

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 1/20/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 1/21/2020 through 1/27/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	700	4.28	2.62	22.8
IA	71-47	Presque Isle	1170	7.16	2.62	38.1
2NS	95-013	Smelter Bay	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



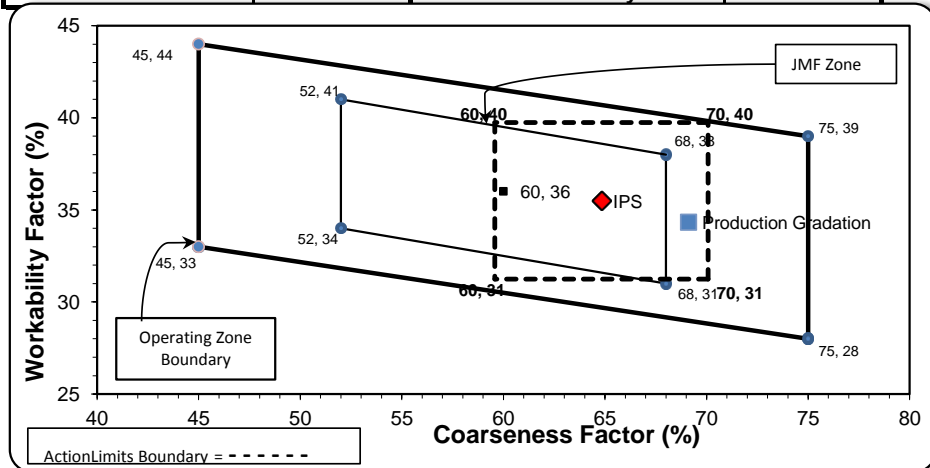
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.6	100.0	100.0	99.7	0.3	0.3
1"	19.3	100.0	100.0	81.6	18.1	18.4
3/4"	4.6	95.6	100.0	76.6	5.0	23.4
1/2"	2.5	69.5	100.0	66.1	10.4	33.9
3/8"	2.4	39.3	100.0	54.6	11.5	45.4
#4	2.1	7.5	96.7	41.1	13.5	58.9
#8	2.1	4.0	82.7	34.3	6.8	65.7
#16	2.0	3.5	68.4	28.5	5.8	71.5
#30	1.9	3.0	49.8	21.0	7.5	79.0
#50	1.8	2.9	23.1	10.5	10.5	89.5
#100	1.7	2.7	6.6	4.0	6.5	96.0
LBW	1.0	2.1	1.4	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:	69	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: 1/20/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 1/21/2020 through 1/27/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	700	4.28	2.62	22.8
IA	71-47	Presque Isle	1170	7.16	2.62	38.1
2NS	63-92	Grange Hall	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



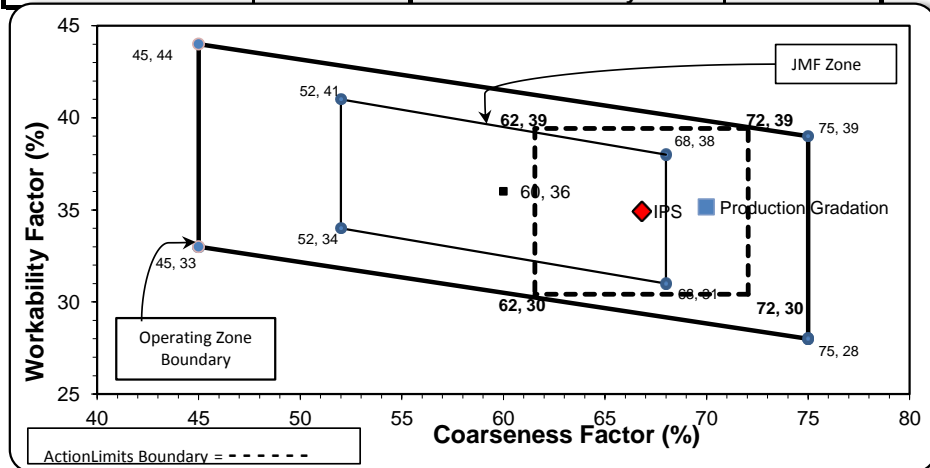
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.6	100.0	100.0	99.7	0.3	0.3
1"	19.3	100.0	100.0	81.6	18.1	18.4
3/4"	4.6	95.6	100.0	76.6	5.0	23.4
1/2"	2.5	69.5	100.0	66.1	10.4	33.9
3/8"	2.4	39.3	100.0	54.6	11.5	45.4
#4	2.1	7.5	97.5	41.4	13.2	58.6
#8	2.1	4.0	84.8	35.1	6.3	64.9
#16	2.0	3.5	69.9	29.1	6.0	70.9
#30	1.9	3.0	51.7	21.8	7.3	78.2
#50	1.8	2.9	23.2	10.6	11.2	89.4
#100	1.7	2.7	4.3	3.1	7.5	96.9
LBW	1.0	2.1	0.3	1.1	2.0	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:	70	Workability Factor:	35
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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: 1/20/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 1/21/2020 through 1/27/2020

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%



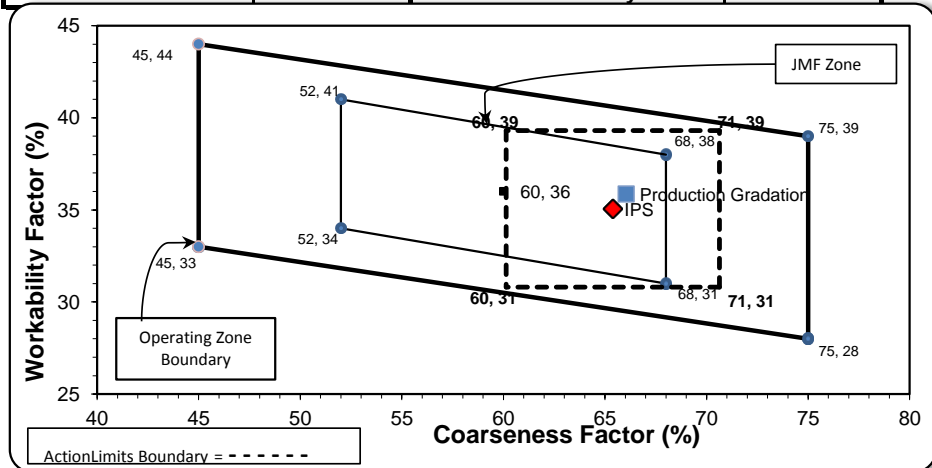
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 30701 W. 10 Mile Rd.
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 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.4	100.0	100.0	99.5	0.5	0.5
1"	44.6	100.0	100.0	82.0	17.5	18.0
3/4"	15.6	98.0	100.0	72.0	10.0	28.0
1/2"	3.6	83.6	100.0	64.1	7.9	35.9
3/8"	2.5	61.7	100.0	57.6	6.4	42.4
#4	1.9	17.4	97.5	44.2	13.5	55.8
#8	1.7	5.8	84.8	35.9	8.3	64.1
#16	1.5	3.3	69.9	29.2	6.7	70.8
#30	1.5	2.7	51.7	21.8	7.4	78.2
#50	1.4	2.5	23.2	10.4	11.4	89.6
#100	1.3	2.4	4.3	2.8	7.6	97.2
LBW	1.2	2.2	0.3	1.1	1.7	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)

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: 1/20/20

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 1/21/2020 through 1/27/2020

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%



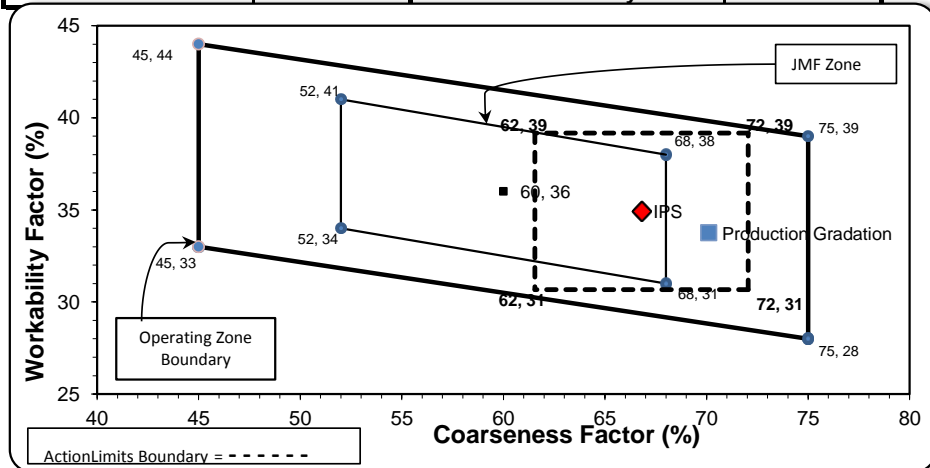
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.6	100.0	100.0	99.6	0.4	0.4
1"	19.3	100.0	100.0	77.1	22.5	22.9
3/4"	4.6	95.6	100.0	71.6	5.5	28.4
1/2"	2.5	69.5	100.0	62.9	8.7	37.1
3/8"	2.4	39.3	100.0	53.6	9.4	46.4
#4	2.1	7.5	96.2	42.1	11.5	57.9
#8	2.1	4.0	78.4	33.8	8.3	66.2
#16	2.0	3.5	62.1	26.9	6.8	73.1
#30	1.9	3.0	47.3	20.7	6.2	79.3
#50	1.8	2.9	25.4	11.7	9.0	88.3
#100	1.7	2.7	5.8	3.7	8.1	96.3
LBW	1.0	2.1	1.1	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:	70	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: