Aggregate Optimization Chart

Production Gradation Report

PLANT #: 20

Sample Date: 7/10/23

Concrete Grade: **S2M, 3500HP**

Contractor: _____

Dates Test Represents: 7/11/2023 through 7/17/2023

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1550	9.48	2.62	50.8
26A	71-47	Presque Isle	250	1.53	2.62	8.2
2NS	63-92	Grange Hall	1250	7.56	2.65	41.0
		Total Wt	**3050**	**18.57**		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"	86.7	100.0	100.0	93.2	6.8	6.8
1/2"	43.9	98.0	100.0	71.3	21.9	28.7
3/8"	22.6	87.2	100.0	59.6	11.7	40.4
#4	3.7	21.3	98.4	44.0	15.7	56.0
#8	2.3	6.2	85.4	36.7	7.3	63.3
#16	2.0	3.9	70.6	30.3	6.4	69.7
#30	1.9	3.4	51.9	22.5	7.8	77.5
#50	1.9	3.1	20.7	9.7	12.8	90.3
#100	1.8	2.9	3.9	2.8	7.0	97.2
LBW	1.5	2.6	0.8	1.3	1.4	98.7

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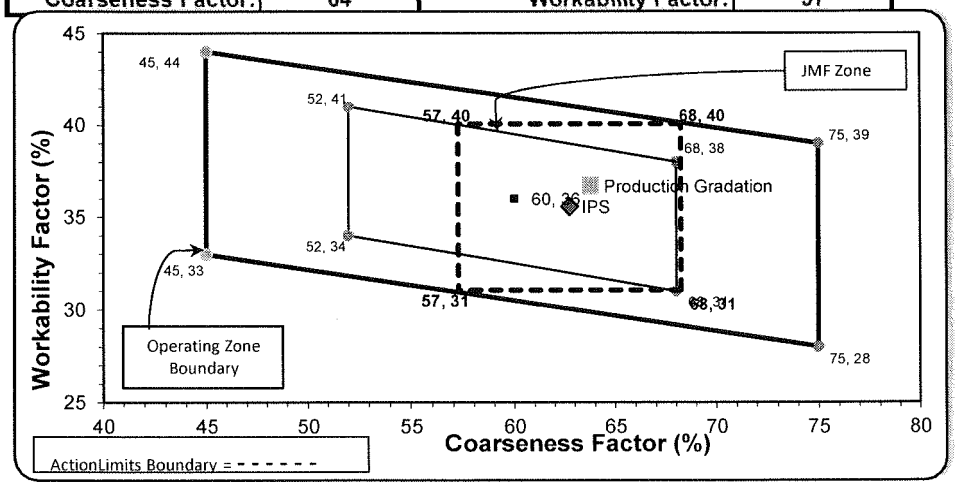
*Maximum % Retained must be above the 3/8" sieve.
*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom.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

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	64	Workability Factor:	37



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"	100.0	0.0	0.0
3/4"	93.3	6.7	6.7
1/2"	70.6	22.6	29.4
3/8"	59.6	11.0	40.4
#4	43.9	15.7	56.1
#8	35.6	8.4	64.4
#16	28.4	7.2	71.6
#30	19.4	9.0	80.6
#50	7.5	11.9	92.5
#100	0.9	6.6	99.1
LBW	0.9	0.1	99.1

PREPARED BY:
SM, LLC Technical Service

Approved By:

Plant S20-Superior Flint

Product 1054-6AA LS PI

Period: 07/09/2023 - 07/15/2023

Name/Title Doug Storey / QC Technician

Report Date 07/13/2023

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)	86.7	%	
	1/2" (12.5mm)	43.9	%	30-60
	3/8" (9.5mm)	22.6	%	
	#4 (4.75mm)	3.7	%	0-8
	#8 (2.36mm)	2.3	%	
	#16 (1.18mm)	2.0	%	
	#30 (.6mm)	1.9	%	
	#50 (.3mm)	1.9	%	
	#100 (.15mm)	1.8	%	
	#200 (75µm)	1.62	%	
	Wash Loss (#200/75um)	1.5	%	0-2
	Total Moisture	3.83	%	

Plant S20-Superior Flint

Product 1067-26A Mod LS

Period: 07/09/2023 - 07/15/2023

Name/Title Doug Storey / QC Technician

Report Date 07/13/2023

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)	98.0	%	95-100
	3/8" (9.5mm)	87.2	%	60-95
	#4 (4.75mm)	21.3	%	5-30
	#8 (2.36mm)	6.2	%	0-12
	#16 (1.18mm)	3.9	%	
	#30 (.6mm)	3.4	%	
	#50 (.3mm)	3.1	%	
	#100 (.15mm)	2.9	%	
	#200 (75µm)	2.6	%	
	Wash Loss (#200/75um)	2.6	%	0-3
	Total Moisture	2.51	%	

Plant S20-Superior Flint

Product 1022-2NS GR

Period: 07/09/2023 - 07/15/2023

Name/Title Doug Storey / QC Technician

Report Date 07/13/2023

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)	85.4	%	65-95
	#16 (1.18mm)	70.6	%	35-75
	#30 (.6mm)	51.9	%	20-55
	#50 (.3mm)	20.7	%	10-30
	#100 (.15mm)	3.9	%	0-10
	#200 (75µm)	1.0	%	
	FM	2.69		2.6-3
	Wash Loss (#200/75um)	0.8	%	0-3
	Total Moisture	2.92	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-102

Sample Date: 7/10/23

Concrete Grade: **S2M, 3500HP**

Dates Test Represents: 7/11/2023 through 7/17/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1650	9.83	2.69	53.2
26A	58-003	Stoneco	250	1.49	2.69	8.1
2NS	81-019	Pleasant Lake	1200	7.26	2.65	38.7
		Total Wt	**3100**	**18.58**		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"	97.1	100.0	100.0	98.5	1.5	1.5
3/4"	78.4	100.0	100.0	88.5	10.0	11.5
1/2"	46.4	99.7	100.0	71.4	17.1	28.6
3/8"	27.3	90.5	100.0	60.5	10.9	39.5
#4	6.7	13.9	99.0	43.0	17.5	57.0
#8	3.2	4.6	84.7	34.9	8.1	65.1
#16	2.4	3.3	66.7	27.4	7.5	72.6
#30	2.2	2.9	48.0	20.0	7.4	80.0
#50	2.1	2.6	23.0	10.2	9.8	89.8
#100	2.0	2.5	6.7	3.9	6.4	96.1
LBW	1.8	2.3	1.3	1.6	2.2	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.

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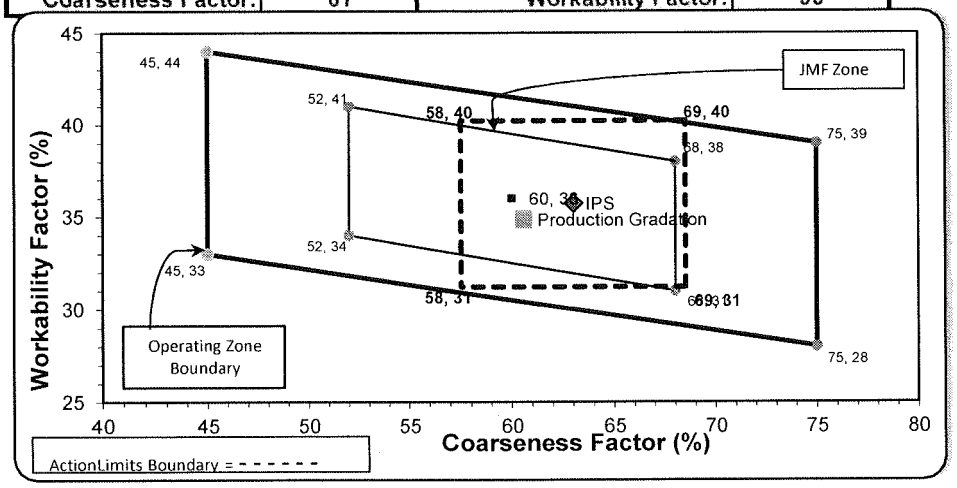
Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	61	Workability Factor:	35



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"	99.2	0.8	0.8
3/4"	90.9	8.3	9.1
1/2"	71.3	19.6	28.7
3/8"	59.5	11.8	40.5
#4	43.8	15.7	56.2
#8	35.7	8.1	64.3
#16	27.0	8.7	73.0
#30	18.6	8.4	81.4
#50	6.8	11.8	93.2
#100	1.4	5.4	98.6
LBW	0.6	0.8	99.4

PREPARED BY:
SM, LLC Technical Service

Approved By:

Plant S102-Superior Novi

Product 1051-6AA LS

Period: 07/09/2023 - 07/15/2023

Name/Title Doug Storey / QC Technician

Report Date 07/13/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	97.1	%	95-100
	3/4" (19mm)	78.4	%	
	1/2" (12.5mm)	46.4	%	30-60
	3/8" (9.5mm)	27.3	%	
	#4 (4.75mm)	6.7	%	0-8
	#8 (2.36mm)	3.2	%	
	#16 (1.18mm)	2.4	%	
	#30 (.6mm)	2.2	%	
	#50 (.3mm)	2.1	%	
	#100 (.15mm)	2.0	%	
	#200 (75µm)	1.95	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	4.27	%	

Plant S102-Superior Novi

Product 1067-26A Mod LS

Period: 07/09/2023 - 07/15/2023

Name/Title Doug Storey / QC Technician

Report Date 07/13/2023

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)	99.7	%	95-100
	3/8" (9.5mm)	90.5	%	60-95
	#4 (4.75mm)	13.9	%	5-30
	#8 (2.36mm)	4.6	%	0-12
	#16 (1.18mm)	3.3	%	
	#30 (.6mm)	2.9	%	
	#50 (.3mm)	2.6	%	
	#100 (.15mm)	2.5	%	
	#200 (75µm)	2.3	%	
	Wash Loss (#200/75um)	2.3	%	0-3
	Total Moisture	3.02	%	

Plant S102-Superior Novi

Product 1022-2NS GR

Period: 07/09/2023 - 07/15/2023

Name/Title Doug Storey / QC Technician

Report Date 07/13/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	99.0	%	95-100
	#8 (2.36mm)	84.7	%	65-95
	#16 (1.18mm)	66.7	%	35-75
	#30 (.6mm)	48.0	%	20-55
	#50 (.3mm)	23.0	%	10-30
	#100 (.15mm)	6.7	%	0-10
	#200 (75µm)	1.8	%	
	FM	2.72		2.6-3
	Wash Loss (#200/75um)	1.3	%	0-3
	Total Moisture	3.17	%	