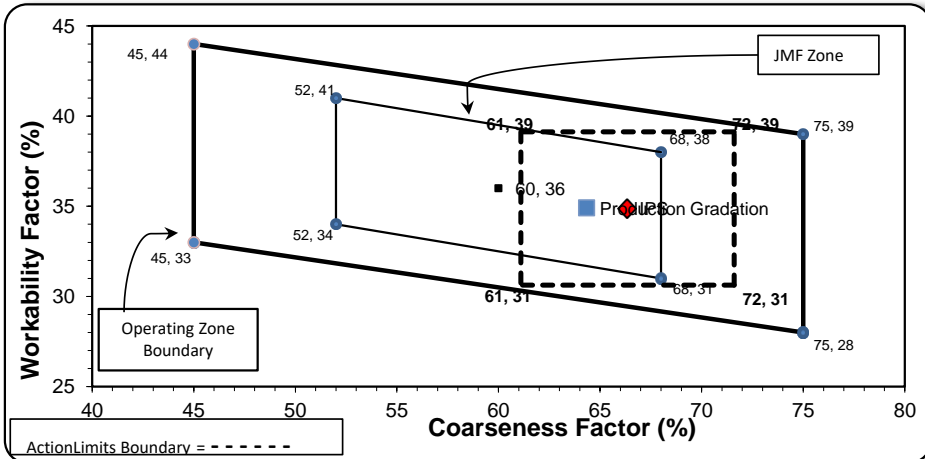
Coarseness Factor:	64	Workability Factor:	35
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Initial Production Sample (IPS)

Coarseness Factor:	66
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Workability Factor:	35
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Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.6	0.4	0.4
1"	84.3	15.3	15.7
3/4"	74.8	9.6	25.2
1/2"	64.3	10.4	35.7
3/8"	56.8	7.5	43.2
#4	43.0	13.8	57.0
#8	34.9	8.1	65.1
#16	26.4	8.5	73.6
#30	19.9	6.5	80.1
#50	10.4	9.5	89.6
#100	3.4	7.0	96.6
LBW	1.2	2.2	98.8



PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 12/14/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/15/2020 through 12/21/2020

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	750	4.59	2.62	24.4
2NS	95-013	Smelter Bay	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



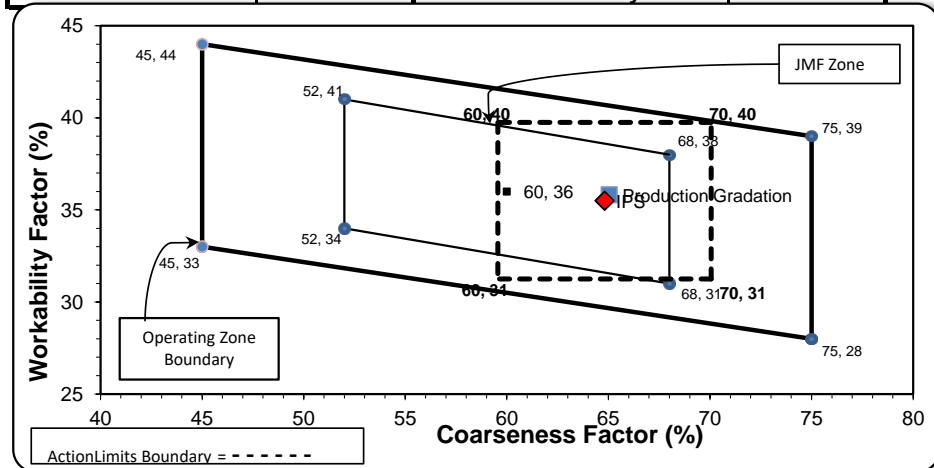
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.4	100.0	100.0	98.0	2.0	2.0
1"	49.7	100.0	100.0	82.5	15.6	17.5
3/4"	23.3	99.0	100.0	73.0	9.4	27.0
1/2"	5.0	89.0	100.0	64.2	8.8	35.8
3/8"	2.9	67.7	100.0	58.3	5.9	41.7
#4	2.6	21.5	95.8	45.2	13.1	54.8
#8	2.3	5.2	82.9	35.8	9.3	64.2
#16	2.1	3.5	66.8	28.8	7.0	71.2
#30	2.0	2.8	46.6	20.4	8.4	79.6
#50	2.0	2.4	27.4	12.4	7.9	87.6
#100	1.9	2.2	9.5	5.1	7.4	94.9
LBW	1.6	1.8	1.2	1.5	3.6	98.5

*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:	36
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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"	99.0	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

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 12/14/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/15/2020 through 12/21/2020

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%



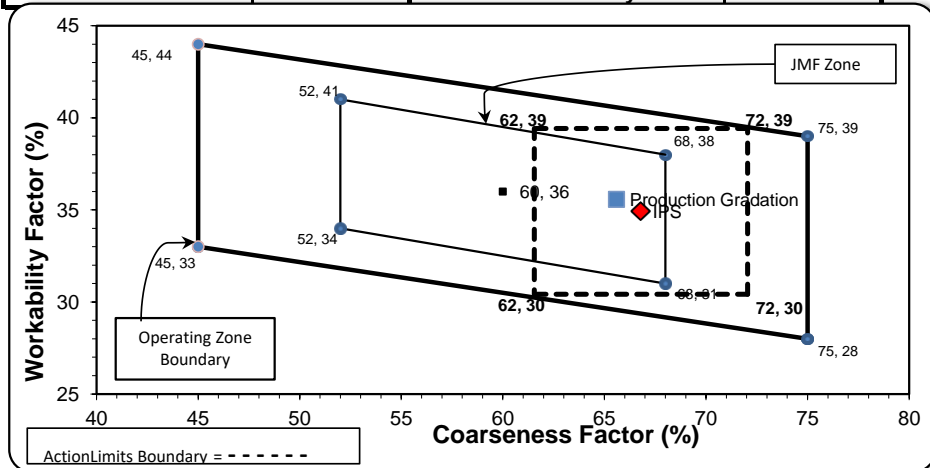
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.4	100.0	100.0	98.0	2.0	2.0
1"	49.7	100.0	100.0	82.5	15.6	17.5
3/4"	23.3	99.0	100.0	73.0	9.5	27.0
1/2"	5.0	89.0	100.0	64.0	9.0	36.0
3/8"	2.9	67.7	100.0	57.7	6.3	42.3
#4	2.6	21.5	97.5	44.6	13.1	55.4
#8	2.3	5.2	85.5	35.6	9.0	64.4
#16	2.1	3.5	70.5	29.2	6.4	70.8
#30	2.0	2.8	45.8	19.3	9.9	80.7
#50	2.0	2.4	13.5	6.6	12.7	93.4
#100	1.9	2.2	1.8	1.9	4.7	98.1
LBW	1.6	1.8	0.3	1.1	0.8	98.9

*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:	36
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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

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 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 12/14/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/15/2020 through 12/21/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	970	5.93	2.62	31.6
IA	71-47	Presque Isle	900	5.50	2.62	29.3
2NS	44-051	Krake Willis Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



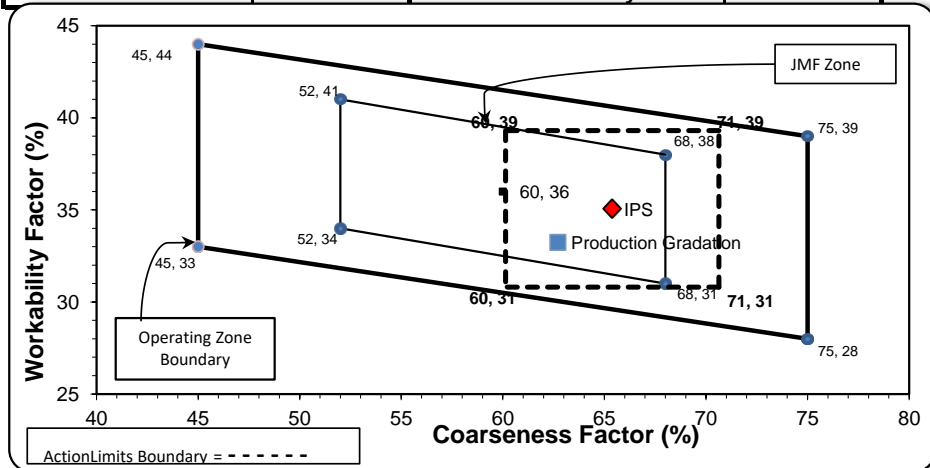
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	48.0	100.0	100.0	83.6	16.4	16.4
3/4"	15.6	99.6	100.0	73.2	10.4	26.8
1/2"	2.6	86.0	100.0	65.1	8.1	34.9
3/8"	2.1	62.7	100.0	58.1	7.0	41.9
#4	1.9	18.0	96.0	43.4	14.7	56.6
#8	1.8	5.3	79.6	33.2	10.2	66.8
#16	1.8	2.9	62.9	26.0	7.2	74.0
#30	1.7	2.5	48.8	20.3	5.7	79.7
#50	1.6	2.4	28.2	12.2	8.1	87.8
#100	1.5	2.3	8.4	4.4	7.8	95.6
LBW	1.3	2.1	1.0	1.4	3.0	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: **63** **Workability Factor:** **33**



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"	99.6	0.4	0.4
1"	83.9	15.7	16.1
3/4"	74.1	9.8	25.9
1/2"	64.3	9.7	35.7
3/8"	57.5	6.8	42.5
#4	44.5	13.1	55.5
#8	35.1	9.4	64.9
#16	27.9	7.2	72.1
#30	21.7	6.2	78.3
#50	12.6	9.1	87.4
#100	3.5	9.1	96.5
LBW	1.2	2.4	98.8

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-02**

Sample Date: 12/14/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/15/2020 through 12/21/2020

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	750	4.59	2.62	24.4
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



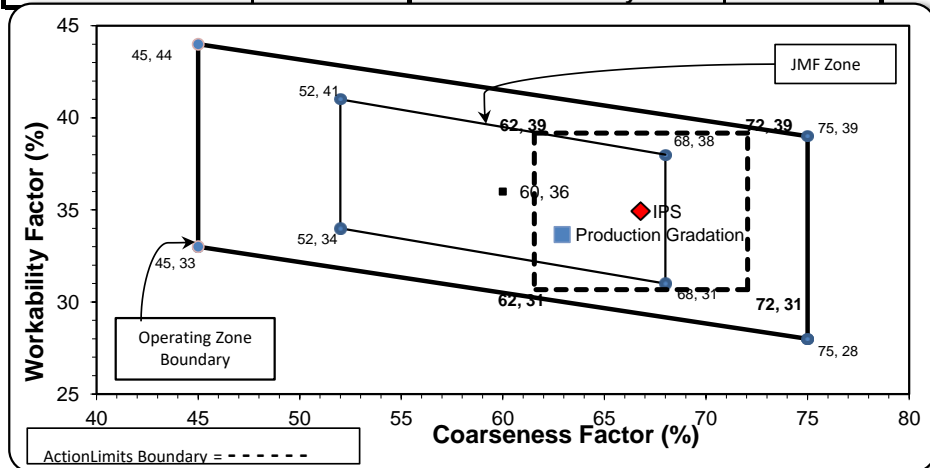
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.4	100.0	100.0	98.0	2.0	2.0
1"	49.7	100.0	100.0	82.5	15.6	17.5
3/4"	23.3	99.0	100.0	73.0	9.4	27.0
1/2"	5.0	89.0	100.0	64.2	8.8	35.8
3/8"	2.9	67.7	100.0	58.3	5.9	41.7
#4	2.6	21.5	95.7	45.1	13.1	54.9
#8	2.3	5.2	77.6	33.7	11.5	66.3
#16	2.1	3.5	61.3	26.5	7.1	73.5
#30	2.0	2.8	46.4	20.3	6.3	79.7
#50	2.0	2.4	22.8	10.6	9.7	89.4
#100	1.9	2.2	4.3	3.0	7.6	97.0
LBW	1.6	1.8	0.5	1.2	1.7	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:	63	Workability Factor:	34
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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"	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: