Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-32

Sample Date: 5/22/23

Concrete Grade: **S2M, 3500HP**

Dates Test Represents: 5/23/2023 through 5/29/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1720	10.52	2.62	56.4
26A	71-47	Presque Isle	100	0.61	2.62	3.3
2NS	95-013	Smelter Bay	1230	7.44	2.65	40.3
		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"	96.7	100.0	100.0	98.1	1.9	1.9
3/4"	78.5	100.0	100.0	87.9	10.3	12.1
1/2"	37.1	94.6	100.0	64.4	23.5	35.6
3/8"	15.5	85.4	99.8	51.8	12.6	48.2
#4	1.3	19.1	96.4	40.2	11.6	59.8
#8	1.0	5.5	84.2	34.7	5.5	65.3
#16	0.9	2.5	68.3	28.1	6.6	71.9
#30	0.9	1.8	48.1	20.0	8.2	80.0
#50	0.9	1.6	22.7	9.7	10.2	90.3
#100	0.9	1.4	6.8	3.3	6.4	96.7
LBW	0.7	1.2	1.4	1.0	2.3	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.

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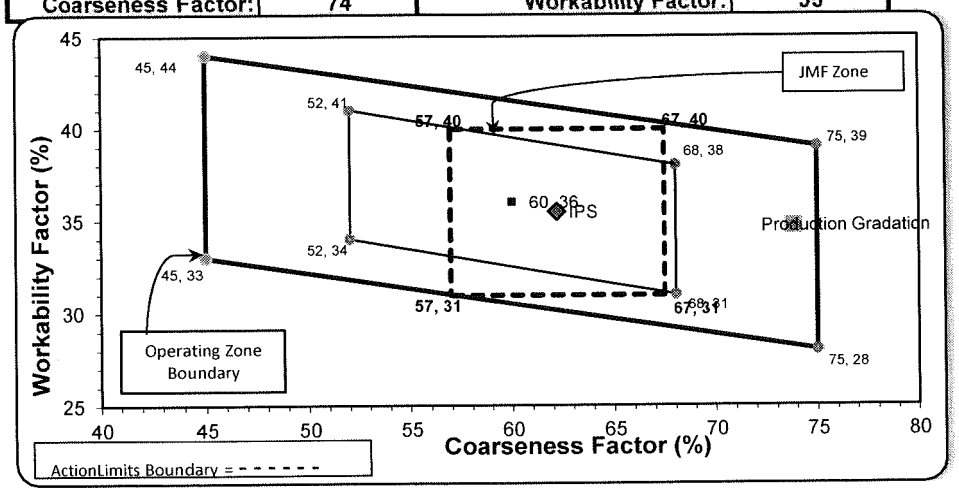
Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	74	Workability Factor:	35



Intial Production Sample (IPS)

Coarseness Factor:	62
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"	94.0	6.0	6.0
1/2"	70.2	23.7	29.8
3/8"	59.9	10.4	40.1
#4	42.7	17.2	57.3
#8	35.5	7.2	64.5
#16	28.4	7.0	71.6
#30	19.2	9.2	80.8
#50	8.9	10.3	91.1
#100	3.1	5.9	96.9
LBW	1.4	1.7	98.6

PREPARED BY:
SM, LLC Technical Service

Approved By:

Edw. C. Levy Co.

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Plant 958-JMT

Product 1054-6AA LS PI

Period: 05/21/2023 - 05/27/2023

Name/Title Doug Storey / QC Technician

Report Date 05/26/2023

Procedure	Sieve/Test	Result	Unit	6AA LS PI Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	96.7	%	95-100
	3/4" (19mm)	78.5	%	
	1/2" (12.5mm)	37.1	%	30-60
	3/8" (9.5mm)	15.5	%	
	#4 (4.75mm)	1.3	%	0-8
	#8 (2.36mm)	1.0	%	
	#16 (1.18mm)	0.9	%	
	#30 (.6mm)	0.9	%	
	#50 (.3mm)	0.9	%	
	#100 (.15mm)	0.9	%	
	#200 (75µm)	0.8	%	
	Wash Loss (#200/75um)	0.7	%	0-2
	Total Moisture	0.8	%	

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Plant 958-JMT

Product 1067-26A Mod LS

Period: 05/21/2023 - 05/27/2023

Name/Title Doug Storey / QC Technician

Report Date 05/26/2023

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)	94.6	%	95-100
	3/8" (9.5mm)	85.4	%	60-95
	#4 (4.75mm)	19.1	%	5-30
	#8 (2.36mm)	5.5	%	0-12
	#16 (1.18mm)	2.5	%	
	#30 (.6mm)	1.8	%	
	#50 (.3mm)	1.6	%	
	#100 (.15mm)	1.4	%	
	#200 (75µm)	1.3	%	
	Wash Loss (#200/75um)	1.2	%	0-3
	Total Moisture	1.9	%	

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Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Period: 05/21/2023 - 05/27/2023

Name/Title Doug Storey / QC Technician

Report Date 05/26/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	99.8	%	100-100
	#4 (4.75mm)	96.4	%	95-100
	#8 (2.36mm)	84.2	%	65-95
	#16 (1.18mm)	68.3	%	35-75
	#30 (.6mm)	48.1	%	20-55
	#50 (.3mm)	22.7	%	10-30
	#100 (.15mm)	6.8	%	0-10
	#200 (75µm)	1.8	%	
	FM	2.74		2.6-3
	Wash Loss (#200/75um)	1.4	%	0-3
	Total Moisture	4.5	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-102

Sample Date: 5/22/23

Concrete Grade: **S2M, 3500HP**

Dates Test Represents: 5/23/2023 through 5/29/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1725	10.28	2.69	55.6
26A	58-003	Stoneco	175	1.04	2.69	5.6
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"	99.3	100.0	100.0	99.6	0.4	0.4
3/4"	82.8	100.0	100.0	90.4	9.2	9.6
1/2"	43.7	99.4	100.0	68.6	21.8	31.4
3/8"	22.4	86.0	100.0	56.0	12.6	44.0
#4	4.7	11.7	98.8	41.5	14.5	58.5
#8	3.1	4.8	86.0	35.3	6.2	64.7
#16	2.5	3.8	70.0	28.7	6.6	71.3
#30	2.1	3.3	51.5	21.3	7.4	78.7
#50	1.6	2.8	24.8	10.6	10.6	89.4
#100	1.2	2.5	6.2	3.2	7.4	96.8
LBW	0.9	2.3	0.6	0.9	2.3	99.1

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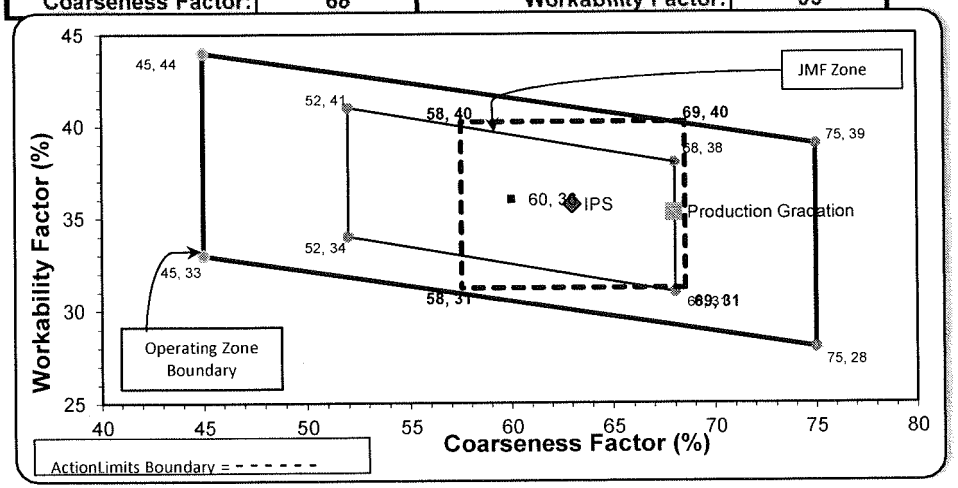
*Maximum % Retained must be above the 3/8" sieve.
*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom.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

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	68	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: 05/21/2023 - 05/27/2023

Name/Title Doug Storey / QC Technician

Report Date 05/26/2023

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)	82.8	%	
	1/2" (12.5mm)	43.7	%	30-60
	3/8" (9.5mm)	22.4	%	
	#4 (4.75mm)	4.7	%	0-8
	#8 (2.36mm)	3.1	%	
	#16 (1.18mm)	2.5	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	1.6	%	
	#100 (.15mm)	1.2	%	
	#200 (75µm)	1.02	%	
	Wash Loss (#200/75um)	0.9	%	0-2
	Total Moisture	3.66	%	

Plant S102-Superior Novi

Product 1067-26A Mod LS

Period: 05/21/2023 - 05/27/2023

Name/Title Doug Storey / QC Technician

Report Date 05/26/2023

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)	99.4	%	95-100
	3/8" (9.5mm)	86.0	%	60-95
	#4 (4.75mm)	11.7	%	5-30
	#8 (2.36mm)	4.8	%	0-12
	#16 (1.18mm)	3.8	%	
	#30 (.6mm)	3.3	%	
	#50 (.3mm)	2.8	%	
	#100 (.15mm)	2.5	%	
	#200 (75µm)	2.4	%	
	Wash Loss (#200/75um)	2.3	%	0-3
	Total Moisture	4.04	%	

Plant S102-Superior Novi

Product 1022-2NS GR

Period: 05/21/2023 - 05/27/2023

Name/Title Doug Storey / QC Technician

Report Date 05/26/2023

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)	86.0	%	65-95
	#16 (1.18mm)	70.0	%	35-75
	#30 (.6mm)	51.5	%	20-55
	#50 (.3mm)	24.8	%	10-30
	#100 (.15mm)	6.2	%	0-10
	#200 (75µm)	1.2	%	
	FM	2.63		2.6-3
	Wash Loss (#200/75um)	0.6	%	0-3
	Total Moisture	4.62	%	