

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 1/6/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 1/7/2020 through 1/13/2020

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	920	5.63	2.62	30.0
2NS	95-013	Smelter Bay	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



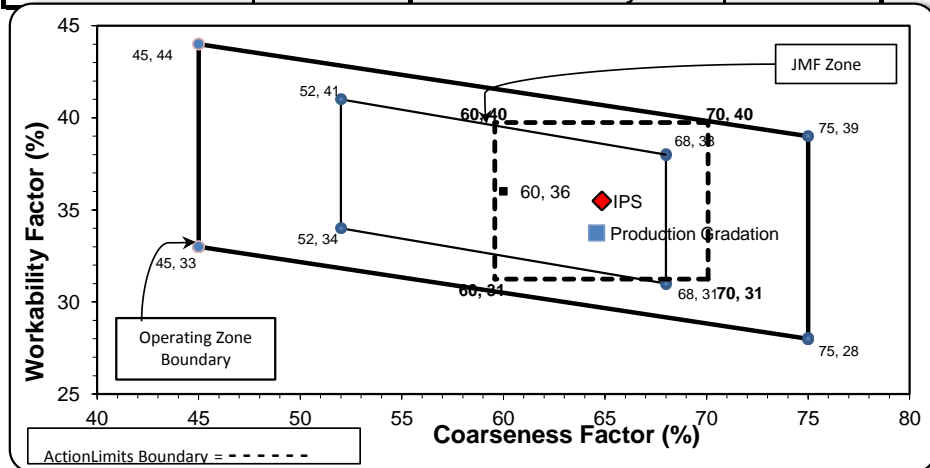
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.8	100.0	100.0	99.0	1.0	1.0
1"	40.8	100.0	100.0	81.7	17.3	18.3
3/4"	18.2	97.5	100.0	73.9	7.7	26.1
1/2"	4.6	81.9	100.0	65.1	8.9	34.9
3/8"	1.3	59.1	100.0	57.2	7.9	42.8
#4	1.1	11.8	95.6	41.2	16.0	58.8
#8	1.1	4.5	82.0	33.7	7.5	66.3
#16	1.1	3.0	65.4	26.8	6.9	73.2
#30	1.0	2.8	46.0	19.1	7.7	80.9
#50	1.0	2.5	19.6	8.7	10.4	91.3
#100	0.9	2.4	4.9	2.9	5.8	97.1
LBW	0.6	1.8	1.3	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:	65	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"	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:

Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 1/6/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 1/7/2020 through 1/13/2020

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	920	5.63	2.62	30.0
2NS	63-92	Grange Hall	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



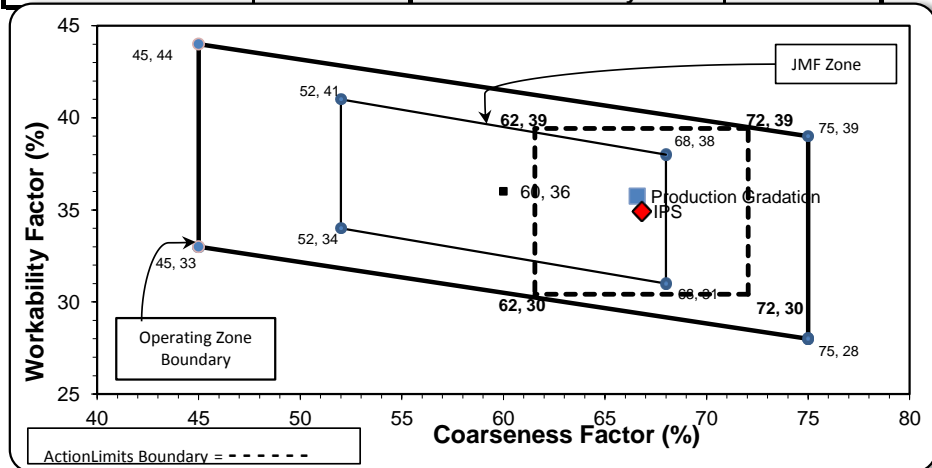
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.8	100.0	100.0	99.0	1.0	1.0
1"	40.8	100.0	100.0	81.7	17.3	18.3
3/4"	18.2	97.5	100.0	73.9	7.7	26.1
1/2"	4.6	81.9	100.0	65.1	8.9	34.9
3/8"	1.3	59.1	100.0	57.2	7.9	42.8
#4	1.1	11.8	98.1	42.2	15.0	57.8
#8	1.1	4.5	87.1	35.7	6.5	64.3
#16	1.1	3.0	73.5	30.0	5.8	70.0
#30	1.0	2.8	53.4	22.0	7.9	78.0
#50	1.0	2.5	21.4	9.4	12.6	90.6
#100	0.9	2.4	2.2	1.9	7.6	98.1
LBW	0.6	1.8	0.3	0.8	1.0	99.2

*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
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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"	72.1	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-39**

Sample Date: 1/6/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 1/7/2020 through 1/13/2020

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	850	5.20	2.62	27.7
2NS	63-92	Grange Hall	1220	7.38	2.65	39.7
Total Wt			3070	18.69		100.0

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



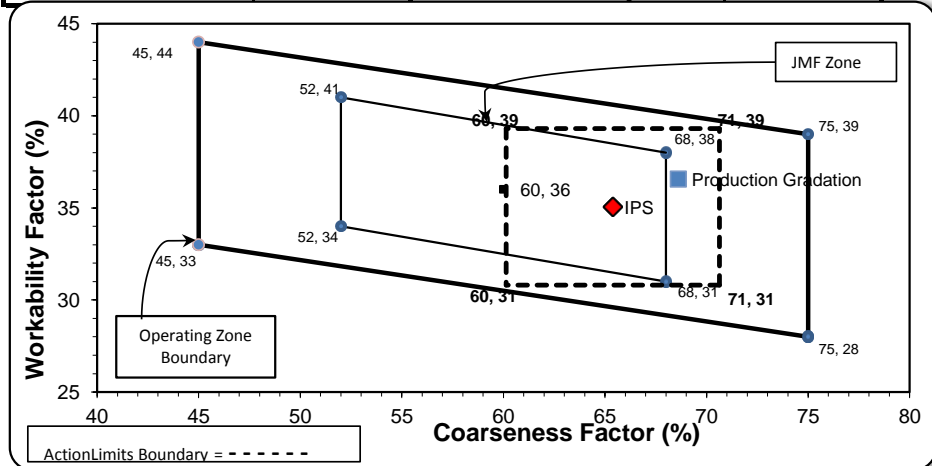
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.3	0.7	0.7
1"	41.0	100.0	100.0	80.8	18.5	19.2
3/4"	11.2	98.2	100.0	70.6	10.2	29.4
1/2"	2.8	80.6	100.0	63.0	7.6	37.0
3/8"	1.9	58.2	100.0	56.5	6.5	43.5
#4	1.5	14.4	98.1	43.5	13.0	56.5
#8	1.4	5.4	87.1	36.6	6.9	63.4
#16	1.4	3.3	73.5	30.6	6.0	69.4
#30	1.3	2.8	53.4	22.4	8.2	77.6
#50	1.2	2.6	21.4	9.6	12.8	90.4
#100	1.2	2.4	2.2	1.9	7.7	98.1
LBW	1.0	2.1	0.3	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: 69 **Workability Factor: 37**



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: 1/6/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 1/7/2020 through 1/13/2020

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	870	5.32	2.62	28.3
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



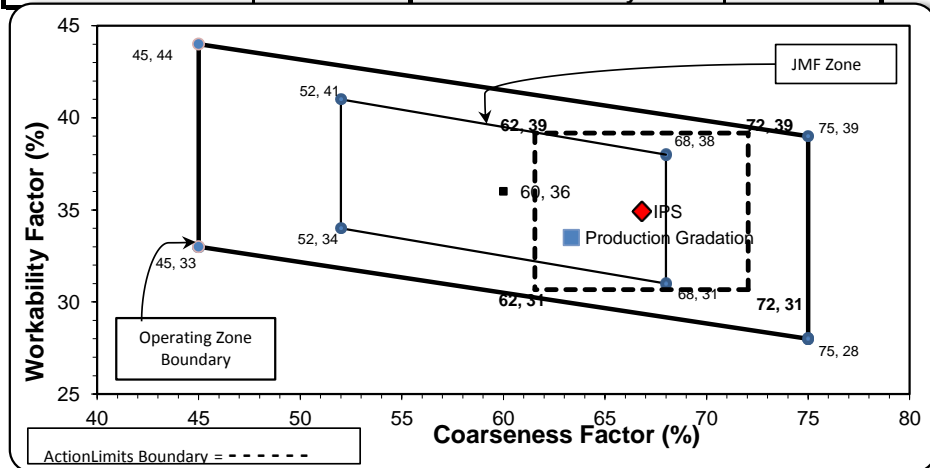
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.8	100.0	100.0	99.0	1.0	1.0
1"	40.8	100.0	100.0	81.7	17.3	18.3
3/4"	18.2	97.5	100.0	74.0	7.7	26.0
1/2"	4.6	81.9	100.0	65.3	8.6	34.7
3/8"	1.3	59.1	100.0	57.9	7.5	42.1
#4	1.1	11.8	96.4	42.9	14.9	57.1
#8	1.1	4.5	78.3	33.5	9.4	66.5
#16	1.1	3.0	62.5	26.6	6.9	73.4
#30	1.0	2.8	48.5	20.9	5.8	79.1
#50	1.0	2.5	26.8	11.9	8.9	88.1
#100	0.9	2.4	6.5	3.6	8.3	96.4
LBW	0.6	1.8	1.2	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.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	63	Workability Factor:	33
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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: