Aggregate Optimization Chart

Production Gradation Report

PLANT #: 12

Contractor: _____

Sample Date: 10/9/23

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 10/10/2023 through 10/16/2023

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	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%

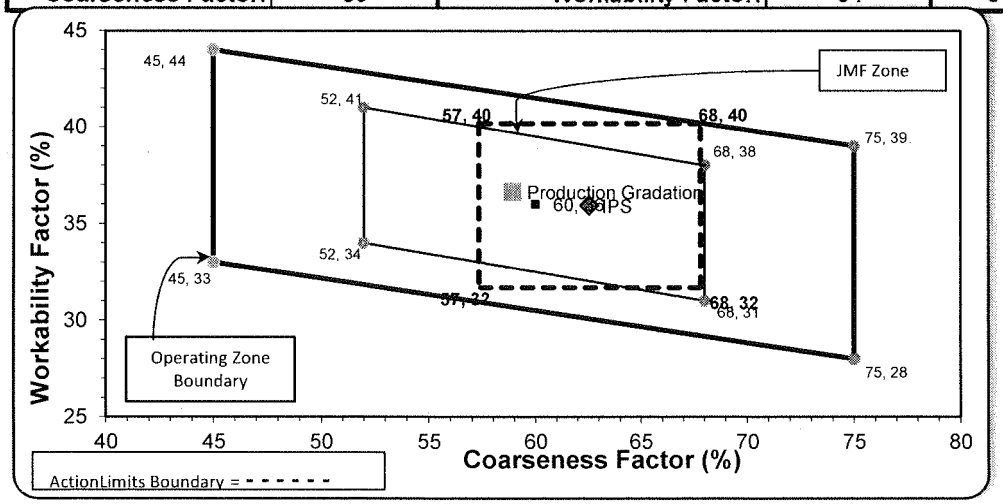
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	92.4	100.0	100.0	96.2	3.8	3.8
3/4"	74.4	100.0	100.0	87.2	9.0	12.8
1/2"	40.3	97.0	100.0	69.9	17.3	30.1
3/8"	24.7	88.4	100.0	61.2	8.7	38.8
#4	5.6	24.4	96.5	43.6	17.6	56.4
#8	2.9	6.8	80.8	34.1	9.4	65.9
#16	2.6	3.6	65.7	27.7	6.5	72.3
#30	2.4	2.9	49.7	21.2	6.5	78.8
#50	2.3	2.6	24.6	11.2	10.0	88.8
#100	2.2	2.5	4.9	3.3	7.9	96.7
LBW	1.8	2.2	0.5	1.3	2.0	98.7

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 4% for the 3/4" sieve when a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	59	Workability Factor:	34	Adjusted WF	36.6



Intial Production Sample (IPS)

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:

Plant S12-Superior Onsite

Southfield Product 1051-6AA LS

Period: 10/08/2023 - 10/14/2023

Name/Title Doug Storey / QC Technician

Report Date 10/13/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	92.4	%	95-100
	3/4" (19mm)	74.4	%	
	1/2" (12.5mm)	40.3	%	30-60
	3/8" (9.5mm)	24.7	%	
	#4 (4.75mm)	5.6	%	0-8
	#8 (2.36mm)	2.9	%	
	#16 (1.18mm)	2.6	%	
	#30 (.6mm)	2.4	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	1.95	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	3.37	%	

Plant S12-Superior Onsite

Southfield Product 1067-26A Mod LS

Period: 10/08/2023 - 10/14/2023

Name/Title Doug Storey / QC Technician

Report Date 10/13/2023

Procedure	Sieve/Test	Result	Unit	26A LS Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	100-100
	1/2" (12.5mm)	97.0	%	95-100
	3/8" (9.5mm)	88.4	%	60-95
	#4 (4.75mm)	24.4	%	5-30
	#8 (2.36mm)	6.8	%	0-12
	#16 (1.18mm)	3.6	%	
	#30 (.6mm)	2.9	%	
	#50 (.3mm)	2.6	%	
	#100 (.15mm)	2.5	%	
	#200 (75µm)	2.2	%	
	Wash Loss (#200/75um)	2.2	%	0-3
	Total Moisture	1.81	%	

Plant S12-Superior Onsite Southfield

Product 1022-2NS GR

Period: 10/08/2023 - 10/14/2023

Name/Title Doug Storey / QC Technician

Report Date 10/13/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.5	%	95-100
	#8 (2.36mm)	80.8	%	65-95
	#16 (1.18mm)	65.7	%	35-75
	#30 (.6mm)	49.7	%	20-55
	#50 (.3mm)	24.6	%	10-30
	#100 (.15mm)	4.9	%	0-10
	#200 (75µm)	0.9	%	
	FM	2.78		2.6-3
	Wash Loss (#200/75um)	0.5	%	0-3
	Total Moisture	3.29	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-102

Contractor: _____

Sample Date: 10/9/23

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 10/10/2023 through 10/16/2023

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	13.6
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	**2950**	**17.68**		100.0

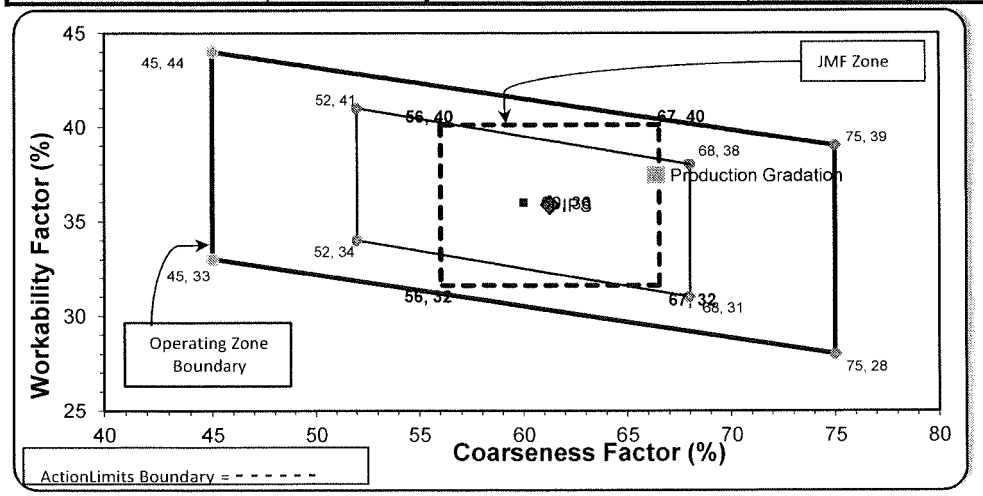
<----- Verify this number is 100%

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"	99.3	100.0	100.0	99.7	0.3	0.3
3/4"	77.7	100.0	100.0	89.4	10.3	10.6
1/2"	28.1	99.3	100.0	65.8	23.6	34.2
3/8"	12.8	86.7	100.0	56.8	9.0	43.2
#4	3.2	11.2	98.4	41.4	15.4	58.6
#8	2.1	3.4	85.9	34.9	6.5	65.1
#16	1.9	2.5	65.6	26.8	8.1	73.2
#30	1.8	2.1	45.7	19.0	7.9	81.0
#50	1.6	2.0	19.9	8.8	10.2	91.2
#100	1.5	1.9	3.5	2.3	6.5	97.7
LBW	1.3	1.8	0.3	1.0	1.4	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 4% for the 3/4" sieve when a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	66	Workability Factor:	35	Adjusted WF: 37.4



Intial Production Sample (IPS)

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

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Suite 500
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PREPARED BY:
SM, LLC Technical Service

Approved By:

Plant S102-Superior Novi

Product 1051-6AA LS

Period: 10/08/2023 - 10/14/2023

Name/Title Doug Storey / QC Technician

Report Date 10/13/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	99.3	%	95-100
	3/4" (19mm)	77.7	%	
	1/2" (12.5mm)	28.1	%	30-60
	3/8" (9.5mm)	12.8	%	
	#4 (4.75mm)	3.2	%	0-8
	#8 (2.36mm)	2.1	%	
	#16 (1.18mm)	1.9	%	
	#30 (.6mm)	1.8	%	
	#50 (.3mm)	1.6	%	
	#100 (.15mm)	1.5	%	
	#200 (75µm)	1.39	%	
	Wash Loss (#200/75um)	1.3	%	0-2
	Total Moisture	3.17	%	

Plant S102-Superior Novi

Product 1067-26A Mod LS

Period: 10/08/2023 - 10/14/2023

Name/Title Doug Storey / QC Technician

Report Date 10/13/2023

Procedure	Sieve/Test	Result	Unit	26A Mod LS Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	100-100
	1/2" (12.5mm)	99.3	%	95-100
	3/8" (9.5mm)	86.7	%	60-95
	#4 (4.75mm)	11.2	%	5-30
	#8 (2.36mm)	3.4	%	0-12
	#16 (1.18mm)	2.5	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.8	%	
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	3.41	%	

Plant S102-Superior Novi

Product 1022-2NS GR

Period: 10/08/2023 - 10/14/2023

Name/Title Doug Storey / QC Technician

Report Date 10/13/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.4	%	95-100
	#8 (2.36mm)	85.9	%	65-95
	#16 (1.18mm)	65.6	%	35-75
	#30 (.6mm)	45.7	%	20-55
	#50 (.3mm)	19.9	%	10-30
	#100 (.15mm)	3.5	%	0-10
	#200 (75µm)	0.3	%	
	FM	2.81		2.6-3
	Wash Loss (#200/75um)	0.3	%	0-3
	Total Moisture	3.45	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-103

Contractor: _____

Sample Date: 10/9/23

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 10/10/2023 through 10/16/2023

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	13.6
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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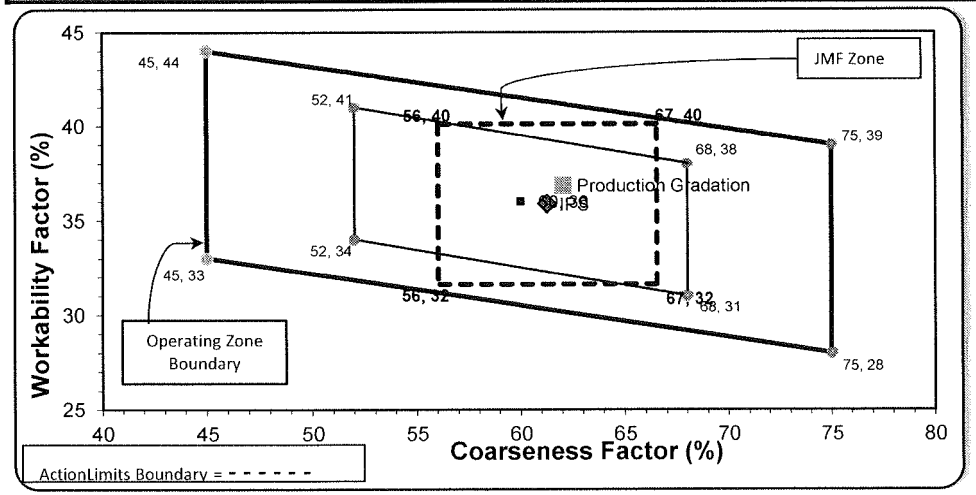
Suite 500
Farmington Hills, MI 48336

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"	80.6	100.0	100.0	90.8	9.2	9.2
1/2"	42.2	99.6	100.0	72.5	18.3	27.5
3/8"	17.0	90.1	100.0	59.3	13.2	40.7
#4	3.0	9.9	98.9	41.3	17.9	58.7
#8	1.6	2.8	85.2	34.4	7.0	65.6
#16	1.4	2.2	65.1	26.3	8.0	73.7
#30	1.3	2.0	46.6	19.1	7.3	80.9
#50	1.2	1.9	20.3	8.7	10.3	91.3
#100	1.2	1.9	3.5	2.2	6.5	97.8
LBW	0.9	1.8	0.5	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 4% for the 3/4" sieve when a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	62	Workability Factor:	34	Adjusted WF: 36.9



Intial Production Sample (IPS)

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:

Plant S103-Superior Brighton

Product 1051-6AA LS

Period: 10/08/2023 - 10/14/2023

Name/Title Doug Storey / QC Technician

Report Date 10/13/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	100.0	%	95-100
	3/4" (19mm)	80.6	%	
	1/2" (12.5mm)	42.2	%	30-60
	3/8" (9.5mm)	17.0	%	
	#4 (4.75mm)	3.0	%	0-8
	#8 (2.36mm)	1.6	%	
	#16 (1.18mm)	1.4	%	
	#30 (.6mm)	1.3	%	
	#50 (.3mm)	1.2	%	
	#100 (.15mm)	1.2	%	
	#200 (75µm)	1.08	%	
	Wash Loss (#200/75um)	0.9	%	0-2
	Total Moisture	2.52	%	

Plant S103-Superior Brighton

Product 1067-26A Mod LS

Period: 10/08/2023 - 10/14/2023

Name/Title Doug Storey / QC Technician

Report Date 10/13/2023

Procedure	Sieve/Test	Result	Unit	26A Mod LS Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	100-100
	1/2" (12.5mm)	99.6	%	95-100
	3/8" (9.5mm)	90.1	%	60-95
	#4 (4.75mm)	9.9	%	5-30
	#8 (2.36mm)	2.8	%	0-12
	#16 (1.18mm)	2.2	%	
	#30 (.6mm)	2.0	%	
	#50 (.3mm)	1.9	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.8	%	
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	3.76	%	

Plant S103-Superior Brighton

Product 1022-2NS GR

Period: 10/08/2023 - 10/14/2023

Name/Title Doug Storey / QC Technician

Report Date 10/13/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.9	%	95-100
	#8 (2.36mm)	85.2	%	65-95
	#16 (1.18mm)	65.1	%	35-75
	#30 (.6mm)	46.6	%	20-55
	#50 (.3mm)	20.3	%	10-30
	#100 (.15mm)	3.5	%	0-10
	#200 (75µm)	0.5	%	
	FM	2.80		2.6-3
	Wash Loss (#200/75um)	0.5	%	0-3
	Total Moisture	3.83	%	