Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-36**

Contractor: _____

Sample Date: 7/6/20

Concrete Grade: **DM**

Dates Test Represents: 7/7/2020 through 7/13/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1555	9.51	2.62	53.5
26A	71-47	Presque Isle	250	1.53	2.62	8.6
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
		Total Wt	**2905**	**17.69**		100.0

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

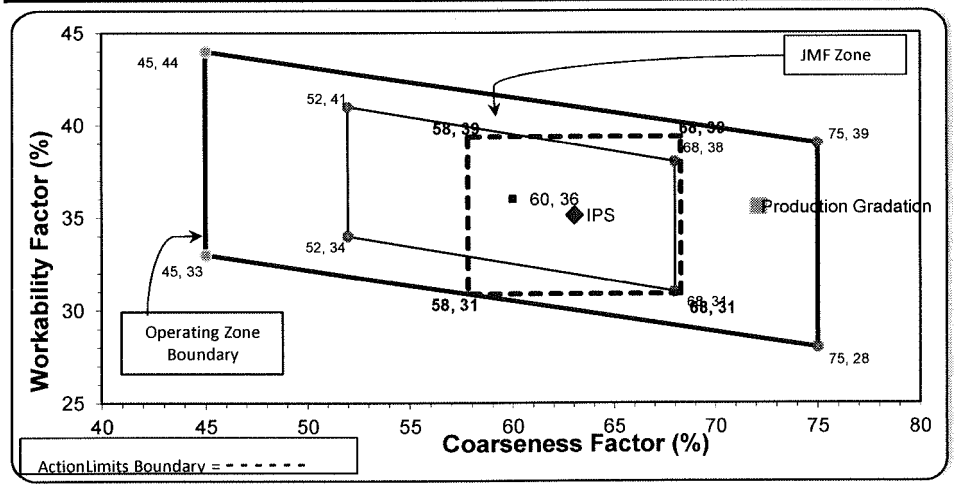
Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

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"	98.2	100.0	100.0	99.0	1.0	1.0
3/4"	71.2	100.0	100.0	84.6	14.5	15.4
1/2"	31.6	95.4	100.0	63.0	21.6	37.0
3/8"	13.0	80.1	100.0	51.7	11.3	48.3
#4	3.2	19.9	96.7	40.0	11.7	60.0
#8	2.4	7.0	82.3	33.1	7.0	66.9
#16	2.2	4.0	66.8	26.8	6.2	73.2
#30	2.0	3.4	48.8	19.8	7.0	80.2
#50	1.9	3.1	22.4	9.8	10.1	90.2
#100	1.7	2.8	4.9	3.0	6.8	97.0
LBW	1.5	2.5	1.9	1.7	1.3	98.3

*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:	72	Workability Factor:	33	Adjusted WF 35.6



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: 07/05/2020 - 07/11/2020

Name/Title Doug Storey / QC Technician

Report Date 07/10/2020

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.2	%	95-100
	3/4" (19mm)	71.2	%	
	1/2" (12.5mm)	31.6	%	30-60
	3/8" (9.5mm)	13.0	%	
	#4 (4.75mm)	3.2	%	0-8
	#8 (2.36mm)	2.4	%	
	#16 (1.18mm)	2.2	%	
	#30 (.6mm)	2.0	%	
	#50 (.3mm)	1.9	%	
	#100 (.15mm)	1.7	%	
	#200 (75µm)	1.5	%	
	Wash Loss (#200/75um)	1.3	%	0-2
	Total Moisture	1.80	%	

2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1067-26A Mod LS

Period: 07/05/2020 - 07/11/2020

Name/Title Doug Storey / QC Technician

Report Date 07/10/2020

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)	95.4	%	95-100
	3/8" (9.5mm)	80.1	%	60-95
	#4 (4.75mm)	19.9	%	5-30
	#8 (2.36mm)	7.0	%	0-12
	#16 (1.18mm)	4.0	%	
	#30 (.6mm)	3.4	%	
	#50 (.3mm)	3.1	%	
	#100 (.15mm)	2.8	%	
	#200 (75µm)	2.5	%	
	Wash Loss (#200/75um)	2.3	%	0-3
	Total Moisture	1.70	%	

2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1022-2NS GR

Period: 07/05/2020 - 07/11/2020

Name/Title Doug Storey / QC Technician

Report Date 07/10/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.7	%	95-100
	#8 (2.36mm)	82.3	%	65-95
	#16 (1.18mm)	66.8	%	35-75
	#30 (.6mm)	48.8	%	20-55
	#50 (.3mm)	22.4	%	10-30
	#100 (.15mm)	4.9	%	0-10
	#200 (75µm)	1.9	%	
	FM	2.78		2.6-3
	Wash Loss (#200/75um)	1.0	%	0-3
	Total Moisture	1.89	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-39**

Sample Date: 7/6/20

Dates Test Represents: 7/7/2020 through 7/13/2020

Concrete Grade: **DM**

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	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	44-051	Krake Willis Rd	1100	6.65	2.65	37.9
		Total Wt	**2905**	**17.69**		100.0

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

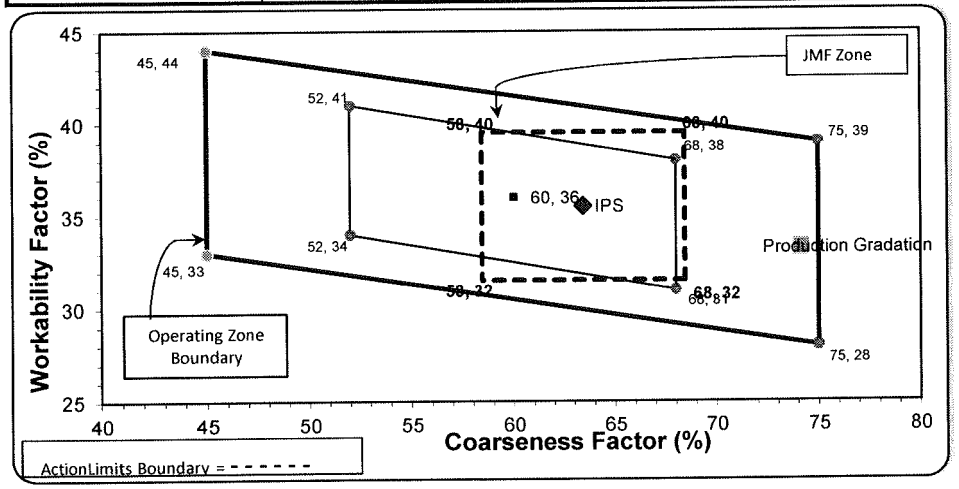
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	97.0	100.0	100.0	98.2	1.8	1.8
3/4"	78.0	100.0	100.0	87.1	11.2	12.9
1/2"	32.1	96.5	100.0	60.0	27.1	40.0
3/8"	13.7	81.1	100.0	48.7	11.3	51.3
#4	3.2	18.6	95.5	38.7	10.0	61.3
#8	2.3	7.2	77.1	30.8	7.9	69.2
#16	2.1	4.2	63.4	25.4	5.4	74.6
#30	2.0	3.4	49.7	20.1	5.3	79.9
#50	1.9	3.1	26.2	11.1	9.0	88.9
#100	1.8	3.0	7.7	4.1	7.1	95.9
LBW	1.5	2.7	2.1	1.8	2.3	98.2

*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.

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

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	74	Workability Factor:	31	Adjusted WF	33.3



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"	89.7	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

PREPARED BY:
SM, LLC Technical Service

Approved By:

SUPERIOR MATERIALS

Plant S39-Superior Sterling Heights

Product 1051-6AA LS

Name/Title Doug Storey / QC Technician

Period: 07/05/2020 - 07/11/2020

Report Date 07/10/2020

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	97.0	%	95-100
	3/4" (19mm)	78.0	%	
	1/2" (12.5mm)	32.1	%	30-60
	3/8" (9.5mm)	13.7	%	
	#4 (4.75mm)	3.2	%	0-8
	#8 (2.36mm)	2.3	%	
	#16 (1.18mm)	2.1	%	
	#30 (.6mm)	2.0	%	
	#50 (.3mm)	1.9	%	
	#100 (.15mm)	1.8	%	
	#200 (75µm)	1.52	%	
	Wash Loss (#200/75um)	1.4	%	0-2
	Total Moisture	3.18	%	

SUPERIOR MATERIALS

Plant S39-Superior Sterling Heights

Product 1067-26A Mod LS

Period: 07/05/2020 - 07/11/2020

Name/Title Doug Storey / QC Technician

Report Date 07/10/2020

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)	96.5	%	95-100
	3/8" (9.5mm)	81.1	%	60-95
	#4 (4.75mm)	18.6	%	5-30
	#8 (2.36mm)	7.2	%	0-12
	#16 (1.18mm)	4.2	%	
	#30 (.6mm)	3.4	%	
	#50 (.3mm)	3.1	%	
	#100 (.15mm)	3.0	%	
	#200 (75µm)	2.7	%	
	Wash Loss (#200/75um)	2.4	%	0-3
	Total Moisture	1.84	%	

SUPERIOR MATERIALS

Plant S39-Superior Sterling Heights

Product 1022-2NS GR

Period: 07/05/2020 - 07/11/2020

Name/Title Doug Storey / QC Technician

Report Date 07/10/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	95.5	%	95-100
	#8 (2.36mm)	77.1	%	65-95
	#16 (1.18mm)	63.4	%	35-75
	#30 (.6mm)	49.7	%	20-55
	#50 (.3mm)	26.2	%	10-30
	#100 (.15mm)	7.7	%	0-10
	#200 (75µm)	2.1	%	
	FM	2.80		2.6-3
	Wash Loss (#200/75um)	2.1	%	0-3
	Total Moisture	3.42	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Contractor: _____

Sample Date: 7/6/20

Concrete Grade: **DM**

Dates Test Represents: 7/7/2020 through 7/13/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1560	9.54	2.62	53.6
26A	71-47	Presque Isle	200	1.22	2.62	6.9
2NS	75-051	Mid-Michigan	1150	6.93	2.66	39.5
		Total Wt	**2910**	**17.69**		100.0

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

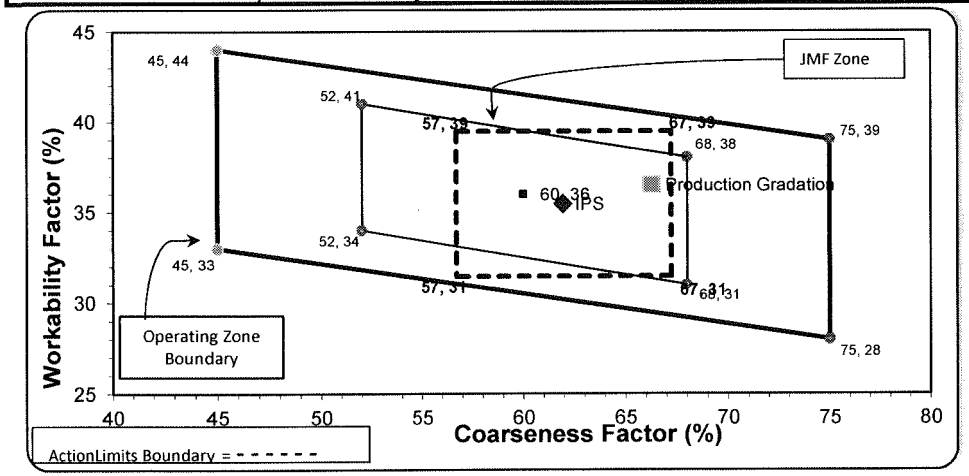
Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

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"	97.5	100.0	100.0	98.7	1.3	1.3
3/4"	74.1	100.0	100.0	86.1	12.5	13.9
1/2"	36.8	98.6	100.0	66.0	20.1	34.0
3/8"	19.6	90.7	100.0	56.3	9.8	43.7
#4	3.3	28.6	97.6	42.3	14.0	57.7
#8	1.8	9.1	82.0	34.0	8.3	66.0
#16	1.6	4.2	66.0	27.2	6.8	72.8
#30	1.5	3.3	50.9	21.1	6.1	78.9
#50	1.4	3.1	27.6	11.9	9.3	88.1
#100	1.4	2.9	8.9	4.5	7.4	95.5
LBW	1.2	2.7	1.8	1.5	2.9	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:	66	Workability Factor:	34	Adjusted WF	36.5



Initial Production Sample (IPS)

Coarseness Factor:	62
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"	95.0	5.0	5.0
1/2"	70.5	24.5	29.5
3/8"	60.0	10.5	40.0
#4	44.4	15.6	55.6
#8	35.5	9.0	64.5
#16	28.5	7.0	71.5
#30	21.5	7.0	78.5
#50	10.2	11.3	89.8
#100	3.1	7.1	96.9
LBW	1.3	1.8	98.7

PREPARED BY:
SM, LLC Technical Service

Approved By:

SUPERIOR MATERIALS

Plant S101-Superior Mount Clemens

Product 1051-6AA LS

Period: 07/05/2020 - 07/11/2020

Name/Title Doug Storey / QC Technician

Report Date 07/10/2020

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	97.5	%	95-100
	3/4" (19mm)	74.1	%	
	1/2" (12.5mm)	36.8	%	30-60
	3/8" (9.5mm)	19.6	%	
	#4 (4.75mm)	3.3	%	0-8
	#8 (2.36mm)	1.8	%	
	#16 (1.18mm)	1.6	%	
	#30 (.6mm)	1.5	%	
	#50 (.3mm)	1.4	%	
	#100 (.15mm)	1.4	%	
	#200 (75µm)	1.23	%	
	Wash Loss (#200/75um)	1.1	%	0-2
	Total Moisture	3.18	%	

SUPERIOR MATERIALS

Plant S101-Superior Mount Clemens

Product 1067-26A Mod LS

Period: 07/05/2020 - 07/11/2020

Name/Title Doug Storey / QC Technician

Report Date 07/10/2020

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)	98.6	%	95-100
	3/8" (9.5mm)	90.7	%	60-95
	#4 (4.75mm)	28.6	%	5-30
	#8 (2.36mm)	9.1	%	0-12
	#16 (1.18mm)	4.2	%	
	#30 (.6mm)	3.3	%	
	#50 (.3mm)	3.1	%	
	#100 (.15mm)	2.9	%	
	#200 (75µm)	2.7	%	
	Wash Loss (#200/75um)	2.5	%	0-3
	Total Moisture	2.88	%	

SUPERIOR MATERIALS

Plant S101-Superior Mount Clemens

Product 1022-2NS GR

Period: 07/05/2020 - 07/11/2020

Name/Title Doug Storey / QC Technician

Report Date 07/10/2020

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)	82.0	%	65-95
	#16 (1.18mm)	66.0	%	35-75
	#30 (.6mm)	50.9	%	20-55
	#50 (.3mm)	27.6	%	10-30
	#100 (.15mm)	8.9	%	0-10
	#200 (75µm)	1.8	%	
	FM	2.67		2.6-3
	Wash Loss (#200/75um)	1.5	%	0-3
	Total Moisture	4.38	%	