Aggregate Optimization Chart

Production Gradation Report

PLANT #: 12

Contractor: _____

Sample Date: 10/16/23

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 10/17/2023 through 10/23/2023

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"	98.4	100.0	100.0	99.2	0.8	0.8
3/4"	81.9	100.0	100.0	91.0	8.2	9.0
1/2"	46.2	97.1	100.0	72.8	18.1	27.2
3/8"	28.0	88.5	100.0	62.9	10.0	37.1
#4	6.2	22.5	96.4	43.6	19.2	56.4
#8	3.5	5.3	80.6	34.2	9.4	65.8
#16	3.0	2.3	65.2	27.5	6.7	72.5
#30	2.8	2.0	49.3	21.1	6.4	78.9
#50	2.6	1.7	24.3	11.1	10.0	88.9
#100	2.4	1.6	5.1	3.4	7.7	96.6
LBW	2.0	1.4	0.8	1.5	1.9	98.5

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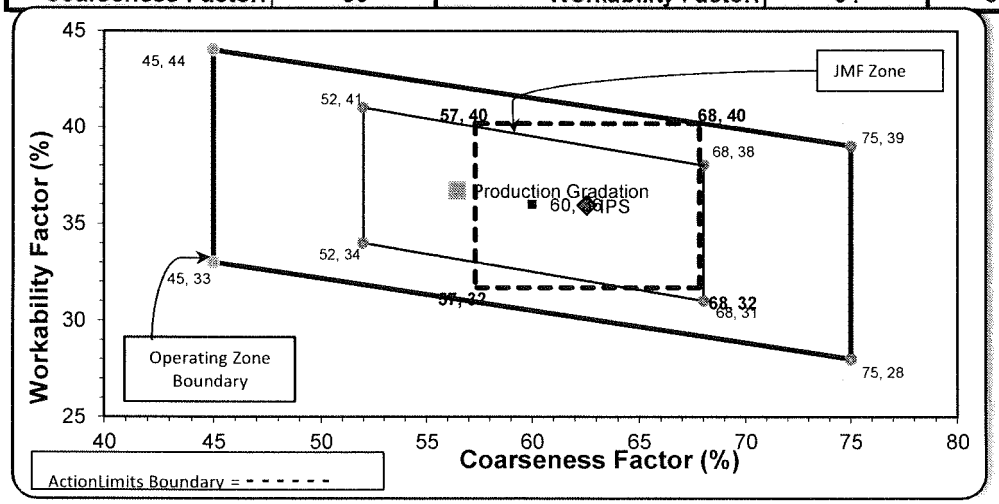
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

*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 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:	56	Workability Factor:	34	Adjusted WF: 36.7



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-Onsite Southfield

Product 1051-6AA LS

Period: 10/15/2023 - 10/21/2023

Name/Title Doug Storey / QC Technician

Report Date 10/21/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.4	%	95-100
	3/4" (19mm)	81.9	%	
	1/2" (12.5mm)	46.2	%	30-60
	3/8" (9.5mm)	28.0	%	
	#4 (4.75mm)	6.2	%	0-8
	#8 (2.36mm)	3.5	%	
	#16 (1.18mm)	3.0	%	
	#30 (.6mm)	2.8	%	
	#50 (.3mm)	2.6	%	
	#100 (.15mm)	2.4	%	
	#200 (75µm)	2.07	%	
	Wash Loss (#200/75um)	2.0	%	0-2
	Total Moisture	3.84	%	

Plant S12-Onsite Southfield

Product 1067-26A Mod LS

Period: 10/15/2023 - 10/21/2023

Name/Title Doug Storey / QC Technician

Report Date 10/21/2023

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)	97.1	%	95-100
	3/8" (9.5mm)	88.5	%	60-95
	#4 (4.75mm)	22.5	%	5-30
	#8 (2.36mm)	5.3	%	0-12
	#16 (1.18mm)	2.3	%	
	#30 (.6mm)	2.0	%	
	#50 (.3mm)	1.7	%	
	#100 (.15mm)	1.6	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75um)	1.4	%	0-3
	Total Moisture	3.97	%	

Plant S12-Onsite Southfield

Product 1022-2NS GR

Period: 10/15/2023 - 10/21/2023

Name/Title Doug Storey / QC Technician

Report Date 10/21/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.4	%	95-100
	#8 (2.36mm)	80.6	%	65-95
	#16 (1.18mm)	65.2	%	35-75
	#30 (.6mm)	49.3	%	20-55
	#50 (.3mm)	24.3	%	10-30
	#100 (.15mm)	5.1	%	0-10
	#200 (75µm)	1.2	%	
	FM	2.79		2.6-3
	Wash Loss (#200/75um)	0.8	%	0-3
	Total Moisture	5.63	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: 14

Sample Date: 10/16/23

Dates Test Represents: 10/17/2023 through 10/23/2023

Concrete Grade: **DM, 4500HP**

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.7
26A	58-003	Stoneco	360	2.14	2.69	12.2
2NS	19-04	Schlegel	1100	6.60	2.67	37.2
		Total Wt	**2960**	**17.68**		100.0

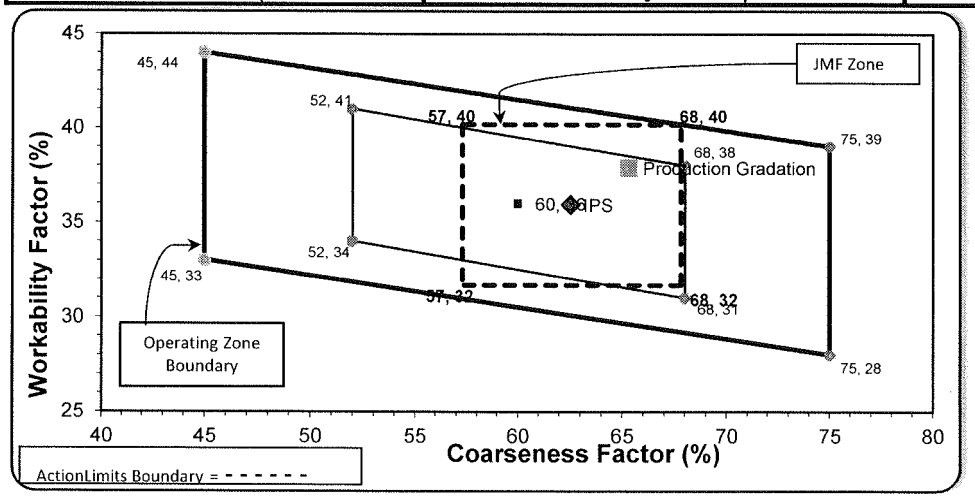
<----- Verify this number is 100%

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"	90.8	100.0	100.0	95.3	4.7	4.7
1/2"	46.5	100.0	100.0	72.9	22.4	27.1
3/8"	19.5	88.5	100.0	57.8	15.1	42.2
#4	2.9	8.3	99.8	39.6	18.2	60.4
#8	2.0	3.1	91.5	35.4	4.2	64.6
#16	1.7	2.5	71.9	27.9	7.5	72.1
#30	1.6	2.3	48.5	19.1	8.8	80.9
#50	1.6	2.3	16.0	7.0	12.1	93.0
#100	1.5	2.2	3.5	2.3	4.7	97.7
LBW	1.3	2.1	0.7	1.2	1.2	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 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:	65	Workability Factor:	35	Adjusted WF: 37.9



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

Builders Redi-Mix
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

PREPARED BY:
SM, LLC Technical Service

Approved By:

Plant S14-Superior Lansing

Product 1051-6AA LS

Period: 10/15/2023 - 10/21/2023

Name/Title Doug Storey / QC Technician

Report Date 10/21/2023

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)	90.8	%	
	1/2" (12.5mm)	46.5	%	30-60
	3/8" (9.5mm)	19.5	%	
	#4 (4.75mm)	2.9	%	0-8
	#8 (2.36mm)	2.0	%	
	#16 (1.18mm)	1.7	%	
	#30 (.6mm)	1.6	%	
	#50 (.3mm)	1.6	%	
	#100 (.15mm)	1.5	%	
	#200 (75µm)	1.39	%	
AASHTO T11	-#200 (75um)	1.39	%	
	Wash Loss (#200/75um)	1.3	%	0-2
ASTM C566	Total Moisture	3.62	%	

Plant S14-Superior Lansing

Product 1067-26A Mod LS

Name/Title Doug Storey / QC Technician

Period: 10/15/2023 - 10/21/2023

Report Date 10/21/2023

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)	100.0	%	95-100
	3/8" (9.5mm)	88.5	%	60-95
	#4 (4.75mm)	8.3	%	5-30
	#8 (2.36mm)	3.1	%	0-12
	#16 (1.18mm)	2.5	%	
	#30 (.6mm)	2.3	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	2.2	%	
	Wash Loss (#200/75um)	2.1	%	0-3
ASTM C566	Total Moisture	3.50	%	

Plant S14-Superior Lansing

Product 1022-2NS GR

Name/Title Doug Storey / QC Technician

Period: 10/15/2023 - 10/21/2023

Report Date 10/21/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	99.8	%	95-100
	#8 (2.36mm)	91.5	%	65-95
	#16 (1.18mm)	71.9	%	35-75
	#30 (.6mm)	48.5	%	20-55
	#50 (.3mm)	16.0	%	10-30
	#100 (.15mm)	3.5	%	0-10
	#200 (75µm)	0.9	%	
	FM	2.69		2.6-3
AASHTO T11	-#200 (75um)	0.92	%	
	Wash Loss (#200/75um)	0.7	%	0-3
ASTM C566	Total Moisture	3.31	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-102

Contractor: _____

Sample Date: 10/16/23

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 10/17/2023 through 10/23/2023

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	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"	84.4	100.0	100.0	92.1	7.9	7.9
1/2"	41.5	99.8	100.0	70.2	21.8	29.8
3/8"	18.0	90.3	100.0	57.3	12.9	42.7
#4	3.6	13.1	98.8	41.7	15.6	58.3
#8	2.5	3.8	85.2	34.9	6.8	65.1
#16	2.3	2.9	67.0	27.6	7.3	72.4
#30	2.1	2.5	47.1	19.7	7.9	80.3
#50	2.0	2.4	21.5	9.6	10.0	90.4
#100	2.0	2.3	4.3	2.9	6.7	97.1
LBW	1.7	2.1	0.6	1.3	1.6	98.7

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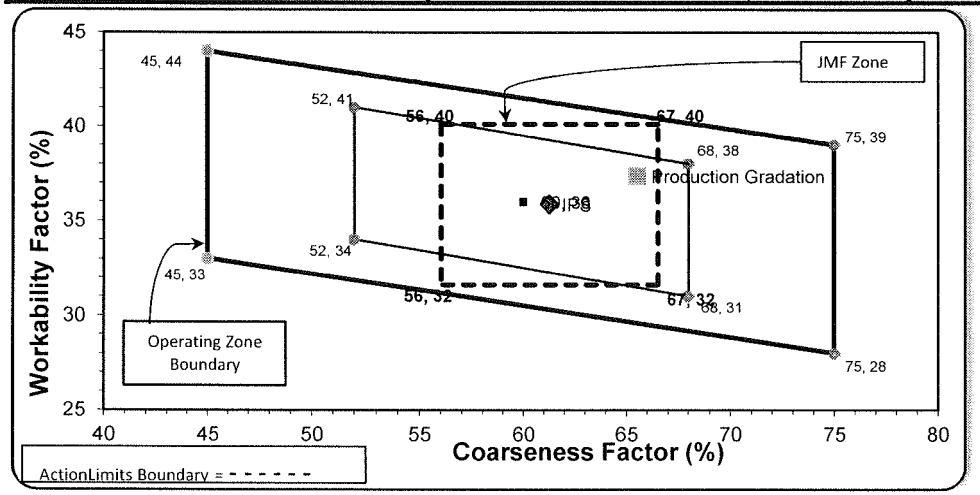
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

*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 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

PREPARED BY:
SM, LLC Technical Service

Approved By:

Plant S102-Superior Novi

Product 1051-6AA LS

Period: 10/15/2023 - 10/21/2023

Name/Title Doug Storey / QC Technician

Report Date 10/21/2023

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)	84.4	%	
	1/2" (12.5mm)	41.5	%	30-60
	3/8" (9.5mm)	18.0	%	
	#4 (4.75mm)	3.6	%	0-8
	#8 (2.36mm)	2.5	%	
	#16 (1.18mm)	2.3	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	2.0	%	
	#200 (75µm)	1.85	%	
	Wash Loss (#200/75um)	1.7	%	0-2
	Total Moisture	4.12	%	

Plant S102-Superior Novi

Product 1067-26A Mod LS

Period: 10/15/2023 - 10/21/2023

Name/Title Doug Storey / QC Technician

Report Date 10/21/2023

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)	99.8	%	95-100
	3/8" (9.5mm)	90.3	%	60-95
	#4 (4.75mm)	13.1	%	5-30
	#8 (2.36mm)	3.8	%	0-12
	#16 (1.18mm)	2.9	%	
	#30 (.6mm)	2.5	%	
	#50 (.3mm)	2.4	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	2.2	%	
	Wash Loss (#200/75um)	2.1	%	0-3
	Total Moisture	4.28	%	

Plant S102-Superior Novi

Product 1022-2NS GR

Period: 10/15/2023 - 10/21/2023

Name/Title Doug Storey / QC Technician

Report Date 10/21/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.8	%	95-100
	#8 (2.36mm)	85.2	%	65-95
	#16 (1.18mm)	67.0	%	35-75
	#30 (.6mm)	47.1	%	20-55
	#50 (.3mm)	21.5	%	10-30
	#100 (.15mm)	4.3	%	0-10
	#200 (75µm)	0.7	%	
	FM	2.76		2.6-3
	Wash Loss (#200/75um)	0.6	%	0-3
	Total Moisture	3.89	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-103

Sample Date: 10/16/23

Dates Test Represents: 10/17/2023 through 10/23/2023

Contractor: _____

Concrete Grade: **DM, 4500HP**

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	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

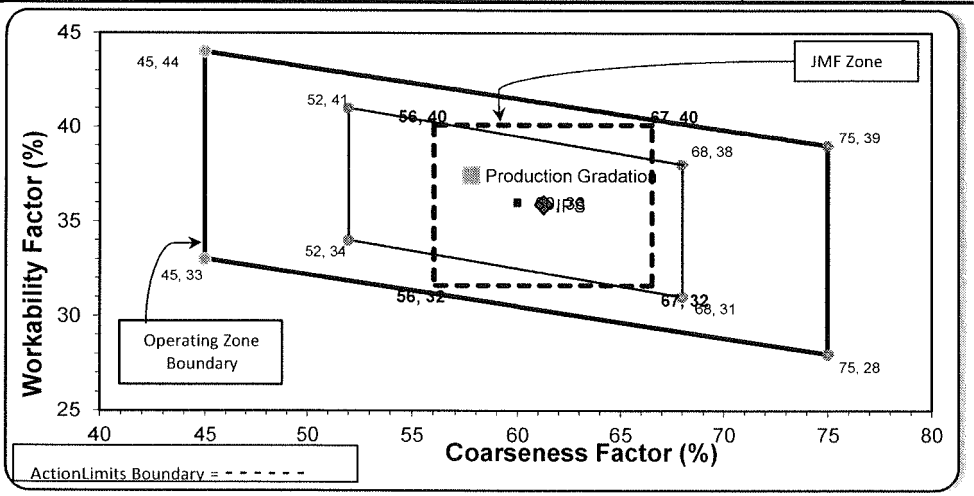
<----- Verify this number is 100%

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"	86.8	100.0	100.0	93.3	6.7	6.7
1/2"	46.2	99.8	100.0	72.6	20.7	27.4
3/8"	28.7	87.0	100.0	62.4	10.2	37.6
#4	4.3	14.4	98.8	42.2	20.3	57.8
#8	1.9	5.3	85.8	35.0	7.2	65.0
#16	1.5	4.0	67.7	27.6	7.4	72.4
#30	1.4	3.5	48.2	19.9	7.7	80.1
#50	1.4	3.3	22.8	9.9	9.9	90.1
#100	1.3	3.2	4.8	2.9	7.1	97.1
LBW	1.1	3.0	0.7	1.1	1.7	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 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:	58	Workability Factor:	35	Adjusted WF: 37.5



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
Farmington Hills, MI 48336

PREPARED BY:
SM, LLC Technical Service

Approved BY:

Plant S103-Superior Brighton

Product 1051-6AA LS

Period: 10/15/2023 - 10/21/2023

Name/Title Doug Storey / QC Technician

Report Date 10/21/2023

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)	86.8	%	
	1/2" (12.5mm)	46.2	%	30-60
	3/8" (9.5mm)	28.7	%	
	#4 (4.75mm)	4.3	%	0-8
	#8 (2.36mm)	1.9	%	
	#16 (1.18mm)	1.5	%	
	#30 (.6mm)	1.4	%	
	#50 (.3mm)	1.4	%	
	#100 (.15mm)	1.3	%	
	#200 (75µm)	1.22	%	
	Wash Loss (#200/75um)	1.1	%	0-2
	Total Moisture	3.79	%	

Plant S103-Superior Brighton

Product 1067-26A Mod LS

Period: 10/15/2023 - 10/21/2023

Name/Title Doug Storey / QC Technician

Report Date 10/21/2023

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)	99.8	%	95-100
	3/8" (9.5mm)	87.0	%	60-95
	#4 (4.75mm)	14.4	%	5-30
	#8 (2.36mm)	5.3	%	0-12
	#16 (1.18mm)	4.0	%	
	#30 (.6mm)	3.5	%	
	#50 (.3mm)	3.3	%	
	#100 (.15mm)	3.2	%	
	#200 (75µm)	3.1	%	
	Wash Loss (#200/75um)	3.0	%	0-3
	Total Moisture	4.20	%	

Plant S103-Superior Brighton

Product 1022-2NS GR

Period: 10/15/2023 - 10/21/2023

Name/Title Doug Storey / QC Technician

Report Date 10/21/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.8	%	95-100
	#8 (2.36mm)	85.8	%	65-95
	#16 (1.18mm)	67.7	%	35-75
	#30 (.6mm)	48.2	%	20-55
	#50 (.3mm)	22.8	%	10-30
	#100 (.15mm)	4.8	%	0-10
	#200 (75µm)	0.8	%	
	FM	2.72		2.6-3
	Wash Loss (#200/75um)	0.7	%	0-3
	Total Moisture	3.67	%	