

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 10/11/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

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	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"	98.8	100.0	100.0	99.6	0.4	0.4
1"	45.9	100.0	100.0	81.1	18.4	18.9
3/4"	11.7	98.8	100.0	68.9	12.2	31.1
1/2"	3.4	81.5	100.0	61.5	7.4	38.5
3/8"	2.5	58.9	100.0	55.3	6.2	44.7
#4	2.1	12.0	99.0	42.6	12.8	57.4
#8	1.9	4.5	82.4	34.0	8.5	66.0
#16	1.8	2.6	65.5	26.9	7.1	73.1
#30	1.7	2.3	49.3	20.5	6.4	79.5
#50	1.7	2.1	26.1	11.3	9.1	88.7
#100	1.6	2.0	7.1	3.9	7.5	96.1
LBW	1.4	1.8	0.8	1.3	2.6	98.7

*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

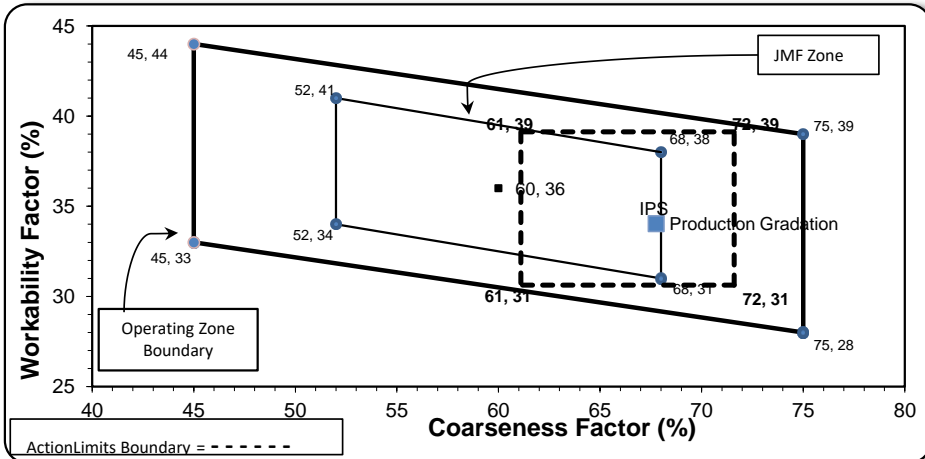
Coarseness Factor:	68	Workability Factor:	34
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Initial Production Sample (IPS)

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-102**

Sample Date: 10/11/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1420	8.46	2.69	45.5
IA	58-003	Stoneco	500	2.98	2.69	16.0
2NS	63-114	Highland	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



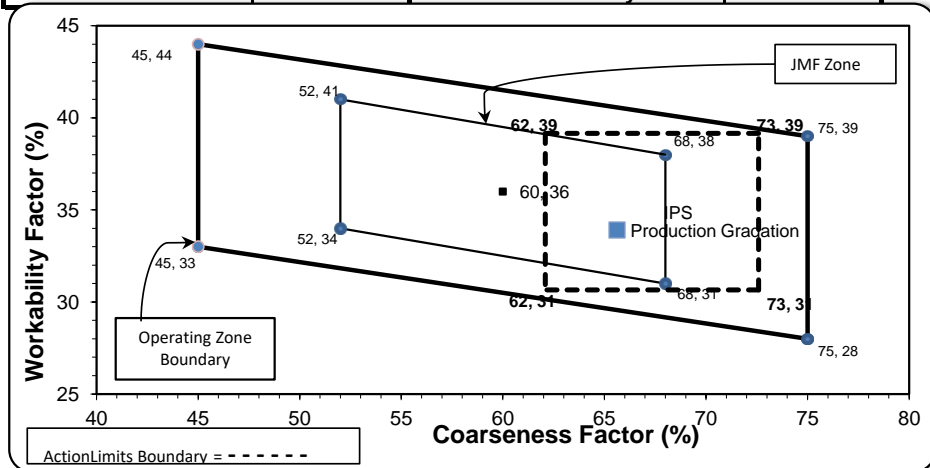
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 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

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"	66.0	100.0	100.0	84.5	15.5	15.5
3/4"	42.0	100.0	100.0	73.6	10.9	26.4
1/2"	19.5	91.5	100.0	62.0	11.6	38.0
3/8"	11.9	79.6	100.0	56.6	5.4	43.4
#4	3.2	23.5	99.1	43.3	13.3	56.7
#8	1.9	5.6	83.6	33.9	9.4	66.1
#16	1.4	2.5	63.5	25.5	8.5	74.5
#30	1.2	1.9	43.1	17.4	8.0	82.6
#50	1.1	1.7	18.0	7.7	9.7	92.3
#100	1.1	1.5	3.9	2.2	5.5	97.8
LBW	0.9	1.4	0.8	0.9	1.3	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:	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"	85.5	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 #: P-12

Sample Date: 10/11/21

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1020	6.24	2.62	33.2
IA	71-47	Presque Isle	800	4.89	2.62	26.1
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



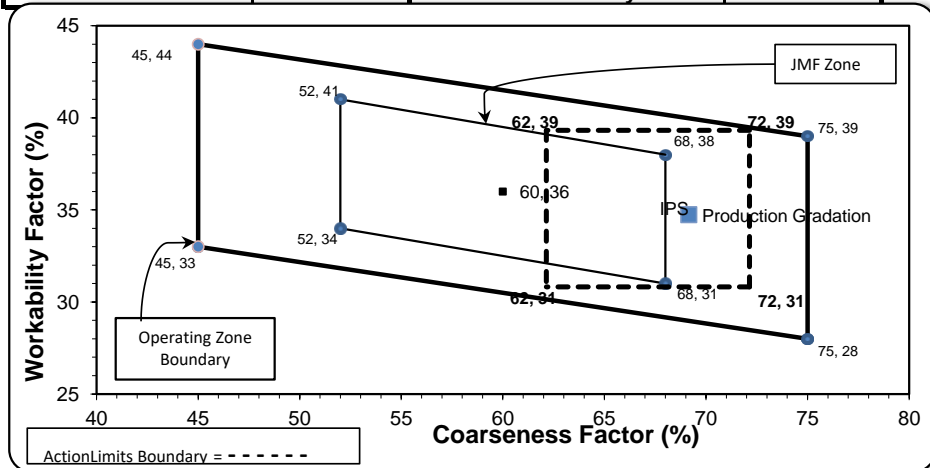
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 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.0	100.0	100.0	98.7	1.3	1.3
1"	35.1	100.0	100.0	78.4	20.2	21.6
3/4"	8.7	97.9	100.0	69.1	9.3	30.9
1/2"	2.7	77.2	100.0	61.7	7.4	38.3
3/8"	2.3	51.4	100.0	54.9	6.9	45.1
#4	2.0	11.8	96.7	43.1	11.8	56.9
#8	1.9	4.8	80.7	34.7	8.4	65.3
#16	1.9	3.3	66.3	28.5	6.3	71.5
#30	1.8	2.8	51.3	22.2	6.3	77.8
#50	1.7	2.5	28.2	12.7	9.5	87.3
#100	1.5	2.3	6.3	3.7	9.0	96.3
LBW	1.2	1.6	1.0	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: 69 **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"	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 #: **P-32**

Sample Date: 10/11/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

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	95-013	Smelter Bay	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



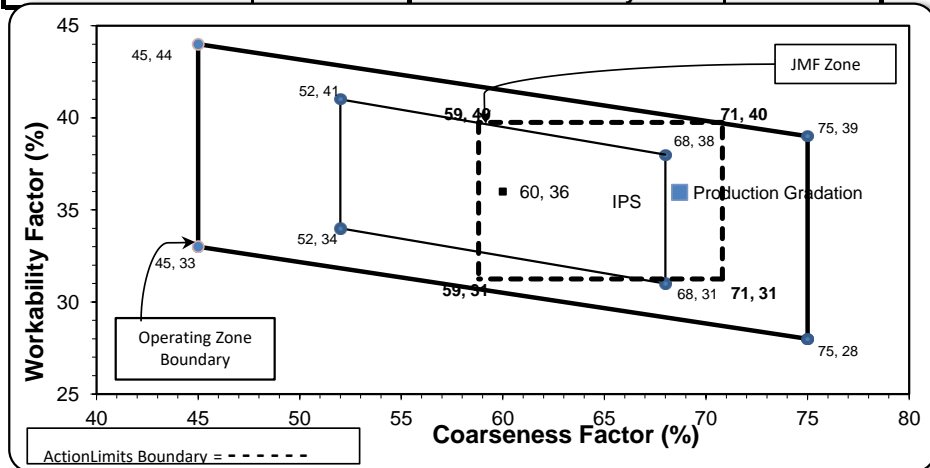
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 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.0	100.0	100.0	98.8	1.2	1.2
1"	35.1	100.0	100.0	79.9	18.8	20.1
3/4"	8.7	97.9	100.0	71.2	8.8	28.8
1/2"	2.7	77.2	100.0	63.4	7.7	36.6
3/8"	2.3	51.4	100.0	56.0	7.4	44.0
#4	2.0	11.8	96.4	43.2	12.8	56.8
#8	1.9	4.8	83.5	35.9	7.3	64.1
#16	1.9	3.3	67.9	29.2	6.8	70.8
#30	1.8	2.8	50.2	21.8	7.4	78.2
#50	1.7	2.5	25.0	11.4	10.4	88.6
#100	1.5	2.3	8.2	4.5	7.0	95.5
LBW	1.2	1.6	1.9	1.6	2.9	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: 36**



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-35**

Sample Date: 10/11/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

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	81-093	Burmeister	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



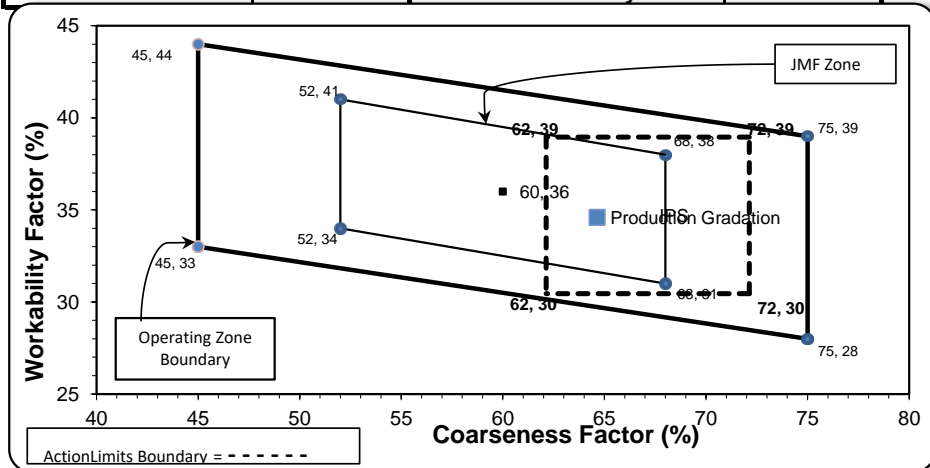
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 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

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"	66.0	100.0	100.0	85.1	14.9	14.9
3/4"	42.0	100.0	100.0	74.5	10.5	25.5
1/2"	19.5	91.5	100.0	63.2	11.4	36.8
3/8"	11.9	79.6	100.0	57.7	5.4	42.3
#4	3.2	23.5	98.9	43.6	14.1	56.4
#8	1.9	5.6	85.2	34.6	9.0	65.4
#16	1.4	2.5	66.7	26.7	7.9	73.3
#30	1.2	1.9	46.9	18.9	7.8	81.1
#50	1.1	1.7	15.8	6.9	12.0	93.1
#100	1.1	1.5	2.1	1.6	5.3	98.4
LBW	0.9	1.4	0.6	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:	65	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"	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: 10/11/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	920	5.63	2.62	30.0
IA	71-47	Presque Isle	950	5.81	2.62	30.9
2NS	63-92	Grange Hall	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



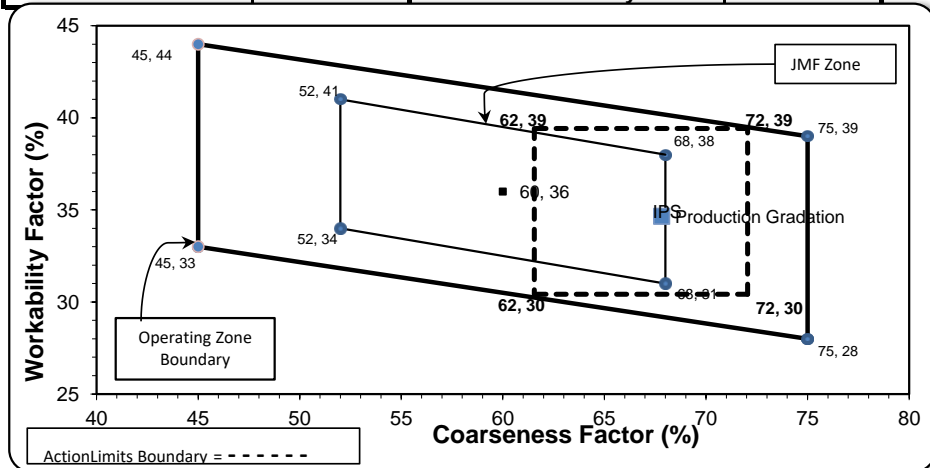
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.0	100.0	100.0	98.8	1.2	1.2
1"	35.1	100.0	100.0	80.6	18.3	19.4
3/4"	8.7	97.9	100.0	72.0	8.6	28.0
1/2"	2.7	77.2	100.0	63.8	8.2	36.2
3/8"	2.3	51.4	100.0	55.7	8.1	44.3
#4	2.0	11.8	97.9	42.5	13.2	57.5
#8	1.9	4.8	83.4	34.7	7.9	65.3
#16	1.9	3.3	68.1	28.2	6.4	71.8
#30	1.8	2.8	49.6	20.8	7.4	79.2
#50	1.7	2.5	27.6	12.1	8.7	87.9
#100	1.5	2.3	3.4	2.5	9.6	97.5
LBW	1.2	1.6	0.2	0.9	1.6	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:	68	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: 10/11/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

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	44-051	Krake Willis Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



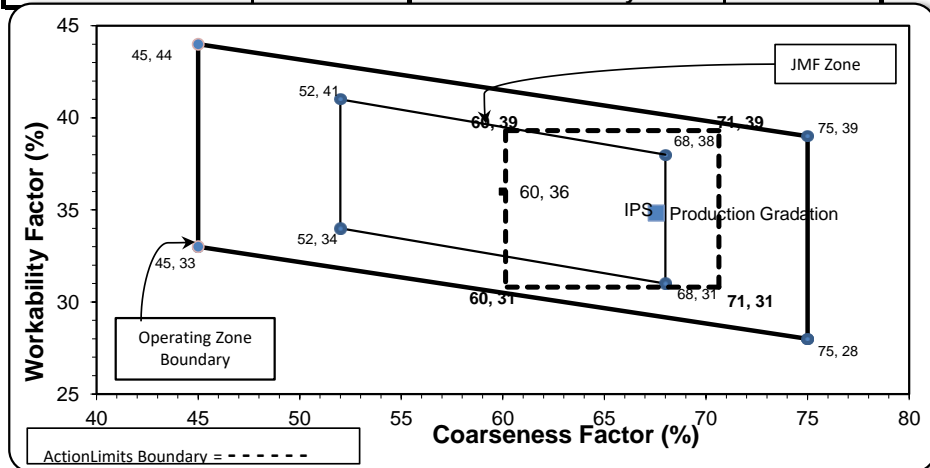
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.8	100.0	100.0	99.6	0.4	0.4
1"	45.9	100.0	100.0	81.1	18.4	18.9
3/4"	11.7	98.8	100.0	68.9	12.2	31.1
1/2"	3.4	81.5	100.0	61.8	7.1	38.2
3/8"	2.5	58.9	100.0	56.0	5.8	44.0
#4	2.1	12.0	97.1	43.2	12.8	56.8
#8	1.9	4.5	81.2	34.8	8.4	65.2
#16	1.8	2.6	65.8	28.1	6.8	71.9
#30	1.7	2.3	49.4	21.3	6.8	78.7
#50	1.7	2.1	25.4	11.4	9.8	88.6
#100	1.6	2.0	8.4	4.5	7.0	95.5
LBW	1.4	1.8	1.6	1.6	2.9	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: **68** **Workability Factor:** **35**



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: 10/11/21

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

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%



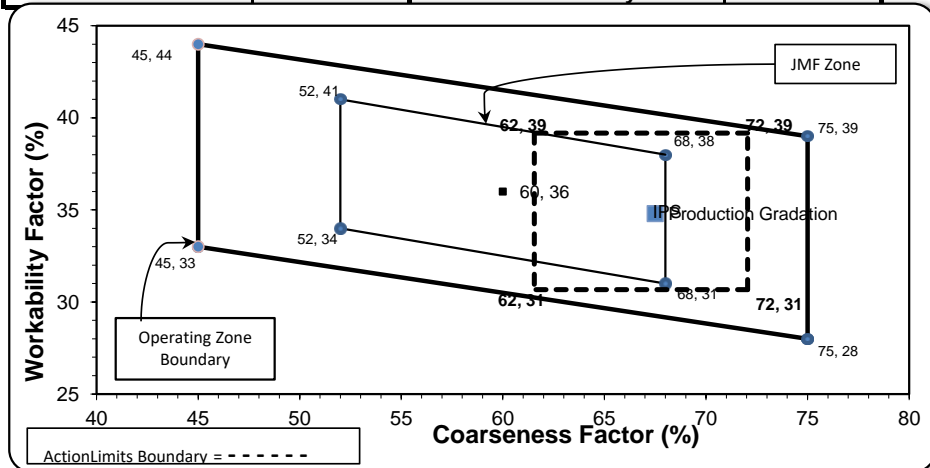
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.0	100.0	100.0	98.8	1.2	1.2
1"	35.1	100.0	100.0	79.9	18.8	20.1
3/4"	8.7	97.9	100.0	71.2	8.8	28.8
1/2"	2.7	77.2	100.0	63.4	7.7	36.6
3/8"	2.3	51.4	100.0	56.0	7.4	44.0
#4	2.0	11.8	96.7	43.3	12.7	56.7
#8	1.9	4.8	80.7	34.8	8.5	65.2
#16	1.9	3.3	66.3	28.5	6.3	71.5
#30	1.8	2.8	51.3	22.2	6.3	77.8
#50	1.7	2.5	28.2	12.7	9.5	87.3
#100	1.5	2.3	6.3	3.7	9.0	96.3
LBW	1.2	1.6	1.0	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: 67 **Workability Factor:** 35



Initial Production Sample (IPS)

Coarseness Factor: <u>67</u>		Workability Factor: <u>35</u>	
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: