Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-36

Contractor: _____

Sample Date: 8/17/20

Concrete Grade: **DM**

Dates Test Represents: 8/18/2020 through 8/24/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1455	8.90	2.62	50.1
26A	71-47	Presque Isle	350	2.14	2.62	12.0
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
		Total Wt	**2905**	**17.69**		100.0

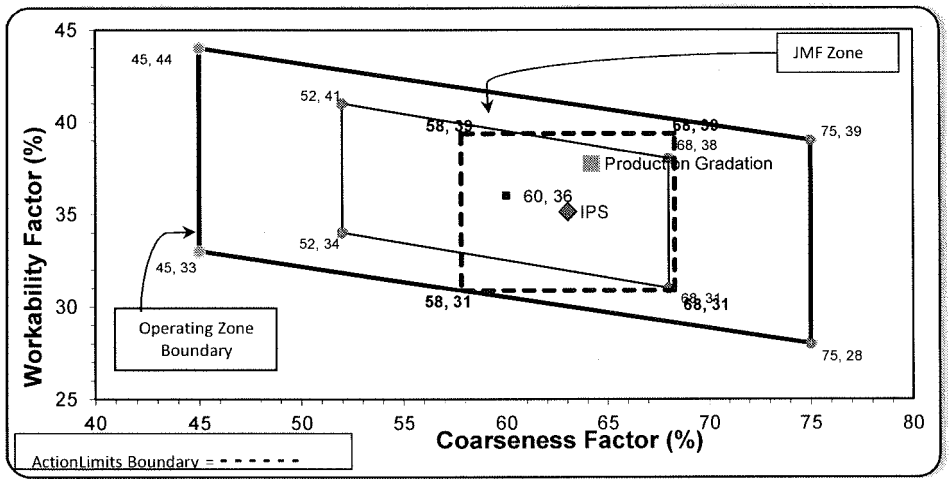
<----- Verify this number is 100%

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"	97.1	100.0	100.0	98.5	1.5	1.5
3/4"	65.2	100.0	100.0	82.6	16.0	17.4
1/2"	36.2	98.5	100.0	67.9	14.7	32.1
3/8"	20.1	87.1	100.0	58.4	9.4	41.6
#4	5.9	26.5	97.6	43.1	15.3	56.9
#8	3.2	8.5	86.1	35.2	7.9	64.8
#16	2.3	4.3	72.1	29.0	6.3	71.0
#30	2.1	3.5	49.7	20.3	8.7	79.7
#50	2.0	3.3	19.9	8.9	11.4	91.1
#100	1.8	3.0	2.7	2.3	6.6	97.7
LBW	1.7	2.6	0.8	1.5	0.8	98.5

*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:	35	Adjusted WF	37.7



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

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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: 08/16/2020 - 08/22/2020

Name/Title Doug Storey / QC Technician

Report Date 08/21/2020

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)	65.2	%	
	1/2" (12.5mm)	36.2	%	30-60
	3/8" (9.5mm)	20.1	%	
	#4 (4.75mm)	5.9	%	0-8
	#8 (2.36mm)	3.2	%	
	#16 (1.18mm)	2.3	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.8	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75um)	1.6	%	0-2
	Total Moisture	2.36	%	

2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1067-26A Mod LS

Period: 08/16/2020 - 08/22/2020

Name/Title Doug Storey / QC Technician

Report Date 08/21/2020

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)	98.5	%	95-100
	3/8" (9.5mm)	87.1	%	60-95
	#4 (4.75mm)	26.5	%	5-30
	#8 (2.36mm)	8.5	%	0-12
	#16 (1.18mm)	4.3	%	
	#30 (.6mm)	3.5	%	
	#50 (.3mm)	3.3	%	
	#100 (.15mm)	3.0	%	
	#200 (75µm)	2.6	%	
	Wash Loss (#200/75um)	2.4	%	0-3
	Total Moisture	2.27	%	

2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1022-2NS GR

Period: 08/16/2020 - 08/22/2020

Name/Title Doug Storey / QC Technician

Report Date 08/21/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.6	%	95-100
	#8 (2.36mm)	86.1	%	65-95
	#16 (1.18mm)	72.1	%	35-75
	#30 (.6mm)	49.7	%	20-55
	#50 (.3mm)	19.9	%	10-30
	#100 (.15mm)	2.7	%	0-10
	#200 (75µm)	0.8	%	
	FM	2.72		2.6-3
	Wash Loss (#200/75um)	0.8	%	0-3
	Total Moisture	3.36	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-39

Sample Date: 8/17/20

Concrete Grade: **DM**

Dates Test Represents: 8/18/2020 through 8/24/2020

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	44-051	Krake Willis Rd	1150	6.95	2.65	39.6
		Total Wt	**2905**	**17.69**		100.0

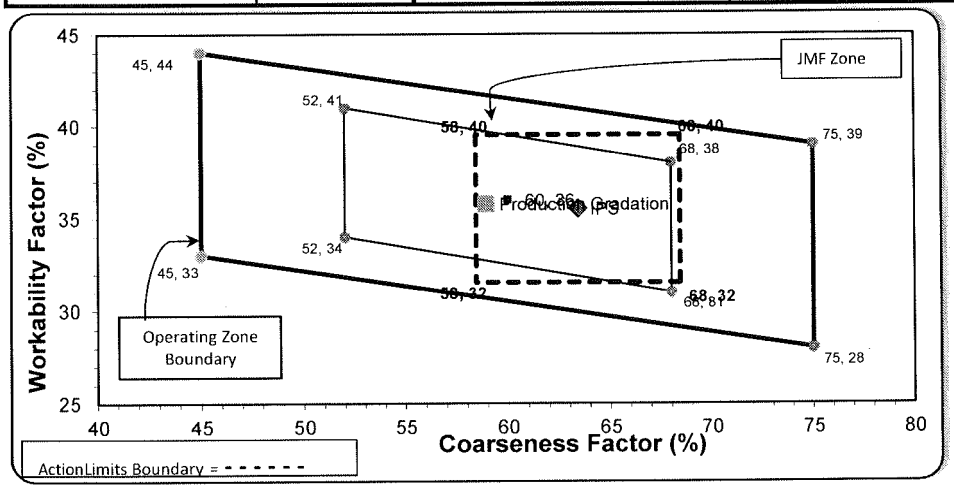
<----- Verify this number is 100%

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"	98.8	100.0	100.0	99.4	0.6	0.6
3/4"	78.9	100.0	100.0	89.1	10.3	10.9
1/2"	43.4	98.2	100.0	70.5	18.5	29.5
3/8"	25.8	89.8	100.0	60.7	9.8	39.3
#4	4.9	28.4	95.4	42.7	17.9	57.3
#8	2.5	8.1	79.0	33.3	9.5	66.7
#16	2.0	3.3	64.8	27.0	6.3	73.0
#30	1.9	2.6	48.8	20.5	6.4	79.5
#50	1.8	2.4	24.1	10.7	9.8	89.3
#100	1.7	2.3	6.3	3.6	7.1	96.4
LBW	1.5	2.2	0.6	1.2	2.4	98.8

*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:	59	Workability Factor:	33	Adjusted WF	35.8



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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PREPARED BY:
SM, LLC Technical Service

Approved By:

SUPERIOR MATERIALS

Plant S39-Superior Sterling Heights

Product 1051-6AA LS

Period: 08/16/2020 - 08/22/2020

Name/Title Doug Storey / QC Technician

Report Date 08/21/2020

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.8	%	95-100
	3/4" (19mm)	78.9	%	
	1/2" (12.5mm)	43.4	%	30-60
	3/8" (9.5mm)	25.8	%	
	#4 (4.75mm)	4.9	%	0-8
	#8 (2.36mm)	2.5	%	
	#16 (1.18mm)	2.0	%	
	#30 (.6mm)	1.9	%	
	#50 (.3mm)	1.8	%	
	#100 (.15mm)	1.7	%	
	#200 (75µm)	1.47	%	
	Wash Loss (#200/75um)	1.3	%	0-2
	Total Moisture	2.09	%	

Plant S39-Superior Sterling Heights

Product 1067-26A Mod LS

Period: 08/16/2020 - 08/22/2020

Name/Title Doug Storey / QC Technician

Report Date 08/21/2020

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)	98.2	%	95-100
	3/8" (9.5mm)	89.8	%	60-95
	#4 (4.75mm)	28.4	%	5-30
	#8 (2.36mm)	8.1	%	0-12
	#16 (1.18mm)	3.3	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.4	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	2.2	%	
	Wash Loss (#200/75um)	2.0	%	0-3
	Total Moisture	2.39	%	

Plant S39-Superior Sterling Heights

Product 1022-2NS GR

Period: 08/16/2020 - 08/22/2020

Name/Title Doug Storey / QC Technician

Report Date 08/21/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	95.4	%	95-100
	#8 (2.36mm)	79.0	%	65-95
	#16 (1.18mm)	64.8	%	35-75
	#30 (.6mm)	48.8	%	20-55
	#50 (.3mm)	24.1	%	10-30
	#100 (.15mm)	6.3	%	0-10
	#200 (75µm)	0.6	%	
	FM	2.82		2.6-3
	Wash Loss (#200/75um)	0.6	%	0-3
	Total Moisture	5.56	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-102

Contractor: _____

Sample Date: 8/17/20

Concrete Grade: DM

Dates Test Represents: 8/18/2020 through 8/24/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.8
26A	58-003	Stoneco	305	1.82	2.69	10.3
2NS	63-114	Highland	1150	6.95	2.65	38.9
		Total Wt	**2955**	**17.71**		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"	98.1	100.0	100.0	99.0	1.0	1.0
3/4"	67.1	100.0	100.0	83.3	15.7	16.7
1/2"	31.6	99.8	100.0	65.3	18.0	34.7
3/8"	10.4	84.8	100.0	52.9	12.3	47.1
#4	2.6	17.1	99.0	41.6	11.3	58.4
#8	1.6	5.3	81.6	33.1	8.5	66.9
#16	1.4	2.7	63.3	25.6	7.5	74.4
#30	1.3	2.1	46.4	18.9	6.7	81.1
#50	1.2	1.9	23.9	10.1	8.8	89.9
#100	1.1	1.8	6.7	3.4	6.8	96.6
LBW	1.0	1.7	1.7	1.3	2.0	98.7

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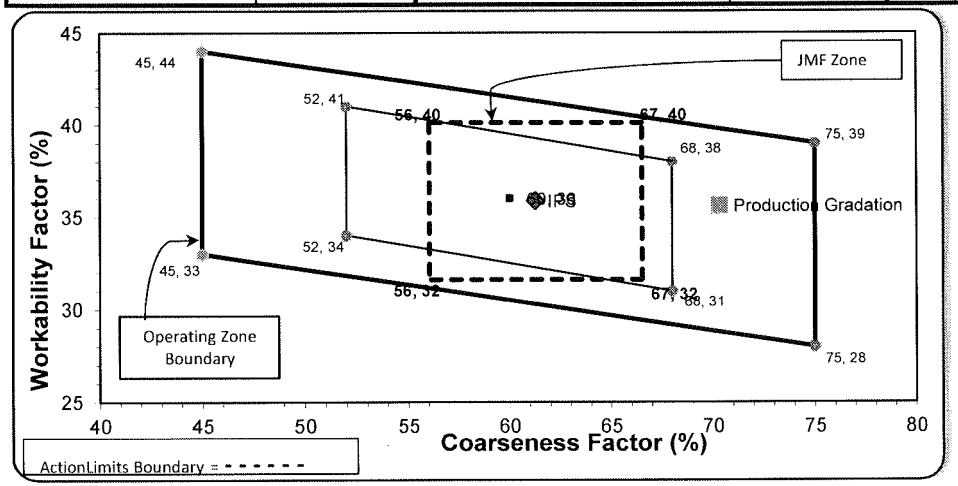
Farmington Hills, MI 48336

*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:	70	Workability Factor:	33	Adjusted WF 35.6



Intial Production Sample (IPS)

Coarseness Factor:	61
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"	99.3	0.7	0.7
3/4"	89.2	10.1	10.8
1/2"	70.7	18.5	29.3
3/8"	60.7	10.0	39.3
#4	44.4	16.3	55.6
#8	35.9	8.5	64.1
#16	27.3	8.6	72.7
#30	19.1	8.2	80.9
#50	7.4	11.7	92.6
#100	1.9	5.6	98.1
LBW	0.7	1.2	99.3

PREPARED BY:
SM, LLC Technical Service

Approved By:

Plant S102-Superior Novi

Product 1051-6AA LS

Period: 08/16/2020 - 08/22/2020

Name/Title Doug Storey / QC Technician

Report Date 08/21/2020

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.1	%	95-100
	3/4" (19mm)	67.1	%	
	1/2" (12.5mm)	31.6	%	30-60
	3/8" (9.5mm)	10.4	%	
	#4 (4.75mm)	2.6	%	0-8
	#8 (2.36mm)	1.6	%	
	#16 (1.18mm)	1.4	%	
	#30 (.6mm)	1.3	%	
	#50 (.3mm)	1.2	%	
	#100 (.15mm)	1.1	%	
	#200 (75µm)	1.01	%	
	Wash Loss (#200/75um)	0.9	%	0-2
	Total Moisture	2.88	%	

SUPERIOR MATERIALS

Plant S102-Superior Novi

Product 1067-26A Mod LS

Period: 08/16/2020 - 08/22/2020

Name/Title Doug Storey / QC Technician

Report Date 08/21/2020

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)	99.8	%	95-100
	3/8" (9.5mm)	84.8	%	60-95
	#4 (4.75mm)	17.1	%	5-30
	#8 (2.36mm)	5.3	%	0-12
	#16 (1.18mm)	2.7	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	1.9	%	
	#100 (.15mm)	1.8	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75um)	1.7	%	0-3
	Total Moisture	3.08	%	

Plant S102-Superior Novi

Product 1022-2NS GR

Period: 08/16/2020 - 08/22/2020

Name/Title Doug Storey / QC Technician

Report Date 08/21/2020

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)	81.6	%	65-95
	#16 (1.18mm)	63.3	%	35-75
	#30 (.6mm)	46.4	%	20-55
	#50 (.3mm)	23.9	%	10-30
	#100 (.15mm)	6.7	%	0-10
	#200 (75µm)	1.7	%	
	FM	2.79		2.6-3
	Wash Loss (#200/75um)	1.7	%	0-3
	Total Moisture	4.49	%	