Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-20**

Contractor: _____

Sample Date: 6/3/19

Concrete Grade: **DM**

Dates Test Represents: 6/4/2019 through 6/10/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1550	9.48	2.62	52.5
26A	71-47	Presque Isle	250	1.53	2.62	8.5
2NS	63-54	Holly	1150	6.95	2.65	39.0
		Total Wt	**2950**	**17.96**		100.0

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

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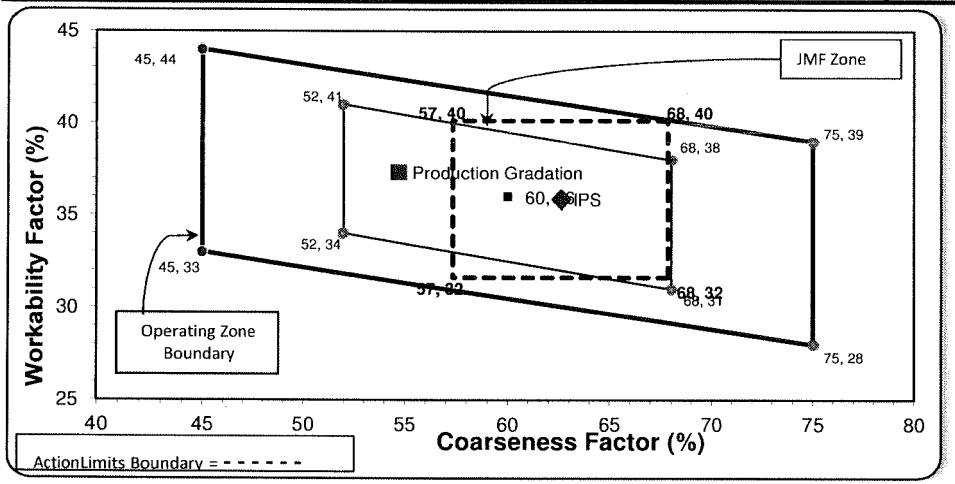
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

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"	98.0	100.0	100.0	98.9	1.1	1.1
3/4"	85.0	100.0	100.0	92.1	6.8	7.9
1/2"	51.5	97.0	100.0	74.3	17.9	25.7
3/8"	33.8	89.8	100.0	64.4	9.9	35.6
#4	8.0	26.0	96.9	44.2	20.2	55.8
#8	3.2	8.4	83.2	34.8	9.4	65.2
#16	2.6	3.7	67.0	27.8	7.0	72.2
#30	2.5	2.9	48.0	20.3	7.5	79.7
#50	2.4	2.6	17.6	8.3	11.9	91.7
#100	2.2	2.3	3.3	2.6	5.7	97.4
LBW	2.0	2.0	0.3	1.3	1.3	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 Supplier Gradations

Coarseness Factor:	55	Workability Factor:	35	Adjusted WF 37.3



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"	89.2	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

PREPARED BY:
SM, LLC Technical Service

Approved By:

SUPERIOR MATERIALS

Plant S20-Superior Flint

Product 1054-6AA LS PI

Period: 06/02/2019 - 06/08/2019

Name/Title Doug Storey / QC Technician

Report Date 06/06/2019

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.0	%	95-100
	3/4" (19mm)	85.0	%	
	1/2" (12.5mm)	51.5	%	30-60
	3/8" (9.5mm)	33.8	%	
	#4 (4.75mm)	8.0	%	0-8
	#8 (2.36mm)	3.2	%	
	#16 (1.18mm)	2.6	%	
	#30 (0.6mm)	2.5	%	
	#50 (0.3mm)	2.4	%	
	#100 (0.15mm)	2.2	%	
	#200 (75µm)	2.08	%	
	Wash Loss (#200/75um)	2.0	%	0-2
	Total Moisture	2.53	%	

Plant S20-Superior Flint

Product 1067-26A LS

Period: 06/02/2019 - 06/08/2019

Name/Title Doug Storey / QC Technician

Report Date 06/06/2019

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)	89.8	%	60-90
	#4 (4.75mm)	26.0	%	5-30
	#8 (2.36mm)	8.4	%	0-12
	#16 (1.18mm)	3.7	%	
	#30 (0.6mm)	2.9	%	
	#50 (0.3mm)	2.6	%	
	#100 (0.15mm)	2.3	%	
	#200 (75µm)	2.0	%	
	Wash Loss (#200/75um)	2.0	%	0-3
	Total Moisture	2.03	%	

Plant S20-Superior Flint

Product 1022-2NS GR

Period: 06/02/2019 - 06/08/2019

Name/Title Doug Storey / QC Technician

Report Date 06/06/2019

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.9	%	95-100
	#8 (2.36mm)	83.2	%	65-95
	#16 (1.18mm)	67.0	%	35-75
	#30 (0.6mm)	48.0	%	20-55
	#50 (0.3mm)	17.6	%	10-30
	#100 (0.15mm)	3.3	%	0-10
	#200 (75µm)	0.5	%	
	FM	2.84		2.6-3
	Wash Loss (#200/75um)	0.3	%	0-3
	Total Moisture	4.08	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-36**

Contractor: _____

Sample Date: 6/3/19

Concrete Grade: **DM**

Dates Test Represents: 6/4/2019 through 6/10/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1600	9.79	2.62	54.2
26A	71-47	Presque Isle	200	1.22	2.62	6.8
2NS	63-92	Grange Hall	1150	6.95	2.65	39.0
		Total Wt	**2950**	**17.96**		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"	97.2	100.0	100.0	98.5	1.5	1.5
3/4"	84.2	100.0	100.0	91.4	7.1	8.6
1/2"	51.0	97.3	100.0	73.2	18.2	26.8
3/8"	32.9	88.6	100.0	62.8	10.4	37.2
#4	5.9	23.2	97.3	42.7	20.1	57.3
#8	2.5	6.2	84.6	34.8	7.9	65.2
#16	2.0	3.9	69.0	28.2	6.5	71.8
#30	1.9	2.9	51.2	21.2	7.1	78.8
#50	1.8	2.6	23.5	10.3	10.9	89.7
#100	1.7	2.4	4.0	2.6	7.7	97.4
LBW	1.6	2.2	0.3	1.1	1.5	98.9

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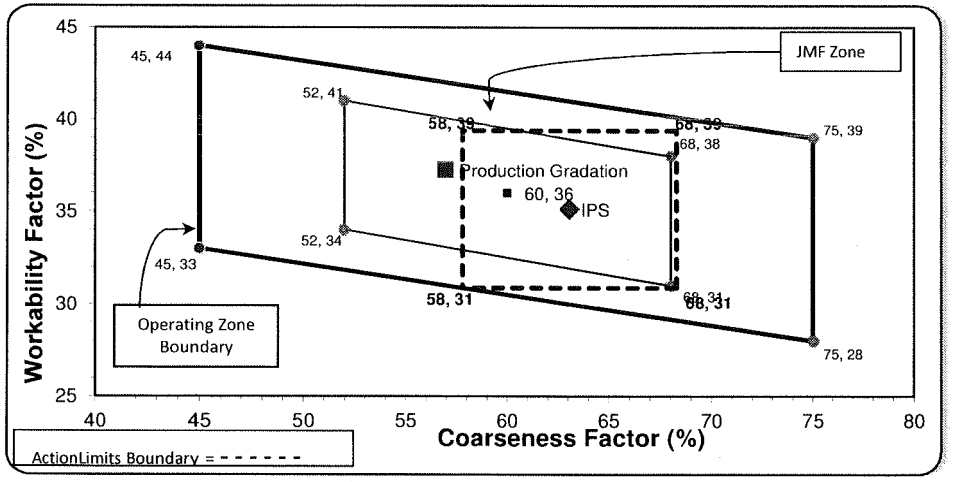
Suite 500
Farmington Hills, MI 48336

*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:	57	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:

Superior Auburn Hills
2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1051-6AA LS

Period: 06/02/2019 - 06/08/2019

Name/Title Doug Storey / QC Technician

Report Date 06/06/2019

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	97.2	%	95-100
	3/4" (19mm)	84.2	%	
	1/2" (12.5mm)	51.0	%	30-60
	3/8" (9.5mm)	32.9	%	
	#4 (4.75mm)	5.9	%	0-8
	#8 (2.36mm)	2.5	%	
	#16 (1.18mm)	2.0	%	
	#30 (0.6mm)	1.9	%	
	#50 (0.3mm)	1.8	%	
	#100 (0.15mm)	1.7	%	
	#200 (75µm)	1.62	%	
	Wash Loss (#200/75um)	1.6	%	0-2
	Total Moisture	2.46	%	

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2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1067-26A LS

Name/Title Doug Storey / QC Technician

Period: 06/02/2019 - 06/08/2019

Report Date 06/06/2019

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)	97.3	%	95-100
	3/8" (9.5mm)	88.6	%	60-90
	#4 (4.75mm)	23.2	%	5-30
	#8 (2.36mm)	6.2	%	0-12
	#16 (1.18mm)	3.9	%	
	#30 (0.6mm)	2.9	%	
	#50 (0.3mm)	2.6	%	
	#100 (0.15mm)	2.4	%	
	#200 (75µm)	2.2	%	
	Wash Loss (#200/75um)	2.2	%	0-3
	Total Moisture	2.68	%	

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2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1022-2NS GR

Period: 06/02/2019 - 06/08/2019

Name/Title Doug Storey / QC Technician

Report Date 06/06/2019

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.3	%	95-100
	#8 (2.36mm)	84.6	%	65-95
	#16 (1.18mm)	69.0	%	35-75
	#30 (0.6mm)	51.2	%	20-55
	#50 (0.3mm)	23.5	%	10-30
	#100 (0.15mm)	4.0	%	0-10
	#200 (75µm)	0.5	%	
	FM	2.70		2.6-3
	Wash Loss (#200/75um)	0.3	%	0-3
	Total Moisture	3.52	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-102**

Contractor: _____

Sample Date: 6/3/19

Concrete Grade: **DM**

Dates Test Represents: 6/4/2019 through 6/10/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	51.8
26A	58-003	Stoneco	295	1.76	2.69	9.8
2NS	38-046	Chelsea	1150	6.98	2.64	38.4
		Total Wt	**2995**	**17.97**		100.0

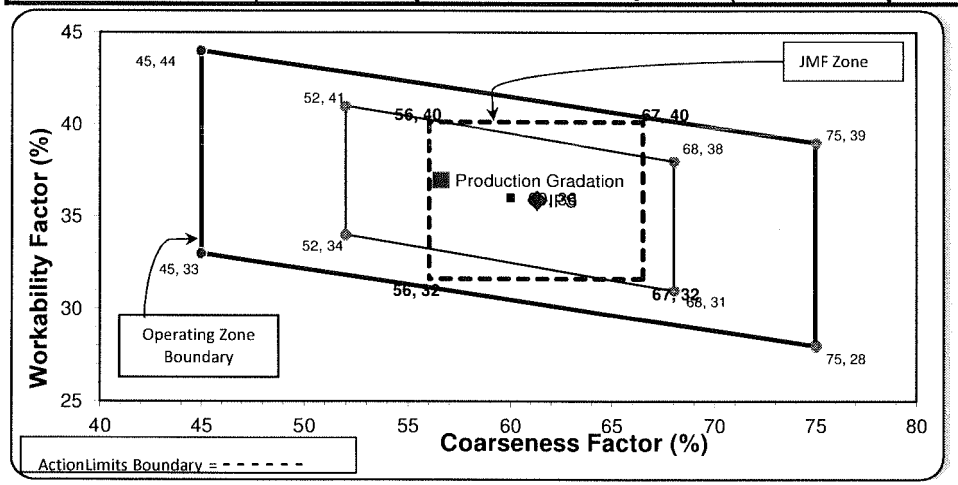
<----- Verify this number is 100%

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"	98.7	100.0	100.0	99.3	0.7	0.7
3/4"	83.9	100.0	100.0	91.7	7.7	8.3
1/2"	50.9	99.3	100.0	74.5	17.1	25.5
3/8"	31.1	85.4	100.0	62.9	11.6	37.1
#4	7.1	24.3	99.6	44.3	18.6	55.7
#8	2.1	7.7	85.0	34.5	9.8	65.5
#16	1.6	3.8	61.1	24.7	9.8	75.3
#30	1.4	2.9	40.4	16.5	8.1	83.5
#50	1.3	2.5	19.6	8.4	8.1	91.6
#100	1.3	2.4	4.3	2.6	5.9	97.4
LBW	1.1	2.3	1.1	1.2	1.3	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:	57	Workability Factor:	34	Adjusted WF 37.0



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

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Suite 500
Farmington Hills, MI 48336

PREPARED BY:
SM, LLC Technical Service

Approved By:

Plant S102-Superior Novi

Product 1051-6AA LS

Period: 06/02/2019 - 06/08/2019

Name/Title Doug Storey / QC Technician

Report Date 06/05/2019

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.7	%	95-100
	3/4" (19mm)	83.9	%	
	1/2" (12.5mm)	50.9	%	30-60
	3/8" (9.5mm)	31.1	%	
	#4 (4.75mm)	7.1	%	0-8
	#8 (2.36mm)	2.1	%	
	#16 (1.18mm)	1.6	%	
	#30 (0.6mm)	1.4	%	
	#50 (0.3mm)	1.3	%	
	#100 (0.15mm)	1.3	%	
	#200 (75µm)	1.24	%	
	Wash Loss (#200/75um)	1.1	%	0-2
	Total Moisture	3.17	%	

Plant S102-Superior Novi

Product 1067-26A LS

Period: 06/02/2019 - 06/08/2019

Name/Title Doug Storey / QC Technician

Report Date 06/05/2019

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)	99.3	%	95-100
	3/8" (9.5mm)	85.4	%	60-90
	#4 (4.75mm)	24.3	%	5-30
	#8 (2.36mm)	7.7	%	0-12
	#16 (1.18mm)	3.8	%	
	#30 (0.6mm)	2.9	%	
	#50 (0.3mm)	2.5	%	
	#100 (0.15mm)	2.4	%	
	#200 (75µm)	2.3	%	
	Wash Loss (#200/75um)	2.3	%	0-3
	Total Moisture	3.91	%	

SUPERIOR MATERIALS

Plant S102-Superior Novi

Product 1022-2NS GR

Period: 06/02/2019 - 06/08/2019

Name/Title Doug Storey / QC Technician

Report Date 06/05/2019

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	99.6	%	95-100
	#8 (2.36mm)	85.0	%	65-95
	#16 (1.18mm)	61.1	%	35-75
	#30 (0.6mm)	40.4	%	20-55
	#50 (0.3mm)	19.6	%	10-30
	#100 (0.15mm)	4.3	%	0-10
	#200 (75µm)	1.3	%	
	FM	2.90		2.6-3
	Wash Loss (#200/75um)	1.1	%	0-3
	Total Moisture	4.89	%	