

# Aggregate Optimization Chart

## Production Gradation Report

PLANT #: **P-32**

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

Sample Date: **7/26/21**

Concrete Grade: **P1M**

Dates Test Represents: **7/27/2021** through **8/2/2021**

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



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

Agg. Class	Pit #	Source	Weight (SSD)	f <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	900	5.50	2.62	29.3
IA	71-47	Presque Isle	920	5.63	2.62	30.0
2NS	95-013	Smelter Bay	1250	7.56	2.65	40.7
		<b>Total Wt</b>	<b>3070</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"	98.7	100.0	100.0	99.6	0.4	0.4
1"	41.0	100.0	100.0	82.7	16.9	17.3
3/4"	10.9	98.9	100.0	73.5	9.2	26.5
1/2"	4.2	79.6	100.0	65.8	7.7	34.2
3/8"	3.5	55.6	100.0	58.4	7.4	41.6
#4	3.0	15.7	96.6	44.9	13.5	55.1
#8	2.7	7.0	84.5	37.3	7.6	62.7
#16	2.6	5.0	70.2	30.8	6.5	69.2
#30	2.5	4.3	49.7	22.3	8.6	77.7
#50	2.2	3.6	23.0	11.1	11.2	88.9
#100	1.9	2.9	6.6	4.1	7.0	95.9
LBW	1.1	1.7	0.8	1.2	3.0	98.8

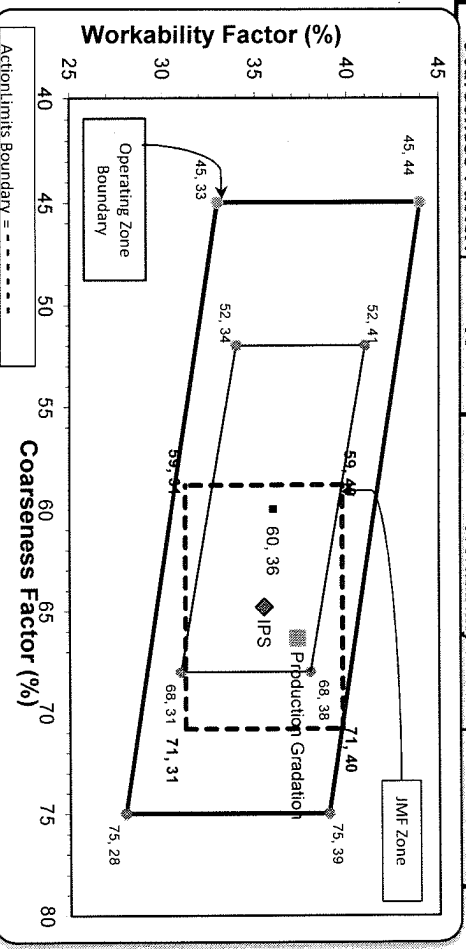
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max.  
 nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max..  
 nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when  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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **66** Workability Factor: **37**

Initial Production Sample (IPS)

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: 07/25/2021 - 07/31/2021

Report Date 07/31/2021

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)	84.5	%	65-95
	#16 (1.18mm)	70.2	%	35-75
	#30 (.6mm)	49.7	%	20-55
	#50 (.3mm)	23.0	%	10-30
	#100 (.15mm)	6.6	%	0-10
	#200 (75µm)	1.6	%	
	FM	2.70		2.6-3
	Wash Loss (#200/75um)	0.8	%	0-3
	Total Moisture	4.7	%	

Plant 958-JMT

Product 7920-INTERMED AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 07/25/2021 - 07/31/2021

Report Date 07/31/2021

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)	98.9	%	
	1/2" (12.5mm)	79.6	%	
	3/8" (9.5mm)	55.6	%	
	#4 (4.75mm)	15.7	%	
	#8 (2.36mm)	7.0	%	
	#16 (1.18mm)	5.0	%	
	#30 (.6mm)	4.3	%	
	#50 (.3mm)	3.6	%	
	#100 (.15mm)	2.9	%	
	#200 (75µm)	2.2	%	
	Wash Loss (#200/75µm)	1.7	%	0-3
	Total Moisture	2.4	%	

# Edw. C. Levy Co.

JMT  
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**Plant** 958-JMT

**Product** 7919-COARSE AGG P1M LS PI

**Period:** 07/25/2021 - 07/31/2021

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

**Report Date** 07/31/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	98.7	%	
	1" (25mm)	41.0	%	
	3/4" (19mm)	10.9	%	
	1/2" (12.5mm)	4.2	%	
	3/8" (9.5mm)	3.5	%	
	#4 (4.75mm)	3.0	%	
	#8 (2.36mm)	2.7	%	
	#16 (1.18mm)	2.6	%	
	#30 (.6mm)	2.5	%	
	#50 (.3mm)	2.2	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75um)	1.1	%	0-2
	Total Moisture	2.9	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-35**

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

Sample Date: **7/26/21**

Concrete Grade: **P1M**

Dates Test Represents: **7/27/2021** through **8/2/2021**

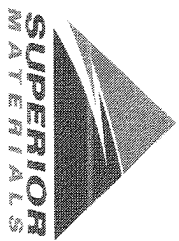
MDOT No.: \_\_\_\_\_

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
2NS	81-093	Burnmaster	1200	7.26	2.65	38.5
Total Wt			<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"	49.9	100.0	100.0	78.0	22.0	22.0
3/4"	21.2	100.0	100.0	65.4	34.6	57.0
1/2"	6.4	93.4	100.0	57.7	42.3	79.3
3/8"	3.0	71.0	100.0	52.3	47.7	84.0
#4	1.8	19.4	98.6	42.1	57.9	91.9
#8	1.6	5.2	85.2	34.4	65.6	97.5
#16	1.4	2.8	68.9	27.6	72.4	99.7
#30	1.4	2.2	47.5	19.3	80.7	99.9
#50	1.2	1.9	16.3	7.1	92.9	99.9
#100	1.2	1.8	3.7	2.3	97.7	99.9
LBW	0.9	1.4	1.1	1.1	98.9	99.9

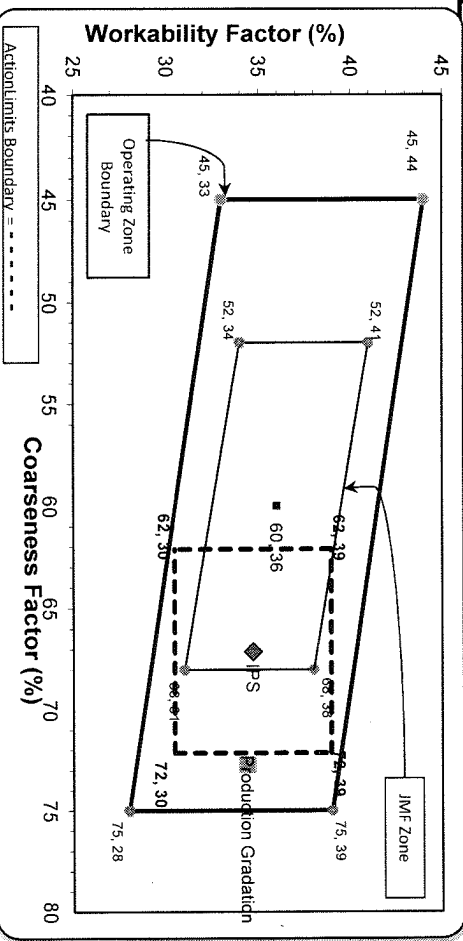
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max.  
 nom. max. #100 and #200 sieves.  
 \*\*% Retained must be at least 4% for each sieve except max.  
 nom. max. #100 and #200 sieves.  
 \*\*\*% Retained must be at least 8% for the 1" sieve when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



Superior Materials, LLC  
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 Farmington Hills, MI 48336

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations  
 Coarseness Factor: **73** Workability Factor: **34**

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  
Period: 07/25/2021 - 07/31/2021

Name/Title Doug Storey / QC Technician  
Report Date 07/31/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.6	%	95-100
	#8 (2.36mm)	85.2	%	65-95
	#16 (1.18mm)	68.9	%	35-75
	#30 (.6mm)	47.5	%	20-55
	#50 (.3mm)	16.3	%	10-30
	#100 (.15mm)	3.7	%	0-10
	#200 (75µm)	1.2	%	
	FM	2.80		2.6-3
AASHTO T11	-#200 (75um)	1.22	%	
	Wash Loss (#200/75um)	1.1	%	0-3
ASTM C566	Total Moisture	5.02	%	



Plant S35-Superior Romulus  
 Product 7920-INTERMED AGG P1M LS  
 Period: 07/25/2021 - 07/31/2021

Name/Title Doug Storey / QC Technician  
 Report Date 07/31/2021

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)	93.4	%	
	3/8" (9.5mm)	71.0	%	
	#4 (4.75mm)	19.4	%	
	#8 (2.36mm)	5.2	%	
	#16 (1.18mm)	2.8	%	
	#30 (.6mm)	2.2	%	
	#50 (.3mm)	1.9	%	
	#100 (.15mm)	1.8	%	
	#200 (75µm)	1.6	%	
	Wash Loss (#200/75um)	1.4	%	0-3
ASTM C566	Total Moisture	3.02	%	



**Plant** S35-Superior Romulus  
**Product** 7919-COARSE AGG P1M LS  
**Period:** 07/25/2021 - 07/31/2021

**Name/Title** Doug Storey / QC Technician  
**Report Date** 07/31/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	49.9	%	
	3/4" (19mm)	21.2	%	
	1/2" (12.5mm)	6.4	%	
	3/8" (9.5mm)	3.0	%	
	#4 (4.75mm)	1.8	%	
	#8 (2.36mm)	1.6	%	
	#16 (1.18mm)	1.4	%	
	#30 (.6mm)	1.4	%	
	#50 (.3mm)	1.2	%	
	#100 (.15mm)	1.2	%	
	#200 (75µm)	1.1	%	
	Wash Loss (#200/75um)	0.9	%	0-2
ASTM C566	Total Moisture	2.38	%	



# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-36**

Sample Date: **7/26/21**

Dates Test Represents: **7/27/2021** through **8/2/2021**

Concrete Grade: **P1M**

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

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

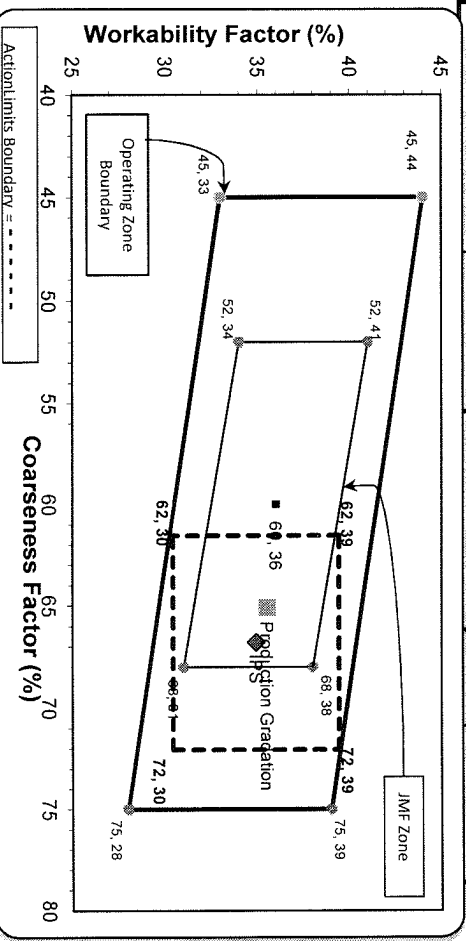
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	920	5.63	2.62	30.0
IA	71-47	Presque Isle	950	5.81	2.62	30.9
NNS	63-92	Grange Hall	1200	7.26	2.65	39.1
<b>Total Wt</b>			<b>3070</b>			<b>100.0</b>

Sieve	CA	IA	NNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.9	100.0	100.0	99.4	0.6	0.6
1"	36.1	100.0	100.0	80.9	18.5	19.1
3/4"	12.6	98.7	100.0	73.4	7.4	26.6
1/2"	4.5	80.7	100.0	65.4	8.0	34.6
3/8"	3.4	57.9	100.0	58.0	7.4	42.0
#4	2.7	13.0	97.8	43.1	15.0	56.9
#8	2.4	4.7	85.3	35.5	7.5	64.5
#16	2.3	3.0	71.2	29.4	6.1	70.6
#30	2.2	2.8	52.1	21.9	7.6	78.1
#50	2.0	2.6	23.9	10.7	11.1	89.3
#100	1.9	2.5	3.8	2.8	7.9	97.2
LBW	1.6	2.0	0.8	1.4	1.4	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

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



Initial Production Sample (IPS)

Sieve	Coarseness Factor:	Workability Factor:	Cumulative % Passing	% Retained	Cumulative % Retained
2"	67	35	100.0	0.0	0.0
1.5"			100.0	0.0	0.0
1"			85.0	15.0	15.0
3/4"			72.1	12.9	27.9
1/2"			64.5	7.6	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



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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: 07/25/2021 - 07/31/2021

Name/Title Doug Storey / QC Technician  
Report Date 07/31/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.8	%	95-100
	#8 (2.36mm)	85.3	%	65-95
	#16 (1.18mm)	71.2	%	35-75
	#30 (.6mm)	52.1	%	20-55
	#50 (.3mm)	23.9	%	10-30
	#100 (.15mm)	3.8	%	0-10
	#200 (75µm)	1.0	%	
	FM	2.66		2.6-3
	Wash Loss (#200/75µm)	0.8	%	0-3
	Total Moisture	3.33	%	



Superior Auburn Hills  
 2470 Auburn Road  
 Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills  
 Product 7920-INTERMED AGG P1M LS  
 Period: 07/25/2021 - 07/31/2021

Name/Title Doug Storey / QC Technician  
 Report Date 07/31/2021

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)	98.7	%	
	1/2" (12.5mm)	80.7	%	
	3/8" (9.5mm)	57.9	%	
	#4 (4.75mm)	13.0	%	
	#8 (2.36mm)	4.7	%	
	#16 (1.18mm)	3.0	%	
	#30 (.6mm)	2.8	%	
	#50 (.3mm)	2.6	%	
	#100 (.15mm)	2.5	%	
	#200 (75µm)	2.2	%	
	Wash Loss (#200/75um)	2.0	%	0-3
	Total Moisture	2.50	%	



Superior Auburn Hills  
 2470 Auburn Road  
 Auburn Hills, MI 48432

**Plant** S36-Superior Auburn Hills

**Product** 7919-COARSE AGG P1M LS

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

**Period:** 07/25/2021 - 07/31/2021

**Report Date** 07/31/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	97.9	%	
	1" (25mm)	36.1	%	
	3/4" (19mm)	12.6	%	
	1/2" (12.5mm)	4.5	%	
	3/8" (9.5mm)	3.4	%	
	#4 (4.75mm)	2.7	%	
	#8 (2.36mm)	2.4	%	
	#16 (1.18mm)	2.3	%	
	#30 (.6mm)	2.2	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75um)	1.6	%	0-2
	Total Moisture	2.08	%	