

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-32**

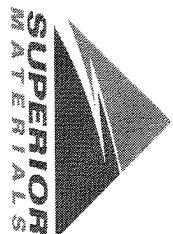
Sample Date: **3/27/23**

Dates Test Represents: **3/28/2023** through **4/3/2023**

Concrete Grade: **DM, 4500HP**

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 %
6AA	71-47	Presque Isle	1405	8.59	2.62	48.4
26A	71-47	Presque Isle	350	2.14	2.62	12.0
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		<b>Total Wt</b>	<b>2905</b>	<b>17.69</b>		<b>100.0</b>

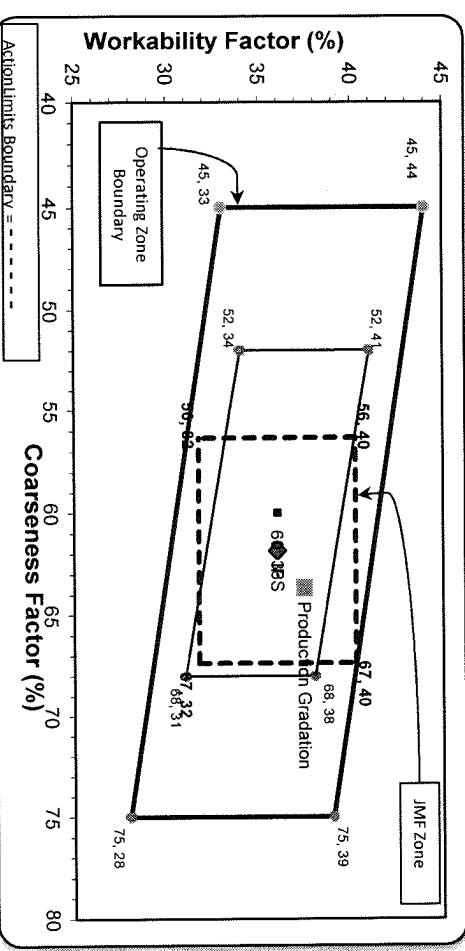
  

Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	96.9	100.0	100.0	98.5	1.5	1.5
3/4"	72.4	100.0	100.0	86.7	11.8	13.3
1/2"	33.4	95.1	100.0	67.2	19.5	32.8
3/8"	19.3	80.1	100.0	58.6	8.6	41.4
#4	2.6	14.7	96.7	41.3	17.3	58.7
#8	1.7	4.5	84.8	34.9	6.4	65.1
#16	1.5	2.7	69.8	28.7	6.3	71.3
#30	1.5	2.3	50.8	21.1	7.6	78.9
#50	1.4	2.1	24.8	10.7	10.4	89.3
#100	1.3	1.9	6.8	3.5	7.2	96.5
LBW	1.1	1.7	1.2	1.2	2.3	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: **64** Workability Factor: **35** Adjusted WF: **37.4**



Sieve	Coarseness Factor:	Workability Factor:	Adjusted WF	Initial Production Sample (IPS)
2"	100.0	0.0	0.0	0.0
1.5"	100.0	0.0	0.0	0.0
1"	100.0	0.0	0.0	0.0
3/4"	95.0	5.0	5.0	5.0
1/2"	72.3	22.8	27.7	27.7
3/8"	60.4	11.8	39.6	39.6
#4	42.6	17.8	57.4	57.4
#8	36.0	6.6	64.0	64.0
#16	29.5	6.5	70.5	70.5
#30	20.3	9.2	79.7	79.7
#50	9.5	10.8	90.5	90.5
#100	3.4	6.1	96.6	96.6
LBW	1.3	2.1	98.7	98.7

PREPARED BY:  
SM, LLC Technical Service

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

Plant 958-JMT

Product 1054-6AA LS PI

Period: 03/26/2023 - 04/01/2023

Report Date 04/01/2023

Name/Title Doug Storey / QC Technician

Procedure	Sieve/Test	Result	Unit
	2" (50mm)	100.0	%
	1 1/2" (37.5mm)	100.0	%
100-100	1" (25mm)	96.9	%
95-100	3/4" (19mm)	72.4	%
30-60	1/2" (12.5mm)	33.4	%
	3/8" (9.5mm)	19.3	%
0-8	#4 (4.75mm)	2.6	%
	#8 (2.36mm)	1.7	%
	#16 (1.18mm)	1.5	%
	#30 (.6mm)	1.5	%
	#50 (.3mm)	1.4	%
	#100 (.15mm)	1.3	%
	#200 (75µm)	1.2	%
	Wash Loss (#200/75µm)	1.1	%
	Total Moisture	3.0	%

6AA LS PI Spec



Plant 958-JMT

Product 1022-ZNS GR - Smelter Bay

Name/Title Doug Storey / QC Technician

Period: 03/26/2023 - 04/01/2023

Report Date 04/01/2023

Procedure	Sieve/Test	Result	Unit	ZNS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.7	%	95-100
	#8 (2.36mm)	84.8	%	65-95
	#16 (1.18mm)	69.8	%	35-75
	#30 (.6mm)	50.8	%	20-55
	#50 (.3mm)	24.8	%	10-30
	#100 (.15mm)	6.8	%	0-10
	#200 (75µm)	1.6	%	
<hr/>				
	FM	2.66		2.6-3
	Wash Loss (#200/75µm)	1.2	%	0-3
	Total Moisture	5.9	%	

# Aggregate Optimization Chart

## Production Gradation Report

PLANT #: **P-101**

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

Sample Date: **3/27/23**

Concrete Grade: **DM, 4500HP**

Dates Test Represents: **3/28/2023** through **4/3/2023**

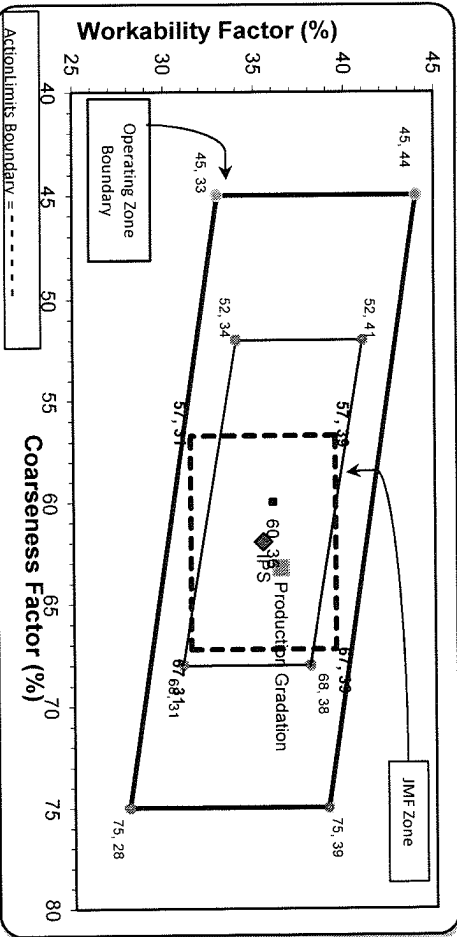
MDOT No.: \_\_\_\_\_

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	48.3
26A	71-47	Presque Isle	350	2.14	2.62	12.1
ZNS	63-115	Ray Rd	1150	6.95	2.65	39.7
<b>Total Wt</b>			<b>2900</b>	<b>17.66</b>		<b>100.0</b>

Sieve	6AA	26A	ZNS	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	98.6	1.4	1.4
3/4"	78.4	100.0	100.0	89.6	9.1	10.4
1/2"	33.1	96.3	100.0	67.3	22.3	32.7
3/8"	16.9	86.1	100.0	58.2	9.1	41.8
#4	3.7	19.6	97.3	42.7	15.5	57.3
#8	2.9	5.6	80.3	33.9	8.8	66.1
#16	2.6	3.6	63.6	26.9	7.0	73.1
#30	2.4	3.1	47.8	20.5	6.4	79.5
#50	2.3	2.9	24.2	11.1	9.4	88.9
#100	2.2	2.7	5.7	3.6	7.4	96.4
LBW	1.9	2.3	1.1	1.6	2.0	98.4

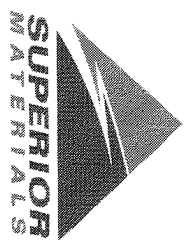
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max.  
 nom. max., #100 and #200 sieves.  
 \*\*Retained must be at least 4% for each sieve except max.  
 nom. max., #100 and #200 sieves.  
 \*Retained must be at least 8% for the 1" sieve when  
 a 2" max. size (nom. 1.5") aggregate is used.

Production Gradation	Batch Plant Gradations	Aggregate Supplier Gradations	Adjusted WF
Coarseness Factor: <b>63</b>	<input checked="" type="radio"/> Batch Plant Gradations	<input type="radio"/> Aggregate Supplier Gradations	Workability Factor: <b>34</b>
			Adjusted WF: <b>36.4</b>



Sieve	Workability Factor:	Coarseness Factor:	Initial Production Sample (IPS)
2"	100.0	62	100.0
1.5"	100.0	62	100.0
1"	100.0	62	100.0
3/4"	95.0	62	95.0
1/2"	70.5	62	70.5
3/8"	60.0	62	60.0
#4	44.4	62	44.4
#8	35.5	62	35.5
#16	28.5	62	28.5
#30	21.5	62	21.5
#50	10.2	62	10.2
#100	3.1	62	3.1
LBW	1.3	62	1.3

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



PREPARED BY:  
 SM, LLC Technical Service

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



**Plant** S101-Superior Mount Clemens

**Product** 1051-6AA LS

**Period:** 03/26/2023 - 04/01/2023

**Name/Title** Doug Storey / QC Technician

**Report Date** 04/01/2023

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)	78.4	%	
	1/2" (12.5mm)	33.1	%	30-60
	3/8" (9.5mm)	16.9	%	
	#4 (4.75mm)	3.7	%	0-8
	#8 (2.36mm)	2.9	%	
	#16 (1.18mm)	2.6	%	
	#30 (.6mm)	2.4	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	1.94	%	
	Wash Loss (#200/75um)	1.9	%	0-2
	Total Moisture	2.58	%	



Plant S101-Superior Mount Clemens

Product 1067-26A Mod LS

Name/Title Doug Storey / QC Technician

Period: 03/26/2023 - 04/01/2023

Report Date 04/01/2023

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)	86.1	%	60-95
	#4 (4.75mm)	19.6	%	5-30
	#8 (2.36mm)	5.6	%	0-12
	#16 (1.18mm)	3.6	%	
	#30 (.6mm)	3.1	%	
	#50 (.3mm)	2.9	%	
	#100 (.15mm)	2.7	%	
	#200 (75µm)	2.4	%	
	Wash Loss (#200/75um)	2.3	%	0-3
	Total Moisture	2.62	%	



Plant S101-Superior Mount Clemens

Product 1022-2NS GR

Name/Title Doug Storey / QC Technician

Period: 03/26/2023 - 04/01/2023

Report Date 04/01/2023

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)	80.3	%	65-95
	#16 (1.18mm)	63.6	%	35-75
	#30 (.6mm)	47.8	%	20-55
	#50 (.3mm)	24.2	%	10-30
	#100 (.15mm)	5.7	%	0-10
	#200 (75µm)	1.2	%	
	FM	2.81		2.6-3
	Wash Loss (#200/75um)	1.1	%	0-3
	Total Moisture	3.91	%	



# Aggregate Optimization Chart

# Production Gradation Report

**PLANT #:** P-102

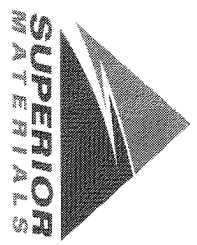
**Sample Date:** 3/27/23

**Dates Test Represents:** 3/28/2023 through 4/3/2023

**Concrete Grade:** DM-4500HP

through

**Contractor:** \_\_\_\_\_  
**MDOT No.:** \_\_\_\_\_



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

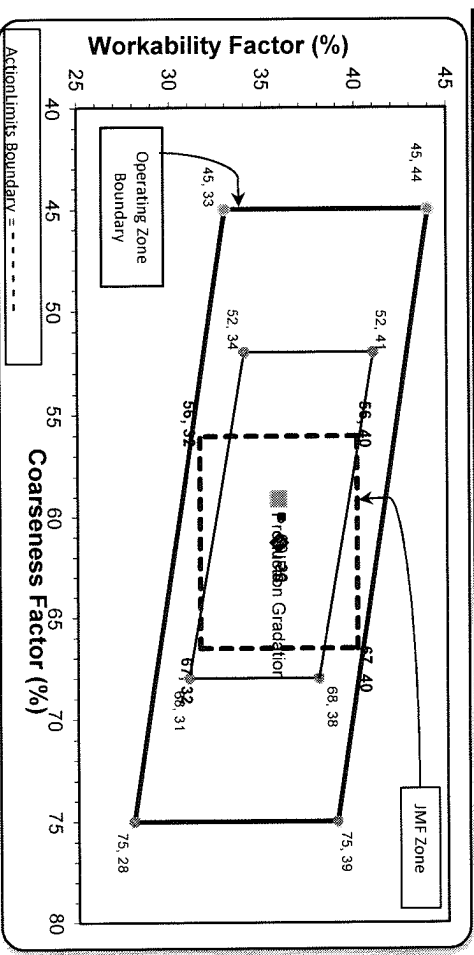
Agg. Class	Pit #	Source	Weight (ssd)	ft <sup>3</sup>	Specific Gravity	Contribution %
6AA	58-003	Stoneco	1500	8.94	2.69	50.8
26A	58-003	Stoneco	300	1.79	2.69	10.2
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
<b>Total Wt:</b>						<b>17.68</b>
						<b>100.0</b>

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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	85.8	100.0	100.0	100.0	7.2	7.2
1/2"	40.2	99.5	100.0	99.5	23.2	30.5
3/8"	24.4	90.5	100.0	90.5	8.9	39.4
#4	4.0	12.1	96.6	40.9	19.7	59.1
#8	2.0	3.1	82.1	33.3	7.6	66.7
#16	1.6	1.9	66.0	26.7	6.6	73.3
#30	1.4	1.6	48.9	19.9	6.8	80.1
#50	1.3	1.5	22.9	9.7	10.2	90.3
#100	1.2	1.4	6.2	3.2	6.6	96.8
LBW	1.1	1.3	1.5	1.3	1.9	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:** 59 **Workability Factor:** 33 **Adjusted WF:** 35.8

**Initial 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

PREPARED BY:  
 SM, LLC Technical Service

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



**Plant** S102-Superior Novi

**Product** 1051-6AA LS

**Period:** 03/26/2023 - 04/01/2023

**Name/Title** Doug Storey / QC Technician

**Report Date** 04/01/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	100.0	%	95-100
	3/4" (19mm)	85.8	%	
	1/2" (12.5mm)	40.2	%	30-60
	3/8" (9.5mm)	24.4	%	
	#4 (4.75mm)	4.0	%	0-8
	#8 (2.36mm)	2.0	%	
	#16 (1.18mm)	1.6	%	
	#30 (.6mm)	1.4	%	
	#50 (.3mm)	1.3	%	
	#100 (.15mm)	1.2	%	
	#200 (75µm)	1.11	%	
	Wash Loss (#200/75um)	1.1	%	0-2
	Total Moisture	2.38	%	



Plant S102-Superior Novi

Product 1067-26A Mod LS

Name/Title Doug Storey / QC Technician

Period: 03/26/2023 - 04/01/2023

Report Date 04/01/2023

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)	99.5	%	95-100
	3/8" (9.5mm)	90.5	%	60-95
	#4 (4.75mm)	12.1	%	5-30
	#8 (2.36mm)	3.1	%	0-12
	#16 (1.18mm)	1.9	%	
	#30 (.6mm)	1.6	%	
	#50 (.3mm)	1.5	%	
	#100 (.15mm)	1.4	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75um)	1.3	%	0-3
	Total Moisture	6.14	%	



Plant S102-Superior Novi

Product 1022-2NS GR

Name/Title Doug Storey / QC Technician

Period: 03/26/2023 - 04/01/2023

Report Date 04/01/2023

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)	82.1	%	65-95
	#16 (1.18mm)	66.0	%	35-75
	#30 (.6mm)	48.9	%	20-55
	#50 (.3mm)	22.9	%	10-30
	#100 (.15mm)	6.2	%	0-10
	#200 (75µm)	1.7	%	
	FM	2.77		2.6-3
	Wash Loss (#200/75um)	1.5	%	0-3
	Total Moisture	3.54	%	