

Aggregate Optimization Chart

PLANT #: **P-102**

Sample Date: 8/19/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 8/20/2019 through 8/26/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.8
26A	58-003	Stoneco	350	2.09	2.69	11.9
2NS	38-046	Chelsea	1100	6.68	2.64	37.3
Total Wt			2950	17.70		100.0

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



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

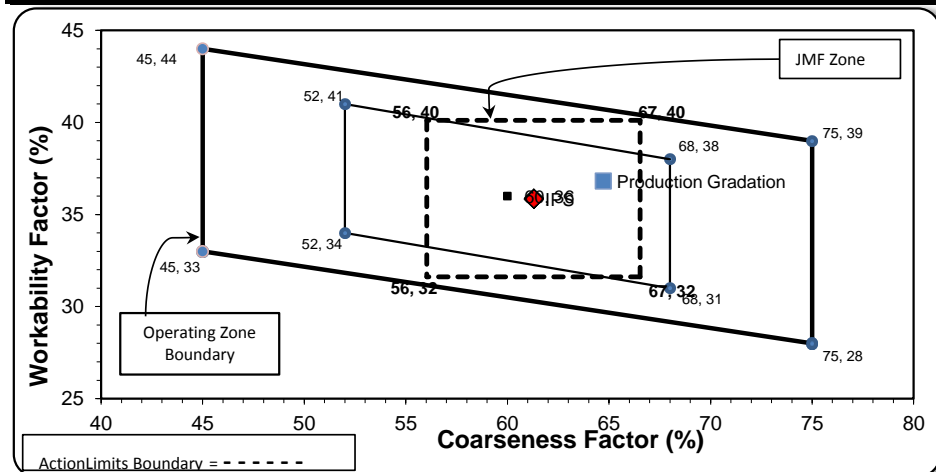
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.4	100.0	100.0	99.7	0.3	0.3
3/4"	77.6	100.0	100.0	88.6	11.1	11.4
1/2"	37.1	99.7	100.0	68.0	20.6	32.0
3/8"	18.8	89.7	100.0	57.5	10.5	42.5
#4	5.6	19.0	99.9	42.4	15.1	57.6
#8	2.2	4.2	87.7	34.3	8.0	65.7
#16	1.6	2.0	59.7	23.3	11.0	76.7
#30	1.2	1.5	34.0	13.5	9.8	86.5
#50	1.0	1.5	13.4	5.7	7.8	94.3
#100	0.9	1.4	2.4	1.5	4.2	98.5
LBW	0.7	1.1	0.7	0.7	0.8	99.3

*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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	34	Adjusted WF	36.8
---------------------------	-----------	----------------------------	-----------	--------------------	-------------

Coarseness Factor:	61
Workability Factor:	36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.2	10.1	10.8
1/2"	70.7	18.5	29.3
3/8"	60.7	10.0	39.3
#4	44.4	16.3	55.6
#8	35.9	8.5	64.1
#16	27.3	8.6	72.7
#30	19.1	8.2	80.9
#50	7.4	11.7	92.6
#100	1.9	5.6	98.1
LBW	0.7	1.2	99.3

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-103**

Sample Date: 8/19/19

Concrete Grade: DM

Contractor: _____

Dates Test Represents: 8/20/2019 through 8/26/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.8
26A	58-003	Stoneco	350	2.09	2.69	11.9
2NS	38-046	Chelsea	1100	6.68	2.64	37.3
Total Wt			2950	17.70		100.0

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



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

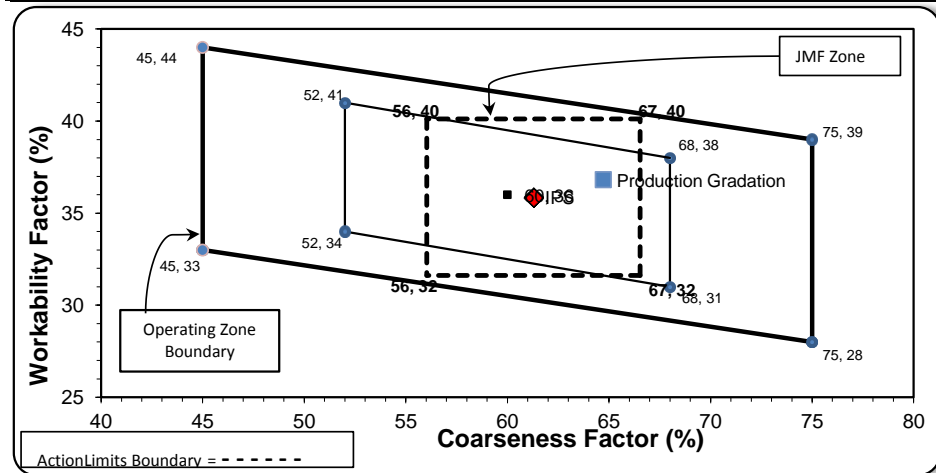
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.4	100.0	100.0	99.7	0.3	0.3
3/4"	77.6	100.0	100.0	88.6	11.1	11.4
1/2"	37.1	99.7	100.0	68.0	20.6	32.0
3/8"	18.8	89.7	100.0	57.5	10.5	42.5
#4	5.6	19.0	99.9	42.4	15.1	57.6
#8	2.2	4.2	87.7	34.3	8.0	65.7
#16	1.6	2.0	59.7	23.3	11.0	76.7
#30	1.2	1.5	34.0	13.5	9.8	86.5
#50	1.0	1.5	13.4	5.7	7.8	94.3
#100	0.9	1.4	2.4	1.5	4.2	98.5
LBW	0.7	1.1	0.7	0.7	0.8	99.3

*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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	34	Adjusted WF	36.8
---------------------------	-----------	----------------------------	-----------	--------------------	-------------

Coarseness Factor:	61
Workability Factor:	36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.2	10.1	10.8
1/2"	70.7	18.5	29.3
3/8"	60.7	10.0	39.3
#4	44.4	16.3	55.6
#8	35.9	8.5	64.1
#16	27.3	8.6	72.7
#30	19.1	8.2	80.9
#50	7.4	11.7	92.6
#100	1.9	5.6	98.1
LBW	0.7	1.2	99.3

PREPARED BY:
 SM, LLC Technical Service

Approved BY:

Aggregate Optimization Chart

PLANT #: **P-20**

Sample Date: 8/19/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 8/20/2019 through 8/26/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1555	9.51	2.62	53.5
26A	71-47	Presque Isle	200	1.22	2.62	6.9
2NS	63-54	Holly	1150	6.95	2.65	39.6
Total Wt			2905	17.69		100.0

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

Sieve	6AA	26A	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	89.9	100.0	100.0	94.6	5.4	5.4
1/2"	49.5	97.8	100.0	72.8	21.8	27.2
3/8"	28.2	90.8	100.0	60.9	11.9	39.1
#4	4.0	21.6	98.1	42.5	18.5	57.5
#8	2.0	5.2	86.9	35.8	6.6	64.2
#16	1.6	2.4	71.6	29.4	6.5	70.6
#30	1.5	1.9	52.3	21.6	7.7	78.4
#50	1.4	1.7	18.8	8.3	13.3	91.7
#100	1.4	1.6	1.6	1.5	6.8	98.5
LBW	1.3	1.4	0.2	0.9	0.6	99.1



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

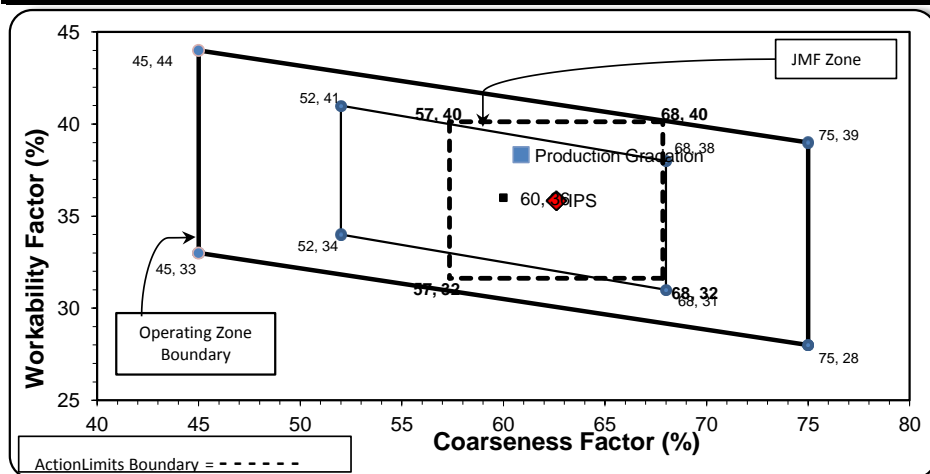
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	61	Workability Factor:	36	38.3
---------------------------	-----------	----------------------------	-----------	-------------

Coarseness Factor:	63
Workability Factor:	36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	89.2	10.8	10.8
1/2"	68.4	20.8	31.6
3/8"	59.9	8.6	40.1
#4	43.0	16.9	57.0
#8	35.9	7.1	64.1
#16	29.0	6.8	71.0
#30	21.3	7.7	78.7
#50	9.9	11.4	90.1
#100	2.4	7.5	97.6
LBW	1.2	1.2	98.8

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 8/19/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 8/20/2019 through 8/26/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1600	9.79	2.62	55.1
26A	71-47	Presque Isle	155	0.95	2.62	5.3
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
Total Wt			2905	17.69		100.0

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

Sieve	6AA	26A	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"	98.8	100.0	100.0	99.3	0.7	0.7
3/4"	78.6	100.0	100.0	88.2	11.1	11.8
1/2"	42.4	95.2	100.0	68.0	20.2	32.0
3/8"	26.8	83.3	100.0	58.8	9.2	41.2
#4	6.5	22.1	96.8	43.1	15.7	56.9
#8	3.7	6.3	85.2	36.1	7.0	63.9
#16	3.0	3.3	70.3	29.7	6.4	70.3
#30	2.7	2.6	50.9	21.8	7.9	78.2
#50	2.5	2.3	21.8	10.1	11.6	89.9
#100	2.4	2.2	4.4	3.2	6.9	96.8
LBW	1.9	1.8	1.3	1.7	1.5	98.3

*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.



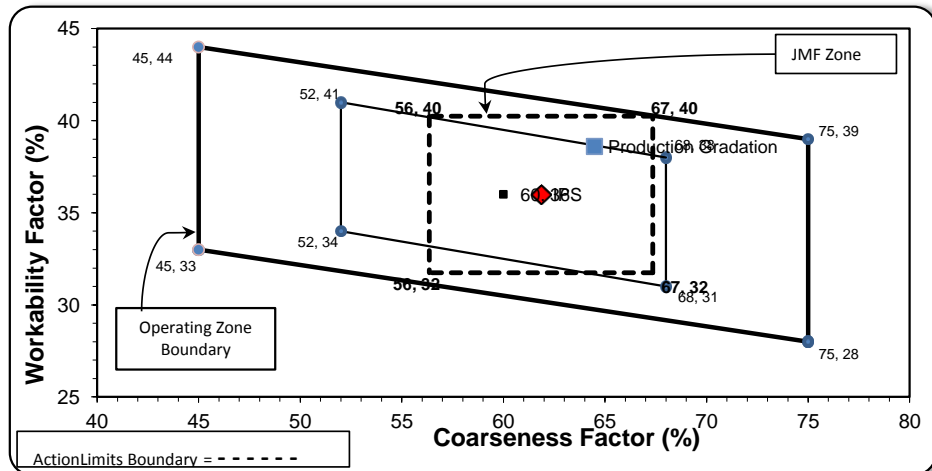
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	64	Workability Factor:	36	Adjusted WF	38.6
---------------------------	-----------	----------------------------	-----------	--------------------	-------------

Coarseness Factor:	62
Workability Factor:	36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	72.3	22.8	27.7
3/8"	60.4	11.8	39.6
#4	42.6	17.8	57.4
#8	36.0	6.6	64.0
#16	29.5	6.5	70.5
#30	20.3	9.2	79.7
#50	9.5	10.8	90.5
#100	3.4	6.1	96.6
LBW	1.3	2.1	98.7

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 8/19/19

Concrete Grade: DM

Contractor: _____

Dates Test Represents: 8/20/2019 through 8/26/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	52.5
26A	58-003	Stoneco	300	1.79	2.69	10.2
2NS	81-093	Burmeister	1100	6.65	2.65	37.3
Total Wt			2950	17.67		100.0

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



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

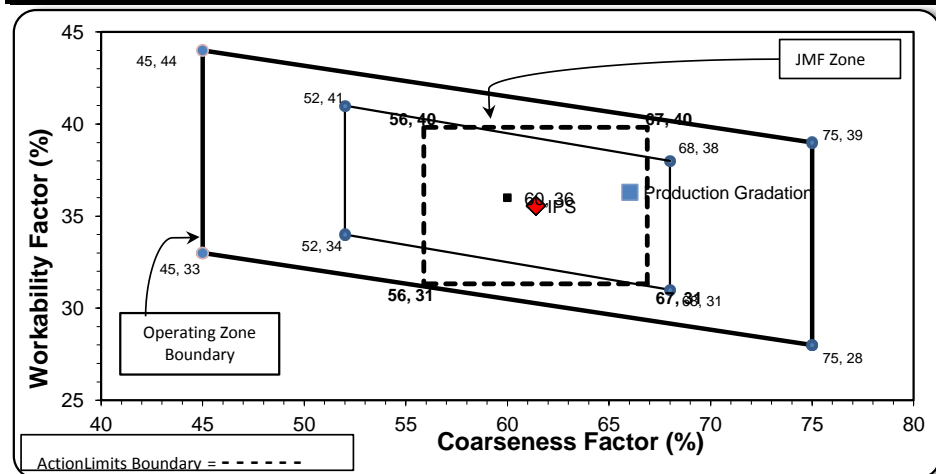
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.4	100.0	100.0	99.7	0.3	0.3
3/4"	77.6	100.0	100.0	88.2	11.5	11.8
1/2"	37.1	99.7	100.0	66.9	21.3	33.1
3/8"	18.8	89.7	100.0	56.3	10.6	43.7
#4	5.6	19.0	96.3	40.8	15.5	59.2
#8	2.2	4.2	86.4	33.8	7.0	66.2
#16	1.6	2.0	60.6	23.6	10.2	76.4
#30	1.2	1.5	39.2	15.4	8.2	84.6
#50	1.0	1.5	13.1	5.6	9.8	94.4
#100	0.9	1.4	2.5	1.5	4.0	98.5
LBW	0.7	1.1	1.0	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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	34	Adjusted WF	36.3
---------------------------	-----------	----------------------------	-----------	--------------------	-------------

Coarseness Factor:	61
Workability Factor:	36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.1	10.2	10.9
1/2"	70.5	18.6	29.5
3/8"	60.5	10.0	39.5
#4	44.1	16.4	55.9
#8	35.6	8.5	64.4
#16	27.7	7.9	72.3
#30	20.6	7.1	79.4
#50	8.7	11.8	91.3
#100	1.6	7.1	98.4
LBW	1.1	0.6	98.9

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 8/19/19

Concrete Grade: DM

Contractor: _____

Dates Test Represents: 8/20/2019 through 8/26/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1555	9.51	2.62	53.5
26A	71-47	Presque Isle	250	1.53	2.62	8.6
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

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



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

Sieve	6AA	26A	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"	97.9	100.0	100.0	98.9	1.1	1.1
3/4"	81.6	100.0	100.0	90.2	8.7	9.8
1/2"	43.8	95.2	100.0	69.5	20.6	30.5
3/8"	23.2	83.3	100.0	57.5	12.1	42.5
#4	4.0	22.1	98.1	41.2	16.3	58.8
#8	2.5	6.3	86.9	34.8	6.4	65.2
#16	2.2	3.3	71.6	28.6	6.2	71.4
#30	2.0	2.6	52.3	21.1	7.5	78.9
#50	1.9	2.3	18.8	8.3	12.8	91.7
#100	1.8	2.2	1.6	1.8	6.6	98.2
LBW	1.3	1.8	0.2	0.9	0.8	99.1

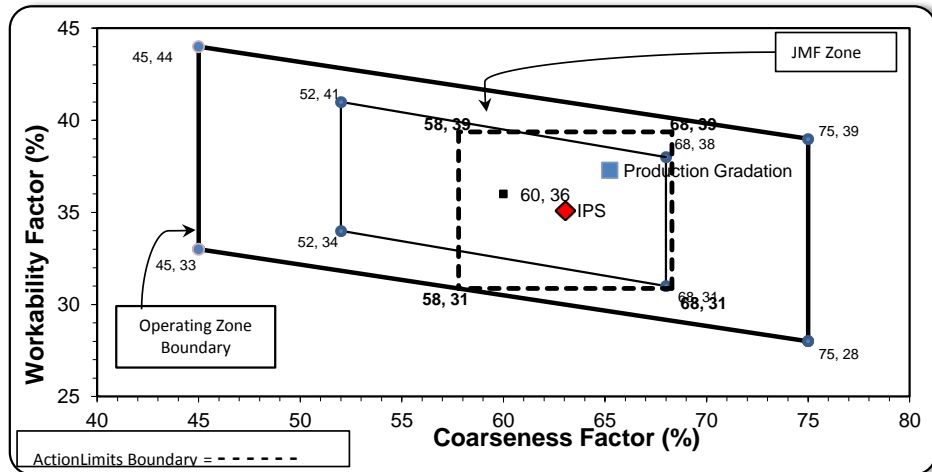
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	35	Adjusted WF	37.3
---------------------------	-----------	----------------------------	-----------	--------------------	-------------

Coarseness Factor:	63
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"	99.1	0.9	0.9
3/4"	90.3	8.8	9.7
1/2"	69.2	21.1	30.8
3/8"	59.1	10.1	40.9
#4	41.8	17.3	58.2
#8	35.1	6.6	64.9
#16	28.5	6.6	71.5
#30	21.2	7.3	78.8
#50	8.7	12.5	91.3
#100	1.8	7.0	98.2
LBW	0.7	1.0	99.3



PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 8/19/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 8/20/2019 through 8/26/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1755	10.73	2.62	60.4
26A	71-47	Presque Isle	0	0.00	2.62	0.0
2NS	44-051	Krake Willis Rd	1150	6.95	2.65	39.6
Total Wt			2905	17.69		100.0

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

Sieve	6AA	26A	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"	98.9	100.0	100.0	99.3	0.7	0.7
3/4"	86.9	100.0	100.0	92.1	7.2	7.9
1/2"	51.2	99.0	100.0	70.5	21.6	29.5
3/8"	29.1	90.2	100.0	57.2	13.4	42.8
#4	3.8	13.6	96.5	40.5	16.7	59.5
#8	2.0	3.9	83.6	34.3	6.2	65.7
#16	1.7	2.4	68.2	28.0	6.3	72.0
#30	1.6	1.9	51.2	21.2	6.8	78.8
#50	1.5	1.8	21.8	9.5	11.7	90.5
#100	1.4	1.7	4.7	2.7	6.8	97.3
LBW	1.4	1.5	0.7	1.1	1.6	98.9



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

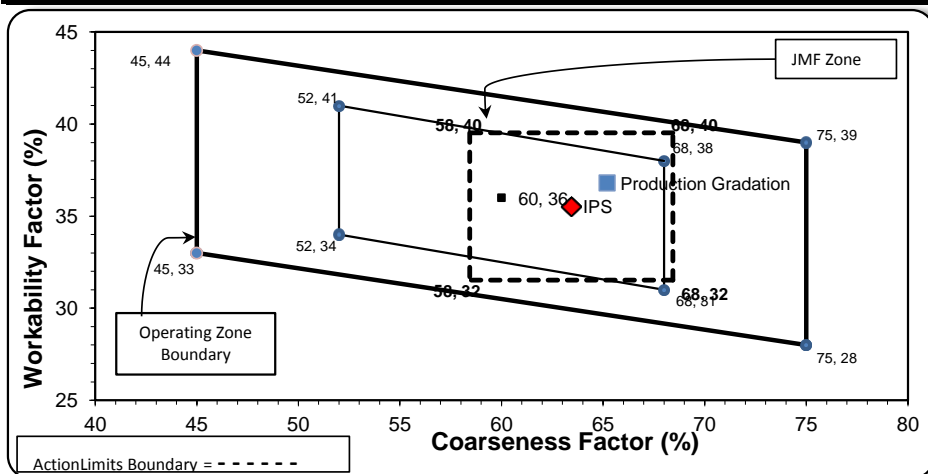
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	34	Adjusted WF	36.8
---------------------------	-----------	----------------------------	-----------	--------------------	-------------

Coarseness Factor:	63
Workability Factor:	36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	89.7	10.3	10.3
1/2"	70.3	19.4	29.7
3/8"	59.1	11.2	40.9
#4	42.8	16.3	57.2
#8	35.5	7.3	64.5
#16	29.0	6.5	71.0
#30	21.2	7.7	78.8
#50	9.8	11.5	90.2
#100	3.7	6.1	96.3
LBW	1.2	2.5	98.8

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-02**

Sample Date: 8/19/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 8/20/2019 through 8/26/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1555	9.51	2.62	53.5
26A	71-47	Presque Isle	250	1.53	2.62	8.6
2NS	47-16	Buno Rd	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

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



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

Sieve	6AA	26A	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"	97.9	100.0	100.0	98.9	1.1	1.1
3/4"	81.6	100.0	100.0	90.2	8.7	9.8
1/2"	43.8	95.2	100.0	69.5	20.6	30.5
3/8"	23.2	83.3	100.0	57.5	12.1	42.5
#4	4.0	22.1	96.8	40.7	16.8	59.3
#8	2.5	6.3	87.2	34.9	5.8	65.1
#16	2.2	3.3	73.8	29.4	5.5	70.6
#30	2.0	2.6	53.7	21.6	7.8	78.4
#50	1.9	2.3	18.4	8.2	13.4	91.8
#100	1.8	2.2	2.1	1.9	6.2	98.1
LBW	1.3	1.8	0.3	1.0	1.0	99.0

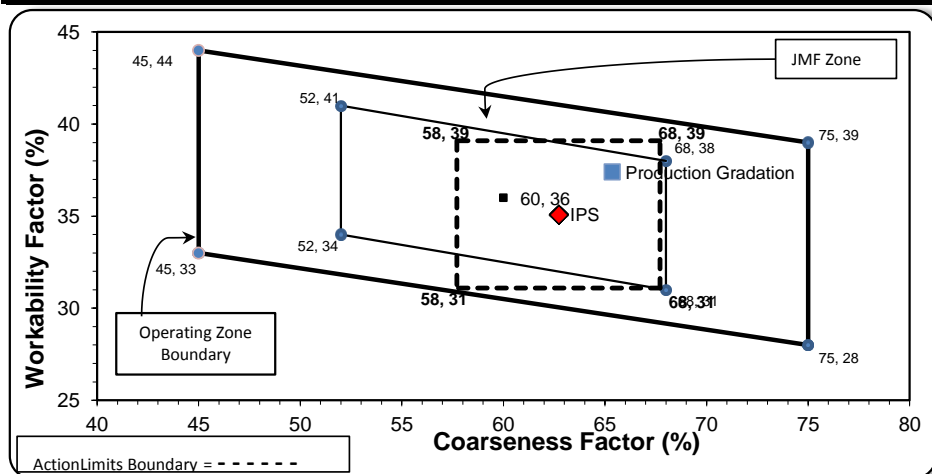
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	35	Adjusted WF	37.4
---------------------------	-----------	----------------------------	-----------	--------------------	-------------

Coarseness Factor:	63
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"	100.0	0.0	0.0
3/4"	95.1	4.9	4.9
1/2"	74.6	20.5	25.4
3/8"	59.3	15.3	40.7
#4	42.1	17.2	57.9
#8	35.1	7.1	64.9
#16	29.2	5.9	70.8
#30	21.9	7.3	78.1
#50	9.6	12.4	90.4
#100	2.4	7.2	97.6
LBW	0.9	1.5	99.1

PREPARED BY:
 SM, LLC Technical Service

Approved By: