

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-32**

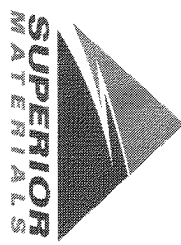
Sample Date: **11/8/21**

Dates Test Represents: **11/9/2021** through **11/15/2021**

Concrete Grade: **P1M**

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 %
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>3070</b>	<b>18.69</b>		<b>100.0</b>

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.2	100.0	100.0	98.2	1.8	1.8
1"	39.0	100.0	100.0	81.1	17.1	18.9
3/4"	8.3	100.0	100.0	71.6	9.5	28.4
1/2"	2.2	83.4	100.0	65.0	6.6	35.0
3/8"	2.0	58.2	100.0	57.8	7.2	42.2
#4	1.8	15.4	95.7	43.9	13.9	56.1
#8	1.7	5.9	82.4	35.7	8.1	64.3
#16	1.7	4.0	66.9	28.9	6.8	71.1
#30	1.6	3.5	48.0	21.0	7.9	79.0
#50	1.6	3.3	24.9	11.6	9.5	88.4
#100	1.5	3.1	7.7	4.5	7.1	95.5
LBW	1.0	2.3	2.0	1.8	2.7	98.2

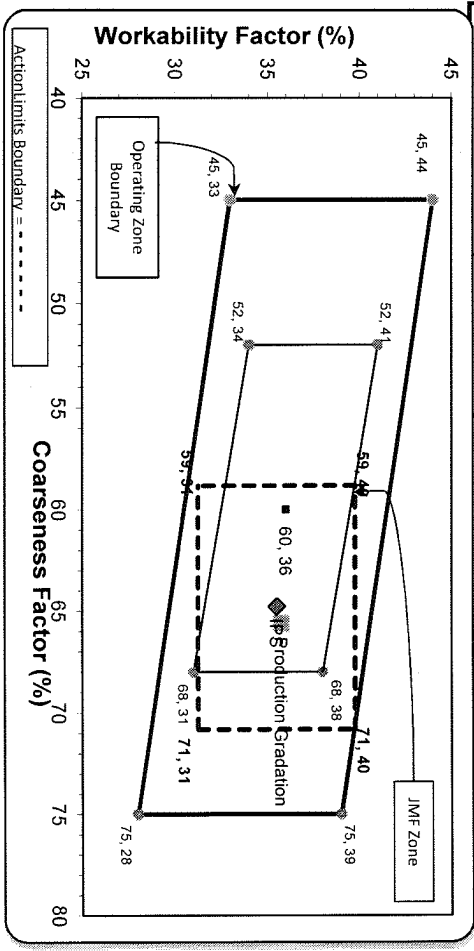
\*Maximum % Retained must be above the 3/8" sieve.  
 \*\*Any two adjacent sieves must equal 10% except max., nom. max. #100 and #200 sieves.  
 \*\*\*Retained must be at least 4% for each sieve except max., nom. max. #100 and #200 sieves.  
 \*\*\*\*Retained must be at least 8% for the 1" sieve when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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Initial Production Sample (IPS)

Coarseness Factor: **66** Workability Factor: **36**

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



Sieve	Cumulative % 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: 11/07/2021 - 11/13/2021

Report Date 11/11/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	95.7	%	95-100
	#8 (2.36mm)	82.4	%	65-95
	#16 (1.18mm)	66.9	%	35-75
	#30 (.6mm)	48.0	%	20-55
	#50 (.3mm)	24.9	%	10-30
	#100 (.15mm)	7.7	%	0-10
	#200 (75µm)	2.4	%	
	FM	2.74		2.6-3
	Wash Loss (#200/75um)	2.0	%	0-3
	Total Moisture	4.0	%	

Plant 958-JMT

Product 7920-INTERMED AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 11/07/2021 - 11/13/2021

Report Date 11/13/2021

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)	100.0	%	
	1/2" (12.5mm)	83.4	%	
	3/8" (9.5mm)	58.2	%	
	#4 (4.75mm)	15.4	%	
	#8 (2.36mm)	5.9	%	
	#16 (1.18mm)	4.0	%	
	#30 (.6mm)	3.5	%	
	#50 (.3mm)	3.3	%	
	#100 (.15mm)	3.1	%	
	#200 (75µm)	2.7	%	
	Wash Loss (#200/75um)	2.3	%	0-3
	Total Moisture	3.3	%	

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Plant 958-JMT

Product 7919-COARSE AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 11/07/2021 - 11/13/2021

Report Date 11/13/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	94.2	%	
	1" (25mm)	39.0	%	
	3/4" (19mm)	8.3	%	
	1/2" (12.5mm)	2.2	%	
	3/8" (9.5mm)	2.0	%	
	#4 (4.75mm)	1.8	%	
	#8 (2.36mm)	1.7	%	
	#16 (1.18mm)	1.7	%	
	#30 (.6mm)	1.6	%	
	#50 (.3mm)	1.6	%	
	#100 (.15mm)	1.5	%	
	#200 (75µm)	1.3	%	
	Wash Loss (#200/75um)	1.0	%	0-2
	Total Moisture	1.8	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-35**

Sample Date: **11/8/21**

Dates Test Represents: **11/9/2021** through **11/15/2021**

Concrete Grade: **P1M**

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

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

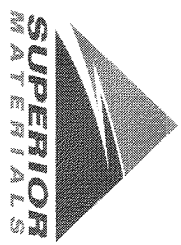
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	550	3.28	2.69	17.6
NNS	81-093	Burnmeister	1200	7.26	2.65	38.5
<b>Total Wt</b>						<b>3120</b>
						<b>100.0</b>

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

Sieve	CA	IA	NNS	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"	62.4	100.0	100.0	83.5	16.5	16.5
3/4"	26.1	100.0	100.0	67.6	15.9	32.4
1/2"	11.4	95.1	100.0	60.2	7.3	39.8
3/8"	6.2	75.0	100.0	54.4	5.8	45.6
#4	2.2	23.2	98.8	43.1	11.3	56.9
#8	1.6	6.7	87.5	35.5	7.5	64.5
#16	1.4	3.2	72.7	29.1	6.4	70.9
#30	1.3	2.3	53.2	21.4	7.7	78.6
#50	1.2	2.0	20.7	8.8	12.6	91.2
#100	1.1	1.9	3.4	2.1	6.7	97.9
LBW	1.0	1.7	0.9	1.1	1.0	98.9

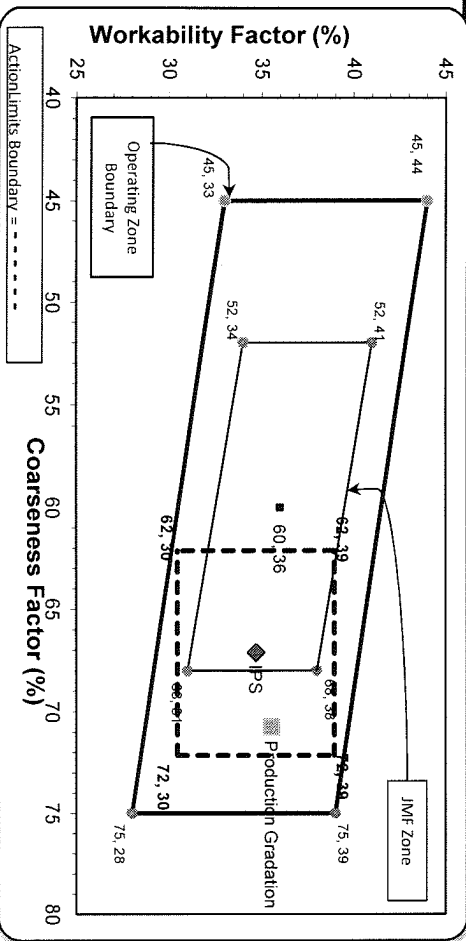
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2" max. 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: **71** Workability Factor: **36**



Initial Production Sample (IPS)

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

Name/Title Doug Storey / QC Technician

Period: 11/07/2021 - 11/13/2021

Report Date 11/13/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.8	%	95-100
	#8 (2.36mm)	87.5	%	65-95
	#16 (1.18mm)	72.7	%	35-75
	#30 (.6mm)	53.2	%	20-55
	#50 (.3mm)	20.7	%	10-30
	#100 (.15mm)	3.4	%	0-10
	#200 (75µm)	1.1	%	
	FM	2.64		2.6-3
AASHTO T11	#200 (75um)	1.07	%	
	Wash Loss (#200/75um)	0.9	%	0-3
ASTM C566	Total Moisture	5.03	%	



Plant S35-Superior Romulus

Product 7920-INTERMED AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 11/07/2021 - 11/13/2021

Report Date 11/13/2021

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)	95.1	%	
	3/8" (9.5mm)	75.0	%	
	#4 (4.75mm)	23.2	%	
	#8 (2.36mm)	6.7	%	
	#16 (1.18mm)	3.2	%	
	#30 (.6mm)	2.3	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.8	%	
	Wash Loss (#200/75um)	1.7	%	0-3
ASTM C566	Total Moisture	2.75	%	



**Plant** S35-Superior Romulus

**Product** 7919-COARSE AGG P1M LS

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

**Period:** 11/07/2021 - 11/13/2021

**Report Date** 11/13/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	62.4	%	
	3/4" (19mm)	26.1	%	
	1/2" (12.5mm)	11.4	%	
	3/8" (9.5mm)	6.2	%	
	#4 (4.75mm)	2.2	%	
	#8 (2.36mm)	1.6	%	
	#16 (1.18mm)	1.4	%	
	#30 (.6mm)	1.3	%	
	#50 (.3mm)	1.2	%	
	#100 (.15mm)	1.1	%	
	#200 (75µm)	1.1	%	
	Wash Loss (#200/75um)	1.0	%	0-2
ASTM C566	Total Moisture	2.07	%	



# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-02**

Sample Date: **11/8/21**

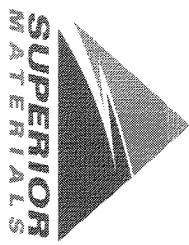
Dates Test Represents: **11/9/2021**

through **11/15/2021**

Concrete Grade: **P1M**

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 %
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	870	5.32	2.62	28.3
NNS	63-115	Ray Rd	1250	7.56	2.65	40.7
<b>Total Wt</b>			<b>3070</b>	<b>18.69</b>		<b>100.0</b>

Sieve	CA	IA	NNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.6	100.0	100.0	98.6	1.4	1.4
1"	42.3	100.0	100.0	82.1	16.5	17.9
3/4"	13.0	97.9	100.0	72.5	9.7	27.5
1/2"	6.3	80.9	100.0	65.6	6.9	34.4
3/8"	5.0	58.3	100.0	58.8	6.8	41.2
#4	3.8	15.0	96.2	44.6	14.2	55.4
#8	3.5	5.6	80.2	35.3	9.3	64.7
#16	3.2	3.6	63.9	28.0	7.3	72.0
#30	2.9	3.1	48.2	21.4	6.6	78.6
#50	2.5	2.9	25.0	11.8	9.6	88.2
#100	2.2	2.7	7.2	4.4	7.4	95.6
LBW	1.8	2.3	0.8	1.5	2.8	98.5

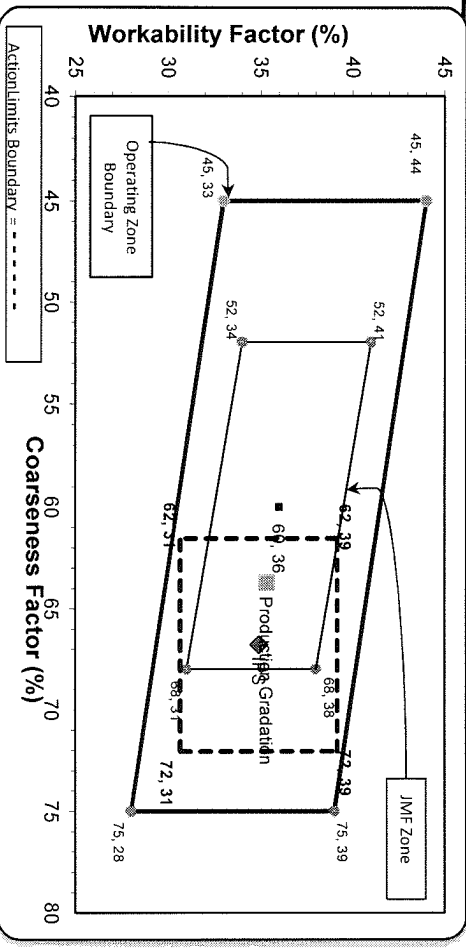
\*Maximum % Retained must be above the 3/8" sieve.  
\*\*Any two adjacent sieves must equal 10% except max.  
nom. max. #100 and #200 sieves.  
\*% Retained must be at least 4% for each sieve except max.  
nom. max. #100 and #200 sieves.  
\*% Retained must be at least 8% for the 1" sieve when a 2" max.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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Initial Production Sample (IPS)

Coarseness Factor: **64** 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"	85.0	15.0	15.0
3/4"	72.3	12.7	27.7
1/2"	64.5	7.8	35.5
3/8"	56.5	8.0	43.5
#4	42.7	13.8	57.3
#8	34.9	7.8	65.1
#16	29.0	5.9	71.0
#30	21.0	8.0	79.0
#50	8.2	12.8	91.8
#100	1.6	6.5	98.4
LBW	0.7	0.9	99.3

PREPARED BY:  
SM, LLC Technical Service

Approved By:



Plant S02-Superior Hoover

Product 1022-2NS GR

Name/Title Doug Storey / QC Technician

Period: 11/07/2021 - 11/13/2021

Report Date 11/13/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.2	%	95-100
	#8 (2.36mm)	80.2	%	65-95
	#16 (1.18mm)	63.9	%	35-75
	#30 (.6mm)	48.2	%	20-55
	#50 (.3mm)	25.0	%	10-30
	#100 (.15mm)	7.2	%	0-10
	#200 (75µm)	1.1	%	
	FM	2.79		2.6-3
	Wash Loss (#200/75um)	0.8	%	0-3
	Total Moisture	4.09	%	



Plant S02-Superior Hoover

Product 7920-INTERMED AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 11/07/2021 - 11/13/2021

Report Date 11/13/2021

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)	97.9	%	
	1/2" (12.5mm)	80.9	%	
	3/8" (9.5mm)	58.3	%	
	#4 (4.75mm)	15.0	%	
	#8 (2.36mm)	5.6	%	
	#16 (1.18mm)	3.6	%	
	#30 (.6mm)	3.1	%	
	#50 (.3mm)	2.9	%	
	#100 (.15mm)	2.7	%	
	#200 (75µm)	2.5	%	
	Wash Loss (#200/75um)	2.3	%	0-3
	Total Moisture	2.60	%	



Plant S02-Superior Hoover

Product 7919-COARSE AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 11/07/2021 - 11/13/2021

Report Date 11/13/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	95.6	%	
	1" (25mm)	42.3	%	
	3/4" (19mm)	13.0	%	
	1/2" (12.5mm)	6.3	%	
	3/8" (9.5mm)	5.0	%	
	#4 (4.75mm)	3.8	%	
	#8 (2.36mm)	3.5	%	
	#16 (1.18mm)	3.2	%	
	#30 (.6mm)	2.9	%	
	#50 (.3mm)	2.5	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	2.28	%	