

# Aggregate Optimization Chart

## Production Gradation Report

PLANT #: **P-32**

Sample Date: **10/25/21**

Dates Test Represents: **10/26/2021** through **11/1/2021**

Concrete Grade: **P1M**

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

MIDOT No.: \_\_\_\_\_

Agg. Class	Pit #	Source	Weight (ssd)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	870	5.32	2.62	28.3
2NS	95-013	Smelter Bay	1250	7.56	2.65	40.7
<b>Total Wt</b>						<b>100.0</b>



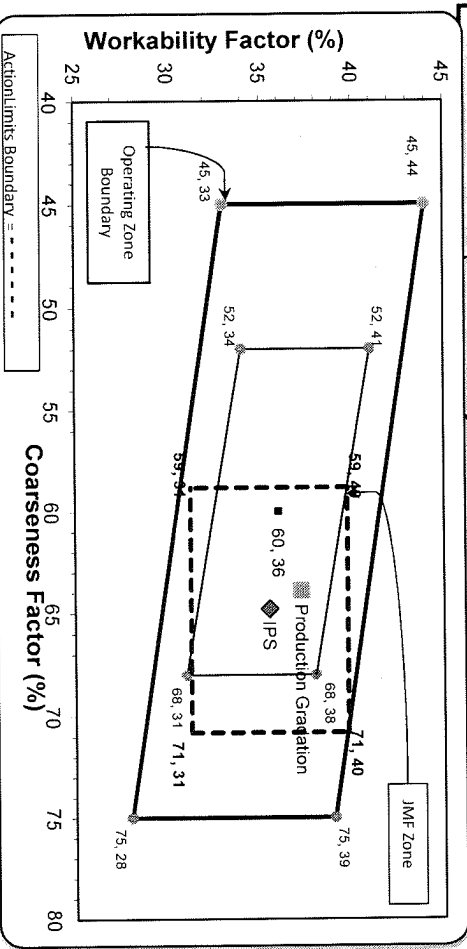
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.4	100.0	100.0	99.2	0.8	0.8
1"	36.1	100.0	100.0	80.2	19.0	19.8
3/4"	8.9	99.5	100.0	71.7	8.6	28.3
1/2"	3.1	85.4	100.0	65.9	5.8	34.1
3/8"	2.5	64.9	100.0	59.9	6.0	40.1
#4	2.2	21.2	96.3	45.9	14.0	54.1
#8	2.1	8.1	84.2	37.2	8.7	62.8
#16	2.0	5.0	68.2	29.8	7.4	70.2
#30	1.9	4.1	49.2	21.8	8.0	78.2
#50	1.8	3.7	23.8	11.3	10.5	88.7
#100	1.7	3.3	7.4	4.5	6.8	95.5
LBW	1.5	2.7	1.6	1.9	2.6	98.1

\*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: **37**



Initial Production Sample (IPS)

Sieve	% Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.0	0.6	0.6
1"	84.0	15.3	16.0
3/4"	73.5	10.5	26.5
1/2"	65.2	8.2	34.8
3/8"	58.2	7.1	41.8
#4	44.1	14.1	55.9
#8	35.5	8.6	64.5
#16	29.1	6.4	70.9
#30	21.9	7.3	78.1
#50	9.6	12.2	90.4
#100	2.6	7.1	97.4
LBW	1.0	1.6	99.0

PREPARED BY:  
 SM, LLC Technical Service

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

Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Name/Title Doug Storey / QC Technician

Period: 10/24/2021 - 10/30/2021

Report Date 10/30/2021

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)	84.2	%	65-95
	#16 (1.18mm)	68.2	%	35-75
	#30 (.6mm)	49.2	%	20-55
	#50 (.3mm)	23.8	%	10-30
	#100 (.15mm)	7.4	%	0-10
	#200 (75µm)	2.2	%	
	FM	2.71		2.6-3
	Wash Loss (#200/75um)	1.6	%	0-3
	Total Moisture	4.4	%	

Plant 958-JMT

Product 7920-INTERMED AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 10/24/2021 - 10/30/2021

Report Date 10/30/2021

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	99.5	%	
	1/2" (12.5mm)	85.4	%	
	3/8" (9.5mm)	64.9	%	
	#4 (4.75mm)	21.2	%	
	#8 (2.36mm)	8.1	%	
	#16 (1.18mm)	5.0	%	
	#30 (.6mm)	4.1	%	
	#50 (.3mm)	3.7	%	
	#100 (.15mm)	3.3	%	
	#200 (75µm)	2.9	%	
	Wash Loss (#200/75um)	2.7	%	0-3
	Total Moisture	3.2	%	

Plant 958-JMT

Product 7919-COARSE AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 10/24/2021 - 10/30/2021

Report Date 10/30/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	97.4	%	
	1" (25mm)	36.1	%	
	3/4" (19mm)	8.9	%	
	1/2" (12.5mm)	3.1	%	
	3/8" (9.5mm)	2.5	%	
	#4 (4.75mm)	2.2	%	
	#8 (2.36mm)	2.1	%	
	#16 (1.18mm)	2.0	%	
	#30 (.6mm)	1.9	%	
	#50 (.3mm)	1.8	%	
	#100 (.15mm)	1.7	%	
	#200 (75µm)	1.6	%	
	Wash Loss (#200/75um)	1.5	%	0-2
	Total Moisture	2.3	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-35**

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

Sample Date: 10/25/21

Concrete Grade: **P-1M**

Dates Test Represents: 10/26/2021 through 11/1/2021

MIDOT No.: \_\_\_\_\_

Agg. Class	Pit #	Source	Weight (ssd)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	560	3.28	2.69	17.6
2NS	81-093	Burmeister	1200	7.26	2.65	38.5
<b>Total Wt</b>			<b>3120</b>	<b>18.70</b>		<b>100.0</b>

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

Sieve	CA	IA	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"	57.1	100.0	100.0	81.2	18.8	18.8
3/4"	24.2	100.0	100.0	66.7	14.4	33.3
1/2"	11.4	94.6	100.0	60.1	6.6	39.9
3/8"	7.1	75.8	100.0	54.9	5.2	45.1
#4	2.7	25.5	99.3	43.9	11.1	56.1
#8	2.0	6.8	85.3	34.9	9.0	65.1
#16	1.6	3.2	66.4	26.8	8.1	73.2
#30	1.4	2.4	46.6	19.0	7.8	81.0
#50	1.3	2.1	16.5	7.3	11.7	92.7
#100	1.2	2.0	3.6	2.3	5.0	97.7
LBW	1.1	1.7	1.7	1.4	0.8	98.6

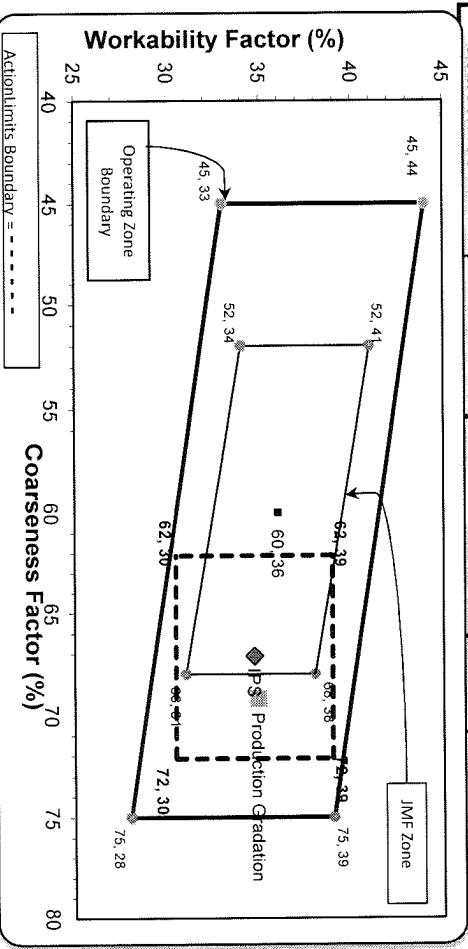
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max.  
 nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max.  
 nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when 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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Initial Production Sample (IPS)

Coarseness Factor: **69** Workability Factor: **35**

Coarseness Factor: **67** 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"	86.9	13.1	13.1
3/4"	76.1	10.8	23.9
1/2"	63.7	12.4	36.3
3/8"	56.2	7.5	43.8
#4	43.2	13.0	56.8
#8	34.7	8.5	65.3
#16	27.5	7.2	72.5
#30	20.6	7.0	79.4
#50	9.0	11.6	91.0
#100	2.1	6.9	97.9
LBW	1.0	1.1	99.0

PREPARED BY:  
SM, LLC Technical Service

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



Plant S35-Superior Romulus  
 Product 1022-2NS GR  
 Period: 10/24/2021 - 10/30/2021

Name/Title Doug Storey / QC Technician  
 Report Date 10/30/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	99.3	%	95-100
	#8 (2.36mm)	85.3	%	65-95
	#16 (1.18mm)	66.4	%	35-75
	#30 (.6mm)	46.6	%	20-55
	#50 (.3mm)	16.5	%	10-30
	#100 (.15mm)	3.6	%	0-10
	#200 (75µm)	1.8	%	
	FM	2.82		2.6-3
AASHTO T11	-#200 (75um)	1.82	%	
	Wash Loss (#200/75um)	1.7	%	0-3
ASTM C566	Total Moisture	6.61	%	



Plant S35-Superior Romulus  
 Product 7920-INTERMED AGG P1M LS  
 Period: 10/24/2021 - 10/30/2021

Name/Title Doug Storey / QC Technician  
 Report Date 10/30/2021

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	
	1/2" (12.5mm)	94.6	%	
	3/8" (9.5mm)	75.8	%	
	#4 (4.75mm)	25.5	%	
	#8 (2.36mm)	6.8	%	
	#16 (1.18mm)	3.2	%	
	#30 (.6mm)	2.4	%	
	#50 (.3mm)	2.1	%	
	#100 (.15mm)	2.0	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.7	%	0-3
ASTM C566	Total Moisture	4.50	%	



**Plant** S35-Superior Romulus  
**Product** 7919-COARSE AGG P1M LS  
**Period:** 10/24/2021 - 10/30/2021

**Name/Title** Doug Storey / QC Technician  
**Report Date** 10/30/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	57.1	%	
	3/4" (19mm)	24.2	%	
	1/2" (12.5mm)	11.4	%	
	3/8" (9.5mm)	7.1	%	
	#4 (4.75mm)	2.7	%	
	#8 (2.36mm)	2.0	%	
	#16 (1.18mm)	1.6	%	
	#30 (.6mm)	1.4	%	
	#50 (.3mm)	1.3	%	
	#100 (.15mm)	1.2	%	
	#200 (75µm)	1.2	%	
	Wash Loss (#200/75um)	1.1	%	0-2
ASTM C566	Total Moisture	2.92	%	