Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-32**

Contractor: _____

Sample Date: 8/19/19

Concrete Grade: **DM**

Dates Test Represents: 8/20/2019 through 8/26/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1600	9.79	2.62	55.1
26A	71-47	Presque Isle	155	0.95	2.62	5.3
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	**2905**	**17.69**		100.0

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

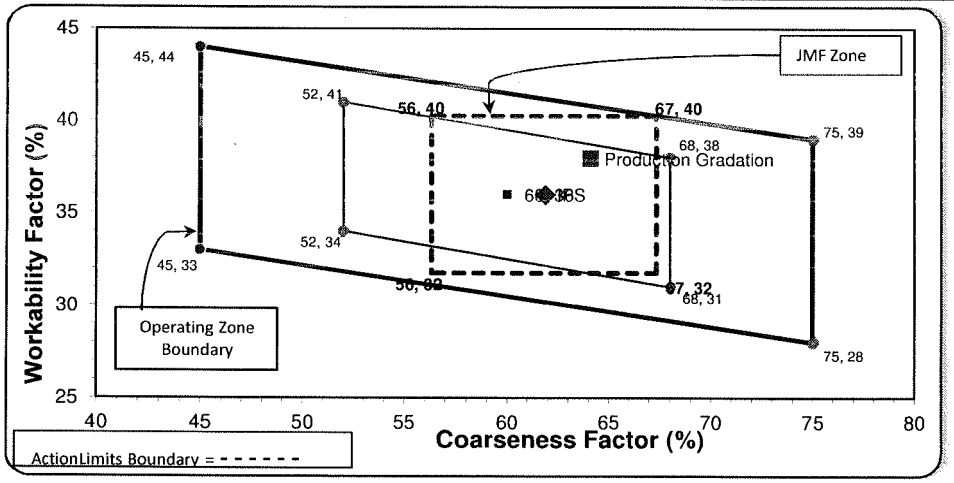
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	95.6	100.0	100.0	97.6	2.4	2.4
3/4"	70.6	100.0	100.0	83.8	13.8	16.2
1/2"	39.9	96.8	100.0	66.7	17.1	33.3
3/8"	26.2	86.4	100.0	58.6	8.1	41.4
#4	7.8	23.2	96.3	43.7	15.0	56.3
#8	3.6	5.8	83.8	35.5	8.2	64.5
#16	2.8	3.0	68.5	28.8	6.6	71.2
#30	2.6	2.4	48.7	20.8	8.0	79.2
#50	2.4	2.2	21.9	10.1	10.7	89.9
#100	2.3	2.1	5.5	3.6	6.6	96.4
LBW	1.7	1.8	1.6	1.7	1.9	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.

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

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	64	Workability Factor:	35	Adjusted WF 38.0



Intial Production Sample (IPS)

Coarseness Factor:	62
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"	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

PREPARED BY:
SM, LLC Technical Service

Approved By:

Edw. C. Levy Co.

JMT
8911 W. Jefferson
Detroit, 48209
(313) 429-2429

Plant 958-JMT

Product 1054-6AA LS PI

Name/Title Doug Storey / QC Technician

Period: 08/18/2019 - 08/24/2019

Report Date 08/21/2019

Procedure	Sieve/Test	Result	Unit	6AA LS PI Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	95.6	%	95-100
	3/4" (19mm)	70.6	%	
	1/2" (12.5mm)	39.9	%	30-60
	3/8" (9.5mm)	26.2	%	
	#4 (4.75mm)	7.8	%	0-8
	#8 (2.36mm)	3.6	%	
	#16 (1.18mm)	2.8	%	
	#30 (0.6mm)	2.6	%	
	#50 (0.3mm)	2.4	%	
	#100 (0.15mm)	2.3	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.7	%	0-2
	Total Moisture	3.5	%	

Edw. C. Levy Co.

JMT
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Detroit, 48209
(313) 429-2429

Plant 958-JMT

Product 1067-26A Mod LS

Period: 08/18/2019 - 08/24/2019

Name/Title Doug Storey / QC Technician

Report Date 08/21/2019

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)	96.8	%	95-100
	3/8" (9.5mm)	86.4	%	60-95
	#4 (4.75mm)	23.2	%	5-30
	#8 (2.36mm)	5.8	%	0-12
	#16 (1.18mm)	3.0	%	
	#30 (0.6mm)	2.4	%	
	#50 (0.3mm)	2.2	%	
	#100 (0.15mm)	2.1	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	4.4	%	

Edw. C. Levy Co.

JMT
8911 W. Jefferson
Detroit, 48209
(313) 429-2429

Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Period: 08/18/2019 - 08/24/2019

Name/Title Doug Storey / QC Technician

Report Date 08/21/2019

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)	83.8	%	65-95
	#16 (1.18mm)	68.5	%	35-75
	#30 (0.6mm)	48.7	%	20-55
	#50 (0.3mm)	21.9	%	10-30
	#100 (0.15mm)	5.5	%	0-10
	#200 (75µm)	1.8	%	
	FM	2.75		2.6-3
	Wash Loss (#200/75um)	1.6	%	0-3
	Total Moisture	5.9	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-36**

Contractor: _____

Sample Date: 8/19/19

Concrete Grade: **DM**

Dates Test Represents: 8/20/2019 through 8/26/2019

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%

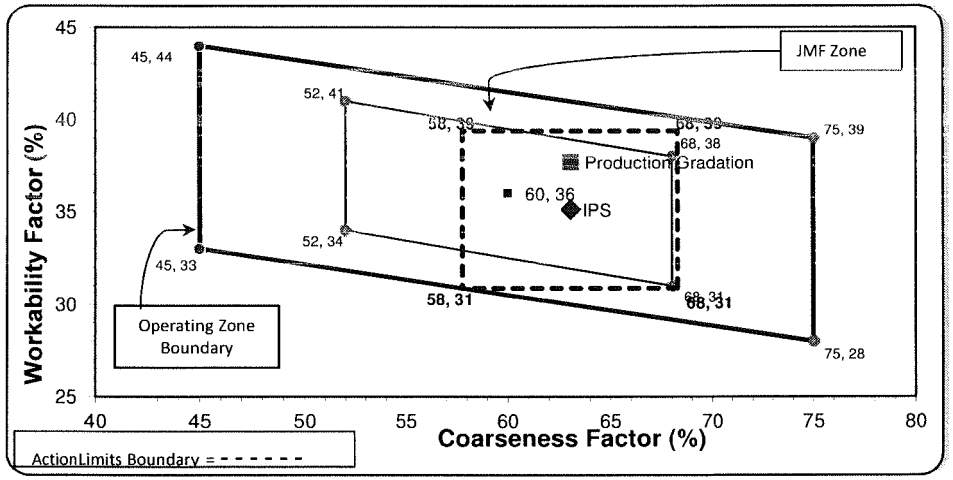
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	98.3	100.0	100.0	99.1	0.9	0.9
3/4"	84.5	100.0	100.0	91.7	7.4	8.3
1/2"	44.6	97.0	100.0	70.1	21.6	29.9
3/8"	25.2	90.2	100.0	59.1	11.0	40.9
#4	4.6	26.8	98.0	41.9	17.2	58.1
#8	2.7	9.0	87.1	35.2	6.7	64.8
#16	2.2	4.5	72.2	28.9	6.3	71.1
#30	2.0	3.6	53.1	21.5	7.4	78.5
#50	1.9	3.2	19.9	8.8	12.7	91.2
#100	1.8	2.9	1.5	1.8	7.0	98.2
LBW	1.6	2.6	0.3	1.2	0.6	98.8

Superior Materials, LLC
30701 W. 10 Mile Rd.
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:	63	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

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: 08/18/2019 - 08/24/2019

Name/Title Doug Storey / QC Technician

Report Date 08/22/2019

Procedure	Sieve/Test	Result	Unit
	2" (50mm)	100.0	%
	1 1/2" (37.5mm)	100.0	%
	1" (25mm)	98.3	%
	3/4" (19mm)	84.5	%
	1/2" (12.5mm)	44.6	%
	3/8" (9.5mm)	25.2	%
	#4 (4.75mm)	4.6	%
	#8 (2.36mm)	2.7	%
	#16 (1.18mm)	2.2	%
	#30 (0.6mm)	2.0	%
	#50 (0.3mm)	1.9	%
	#100 (0.15mm)	1.8	%
	#200 (75µm)	1.66	%
	Wash Loss (#200/75um)	1.6	%
	Total Moisture	2.54	%

Superior Auburn Hills
2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1067-26A Mod LS

Period: 08/18/2019 - 08/24/2019

Name/Title Doug Storey / QC Technician

Report Date 08/22/2019

Procedure	Sieve/Test	Result	Unit
	2" (50mm)	100.0	%
	1 1/2" (37.5mm)	100.0	%
	1" (25mm)	100.0	%
	3/4" (19mm)	100.0	%
	1/2" (12.5mm)	97.0	%
	3/8" (9.5mm)	90.2	%
	#4 (4.75mm)	26.8	%
	#8 (2.36mm)	9.0	%
	#16 (1.18mm)	4.5	%
	#30 (0.6mm)	3.6	%
	#50 (0.3mm)	3.2	%
	#100 (0.15mm)	2.9	%
	#200 (75µm)	2.7	%
	Wash Loss (#200/75um)	2.6	%
	Total Moisture	3.02	%

Superior Auburn Hills
2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1022-2NS GR

Period: 08/18/2019 - 08/24/2019

Name/Title Doug Storey / QC Technician

Report Date 08/21/2019

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.0	%	95-100
	#8 (2.36mm)	87.1	%	65-95
	#16 (1.18mm)	72.2	%	35-75
	#30 (0.6mm)	53.1	%	20-55
	#50 (0.3mm)	19.9	%	10-30
	#100 (0.15mm)	1.5	%	0-10
	#200 (75µm)	0.5	%	
	FM	2.68		2.6-3
	Wash Loss (#200/75um)	0.3	%	0-3
	Total Moisture	3.06	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-39**

Contractor: _____

Sample Date: 8/19/19

Concrete Grade: **DM**

Dates Test Represents: 8/20/2019 through 8/26/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1755	10.73	2.62	60.4
26A	71-47	Presque Isle	0	0.00	2.62	0.0
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%

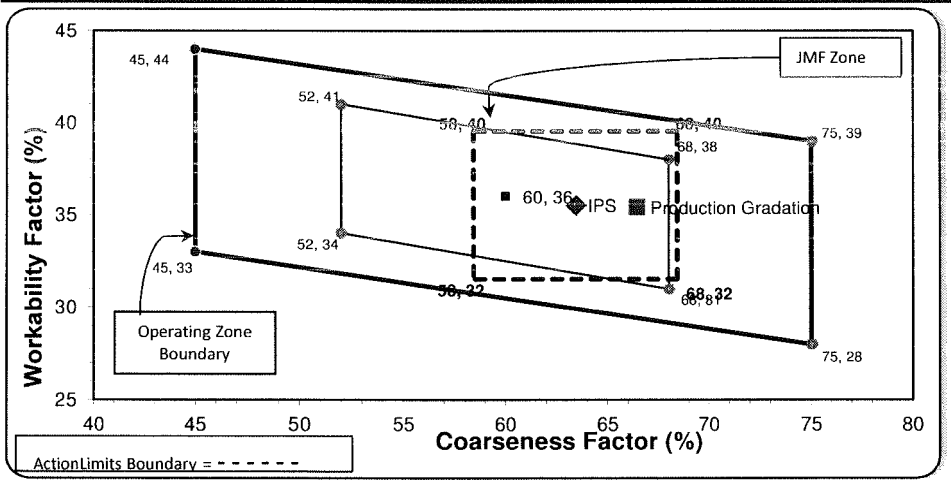
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	96.2	100.0	100.0	97.7	2.3	2.3
3/4"	79.2	100.0	100.0	87.4	10.3	12.6
1/2"	45.2	99.0	100.0	66.9	20.5	33.1
3/8"	26.2	90.0	100.0	55.4	11.5	44.6
#4	4.6	24.8	94.9	40.3	15.1	59.7
#8	2.5	5.6	79.3	32.9	7.4	67.1
#16	2.3	3.0	65.0	27.1	5.8	72.9
#30	2.2	2.5	50.4	21.3	5.8	78.7
#50	2.2	2.3	22.4	10.2	11.1	89.8
#100	2.0	2.2	6.0	3.6	6.6	96.4
LBW	1.6	1.8	1.7	1.6	1.9	98.4

Superior Materials, LLC
30701 W. 10 Mile Rd.
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:	66	Workability Factor:	33	Adjusted WF 35.4



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

Period: 08/18/2019 - 08/24/2019

Name/Title Doug Storey / QC Technician

Report Date 08/21/2019

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	96.2	%	95-100
	3/4" (19mm)	79.2	%	
	1/2" (12.5mm)	45.2	%	30-60
	3/8" (9.5mm)	26.2	%	
	#4 (4.75mm)	4.6	%	0-8
	#8 (2.36mm)	2.5	%	
	#16 (1.18mm)	2.3	%	
	#30 (0.6mm)	2.2	%	
	#50 (0.3mm)	2.2	%	
	#100 (0.15mm)	2.0	%	
	#200 (75µm)	1.78	%	
	Wash Loss (#200/75um)	1.6	%	0-2
	Total Moisture	3.40	%	

Plant S39-Superior Sterling Heights

Product 1067-26A Mod LS

Period: 08/18/2019 - 08/24/2019

Name/Title Doug Storey / QC Technician

Report Date 08/21/2019

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)	99.0	%	95-100
	3/8" (9.5mm)	90.0	%	60-95
	#4 (4.75mm)	24.8	%	5-30
	#8 (2.36mm)	5.6	%	0-12
	#16 (1.18mm)	3.0	%	
	#30 (0.6mm)	2.5	%	
	#50 (0.3mm)	2.3	%	
	#100 (0.15mm)	2.2	%	
	#200 (75µm)	2.0	%	
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	3.80	%	

Plant S39-Superior Sterling Heights

Product 1022-2NS GR

Period: 08/20/2019 - 08/20/2019

Name/Title Maxwell Tupper / QC Technician

Report Date 08/21/2019

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	94.9	%	95-100
	#8 (2.36mm)	79.3	%	65-95
	#16 (1.18mm)	65.0	%	35-75
	#30 (0.6mm)	50.4	%	20-55
	#50 (0.3mm)	22.4	%	10-30
	#100 (0.15mm)	6.0	%	0-10
	#200 (75µm)	2.1	%	
	FM	2.82		2.6-3
	Wash Loss (#200/75um)	1.7	%	0-3
	Total Moisture	4.29	%	