

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-32**

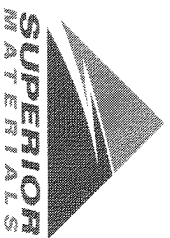
Sample Date: **8/22/22**

Dates Test Represents: **8/23/2022** through **8/29/2022**

Concrete Grade: **DM 4500HP**

Contractor: _____

MDOT No.: _____



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

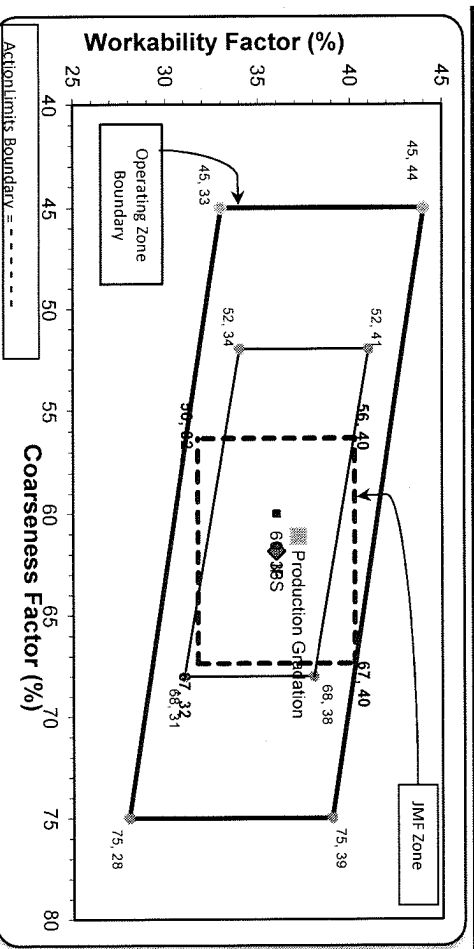
Aggr. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %	
6AA	71-47	Presque Isle	1555	9.51	2.62	53.5	
26A	71-47	Presque Isle	200	1.22	2.62	6.9	
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6	
Total Wt.						2905	100.0

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"	98.9	100.0	100.0	99.4	0.6	0.6
3/4"	85.7	100.0	100.0	92.3	7.1	7.7
1/2"	50.9	96.0	100.0	73.4	18.9	26.6
3/8"	27.0	87.6	100.0	60.1	13.4	39.9
#4	4.7	25.3	95.6	42.1	18.0	57.9
#8	2.7	5.4	83.0	34.7	7.4	65.3
#16	2.3	2.4	67.6	28.2	6.5	71.8
#30	2.2	1.9	48.3	20.4	7.7	79.6
#50	2.1	1.7	24.1	10.8	9.6	89.2
#100	2.0	1.6	7.4	4.1	6.7	95.9
LBW	1.8	1.3	1.5	1.6	2.5	98.4

*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: **61** Workability Factor: **35** Adjusted WF: **37.2**



Sieve	Initial Production Sample (IPS)	Coarseness Factor:	Workability Factor:	Adjusted WF
2"	100.0	62	36	62
1.5"	100.0			
1"	100.0			
3/4"	95.0			
1/2"	72.3			
3/8"	60.4			
#4	42.6			
#8	36.0			
#16	29.5			
#30	20.3			
#50	9.5			
#100	3.4			
LBW	1.3			

PREPARED BY:
SM, LLC Technical Service

Approved By: _____

Plant 958-JMT
 Product 1022-2NS GR - Smelter Bay
 Period: 08/21/2022 - 08/27/2022

Name/Title Doug Storey / QC Technician
 Report Date 08/27/2022

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	95.6	%	95-100
	#8 (2.36mm)	83.0	%	65-95
	#16 (1.18mm)	67.6	%	35-75
	#30 (.6mm)	48.3	%	20-55
	#50 (.3mm)	24.1	%	10-30
	#100 (.15mm)	7.4	%	0-10
	#200 (75µm)	2.0	%	
	FM	2.74		2.6-3
	Wash Loss (#200/75um)	1.5	%	0-3
	Total Moisture	4.3	%	

Plant 958-JMT

Product 1067-26A Mod LS

Name/Title Doug Storey / QC Technician

Period: 08/21/2022 - 08/27/2022

Report Date 08/27/2022

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)	96.0	%	95-100
	3/8" (9.5mm)	87.6	%	60-95
	#4 (4.75mm)	25.3	%	5-30
	#8 (2.36mm)	5.4	%	0-12
	#16 (1.18mm)	2.4	%	
	#30 (.6mm)	1.9	%	
	#50 (.3mm)	1.7	%	
	#100 (.15mm)	1.6	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75um)	1.3	%	0-3
	Total Moisture	3.8	%	

Plant 958-JMT

Product 1054-6AA LS PI

Name/Title Doug Storey / QC Technician

Period: 08/21/2022 - 08/27/2022

Report Date 08/27/2022

Procedure	Sieve/Test	Result	Unit	6AA LS PI Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.9	%	95-100
	3/4" (19mm)	85.7	%	
	1/2" (12.5mm)	50.9	%	30-60
	3/8" (9.5mm)	27.0	%	
	#4 (4.75mm)	4.7	%	0-8
	#8 (2.36mm)	2.7	%	
	#16 (1.18mm)	2.3	%	
	#30 (.6mm)	2.2	%	
	#50 (.3mm)	2.1	%	
	#100 (.15mm)	2.0	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	2.4	%	

Aggregate Optimization Chart

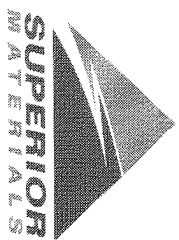
PLANT #: **P-36**

Sample Date: **8/22/22**

Dates Test Represents: **8/23/2022** through **8/29/2022**

Concrete Grade: **DM 4500HP**

Contractor: _____
 MDOT No.: _____



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

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %
6AA	71-47	Presque Isle	1505	9.21	2.62	51.8
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
		Total Wt	2905	17.69		100.0

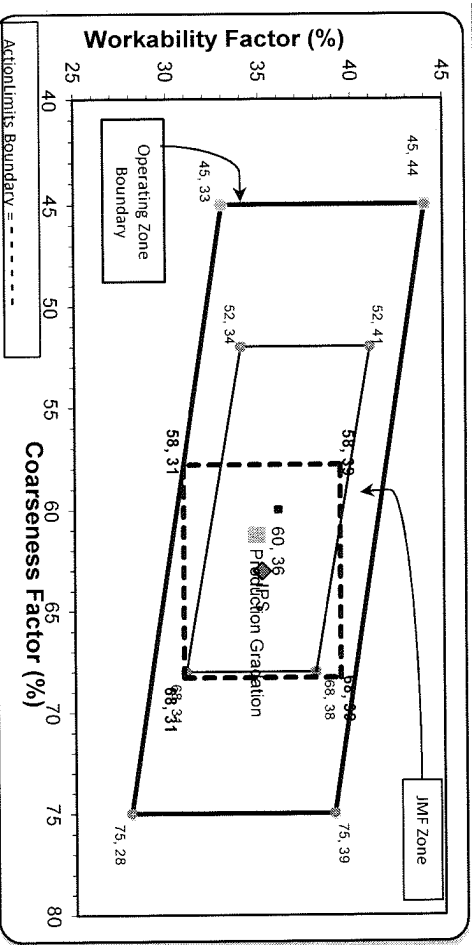
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	98.1	100.0	100.0	99.0	1.0	1.0
3/4"	87.8	100.0	100.0	93.7	5.3	6.3
1/2"	48.2	93.6	100.0	72.5	21.2	27.5
3/8"	23.9	80.3	100.0	58.5	14.0	41.5
#4	4.8	19.5	97.0	41.2	17.3	58.8
#8	2.9	4.7	80.1	32.3	8.9	67.7
#16	2.5	2.1	64.1	25.8	6.5	74.2
#30	2.4	1.5	44.7	18.3	7.5	81.7
#50	2.3	1.4	16.4	7.5	10.8	92.5
#100	2.1	1.3	3.5	2.5	5.0	97.5
LBW	1.6	1.1	0.6	1.2	1.4	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: **61** Workability Factor: **32** Adjusted WF: **34.8**

Initial 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 1022-2NS GR
 Period: 08/21/2022 - 08/27/2022

Name/Title Doug Storey / QC Technician
 Report Date 08/27/2022

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.0	%	95-100
	#8 (2.36mm)	80.1	%	65-95
	#16 (1.18mm)	64.1	%	35-75
	#30 (.6mm)	44.7	%	20-55
	#50 (.3mm)	16.4	%	10-30
	#100 (.15mm)	3.5	%	0-10
	#200 (75µm)	0.7	%	
	FM	2.94		2.6-3
	Wash Loss (#200/75um)	0.6	%	0-3
	Total Moisture	4.03	%	



Superior Auburn Hills
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 Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills
 Product 1067-26A Mod LS
 Period: 08/21/2022 - 08/27/2022

Name/Title Doug Storey / QC Technician
 Report Date 08/27/2022

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)	93.6	%	95-100
	3/8" (9.5mm)	80.3	%	60-95
	#4 (4.75mm)	19.5	%	5-30
	#8 (2.36mm)	4.7	%	0-12
	#16 (1.18mm)	2.1	%	
	#30 (.6mm)	1.5	%	
	#50 (.3mm)	1.4	%	
	#100 (.15mm)	1.3	%	
	#200 (75µm)	1.1	%	
	Wash Loss (#200/75µm)	1.1	%	0-3
	Total Moisture	3.15	%	



Superior Auburn Hills
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 Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1051-6AA LS

Period: 08/21/2022 - 08/27/2022

Name/Title Doug Storey / QC Technician

Report Date 08/27/2022

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)	87.8	%	
	1/2" (12.5mm)	48.2	%	30-60
	3/8" (9.5mm)	23.9	%	
	#4 (4.75mm)	4.8	%	0-8
	#8 (2.36mm)	2.9	%	
	#16 (1.18mm)	2.5	%	
	#30 (.6mm)	2.4	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.1	%	
	#200 (75µm)	1.7	%	
AASHTO T11	-#200 (75um)	1.73	%	
	Wash Loss (#200/75um)	1.6	%	0-2
	Total Moisture	2.57	%	