Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-32

Sample Date: 11/16/20

Dates Test Represents: 11/17/2020 through 11/23/2020

Concrete Grade: DM

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1605	9.82	2.62	55.2
26A	71-47	Presque Isle	150	0.92	2.62	5.2
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	**2905**	**17.69**		100.0

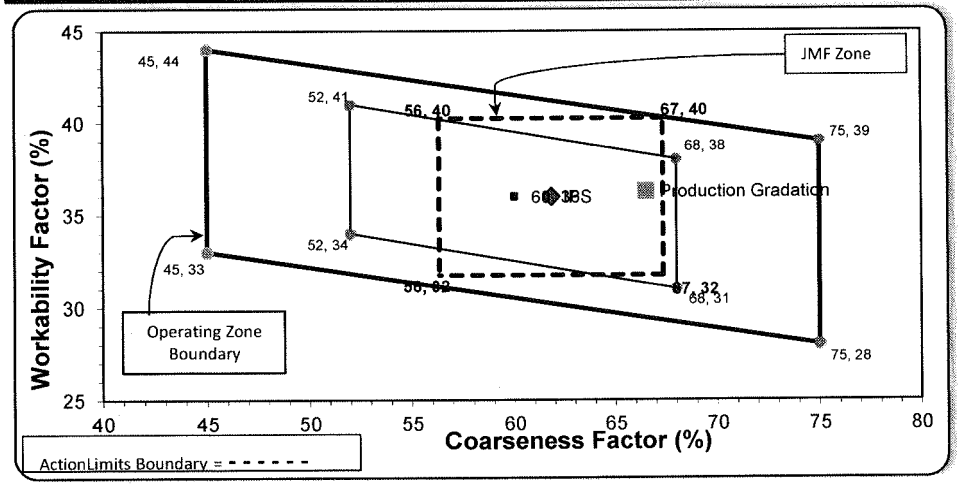
<----- Verify this number is 100%

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"	96.3	100.0	100.0	98.0	2.0	2.0
3/4"	49.6	100.0	100.0	72.2	25.8	27.8
1/2"	33.7	97.6	100.0	63.2	8.9	36.8
3/8"	21.3	89.0	100.0	56.0	7.3	44.0
#4	5.2	23.5	95.2	41.8	14.2	58.2
#8	2.4	6.0	81.2	33.8	8.0	66.2
#16	1.4	3.0	64.8	26.6	7.2	73.4
#30	1.3	2.5	42.8	17.8	8.8	82.2
#50	1.2	2.5	22.8	9.8	8.0	90.2
#100	1.1	2.5	9.7	4.6	5.2	95.4
LBW	1.0	1.6	1.2	1.1	3.5	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

Coarseness Factor:	67	Workability Factor:	34	Adjusted WF	36.3



Intial Production Sample (IPS)

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

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Plant 958-JMT

Product 1054-6AA LS PI

Period: 11/15/2020 - 11/21/2020

Name/Title Doug Storey / QC Technician

Report Date 11/20/2020

Procedure	Sieve/Test	Result	Unit	6AA LS PI Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	96.3	%	95-100
	3/4" (19mm)	49.6	%	
	1/2" (12.5mm)	33.7	%	30-60
	3/8" (9.5mm)	21.3	%	
	#4 (4.75mm)	5.2	%	0-8
	#8 (2.36mm)	2.4	%	
	#16 (1.18mm)	1.4	%	
	#30 (.6mm)	1.3	%	
	#50 (.3mm)	1.2	%	
	#100 (.15mm)	1.1	%	
	#200 (75µm)	1.1	%	
	Wash Loss (#200/75um)	1.0	%	0-2
	Total Moisture	2.5	%	

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Plant 958-JMT

Product 1067-26A Mod LS

Period: 11/15/2020 - 11/21/2020

Name/Title Doug Storey / QC Technician

Report Date 11/20/2020

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)	97.6	%	95-100
	3/8" (9.5mm)	89.0	%	60-95
	#4 (4.75mm)	23.5	%	5-30
	#8 (2.36mm)	6.0	%	0-12
	#16 (1.18mm)	3.0	%	
	#30 (.6mm)	2.5	%	
	#50 (.3mm)	2.5	%	
	#100 (.15mm)	2.5	%	
	#200 (75µm)	1.8	%	
	Wash Loss (#200/75um)	1.6	%	0-3
	Total Moisture	4.0	%	

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Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Period: 11/15/2020 - 11/21/2020

Name/Title Doug Storey / QC Technician

Report Date 11/20/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	95.2	%	95-100
	#8 (2.36mm)	81.2	%	65-95
	#16 (1.18mm)	64.8	%	35-75
	#30 (.6mm)	42.8	%	20-55
	#50 (.3mm)	22.8	%	10-30
	#100 (.15mm)	9.7	%	0-10
	#200 (75µm)	1.6	%	
	FM	2.84		2.6-3
	Wash Loss (#200/75um)	1.2	%	0-3
	Total Moisture	5.0	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-O2

Sample Date: 11/16/20

Dates Test Represents: 11/17/2020 through 11/23/2020

Concrete Grade: DM

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1505	9.21	2.62	51.8
26A	71-47	Presque Isle	250	1.53	2.62	8.6
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	**2905**	**17.69**		100.0

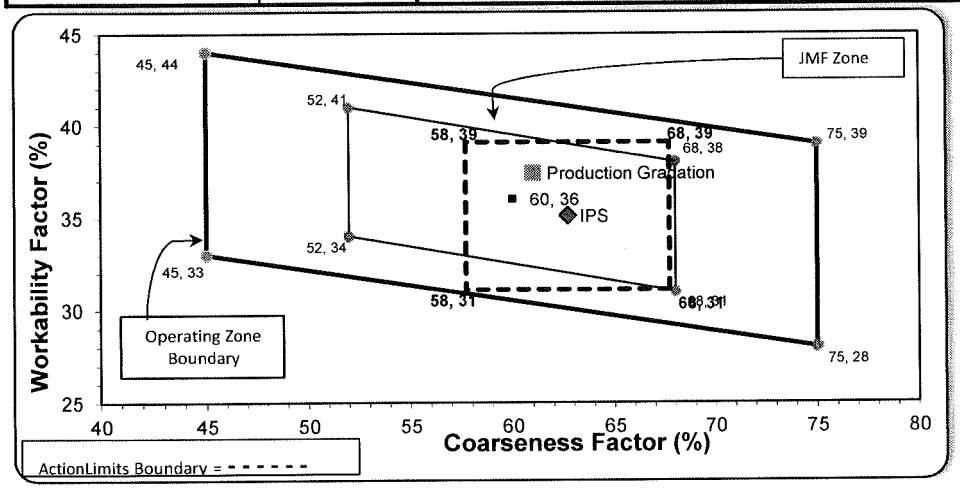
<----- Verify this number is 100%

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"	78.2	100.0	100.0	88.7	10.5	11.3
1/2"	43.0	97.4	100.0	70.2	18.5	29.8
3/8"	25.8	85.1	100.0	60.3	10.0	39.7
#4	5.2	19.1	97.6	43.0	17.3	57.0
#8	3.4	5.1	82.6	34.9	8.1	65.1
#16	2.2	2.8	68.4	28.5	6.4	71.5
#30	2.2	2.4	53.3	22.4	6.0	77.6
#50	2.0	2.3	25.0	11.1	11.3	88.9
#100	2.0	2.1	4.3	2.9	8.2	97.1
LBW	1.6	1.9	0.7	1.3	1.6	98.7

*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 SupplierGradations

Coarseness Factor:	61	Workability Factor:	35	Adjusted WF	37.4



Intial Production Sample (IPS)

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

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PREPARED BY:
SM, LLC Technical Service

Approved By:

Basic Quality Statistical Summary Report

Plant S02-Superior
Product Hoover 1051-6AA
Specification 6AA LS
Period 11/01/2020 - 11/23/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	2	100.0	0.00		
1 1/2" (37.5mm)	2	100.0	0.00		100-100
1" (25mm)	2	98.4	1.27		95-100
3/4" (19mm)	2	78.2	6.29		
1/2" (12.5mm)	2	43.0	6.65		30-60
3/8" (9.5mm)	2	25.8	7.42		
#4 (4.75mm)	2	5.2	1.77		0-8
#8 (2.36mm)	2	3.4	0.35		
#16 (1.18mm)	2	2.2	0.49		
#30 (.6mm)	2	2.2	0.49		
#50 (.3mm)	2	2.0	0.49		
#100 (.15mm)	2	2.0	0.42		
#200 (75µm)	2	1.80	0.325		
Pan	2	0.00	0.000		
Wash Loss (#200/75um)	2	1.6	0.21		0-2
Total Moisture	2	3.27	0.240		

Basic Quality Statistical Summary Report

Plant S02-Superior
Product Hoover 1067-26A S
Specification 26A Mod LS Spec
Period 11/01/2020 - 11/23/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	1	100.0			
1 1/2" (37.5mm)	1	100.0			
1" (25mm)	1	100.0			
3/4" (19mm)	1	100.0			100-100
1/2" (12.5mm)	1	97.4			95-100
3/8" (9.5mm)	1	85.1			60-95
#4 (4.75mm)	1	19.1			5-30
#8 (2.36mm)	1	5.1			0-12
#16 (1.18mm)	1	2.8			
#30 (.6mm)	1	2.4			
#50 (.3mm)	1	2.3			
#100 (.15mm)	1	2.1			
#200 (75µm)	1	2.0			
Pan	1	0.0			
Wash Loss (#200/75um)	1	1.9			0-3
Total Moisture	1	4.30			

Basic Quality Statistical Summary Report

Plant S02-Superior
Product Hoover 1102-2NS
Specification 2NS GR Spec
Period 11/01/2020 - 11/23/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
3/8" (9.5mm)	2	100.0	0.00		100-100
#4 (4.75mm)	2	97.6	0.92		95-100
#8 (2.36mm)	2	82.6	0.78		65-95
#16 (1.18mm)	2	68.4	0.57		35-75
#30 (.6mm)	2	53.3	0.99	40-50	20-55
#50 (.3mm)	2	25.0	2.55		10-30
#100 (.15mm)	2	4.3	0.99		0-10
#200 (75µm)	2	0.9	0.14		
Pan	2	0.0	0.00		
FM	2	2.69	0.071	2.7-2.9	2.6-3
Wash Loss (#200/75um)	2	0.7	0.00		0-3
Total Moisture	2	5.02	0.785		