

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Sample Date: 12/5/22

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 12/6/2022 through 12/12/2022

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1360	8.32	2.62	46.7
26A	71-47	Presque Isle	400	2.45	2.62	13.7
2NS	75-051	Mid Michigan	1150	6.93	2.66	39.5
Total Wt			2910	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"	83.5	100.0	100.0	92.3	7.7	7.7
1/2"	35.2	94.0	100.0	68.9	23.4	31.1
3/8"	15.1	79.7	100.0	57.5	11.4	42.5
#4	1.8	19.1	98.6	42.4	15.1	57.6
#8	1.5	6.6	84.0	34.8	7.6	65.2
#16	1.4	4.0	68.6	28.3	6.5	71.7
#30	1.4	3.3	51.0	21.3	7.1	78.7
#50	1.4	3.0	23.2	10.2	11.0	89.8
#100	1.4	2.8	4.8	2.9	7.3	97.1
LBW	1.3	2.5	0.8	1.3	1.7	98.7



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

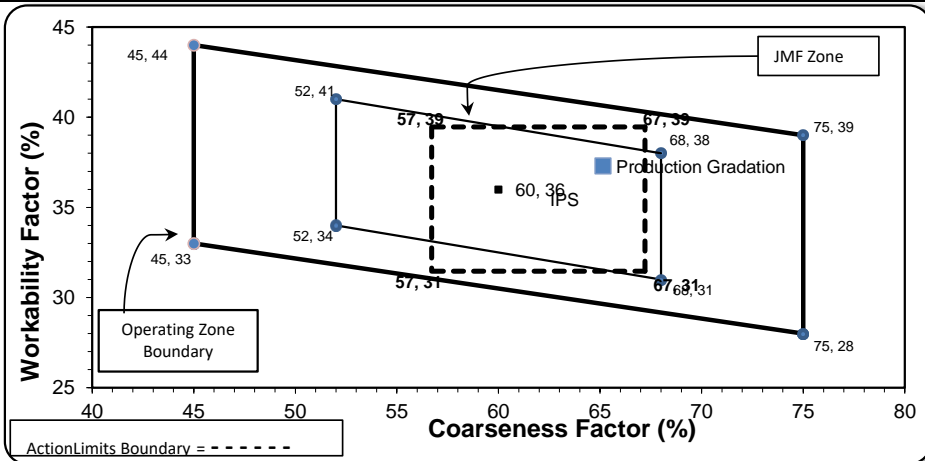
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (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:	35	37.3	Coarseness Factor:	62
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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"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	70.5	24.5	29.5
3/8"	60.0	10.5	40.0
#4	44.4	15.6	55.6
#8	35.5	9.0	64.5
#16	28.5	7.0	71.5
#30	21.5	7.0	78.5
#50	10.2	11.3	89.8
#100	3.1	7.1	96.9
LBW	1.3	1.8	98.7

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-102**

Sample Date: 12/5/22

Concrete Grade: **DM, 4500HP**

Contractor: _____

Dates Test Represents: 12/6/2022 through 12/12/2022

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	300	1.79	2.69	10.2
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
Total Wt			2950	17.68		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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	83.2	100.0	100.0	91.5	8.5	8.5
1/2"	44.2	99.8	100.0	71.6	19.9	28.4
3/8"	19.0	88.2	100.0	57.6	14.0	42.4
#4	3.0	10.3	97.5	40.6	17.0	59.4
#8	2.0	3.9	83.1	33.8	6.8	66.2
#16	2.2	3.5	67.2	27.7	6.1	72.3
#30	2.1	3.2	49.8	20.8	6.9	79.2
#50	1.9	3.0	25.0	11.0	9.8	89.0
#100	1.8	2.9	7.1	4.0	7.0	96.0
LBW	1.3	2.6	1.7	1.6	2.4	98.4

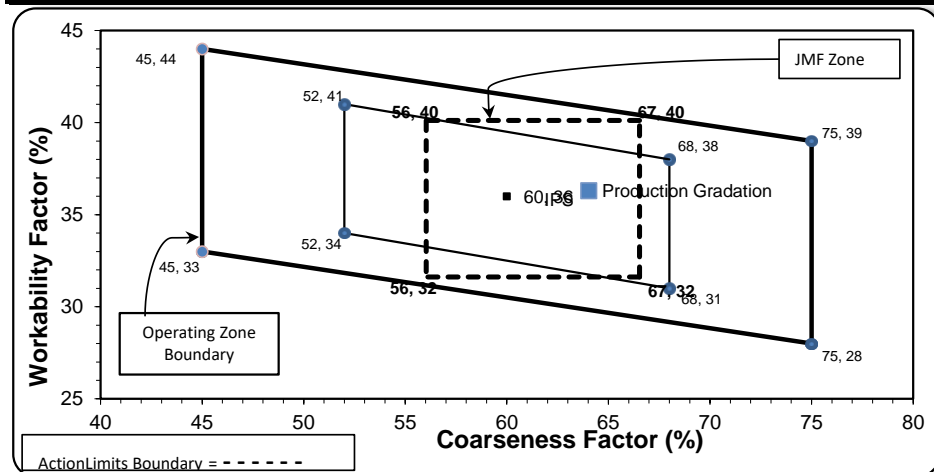
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	64	Workability Factor:	34	Adjusted WF	36.3
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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: 12/5/22

Concrete Grade: **DM, 4500HP**

Contractor: _____

Dates Test Represents: 12/6/2022 through 12/12/2022

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	300	1.79	2.69	10.2
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
Total Wt			2950	17.68		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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	83.2	100.0	100.0	91.5	8.5	8.5
1/2"	44.2	99.8	100.0	71.6	19.9	28.4
3/8"	19.0	88.2	100.0	57.6	14.0	42.4
#4	3.0	10.3	97.5	40.6	17.0	59.4
#8	2.0	3.9	83.1	33.8	6.8	66.2
#16	2.2	3.5	67.2	27.7	6.1	72.3
#30	2.1	3.2	49.8	20.8	6.9	79.2
#50	1.9	3.0	25.0	11.0	9.8	89.0
#100	1.8	2.9	7.1	4.0	7.0	96.0
LBW	1.3	2.6	1.7	1.6	2.4	98.4

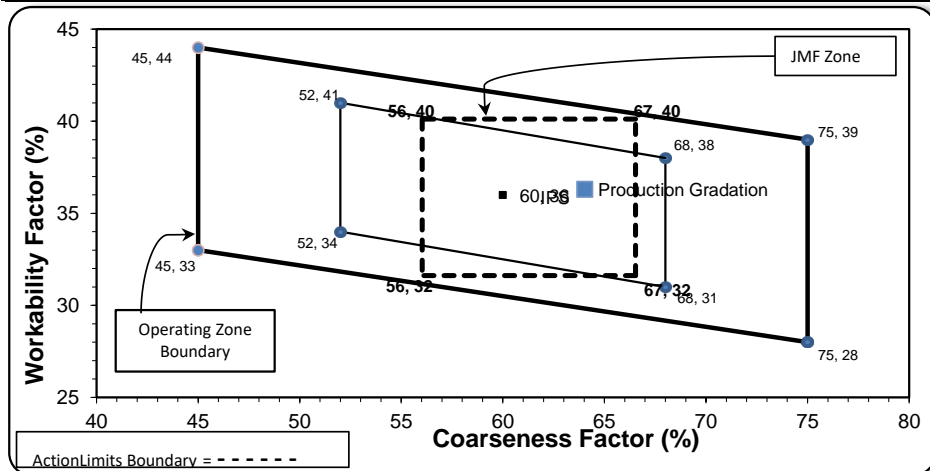
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	64	Workability Factor:	34	36.3	Coarseness Factor:	61
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Workability Factor:	36
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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-14**

Sample Date: 12/5/22

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 12/6/2022 through 12/12/2022

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1460	8.70	2.69	49.3
26A	58-003	Stoneco	400	2.38	2.69	13.5
2NS	19-55	Schlegel	1100	6.60	2.67	37.2
Total Wt			2960	17.68		100.0

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



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 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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	83.2	100.0	100.0	91.7	8.3	8.3
1/2"	44.2	99.8	100.0	72.5	19.3	27.6
3/8"	19.0	88.2	100.0	58.5	14.0	41.5
#4	3.0	10.3	100.0	40.0	18.4	60.0
#8	2.0	3.9	90.8	35.3	4.8	64.7
#16	2.2	3.5	71.2	28.0	7.2	72.0
#30	2.1	3.2	48.1	19.3	8.7	80.7
#50	1.9	3.0	16.9	7.6	11.7	92.4
#100	1.8	2.9	3.2	2.5	5.2	97.5
LBW	1.3	2.6	0.3	1.1	1.4	98.9

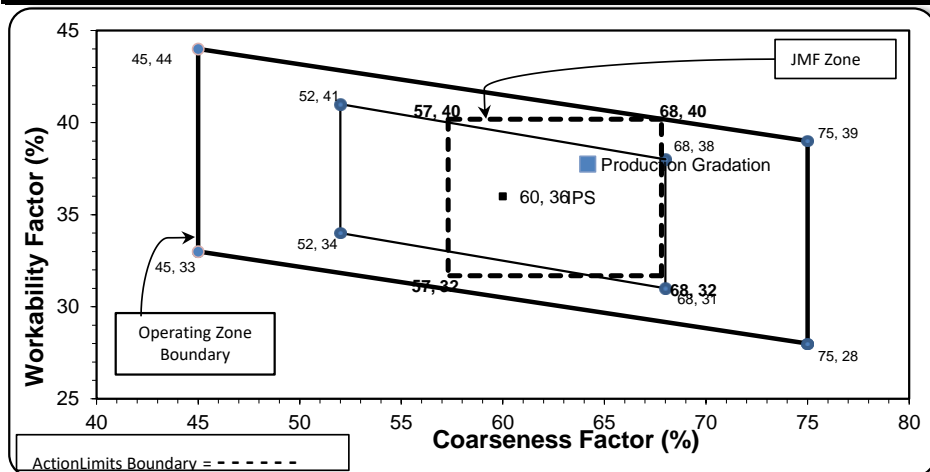
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	64	Workability Factor:	35	37.8
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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"	99.3	0.7	0.7
3/4"	89.0	10.3	11.0
1/2"	70.3	18.7	29.7
3/8"	59.9	10.4	40.1
#4	41.9	18.0	58.1
#8	35.9	6.0	64.1
#16	27.8	8.2	72.2
#30	18.9	8.8	81.1
#50	6.3	12.6	93.7
#100	1.7	4.6	98.3
LBW	1.0	0.7	99.0

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-12**

Sample Date: 12/5/22

Concrete Grade: **DM, 4500HP**

Contractor: _____

Dates Test Represents: 12/6/2022 through 12/12/2022

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1455	8.90	2.62	50.1
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
Total Wt			2905	17.69		100.0

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



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 Suite 500
 Farmington Hills, MI 48336

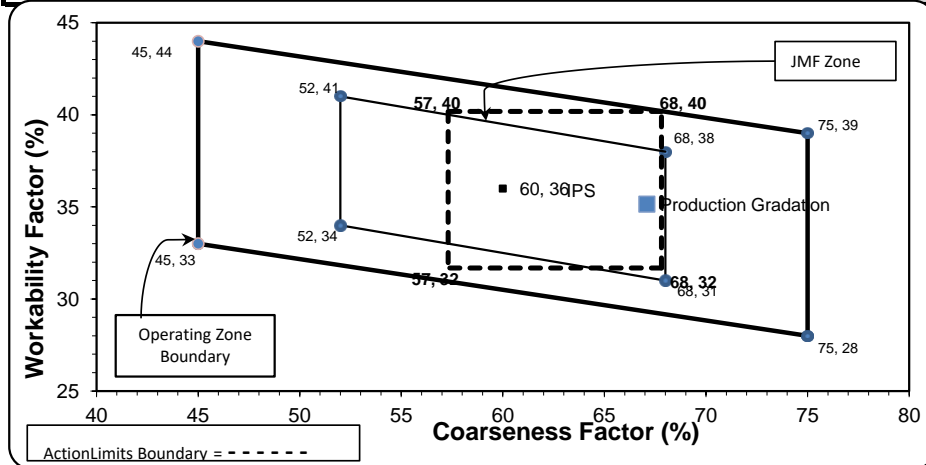
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	95.1	100.0	100.0	97.5	2.5	2.5
3/4"	71.4	100.0	100.0	85.7	11.9	14.3
1/2"	32.0	97.2	100.0	65.7	20.0	34.3
3/8"	13.5	82.0	100.0	54.8	10.8	45.2
#4	2.7	10.3	96.8	40.7	14.1	59.3
#8	1.8	2.7	79.5	32.7	8.1	67.3
#16	1.4	1.4	63.7	26.1	6.6	73.9
#30	1.3	1.1	48.4	19.9	6.1	80.1
#50	1.2	1.0	25.8	10.9	9.0	89.1
#100	1.2	0.9	4.3	2.4	8.5	97.6
LBW	0.9	0.7	0.6	0.8	1.6	99.2

*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: **67** Workability Factor: **33** Adjusted WF: **35.2** Coarseness Factor: **63**



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"	89.0	10.3	11.0
1/2"	70.3	18.7	29.7
3/8"	59.9	10.4	40.1
#4	41.9	18.0	58.1
#8	35.9	6.0	64.1
#16	27.8	8.2	72.2
#30	18.9	8.8	81.1
#50	6.3	12.6	93.7
#100	1.7	4.6	98.3
LBW	1.0	0.7	99.0

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: 11

Sample Date: 12/5/22

Concrete Grade: DM, 4500HP

Contractor: _____

Dates Test Represents: 12/6/2022 through 12/12/2022

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1405	8.59	2.62	48.4
26A	71-47	Presque Isle	350	2.14	2.62	12.0
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
Total Wt			2905	17.69		100.0

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



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 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"	96.7	100.0	100.0	98.4	1.6	1.6
3/4"	74.4	100.0	100.0	87.6	10.8	12.4
1/2"	31.9	97.2	100.0	66.7	20.9	33.3
3/8"	14.7	82.0	100.0	56.6	10.2	43.4
#4	2.5	10.3	96.0	40.5	16.1	59.5
#8	1.9	2.7	83.6	34.3	6.1	65.7
#16	1.7	1.4	67.9	27.9	6.5	72.1
#30	1.5	1.1	49.2	20.3	7.5	79.7
#50	1.4	1.0	24.0	10.3	10.0	89.7
#100	1.3	0.9	6.6	3.3	6.9	96.7
LBW	0.9	0.7	1.2	1.0	2.4	99.0

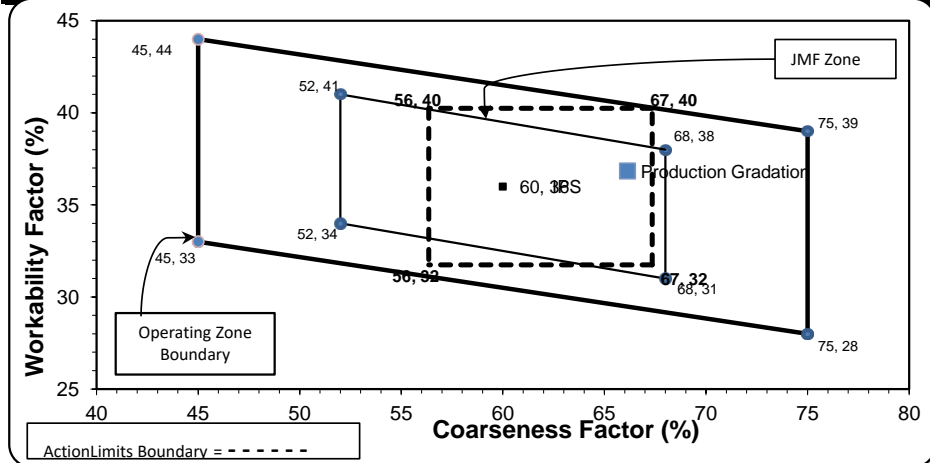
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor: **66** Workability Factor: **34** **36.8** 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-32**

Sample Date: 12/5/22

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 12/6/2022 through 12/12/2022

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
6AA	71-47	Presque Isle	1405	8.59	2.62	48.4
26A	71-47	Presque Isle	350	2.14	2.62	12.0
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"	96.7	100.0	100.0	98.4	1.6	1.6
3/4"	74.4	100.0	100.0	87.6	10.8	12.4
1/2"	31.9	97.2	100.0	66.7	20.9	33.3
3/8"	14.7	82.0	100.0	56.6	10.2	43.4
#4	2.5	10.3	96.0	40.5	16.1	59.5
#8	1.9	2.7	83.6	34.3	6.1	65.7
#16	1.7	1.4	67.9	27.9	6.5	72.1
#30	1.5	1.1	49.2	20.3	7.5	79.7
#50	1.4	1.0	24.0	10.3	10.0	89.7
#100	1.3	0.9	6.6	3.3	6.9	96.7
LBW	0.9	0.7	1.2	1.0	2.4	99.0

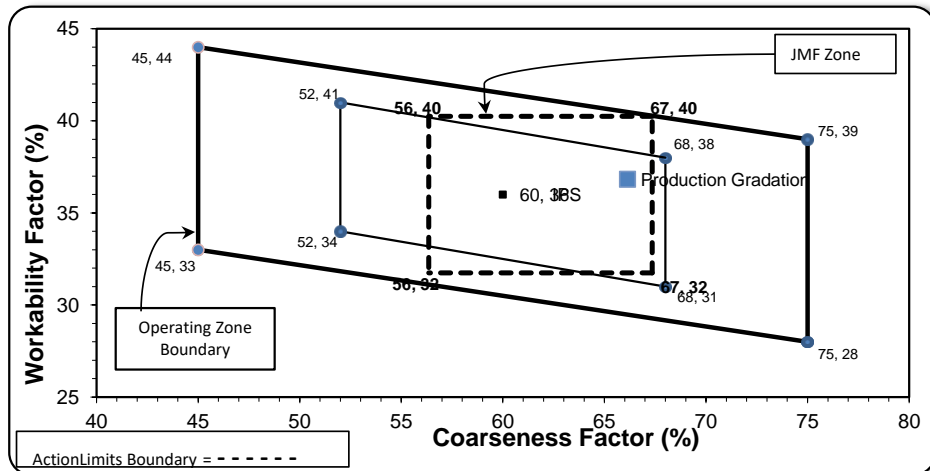
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	34	36.8
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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-35**

Sample Date: 12/5/22

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 12/6/2022 through 12/12/2022

Contractor: _____

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	300	1.79	2.69	10.2
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
Total Wt			2950	17.68		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"	83.2	100.0	100.0	91.5	8.5	8.5
1/2"	44.2	99.8	100.0	71.6	19.9	28.4
3/8"	19.0	88.2	100.0	57.6	14.0	42.4
#4	3.0	10.3	97.5	40.6	17.0	59.4
#8	2.0	3.9	83.1	33.8	6.8	66.2
#16	2.2	3.5	67.2	27.7	6.1	72.3
#30	2.1	3.2	49.8	20.8	6.9	79.2
#50	1.9	3.0	25.0	11.0	9.8	89.0
#100	1.8	2.9	7.1	4.0	7.0	96.0
LBW	1.3	2.6	1.7	1.6	2.4	98.4



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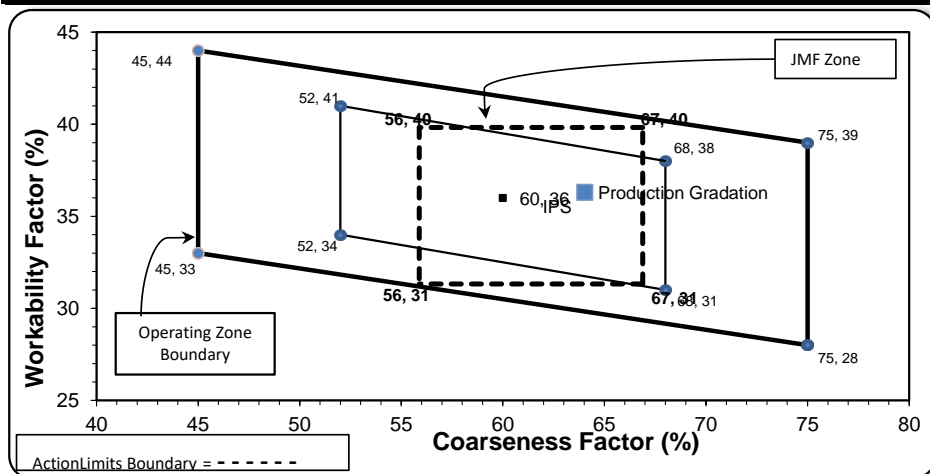
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	64	Workability Factor:	34	36.3
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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

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Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 12/5/22

Concrete Grade: **DM, 4500HP**

Contractor: _____

Dates Test Represents: 12/6/2022 through 12/12/2022

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	51.6
26A	71-47	Presque Isle	305	1.87	2.62	10.5
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
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"	95.1	100.0	100.0	97.5	2.5	2.5
3/4"	71.4	100.0	100.0	85.2	12.2	14.8
1/2"	32.0	97.2	100.0	64.6	20.6	35.4
3/8"	13.5	82.0	100.0	53.4	11.1	46.6
#4	2.7	10.3	96.8	39.1	14.3	60.9
#8	1.8	2.7	81.3	32.0	7.1	68.0
#16	1.4	1.4	65.5	25.7	6.3	74.3
#30	1.3	1.1	45.3	17.9	7.7	82.1
#50	1.2	1.0	18.1	7.6	10.4	92.4
#100	1.2	0.9	2.7	1.7	5.8	98.3
LBW	0.9	0.7	0.7	0.8	0.9	99.2

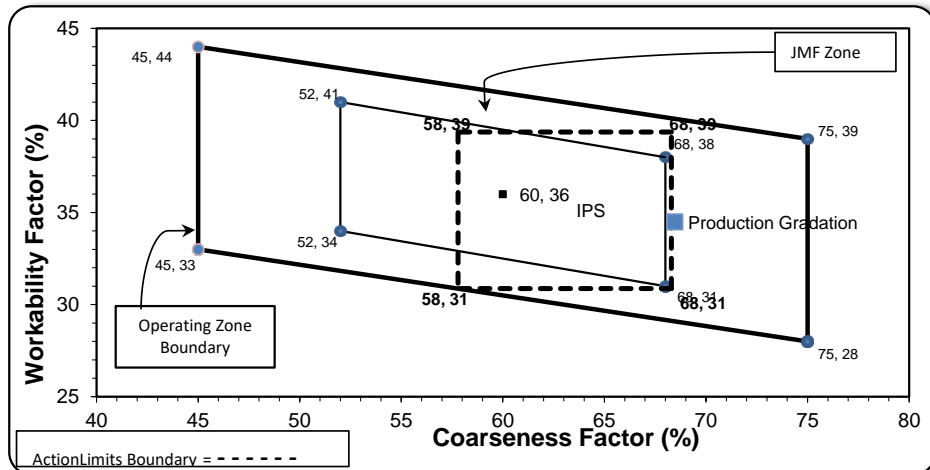
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	68	Workability Factor:	32	34.5
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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

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 12/5/22

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 12/6/2022 through 12/12/2022

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1505	9.21	2.62	51.8
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	44-051	Krake Willis Rd	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	83.5	100.0	100.0	91.5	8.5	8.5
1/2"	35.2	94.0	100.0	65.8	25.6	34.2
3/8"	15.1	79.7	100.0	53.9	11.9	46.1
#4	1.8	19.1	96.2	39.3	14.6	60.7
#8	1.5	6.6	80.4	31.9	7.4	68.1
#16	1.4	4.0	65.2	25.8	6.1	74.2
#30	1.4	3.3	49.4	19.8	6.1	80.2
#50	1.4	3.0	24.3	10.2	9.5	89.8
#100	1.4	2.8	9.0	4.4	5.8	95.6
LBW	1.3	2.5	0.8	1.2	3.2	98.8



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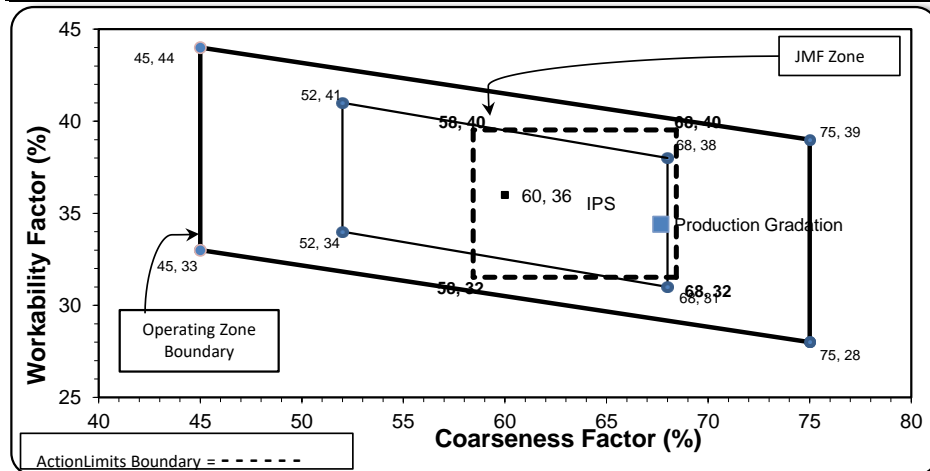
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	68	Workability Factor:	32	34.4	Coarseness Factor:	63
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Workability Factor:	36
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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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Aggregate Optimization Chart

PLANT #: **P-02**

Sample Date: 12/5/22

Concrete Grade: **DM, 4500HP**

Contractor: _____

Dates Test Represents: 12/6/2022 through 12/12/2022

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1455	8.90	2.62	50.1
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
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"	95.1	100.0	100.0	97.5	2.5	2.5
3/4"	71.4	100.0	100.0	85.7	11.9	14.3
1/2"	32.0	97.2	100.0	65.7	20.0	34.3
3/8"	13.5	82.0	100.0	54.8	10.8	45.2
#4	2.7	10.3	96.8	40.7	14.1	59.3
#8	1.8	2.7	79.5	32.7	8.1	67.3
#16	1.4	1.4	63.7	26.1	6.6	73.9
#30	1.3	1.1	48.4	19.9	6.1	80.1
#50	1.2	1.0	25.8	10.9	9.0	89.1
#100	1.2	0.9	4.3	2.4	8.5	97.6
LBW	0.9	0.7	0.6	0.8	1.6	99.2

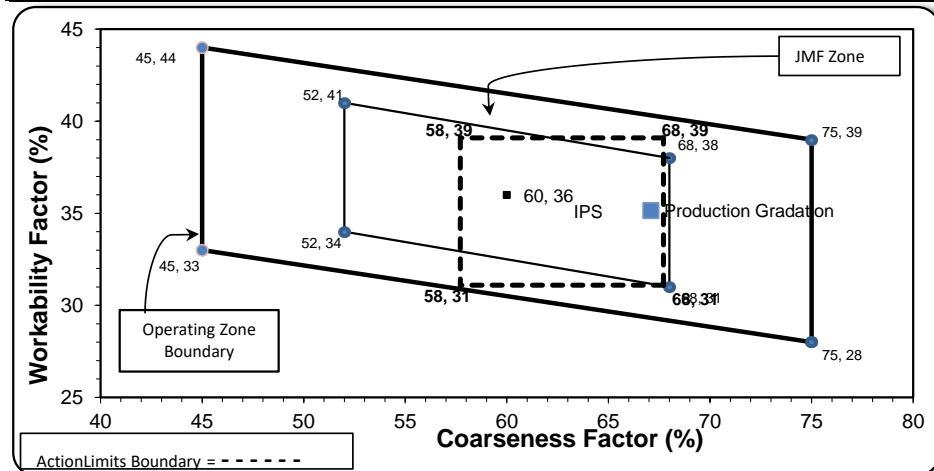
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	67	Workability Factor:	33	Adjusted WF	35.2
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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

PREPARED BY:
 SM, LLC Technical Service

Approved By: