

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 2/17/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 2/18/2020 through 2/24/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1450	8.87	2.62	49.9
26A	71-47	Presque Isle	305	1.87	2.62	10.5
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
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

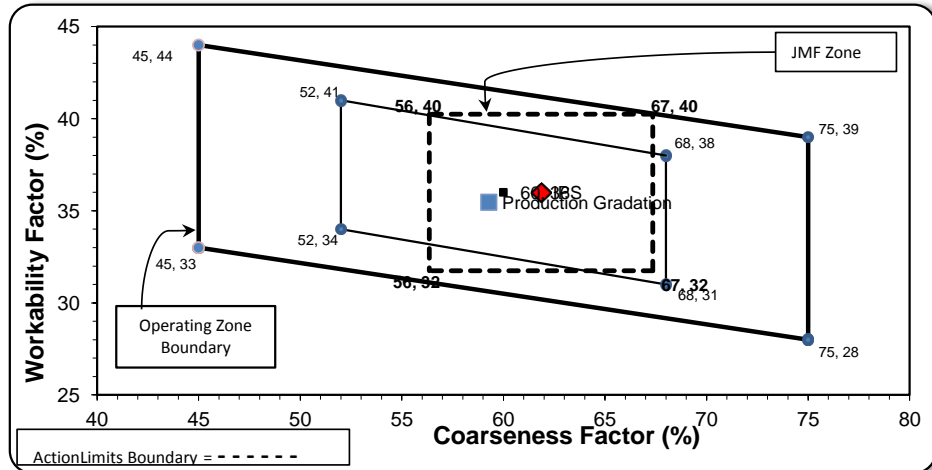
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	98.2	100.0	100.0	99.1	0.9	0.9
3/4"	82.2	100.0	100.0	91.1	8.0	8.9
1/2"	44.6	99.4	100.0	72.3	18.8	27.7
3/8"	25.0	78.0	100.0	60.3	12.0	39.7
#4	4.2	14.6	96.0	41.6	18.6	58.4
#8	2.4	5.0	78.9	33.0	8.7	67.0
#16	2.0	3.4	63.4	26.5	6.5	73.5
#30	1.8	3.2	48.5	20.4	6.0	79.6
#50	1.7	3.0	26.4	11.6	8.8	88.4
#100	1.6	2.8	5.9	3.4	8.2	96.6
LBW	1.2	2.3	1.0	1.2	2.2	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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	59	Workability Factor:	33	Adjusted WF	35.5
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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-36**

Sample Date: 2/17/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 2/18/2020 through 2/24/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1705	10.43	2.62	58.7
26A	71-47	Presque Isle	100	0.61	2.62	3.4
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
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"	97.9	100.0	100.0	98.8	1.2	1.2
3/4"	85.9	100.0	100.0	91.7	7.0	8.3
1/2"	51.2	99.4	100.0	71.3	20.4	28.7
3/8"	26.9	78.0	100.0	56.3	15.0	43.7
#4	4.4	14.6	97.1	39.9	16.5	60.1
#8	2.0	5.0	84.0	33.2	6.7	66.8
#16	1.6	3.4	69.1	27.2	5.9	72.8
#30	1.6	3.2	49.4	19.8	7.5	80.2
#50	1.6	3.0	19.7	8.5	11.3	91.5
#100	1.4	2.8	2.9	2.0	6.5	98.0
LBW	1.1	2.3	0.3	0.8	1.2	99.2



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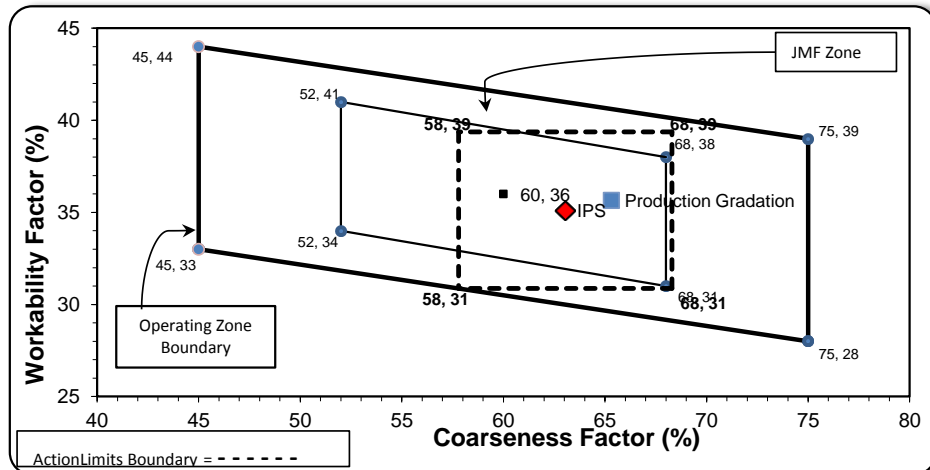
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (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:	33	Adjusted WF	35.7
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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

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Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 2/17/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 2/18/2020 through 2/24/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1655	10.12	2.62	57.0
26A	71-47	Presque Isle	150	0.92	2.62	5.2
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

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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"	99.2	100.0	100.0	99.5	0.5	0.5
3/4"	87.5	100.0	100.0	92.9	6.7	7.1
1/2"	46.0	99.4	100.0	69.2	23.7	30.8
3/8"	26.1	78.0	100.0	56.8	12.4	43.2
#4	4.3	14.6	97.1	40.0	16.8	60.0
#8	2.0	5.0	84.0	33.2	6.8	66.8
#16	1.7	3.4	69.1	27.3	5.9	72.7
#30	1.6	3.2	49.4	19.8	7.5	80.2
#50	1.5	3.0	19.7	8.5	11.3	91.5
#100	1.4	2.8	2.9	2.0	6.4	98.0
LBW	1.2	2.3	0.3	0.9	1.1	99.1

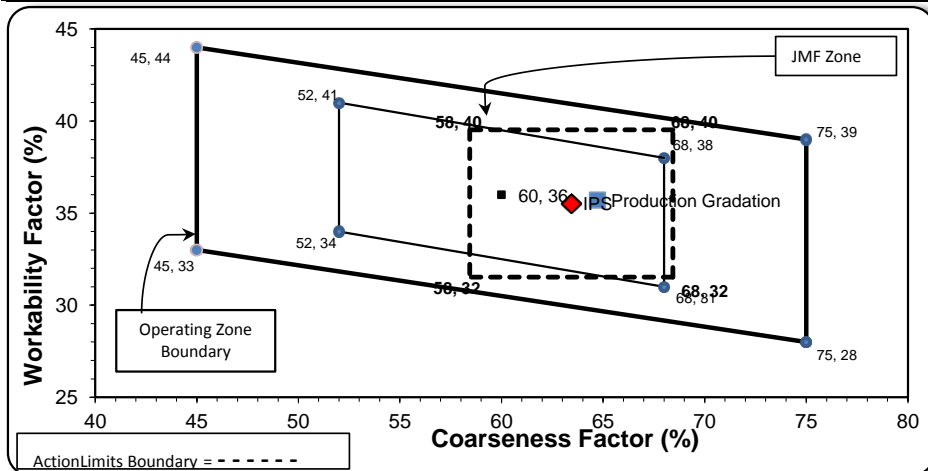
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (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:	33	Adjusted WF	35.7
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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:
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Approved By:

Aggregate Optimization Chart

PLANT #: **P-02**

Sample Date: 2/17/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 2/18/2020 through 2/24/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1775	10.86	2.62	61.1
26A	71-47	Presque Isle	0	0.00	2.62	0.0
2NS	63-115	Ray Rd	1130	6.83	2.65	38.9
Total Wt			2905	17.69		100.0

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



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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	98.7	1.3	1.3
3/4"	85.9	100.0	100.0	91.4	7.3	8.6
1/2"	51.2	99.4	100.0	70.2	21.2	29.8
3/8"	26.9	78.0	100.0	55.3	14.8	44.7
#4	4.4	14.6	96.0	40.0	15.3	60.0
#8	2.0	5.0	78.9	31.9	8.1	68.1
#16	1.6	3.4	63.4	25.6	6.3	74.4
#30	1.6	3.2	48.5	19.8	5.8	80.2
#50	1.6	3.0	26.4	11.2	8.6	88.8
#100	1.4	2.8	5.9	3.2	8.1	96.8
LBW	1.1	2.3	1.0	1.1	2.1	98.9

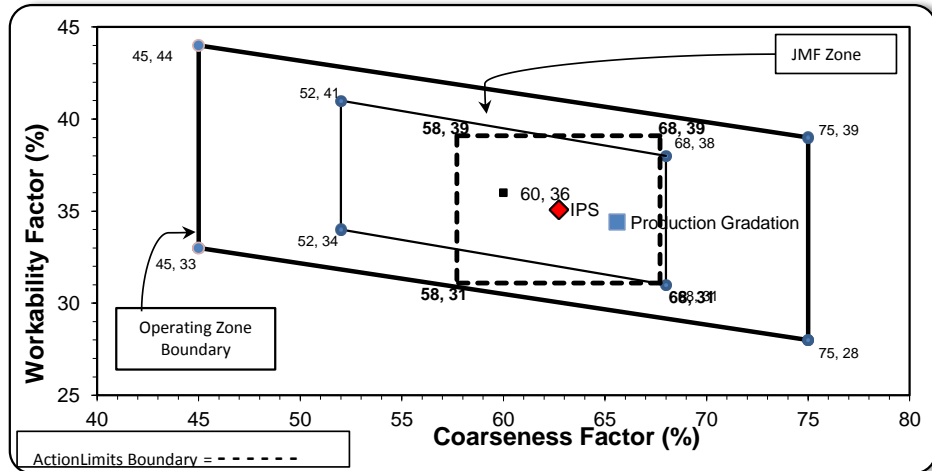
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	32
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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

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 SM, LLC Technical Service

Approved By: