

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 2/10/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 2/11/2020 through 2/17/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	900	5.50	2.62	29.3
IA	71-47	Presque Isle	900	5.50	2.62	29.3
2NS	63-115	Ray Rd	1270	7.68	2.65	41.4
Total Wt			3070	18.69		100.0

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



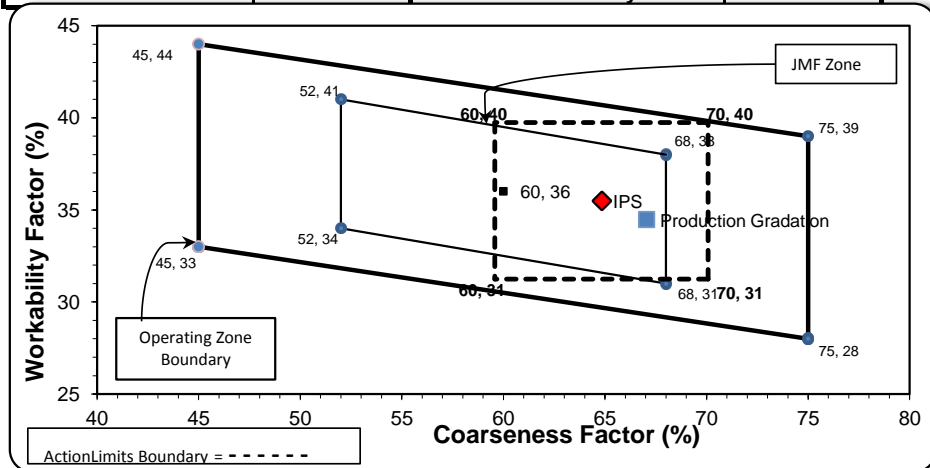
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.3	100.0	100.0	99.5	0.5	0.5
1"	48.6	100.0	100.0	84.9	14.6	15.1
3/4"	15.8	98.2	100.0	74.8	10.1	25.2
1/2"	4.7	74.8	100.0	64.7	10.1	35.3
3/8"	3.5	46.6	100.0	56.1	8.6	43.9
#4	2.7	10.2	95.5	43.3	12.8	56.7
#8	2.5	5.0	78.0	34.5	8.8	65.5
#16	2.4	4.3	61.7	27.5	7.0	72.5
#30	2.3	3.7	46.7	21.1	6.4	78.9
#50	2.2	3.5	25.2	12.1	9.0	87.9
#100	2.2	3.2	5.7	3.9	8.2	96.1
LBW	1.5	2.5	1.0	1.6	2.4	98.4

*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)

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: 2/10/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 2/11/2020 through 2/17/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	850	5.20	2.62	27.7
IA	71-47	Presque Isle	1020	6.24	2.62	33.2
2NS	63-92	Grange Hall	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



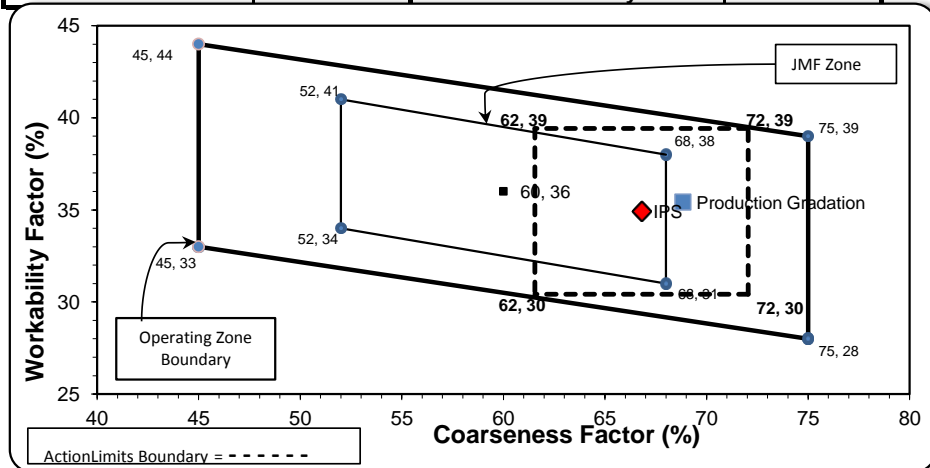
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.3	100.0	100.0	99.5	0.5	0.5
1"	48.6	100.0	100.0	85.8	13.8	14.2
3/4"	15.8	98.2	100.0	76.1	9.7	23.9
1/2"	4.7	74.8	100.0	65.2	10.8	34.8
3/8"	3.5	46.6	100.0	55.5	9.7	44.5
#4	2.7	10.2	97.4	42.2	13.3	57.8
#8	2.5	5.0	84.6	35.4	6.8	64.6
#16	2.4	4.3	69.1	29.1	6.3	70.9
#30	2.3	3.7	49.5	21.2	7.9	78.8
#50	2.2	3.5	20.2	9.7	11.5	90.3
#100	2.2	3.2	2.9	2.8	6.9	97.2
LBW	1.5	2.5	0.3	1.4	1.4	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:	69	Workability Factor:	35
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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-39**

Sample Date: 2/10/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 2/11/2020 through 2/17/2020

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%



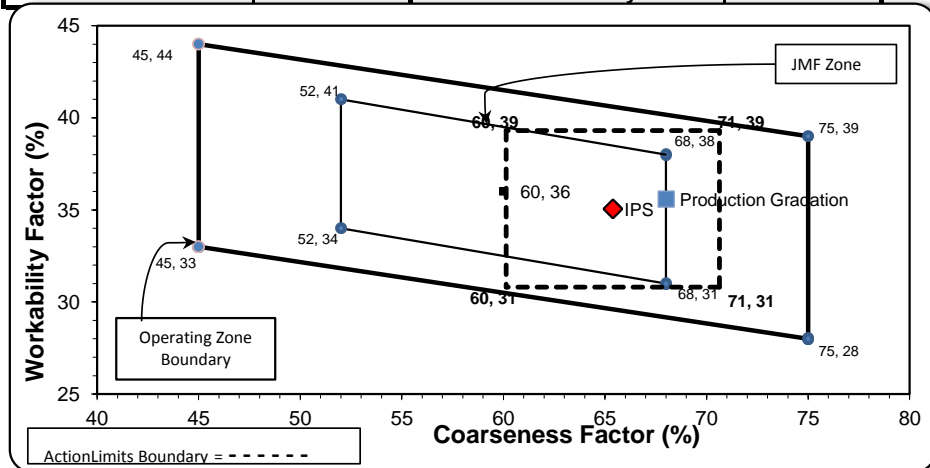
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	43.3	100.0	100.0	81.5	18.5	18.5
3/4"	12.2	98.8	100.0	71.1	10.5	28.9
1/2"	3.2	79.8	100.0	62.9	8.2	37.1
3/8"	2.3	56.7	100.0	56.2	6.7	43.8
#4	1.9	13.3	97.4	43.0	13.2	57.0
#8	1.7	5.1	84.6	35.6	7.4	64.4
#16	1.5	3.2	69.1	28.8	6.8	71.2
#30	1.5	2.7	49.5	20.9	7.9	79.1
#50	1.4	2.4	20.2	9.1	11.8	90.9
#100	1.4	2.2	2.9	2.2	6.9	97.8
LBW	1.2	1.9	0.3	1.0	1.2	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: 68 **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"	99.6	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: 2/10/20

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 2/11/2020 through 2/17/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	870	5.32	2.62	28.3
IA	71-47	Presque Isle	950	5.81	2.62	30.9
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



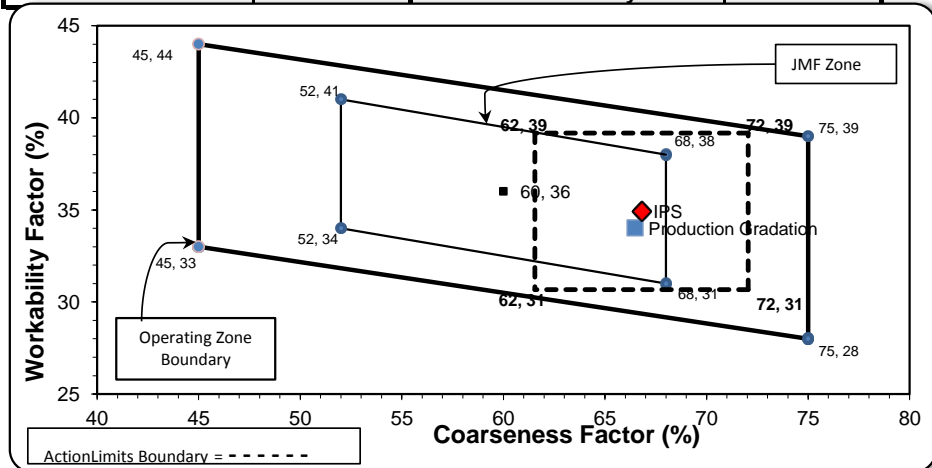
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.3	100.0	100.0	99.5	0.5	0.5
1"	48.6	100.0	100.0	85.4	14.1	14.6
3/4"	15.8	98.2	100.0	75.6	9.9	24.4
1/2"	4.7	74.8	100.0	65.2	10.4	34.8
3/8"	3.5	46.6	100.0	56.1	9.1	43.9
#4	2.7	10.2	95.5	42.8	13.3	57.2
#8	2.5	5.0	78.0	34.0	8.8	66.0
#16	2.4	4.3	61.7	27.1	6.9	72.9
#30	2.3	3.7	46.7	20.8	6.3	79.2
#50	2.2	3.5	25.2	12.0	8.8	88.0
#100	2.2	3.2	5.7	3.9	8.0	96.1
LBW	1.5	2.5	1.0	1.6	2.3	98.4

*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:	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"	72.3	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: