

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 4/11/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/12/2022 through 4/18/2022

Contractor: _____

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"	96.9	100.0	100.0	98.9	1.1	1.1
1"	49.7	100.0	100.0	82.5	16.5	17.5
3/4"	13.4	98.7	100.0	69.5	13.0	30.5
1/2"	2.9	82.1	100.0	61.5	8.0	38.5
3/8"	2.1	60.7	100.0	55.6	5.9	44.4
#4	1.7	11.8	98.5	42.2	13.5	57.8
#8	1.6	3.8	83.3	34.1	8.1	65.9
#16	1.5	2.4	68.3	27.8	6.3	72.2
#30	1.5	2.1	53.3	21.9	5.9	78.1
#50	1.4	2.0	29.2	12.4	9.5	87.6
#100	1.3	1.8	7.3	3.8	8.6	96.2
LBW	1.2	1.6	0.6	1.1	2.7	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.

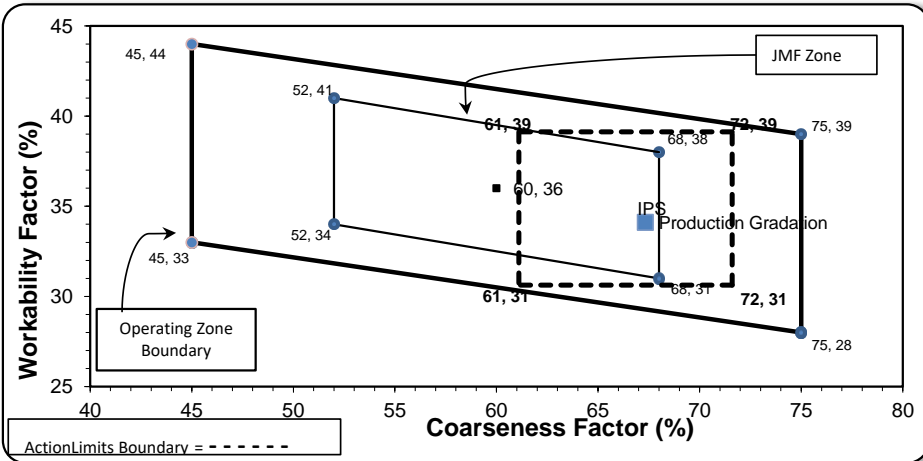
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	67	Workability Factor:	34
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Initial Production Sample (IPS)

Coarseness Factor:	66
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"	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: 4/11/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/12/2022 through 4/18/2022

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1450	8.64	2.69	46.5
IA	58-003	Stoneco	520	3.10	2.69	16.7
2NS	81-019	Pleasant Lake	1150	6.95	2.65	36.9
Total Wt			3120	18.69		100.0

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



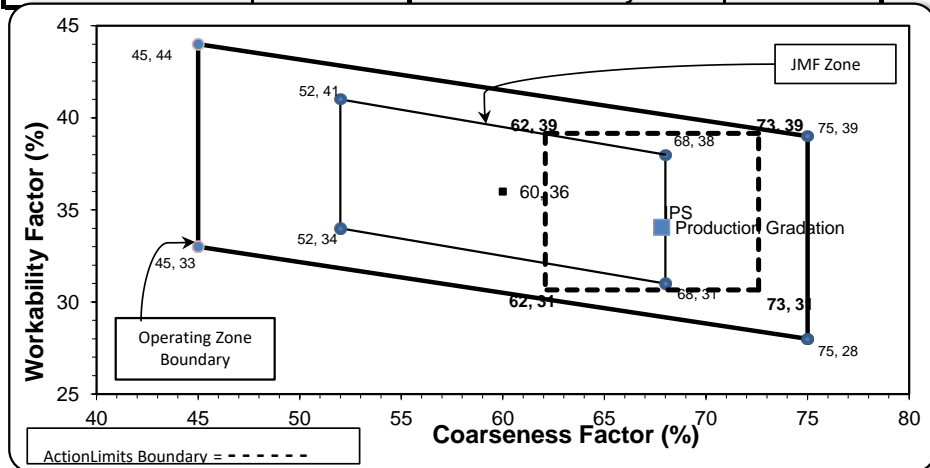
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	68.4	100.0	100.0	85.3	14.7	14.7
3/4"	49.5	100.0	100.0	76.5	8.8	23.5
1/2"	19.1	94.7	100.0	61.5	15.0	38.5
3/8"	9.7	83.5	100.0	55.3	6.2	44.7
#4	5.0	24.5	99.4	43.0	12.2	57.0
#8	2.9	7.2	85.5	34.1	9.0	65.9
#16	2.4	4.4	67.7	26.8	7.3	73.2
#30	2.1	3.3	48.8	19.5	7.3	80.5
#50	1.9	3.0	23.8	10.2	9.4	89.8
#100	1.8	2.8	6.5	3.7	6.5	96.3
LBW	1.6	2.5	2.0	1.9	1.8	98.1

*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:	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: 4/11/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/12/2022 through 4/18/2022

Contractor: _____

MDOT No.: _____



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

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

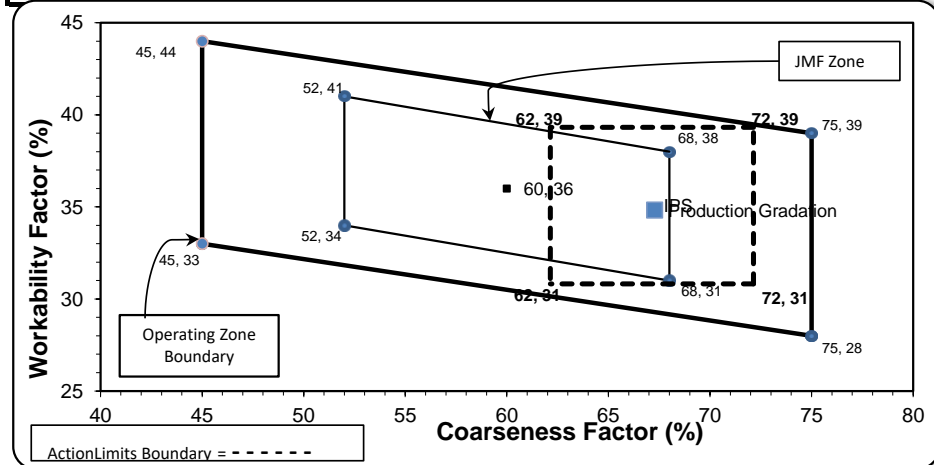
<----- Verify this number is 100%

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.5	100.0	100.0	98.5	1.5	1.5
1"	46.2	100.0	100.0	82.1	16.4	17.9
3/4"	12.1	99.2	100.0	70.6	11.5	29.4
1/2"	4.0	78.0	100.0	62.4	8.2	37.6
3/8"	3.1	55.3	100.0	56.2	6.2	43.8
#4	2.7	13.8	96.9	43.9	12.2	56.1
#8	2.5	5.8	79.8	34.8	9.1	65.2
#16	2.3	3.7	63.7	27.7	7.2	72.3
#30	2.2	3.1	47.5	20.9	6.8	79.1
#50	2.0	2.8	26.0	12.0	8.9	88.0
#100	1.8	2.5	4.8	3.2	8.8	96.8
LBW	1.0	1.9	0.8	1.2	2.1	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
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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"	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: 4/11/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/12/2022 through 4/18/2022

Contractor: _____

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	850	5.20	2.62	27.7
2NS	95-013	Smelter Bay	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



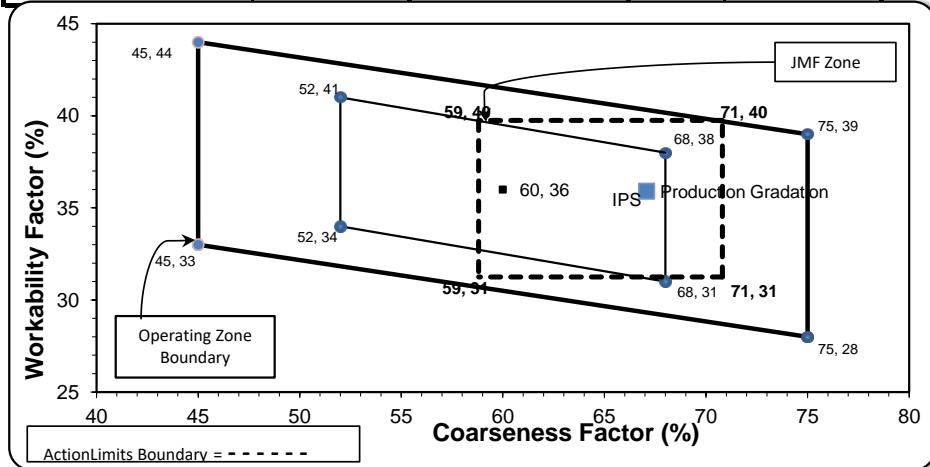
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.5	100.0	100.0	98.6	1.4	1.4
1"	46.2	100.0	100.0	83.0	15.6	17.0
3/4"	12.1	99.2	100.0	72.0	11.0	28.0
1/2"	4.0	78.0	100.0	63.6	8.4	36.4
3/8"	3.1	55.3	100.0	57.0	6.6	43.0
#4	2.7	13.8	96.2	43.8	13.2	56.2
#8	2.5	5.8	82.3	35.9	7.9	64.1
#16	2.3	3.7	67.7	29.3	6.6	70.7
#30	2.2	3.1	49.0	21.5	7.8	78.5
#50	2.0	2.8	25.2	11.7	9.8	88.3
#100	1.8	2.5	7.6	4.4	7.3	95.6
LBW	1.0	1.9	1.9	1.6	2.7	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:** **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: 4/11/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/12/2022 through 4/18/2022

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1450	8.64	2.69	46.5
IA	58-003	Stoneco	520	3.10	2.69	16.7
2NS	81-019	Pleasant Lake	1150	6.95	2.65	36.9
Total Wt			3120	18.69		100.0

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



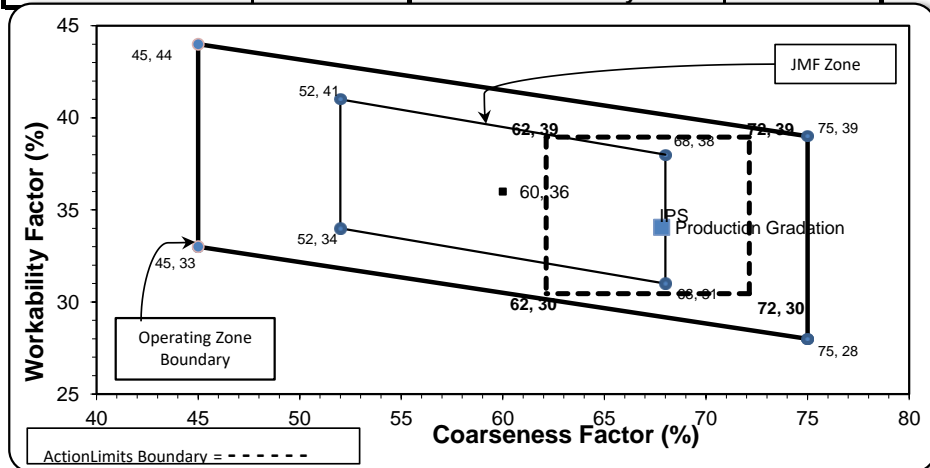
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	68.4	100.0	100.0	85.3	14.7	14.7
3/4"	49.5	100.0	100.0	76.5	8.8	23.5
1/2"	19.1	94.7	100.0	61.5	15.0	38.5
3/8"	9.7	83.5	100.0	55.3	6.2	44.7
#4	5.0	24.5	99.4	43.0	12.2	57.0
#8	2.9	7.2	85.5	34.1	9.0	65.9
#16	2.4	4.4	67.7	26.8	7.3	73.2
#30	2.1	3.3	48.8	19.5	7.3	80.5
#50	1.9	3.0	23.8	10.2	9.4	89.8
#100	1.8	2.8	6.5	3.7	6.5	96.3
LBW	1.6	2.5	2.0	1.9	1.8	98.1

*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:** **34**



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: 4/11/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/12/2022 through 4/18/2022

Contractor: _____

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%



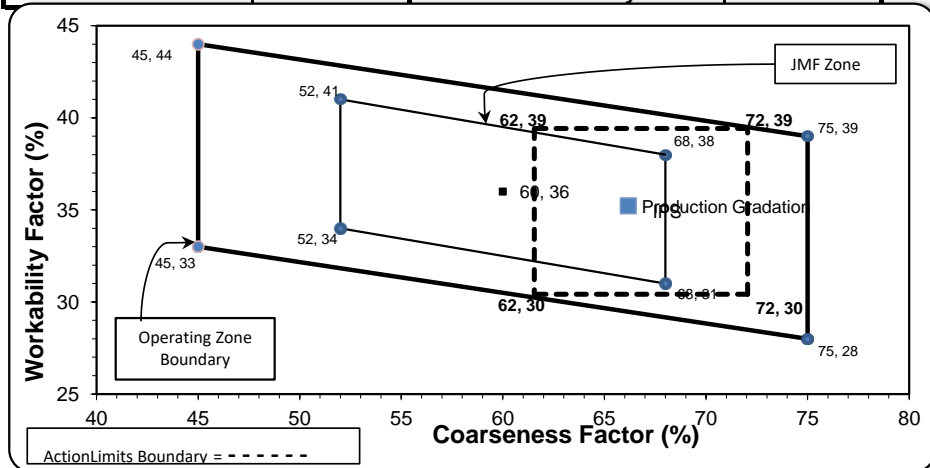
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.5	100.0	100.0	98.7	1.3	1.3
1"	46.2	100.0	100.0	83.9	14.8	16.1
3/4"	12.1	99.2	100.0	73.4	10.5	26.6
1/2"	4.0	78.0	100.0	64.4	9.0	35.6
3/8"	3.1	55.3	100.0	57.1	7.3	42.9
#4	2.7	13.8	97.8	43.3	13.8	56.7
#8	2.5	5.8	83.6	35.2	8.1	64.8
#16	2.3	3.7	68.3	28.5	6.7	71.5
#30	2.2	3.1	49.0	20.8	7.8	79.2
#50	2.0	2.8	21.3	9.8	11.0	90.2
#100	1.8	2.5	3.6	2.7	7.1	97.3
LBW	1.0	1.9	1.0	1.3	1.4	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: **66** **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"	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: 4/11/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/12/2022 through 4/18/2022

Contractor: _____

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

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



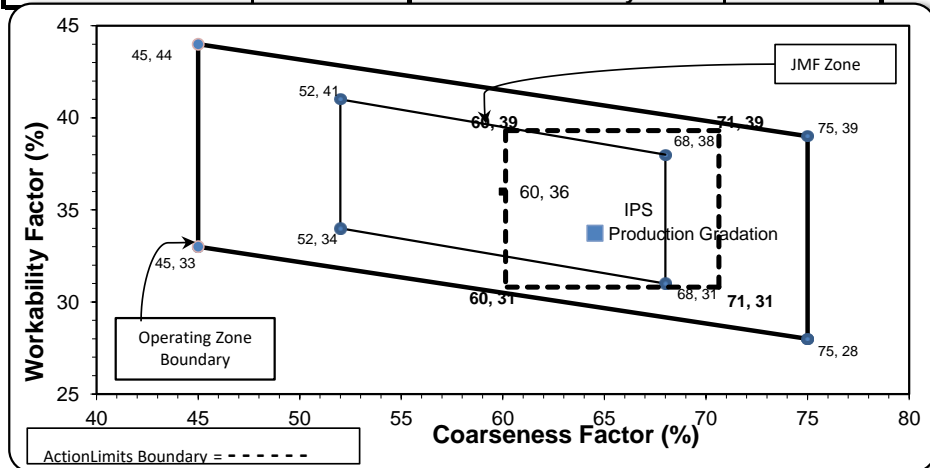
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.9	100.0	100.0	99.0	1.0	1.0
1"	49.7	100.0	100.0	83.3	15.7	16.7
3/4"	13.4	98.7	100.0	70.9	12.4	29.1
1/2"	2.9	82.1	100.0	63.1	7.8	36.9
3/8"	2.1	60.7	100.0	57.2	5.8	42.8
#4	1.7	11.8	96.3	42.8	14.4	57.2
#8	1.6	3.8	79.1	33.7	9.1	66.3
#16	1.5	2.4	63.9	27.1	6.6	72.9
#30	1.5	2.1	48.5	20.8	6.3	79.2
#50	1.4	2.0	27.2	12.1	8.7	87.9
#100	1.3	1.8	8.9	4.5	7.5	95.5
LBW	1.2	1.6	1.2	1.3	3.2	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: **65** **Workability Factor:** **34**



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-O2**

Sample Date: 4/11/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 4/12/2022 through 4/18/2022

Contractor: _____

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	850	5.20	2.62	27.7
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



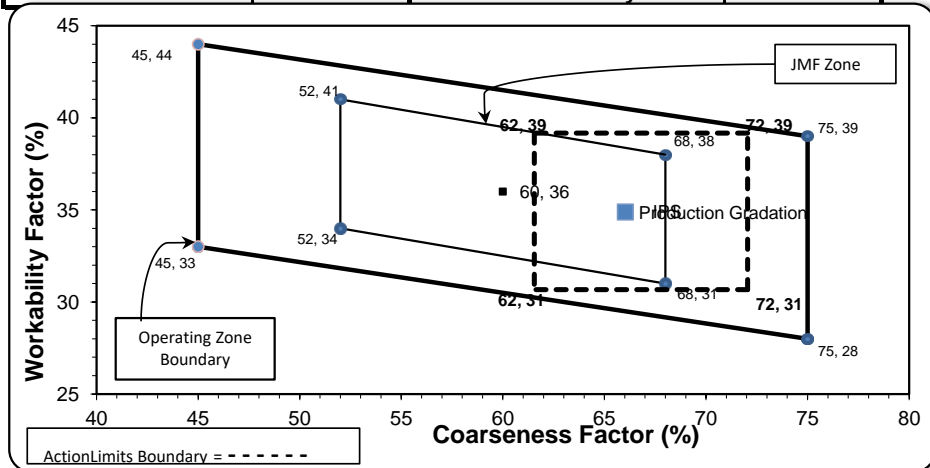
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.5	100.0	100.0	98.6	1.4	1.4
1"	46.2	100.0	100.0	83.0	15.6	17.0
3/4"	12.1	99.2	100.0	72.0	11.0	28.0
1/2"	4.0	78.0	100.0	63.6	8.4	36.4
3/8"	3.1	55.3	100.0	57.0	6.6	43.0
#4	2.7	13.8	96.9	44.1	12.9	55.9
#8	2.5	5.8	79.8	34.9	9.2	65.1
#16	2.3	3.7	63.7	27.7	7.2	72.3
#30	2.2	3.1	47.5	20.9	6.8	79.1
#50	2.0	2.8	26.0	12.0	8.9	88.0
#100	1.8	2.5	4.8	3.2	8.8	96.8
LBW	1.0	1.9	0.8	1.2	2.0	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: **66** **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"	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: