

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **20**

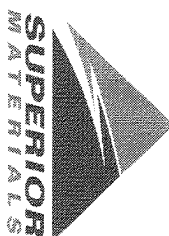
Sample Date: **7/17/23**

Dates Test Represents: **7/18/2023** through **7/24/2023**

Concrete Grade: **S2M 3500HP**

Contractor: \_\_\_\_\_

MDOT No.: \_\_\_\_\_



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

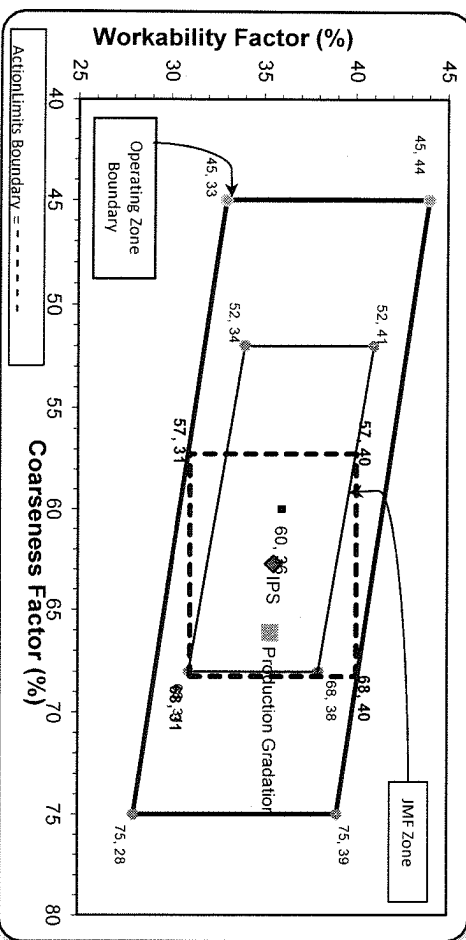
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
GAA	71-47	Presque Isle	1550	9.48	2.62	50.8
26A	71-47	Presque Isle	250	1.53	2.62	8.2
NNS	63-92	Grange Hall	1250	7.56	2.65	41.0
Total Wt			<b>3050</b>	<b>18.57</b>		<b>100.0</b>

Sieve	% Retained	Cumulative % Retained
2"	0.0	0.0
1.5"	0.0	0.0
1"	0.7	0.7
3/4"	11.5	12.1
1/2"	20.7	32.9
3/8"	9.9	42.7
#4	14.5	57.2
#8	7.4	64.6
#16	7.0	71.7
#30	8.5	80.2
#50	11.0	91.1
#100	6.2	97.4
LBW	1.7	99.0

\*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: **35**



Initial Production Sample (IPS)

Coarseness Factor:	Workability Factor:	IPS
<b>63</b>	<b>36</b>	
<b>Workability Factor:</b>		
Sieve	Cumulative % Passing	% Retained
2"	100.0	0.0
1.5"	100.0	0.0
1"	100.0	0.0
3/4"	93.3	6.7
1/2"	70.6	22.6
3/8"	59.6	11.0
#4	43.9	15.7
#8	35.6	8.4
#16	28.4	7.2
#30	19.4	9.0
#50	7.5	11.9
#100	0.9	6.6
LBW	0.9	0.1

PREPARED BY:  
SM, LLC Technical Service

Approved By: \_\_\_\_\_



Plant S20-Superior Flint  
 Product 1051-6AA LS  
 Period: 07/16/2023 - 07/22/2023

Name/Title Doug Storey / QC Technician  
 Report Date 07/22/2023

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)	76.1	%	
	1/2" (12.5mm)	35.9	%	30-60
	3/8" (9.5mm)	18.7	%	
	#4 (4.75mm)	3.6	%	0-8
	#8 (2.36mm)	2.4	%	
	#16 (1.18mm)	2.2	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.53	%	
	Wash Loss (#200/75um)	1.3	%	0-2
	Total Moisture	2.60	%	



Plant S20-Superior Flint  
 Product 1067-26A Mod LS  
 Period: 07/16/2023 - 07/22/2023

Name/Title Doug Storey / QC Technician  
 Report Date 07/22/2023

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)	96.3	%	95-100
	3/8" (9.5mm)	82.7	%	60-95
	#4 (4.75mm)	16.8	%	5-30
	#8 (2.36mm)	5.6	%	0-12
	#16 (1.18mm)	3.6	%	
	#30 (.6mm)	3.0	%	
	#50 (.3mm)	2.7	%	
	#100 (.15mm)	2.5	%	
	#200 (75µm)	2.2	%	
	Wash Loss (#200/75um)	2.2	%	0-3
	Total Moisture	0.71	%	



Plant S20-Superior Flint  
 Product 1022-2NS GR  
 Period: 07/16/2023 - 07/22/2023

Name/Title Doug Storey / QC Technician  
 Report Date 07/22/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.6	%	95-100
	#8 (2.36mm)	82.2	%	65-95
	#16 (1.18mm)	65.7	%	35-75
	#30 (.6mm)	45.2	%	20-55
	#50 (.3mm)	18.6	%	10-30
	#100 (.15mm)	3.6	%	0-10
	#200 (75µm)	0.5	%	
	FM	2.88		2.6-3
	Wash Loss (#200/75um)	0.3	%	0-3
	Total Moisture	2.71	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-32**

Sample Date: **7/17/23**

Dates Test Represents: **7/18/2023** through **7/24/2023**

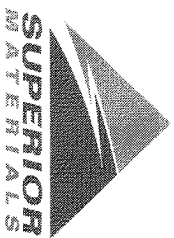
Concrete Grade: **S2M, 3500HP**

Contractor: \_\_\_\_\_

MDOT No.: \_\_\_\_\_

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
6AA	71-47	Presque Isle	1670	10.21	2.62	54.8
26A	71-47	Presque Isle	150	0.92	2.62	4.9
2NS	95-013	Smelter Bay	1230	7.44	2.65	40.3
			<b>Total Wt</b>	<b>3050</b>	<b>18.57</b>	<b>100.0</b>

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"	98.6	100.0	100.0	99.2	0.8	0.8
3/4"	80.3	100.0	100.0	89.2	10.8	10.8
1/2"	41.9	96.4	100.0	68.0	21.2	32.0
3/8"	25.1	87.0	100.0	58.3	9.7	41.7
#4	5.3	22.1	96.1	42.7	15.6	57.3
#8	2.9	5.7	85.3	36.3	6.5	63.7
#16	2.5	3.1	70.5	30.0	6.3	70.0
#30	2.4	2.7	51.0	22.0	7.9	78.0
#50	2.3	2.5	24.7	11.3	10.7	88.7
#100	2.2	2.3	7.6	4.4	7.0	95.6
LBW	1.8	2.0	1.3	1.6	2.8	98.4

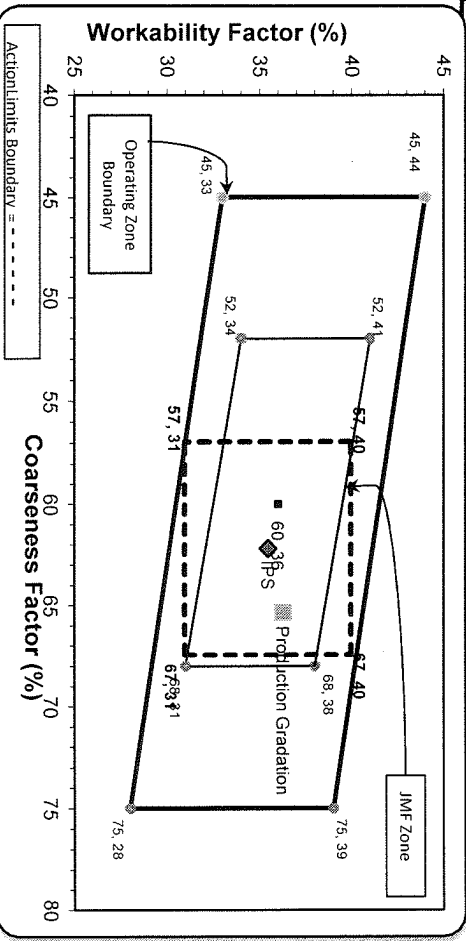


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\*Any two adjacent sieves must equal 10% except max.  
nom. max., #100 and #200 sieves.  
\*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
\*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **65** Workability Factor: **36**



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"	94.0	6.0	6.0
1/2"	70.2	23.7	29.8
3/8"	59.9	10.4	40.1
#4	42.7	17.2	57.3
#8	35.5	7.2	64.5
#16	28.4	7.0	71.6
#30	19.2	9.2	80.8
#50	8.9	10.3	91.1
#100	3.1	5.9	96.9
LBW	1.4	1.7	98.6

PREPARED BY: SM, LLC Technical Service

Approved By: \_\_\_\_\_

Plant 958-JMT

Product 1054-6AA LS PI

Period: 07/16/2023 - 07/22/2023

Name/Title Doug Storey / QC Technician

Report Date 07/22/2023

Procedure	Sieve/Test	Result	Unit	6AA LS PI Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.6	%	95-100
	3/4" (19mm)	80.3	%	
	1/2" (12.5mm)	41.9	%	30-60
	3/8" (9.5mm)	25.1	%	
	#4 (4.75mm)	5.3	%	0-8
	#8 (2.36mm)	2.9	%	
	#16 (1.18mm)	2.5	%	
	#30 (.6mm)	2.4	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	2.7	%	

Plant 958-JMT  
 Product 1067-26A Mod LS  
 Period: 07/16/2023 - 07/22/2023

Name/Title Doug Storey / QC Technician  
 Report Date 07/22/2023

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)	96.4	%	95-100
	3/8" (9.5mm)	87.0	%	60-95
	#4 (4.75mm)	22.1	%	5-30
	#8 (2.36mm)	5.7	%	0-12
	#16 (1.18mm)	3.1	%	
	#30 (.6mm)	2.7	%	
	#50 (.3mm)	2.5	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	2.1	%	
	Wash Loss (#200/75um)	2.0	%	0-3
	Total Moisture	3.3	%	

Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Name/Title Doug Storey / QC Technician

Period: 07/16/2023 - 07/22/2023

Report Date 07/22/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.1	%	95-100
	#8 (2.36mm)	85.3	%	65-95
	#16 (1.18mm)	70.5	%	35-75
	#30 (.6mm)	51.0	%	20-55
	#50 (.3mm)	24.7	%	10-30
	#100 (.15mm)	7.6	%	0-10
	#200 (75µm)	1.8	%	
	FM	2.65		2.6-3
	Wash Loss (#200/75µm)	1.3	%	0-3
	Total Moisture	5.2	%	