

Aggregate Optimization Chart

PLANT #: **P-20**

Sample Date: **7/19/21**

Dates Test Represents: **7/20/2021** through **7/26/2021**

Concrete Grade: **DM**

Contractor: _____

MDOT No.: _____

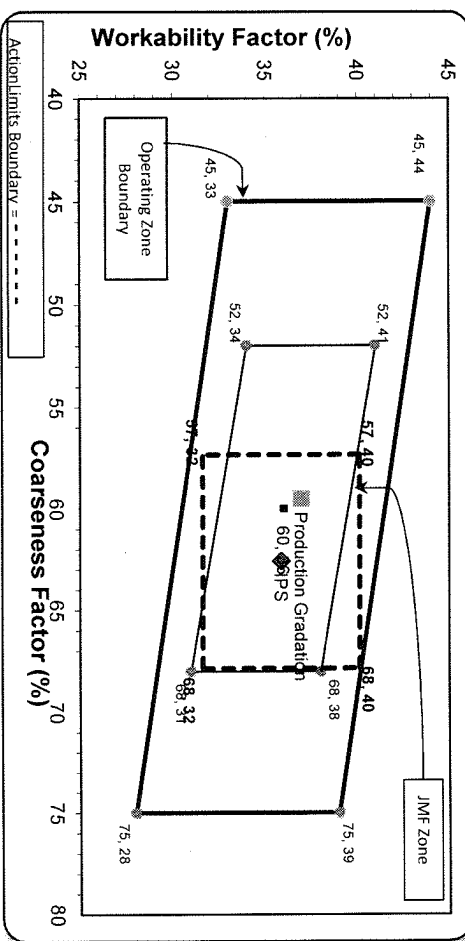
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %
6AA	71-47	Presque Isle	1705	10.43	2.62	58.7
26A	71-47	Presque Isle	100	0.61	2.62	3.4
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
			Total Wt	2905		100.0

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"	99.1	100.0	100.0	99.5	0.5	0.5
3/4"	87.7	100.0	100.0	92.8	6.7	7.2
1/2"	54.1	98.4	100.0	73.0	19.8	27.0
3/8"	34.1	90.7	100.0	61.0	12.0	39.0
#4	6.4	29.5	98.5	42.1	18.9	57.9
#8	3.1	7.4	85.5	34.4	7.6	65.6
#16	2.7	4.8	70.0	28.3	6.2	71.7
#30	2.6	3.6	51.2	21.0	7.2	79.0
#50	2.5	3.2	21.5	9.7	11.3	90.3
#100	2.3	2.9	3.3	2.7	7.0	97.3
LBW	1.9	2.3	0.4	1.3	1.4	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	<input checked="" type="radio"/> Batch Plant Gradations	<input type="radio"/> Aggregate Supplier Gradations
Coarseness Factor:	59	Workability Factor: 34
		Adjusted WF: 36.9



Sieve	% 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"	89.2	10.8	10.8
1/2"	68.4	20.8	31.6
3/8"	59.9	8.6	40.1
#4	43.0	16.9	57.0
#8	35.9	7.1	64.1
#16	29.0	6.8	71.0
#30	21.3	7.7	78.7
#50	9.9	11.4	90.1
#100	2.4	7.5	97.6
LBW	1.2	1.2	98.8



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PREPARED BY:
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Plant S20-Superior Flint

Product 1022-2NS GR

Name/Title Doug Storey / QC Technician

Period: 07/18/2021 - 07/24/2021

Report Date 07/24/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.5	%	95-100
	#8 (2.36mm)	85.5	%	65-95
	#16 (1.18mm)	70.0	%	35-75
	#30 (.6mm)	51.2	%	20-55
	#50 (.3mm)	21.5	%	10-30
	#100 (.15mm)	3.3	%	0-10
	#200 (75µm)	0.6	%	
	FM	2.70		2.6-3
	Wash Loss (#200/75um)	0.4	%	0-3
	Total Moisture	2.58	%	



Plant S20-Superior Flint
 Product 1067-26A Mod LS
 Period: 07/18/2021 - 07/24/2021

Name/Title Doug Storey / QC Technician
 Report Date 07/24/2021

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)	98.4	%	95-100
	3/8" (9.5mm)	90.7	%	60-95
	#4 (4.75mm)	29.5	%	5-30
	#8 (2.36mm)	7.4	%	0-12
	#16 (1.18mm)	4.8	%	
	#30 (.6mm)	3.6	%	
	#50 (.3mm)	3.2	%	
	#100 (.15mm)	2.9	%	
	#200 (75µm)	2.5	%	
	Wash Loss (#200/75um)	2.3	%	0-3
	Total Moisture	2.84	%	



Plant S20-Superior Flint

Product 1054-6AA LS PI

Name/Title Doug Storey / QC Technician

Period: 07/18/2021 - 07/24/2021

Report Date 07/24/2021

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	99.1	%	95-100
	3/4" (19mm)	87.7	%	
	1/2" (12.5mm)	54.1	%	30-60
	3/8" (9.5mm)	34.1	%	
	#4 (4.75mm)	6.4	%	0-8
	#8 (2.36mm)	3.1	%	
	#16 (1.18mm)	2.7	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.5	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	2.05	%	
	Wash Loss (#200/75um)	1.9	%	0-2
	Total Moisture	3.42	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-32**

Sample Date: **7/19/21**

Dates Test Represents: **7/20/2021** through **7/26/2021**

Concrete Grade: **DM**

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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	95-013	Smelter Bay	1150	6.95	2.65	39.6
Total Wt						17.69
						100.0

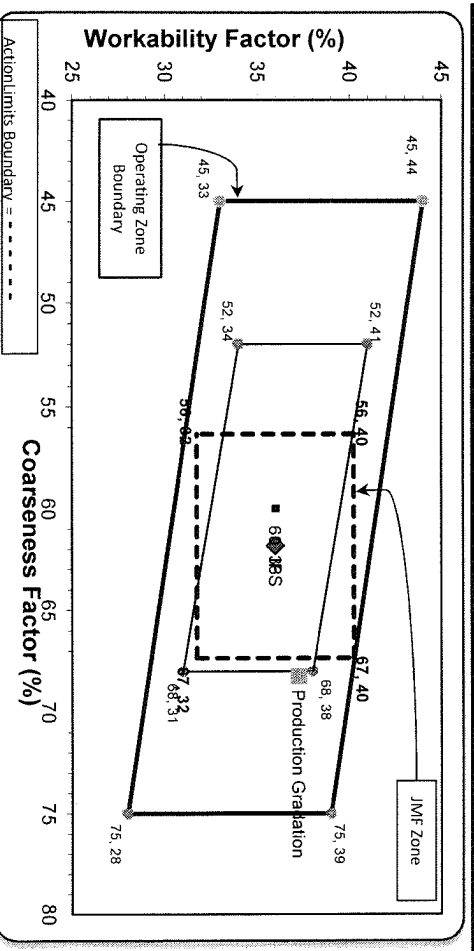
Verify this number is 100%

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"	96.9	100.0	100.0	98.5	1.5	1.5
3/4"	77.4	100.0	100.0	88.7	9.7	11.3
1/2"	31.8	96.2	100.0	65.6	23.2	34.4
3/8"	13.7	86.1	100.0	55.5	10.1	44.5
#4	3.3	23.5	96.0	42.1	13.3	57.9
#8	2.2	6.7	83.2	34.7	7.4	65.3
#16	1.9	3.5	68.4	28.4	6.3	71.6
#30	1.8	2.8	47.4	20.0	8.4	80.0
#50	1.7	2.5	23.3	10.3	9.6	89.7
#100	1.7	2.3	7.0	3.9	6.5	96.1
LBW	1.2	1.7	1.4	1.3	2.5	98.7

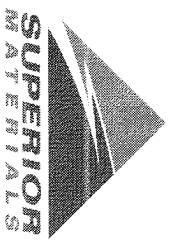
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max.
 nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max.
 nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when
 a 2" max. size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

Production Gradation	<input checked="" type="radio"/> Batch Plant Gradations	<input type="radio"/> Aggregate Supplier Gradations			
Coarseness Factor:	68	Workability Factor:	35	Adjusted WF	37.2

Initial Production Sample (IPS)	Coarseness Factor:	62	Workability Factor:	36
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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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PREPARED BY:
 SM, LLC Technical Service

Approved By: _____

Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Name/Title Doug Storey / QC Technician

Period: 07/18/2021 - 07/24/2021

Report Date 07/24/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.0	%	95-100
	#8 (2.36mm)	83.2	%	65-95
	#16 (1.18mm)	68.4	%	35-75
	#30 (.6mm)	47.4	%	20-55
	#50 (.3mm)	23.3	%	10-30
	#100 (.15mm)	7.0	%	0-10
	#200 (75µm)	1.7	%	
	FM	2.75		2.6-3
	Wash Loss (#200/75um)	1.4	%	0-3
	Total Moisture	5.1	%	

Plant 958-JMT

Product 1067-26A Mod LS

Name/Title Doug Storey / QC Technician

Period: 07/18/2021 - 07/24/2021

Report Date 07/24/2021

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)	96.2	%	95-100
	3/8" (9.5mm)	86.1	%	60-95
	#4 (4.75mm)	23.5	%	5-30
	#8 (2.36mm)	6.7	%	0-12
	#16 (1.18mm)	3.5	%	
	#30 (.6mm)	2.8	%	
	#50 (.3mm)	2.5	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.7	%	0-3
	Total Moisture	3.7	%	

Plant 958-JMT

Product 1054-6AA LS PI

Name/Title Doug Storey / QC Technician

Period: 07/18/2021 - 07/24/2021

Report Date 07/24/2021

Procedure	Sieve/Test	Result	Unit	6AA LS PI Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	96.9	%	95-100
	3/4" (19mm)	77.4	%	
	1/2" (12.5mm)	31.8	%	30-60
	3/8" (9.5mm)	13.7	%	
	#4 (4.75mm)	3.3	%	0-8
	#8 (2.36mm)	2.2	%	
	#16 (1.18mm)	1.9	%	
	#30 (.6mm)	1.8	%	
	#50 (.3mm)	1.7	%	
	#100 (.15mm)	1.7	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75um)	1.2	%	0-2
	Total Moisture	1.6	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-36

Contractor: _____

Sample Date: 7/19/21

Concrete Grade: DM

MDOT No.: _____

Dates Test Represents: 7/20/2021 through 7/26/2021

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %
6AA	71-47	Presque Isle	1405	8.59	2.62	48.4
26A	71-47	Presque Isle	400	2.45	2.62	13.8
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
Total Wt.						17,659
						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"	97.8	100.0	100.0	98.9	1.1	1.1
3/4"	82.8	100.0	100.0	91.7	7.3	8.3
1/2"	45.6	97.9	100.0	73.4	18.3	26.6
3/8"	25.7	88.0	100.0	62.4	11.0	37.6
#4	4.9	27.9	98.5	43.5	18.9	56.5
#8	2.1	6.8	86.4	34.7	8.8	65.3
#16	1.8	2.9	71.3	28.3	6.4	71.7
#30	1.8	2.3	52.5	21.1	7.2	78.9
#50	1.7	2.2	22.5	9.6	11.4	90.4
#100	1.6	2.0	3.7	2.5	7.2	97.5
LBW	1.1	1.4	0.7	1.0	1.5	99.0

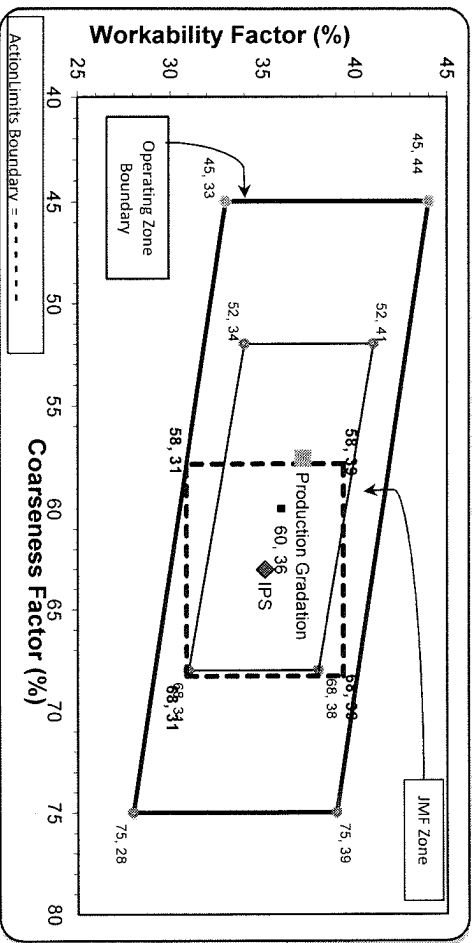
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max. nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max. nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom.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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: 58 Workability Factor: 35 Adjusted WF: 37.2

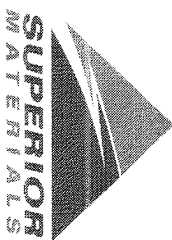
Initial Production Sample (IPS)

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.1	0.9	0.9
3/4"	90.3	8.8	9.7
1/2"	69.2	21.1	30.8
3/8"	59.1	10.1	40.9
#4	41.8	17.3	58.2
#8	35.1	6.6	64.9
#16	28.5	6.6	71.5
#30	21.2	7.3	78.8
#50	8.7	12.5	91.3
#100	1.8	7.0	98.2
LBW	0.7	1.0	99.3



PREPARED BY:
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Approved By: _____



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Plant S36-Superior Auburn Hills
Product 1022-2NS GR
Period: 07/18/2021 - 07/24/2021

Name/Title Doug Storey / QC Technician
Report Date 07/24/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.5	%	95-100
	#8 (2.36mm)	86.4	%	65-95
	#16 (1.18mm)	71.3	%	35-75
	#30 (.6mm)	52.5	%	20-55
	#50 (.3mm)	22.5	%	10-30
	#100 (.15mm)	3.7	%	0-10
	#200 (75µm)	0.9	%	
	FM	2.65		2.6-3
	Wash Loss (#200/75um)	0.7	%	0-3
	Total Moisture	3.25	%	



Superior Auburn Hills
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Plant S36-Superior Auburn Hills

Product 1067-26A Mod LS

Name/Title Doug Storey / QC Technician

Period: 07/18/2021 - 07/24/2021

Report Date 07/24/2021

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)	97.9	%	95-100
	3/8" (9.5mm)	88.0	%	60-95
	#4 (4.75mm)	27.9	%	5-30
	#8 (2.36mm)	6.8	%	0-12
	#16 (1.18mm)	2.9	%	
	#30 (.6mm)	2.3	%	
	#50 (.3mm)	2.2	%	
	#100 (.15mm)	2.0	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75µm)	1.4	%	0-3
	Total Moisture	3.91	%	



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Plant S36-Superior Auburn Hills

Product 1051-6AA LS

Name/Title Doug Storey / QC Technician

Period: 07/18/2021 - 07/24/2021

Report Date 07/24/2021

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	97.8	%	95-100
	3/4" (19mm)	82.8	%	
	1/2" (12.5mm)	45.6	%	30-60
	3/8" (9.5mm)	25.7	%	
	#4 (4.75mm)	4.9	%	0-8
	#8 (2.36mm)	2.1	%	
	#16 (1.18mm)	1.8	%	
	#30 (.6mm)	1.8	%	
	#50 (.3mm)	1.7	%	
	#100 (.15mm)	1.6	%	
	#200 (75µm)	1.2	%	
AASHTO T11	-#200 (75um)	1.24	%	
	Wash Loss (#200/75um)	1.1	%	0-2
	Total Moisture	2.86	%	