Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-36

Sample Date: 5/25/20

Concrete Grade: DM

Contractor: _____

Dates Test Represents: 5/26/2020 through 6/1/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	48.2
26A	71-47	Presque Isle	405	2.48	2.62	13.9
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
		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"	97.9	100.0	100.0	99.0	1.0	1.0
3/4"	72.3	100.0	100.0	86.7	12.3	13.3
1/2"	31.5	95.3	100.0	66.3	20.3	33.7
3/8"	15.6	78.2	100.0	56.3	10.0	43.7
#4	4.2	16.3	98.1	41.4	14.8	58.6
#8	3.0	5.8	86.0	34.8	6.6	65.2
#16	2.7	3.5	72.0	29.1	5.8	70.9
#30	2.6	3.1	53.4	21.9	7.1	78.1
#50	2.4	2.8	19.5	8.9	13.0	91.1
#100	2.2	2.3	3.8	2.8	6.1	97.2
LBW	1.7	1.4	1.1	1.4	1.4	98.6

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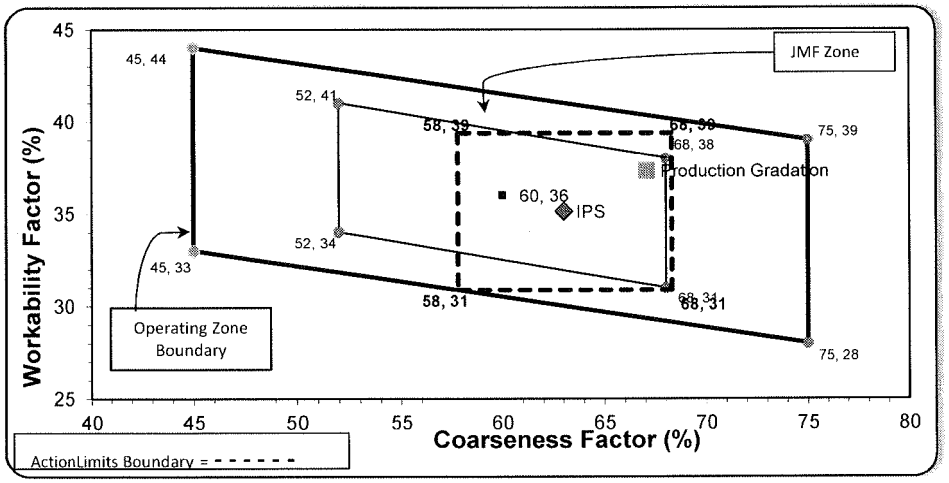
*Maximum % Retained must be above the 3/8" sieve.
*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom.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

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	67	Workability Factor:	35	Adjusted WF 37.3



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"	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:
SM, LLC Technical Service

Approved By:

2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1051-6AA LS

Period: 05/24/2020 - 05/30/2020

Name/Title Doug Storey / QC Technician

Report Date 05/28/2020

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	97.9	%	95-100
	3/4" (19mm)	72.3	%	
	1/2" (12.5mm)	31.5	%	30-60
	3/8" (9.5mm)	15.6	%	
	#4 (4.75mm)	4.2	%	0-8
	#8 (2.36mm)	3.0	%	
	#16 (1.18mm)	2.7	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.4	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	1.67	%	
	Wash Loss (#200/75um)	1.6	%	0-2
	Total Moisture	3.21	%	

2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1067-26A Mod LS

Period: 05/24/2020 - 05/30/2020

Name/Title Doug Storey / QC Technician

Report Date 05/29/2020

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)	95.3	%	95-100
	3/8" (9.5mm)	78.2	%	60-95
	#4 (4.75mm)	16.3	%	5-30
	#8 (2.36mm)	5.8	%	0-12
	#16 (1.18mm)	3.5	%	
	#30 (.6mm)	3.1	%	
	#50 (.3mm)	2.8	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75um)	1.3	%	0-3
	Total Moisture	2.24	%	

2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1022-2NS GR

Period: 05/24/2020 - 05/30/2020

Name/Title Doug Storey / QC Technician

Report Date 05/28/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.1	%	95-100
	#8 (2.36mm)	86.0	%	65-95
	#16 (1.18mm)	72.1	%	35-75
	#30 (.6mm)	53.4	%	20-55
	#50 (.3mm)	19.5	%	10-30
	#100 (.15mm)	3.8	%	0-10
	#200 (75µm)	1.1	%	
	FM	2.67		2.6-3
	Wash Loss (#200/75um)	0.9	%	0-3
	Total Moisture	3.61	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-39

Sample Date: 6/1/20

Dates Test Represents: 6/2/2020 through 6/8/2020

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	200	1.22	2.62	6.9
2NS	44-051	Krake Willis Rd	1100	6.65	2.65	37.9
		Total Wt	**2905**	**17.69**		100.0

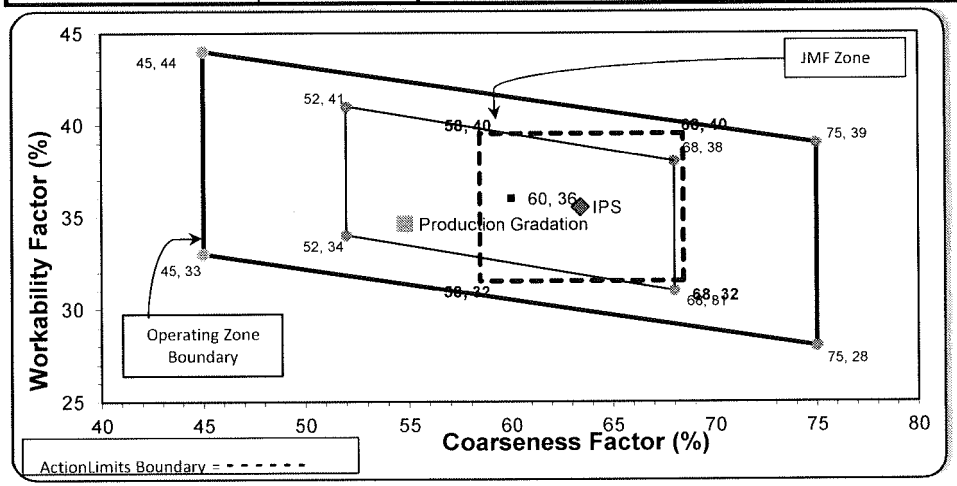
<----- Verify this number is 100%

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"	97.4	100.0	100.0	98.6	1.4	1.4
3/4"	84.7	100.0	100.0	91.5	7.0	8.5
1/2"	52.5	97.0	100.0	73.5	18.0	26.5
3/8"	34.4	86.0	100.0	62.8	10.8	37.2
#4	7.5	26.6	96.3	42.4	20.4	57.6
#8	3.4	9.7	78.1	32.1	10.3	67.9
#16	2.7	5.2	63.5	25.9	6.2	74.1
#30	2.5	4.1	45.5	18.9	7.0	81.1
#50	2.3	3.7	18.9	8.7	10.2	91.3
#100	2.0	3.3	5.1	3.3	5.4	96.7
LBW	1.6	2.7	0.8	1.4	1.9	98.6

*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:	55	Workability Factor:	32	Adjusted WF	34.6



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"	89.7	10.3	10.3
1/2"	70.3	19.4	29.7
3/8"	59.1	11.2	40.9
#4	42.8	16.3	57.2
#8	35.5	7.3	64.5
#16	29.0	6.5	71.0
#30	21.2	7.7	78.8
#50	9.8	11.5	90.2
#100	3.7	6.1	96.3
LBW	1.2	2.5	98.8

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Farmington Hills, MI 48336

PREPARED BY:
SM, LLC Technical Service

Approved By:

SUPERIOR MATERIALS

Plant S39-Superior Sterling Heights

Product 1051-6AA LS

Period: 05/24/2020 - 05/30/2020

Name/Title Doug Storey / QC Technician

Report Date 05/28/2020

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	97.4	%	95-100
	3/4" (19mm)	84.7	%	
	1/2" (12.5mm)	52.5	%	30-60
	3/8" (9.5mm)	34.4	%	
	#4 (4.75mm)	7.5	%	0-8
	#8 (2.36mm)	3.4	%	
	#16 (1.18mm)	2.7	%	
	#30 (.6mm)	2.5	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.0	%	
	#200 (75µm)	1.64	%	
	Wash Loss (#200/75um)	1.6	%	0-2
	Total Moisture	3.57	%	

SUPERIOR MATERIALS

Plant S39-Superior Sterling Heights

Product 1067-26A Mod LS

Period: 05/24/2020 - 05/30/2020

Name/Title Doug Storey / QC Technician

Report Date 05/29/2020

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)	97.0	%	95-100
	3/8" (9.5mm)	86.0	%	60-95
	#4 (4.75mm)	26.6	%	5-30
	#8 (2.36mm)	9.7	%	0-12
	#16 (1.18mm)	5.2	%	
	#30 (.6mm)	4.1	%	
	#50 (.3mm)	3.7	%	
	#100 (.15mm)	3.3	%	
	#200 (75µm)	2.7	%	
	Wash Loss (#200/75um)	2.5	%	0-3
	Total Moisture	1.88	%	

Plant S39-Superior Sterling Heights

Product 1022-2NS GR

Period: 05/24/2020 - 05/30/2020

Name/Title Doug Storey / QC Technician

Report Date 05/28/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.3	%	95-100
	#8 (2.36mm)	78.1	%	65-95
	#16 (1.18mm)	63.5	%	35-75
	#30 (.6mm)	45.5	%	20-55
	#50 (.3mm)	18.9	%	10-30
	#100 (.15mm)	5.1	%	0-10
	#200 (75µm)	0.8	%	
	FM	2.92		2.6-3
	Wash Loss (#200/75um)	0.7	%	0-3
	Total Moisture	3.65	%	