

# Aggregate Optimization Chart

## Production Gradation Report

PLANT #: **P-32**

Sample Date: **3/15/21**

Dates Test Represents: **3/16/2021** through **3/22/2021**

Concrete Grade: **P1M**

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

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



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

Aggr. 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	900	5.50	2.62	29.3
ZNS	95-013	Smelter Bay	1250	7.56	2.65	40.7
		<b>Total Wt</b>	<b>3070</b>			<b>100.0</b>

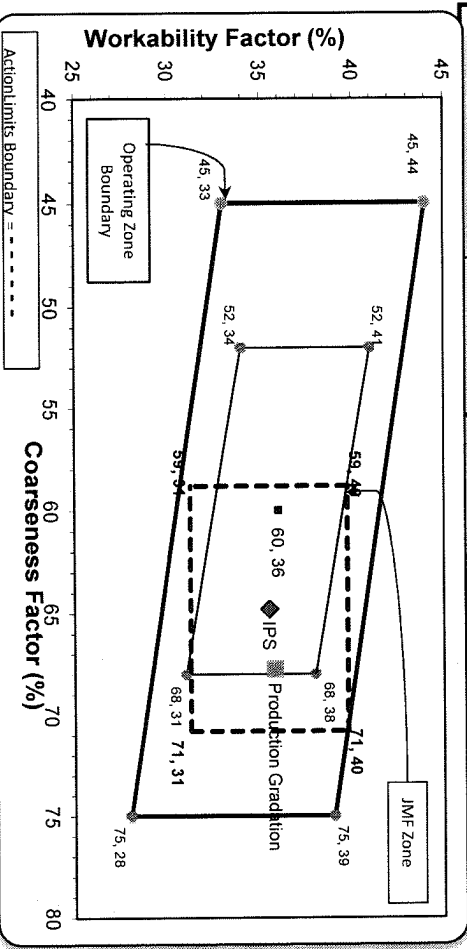
  

Sieve	CA	IA	ZNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.3	100.0	100.0	98.6	1.4	1.4
1"	47.0	100.0	100.0	84.1	14.5	15.9
3/4"	14.7	98.0	100.0	73.9	10.3	26.1
1/2"	5.2	76.6	100.0	64.7	9.1	35.3
3/8"	3.9	49.8	100.0	56.5	8.2	43.5
#4	2.7	10.3	96.1	43.0	13.5	57.0
#8	2.5	4.2	83.0	35.8	7.2	64.2
#16	2.3	3.1	66.9	28.8	6.9	71.2
#30	2.1	2.8	43.9	19.3	9.5	80.7
#50	1.9	2.6	18.8	9.0	10.3	91.0
#100	1.7	2.4	4.4	3.0	6.0	97.0
LBW	1.3	1.7	1.0	1.3	1.7	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: **68** Workability Factor: **36**



Initial Production Sample (IPS)

Sieve	Coarseness Factor:	Workability Factor:	% Cumulative Passing	% Retained	% Cumulative Retained
2"	65	36	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:

# Edw. C. Levy Co.

## Basic Quality Statistical Summary Report

Plant 958-JMT  
Product 1022-2NS GR - Smelter Bay  
Specification 2NS GR Spec  
Period 03/14/2021 - 03/20/2021

Sieve/Test	Tests	Average	St Dev	Target	Specification
3/8" (9.5mm)	1	100.0			100-100
#4 (4.75mm)	1	96.1			95-100
#8 (2.36mm)	1	83.0			65-95
#16 (1.18mm)	1	66.9			35-75
#30 (.6mm)	1	43.9			20-55
#50 (.3mm)	1	18.8		18-28	10-30
#100 (.15mm)	1	4.4			0-10
#200 (75µm)	1	1.0			
Pan	1	0.0			
Wash Loss (#200/75um)	1	1.0			0-3

## Basic Quality Statistical Summary Report

Plant 958-JMT  
 Product 7920-INTERMED AGG P1M LS PI  
 Specification Intermed Agg P1M LS PI Target  
 Period 03/14/2021 - 03/20/2021

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	1	100.0			
1 1/2" (37.5mm)	1	100.0			
1" (25mm)	1	100.0		100-100	
3/4" (19mm)	1	98.0		98-100	
1/2" (12.5mm)	1	76.6		72-92	
3/8" (9.5mm)	1	49.8		39-68	
#4 (4.75mm)	1	10.3		2-23	
#8 (2.36mm)	1	4.2			
#16 (1.18mm)	1	3.1			
#30 (.6mm)	1	2.8			
#50 (.3mm)	1	2.6			
#100 (.15mm)	1	2.4			
#200 (75µm)	1	1.8		0-3	
Pan	1	0.0			
Wash Loss (#200/75um)	1	1.7			0-3

## Basic Quality Statistical Summary Report

Plant 958-JMT  
 Product 7919-COARSE AGG P1M LS PI  
 Specification Coarse Agg P1M LS PI Target  
 Period 03/14/2021 - 03/20/2021

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	1	100.0		100-100	
1 1/2" (37.5mm)	1	95.3		93-100	
1" (25mm)	1	47.0		35-55	
3/4" (19mm)	1	14.7		8-24	
1/2" (12.5mm)	1	5.2		0-6	
3/8" (9.5mm)	1	3.9		0-5	
#4 (4.75mm)	1	2.7		0-3	
#8 (2.36mm)	1	2.5			
#16 (1.18mm)	1	2.3			
#30 (.6mm)	1	2.1			
#50 (.3mm)	1	1.9			
#100 (.15mm)	1	1.7			
#200 (75µm)	1	1.3		0-2	
Pan	1	0.0			
Wash Loss (#200/75um)	1	1.3			0-2

# Aggregate Optimization Chart

# Production Gradation Report

**PLANT #:** P-36

**Sample Date:** 3/15/21

**Dates Test Represents:** 3/16/2021 through 3/22/2021

**Concrete Grade:** P1M

**Contractor:**

**MDOT No.:**

Aggr. 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
2NS	63-92	Grange Hall	1200	7.26	2.65	39.1
<b>Total Wt</b>			<b>3070</b>	<b>18.70</b>		<b>100.0</b>

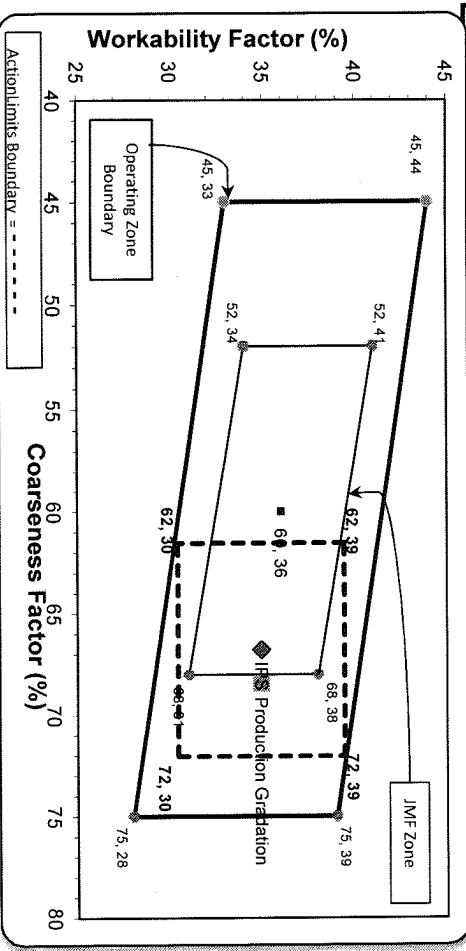
<----- Verify this number is 100%

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.4	100.0	100.0	98.9	1.1	1.1
1"	41.0	100.0	100.0	82.3	16.6	17.7
3/4"	12.6	98.8	100.0	73.4	8.9	26.6
1/2"	3.7	75.3	100.0	63.5	9.9	36.5
3/8"	3.0	50.0	100.0	55.5	8.0	44.5
#4	2.4	10.8	97.7	42.3	13.2	57.7
#8	2.1	4.3	84.3	34.9	7.3	65.1
#16	2.0	2.9	68.3	28.2	6.7	71.8
#30	1.9	2.5	47.7	20.0	8.2	80.0
#50	1.7	2.2	20.3	9.1	10.9	90.9
#100	1.6	1.9	3.6	2.5	6.7	97.5
LBW	1.3	1.6	1.1	1.3	1.2	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:** 68 **Workability Factor:** 35



**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



PREPARED BY:  
SM, LLC Technical Service

Approved By:



## Basic Quality Statistical Summary Report

**Plant** S36-Superior Auburn Hills  
**Product** 1022-2NS GR  
**Specification** 2NS GR Spec  
**Period** 03/14/2021 - 03/20/2021

Sieve/Test	Tests	Average	St Dev	Target	Specification
3/8" (9.5mm)	1	100.0			100-100
#4 (4.75mm)	1	97.7			95-100
#8 (2.36mm)	1	84.3			65-95
#16 (1.18mm)	1	68.3			35-75
#30 (.6mm)	1	47.7		40-50	20-55
#50 (.3mm)	1	20.3			10-30
#100 (.15mm)	1	3.6			0-10
#200 (75µm)	1	1.1			
Pan	1	0.0			
Wash Loss (#200/75um)	1	1.1			0-3



## Basic Quality Statistical Summary Report

**Plant** S36-Superior Auburn Hills  
**Product** 7920-INTERMED AGG P1M LS  
**Specification** Intermed Agg P1M LS Target  
**Period** 03/14/2021 - 03/20/2021

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	1	100.0			
1 1/2" (37.5mm)	1	100.0			
1" (25mm)	1	100.0		100-100	
3/4" (19mm)	1	98.8			
1/2" (12.5mm)	1	75.3			
3/8" (9.5mm)	1	50.0			
#4 (4.75mm)	1	10.8			
#8 (2.36mm)	1	4.3			
#16 (1.18mm)	1	2.9			
#30 (.6mm)	1	2.5			
#50 (.3mm)	1	2.2			
#100 (.15mm)	1	1.9			
#200 (75µm)	1	1.6		0-3	
Pan	1	0.0			
Wash Loss (#200/75um)	1	1.6			0-3



# Basic Quality Statistical Summary Report

**Plant** S36-Superior Auburn Hills  
**Product** 7919-COARSE AGG P1M LS  
**Specification** Coarse Agg P1M LS Target  
**Period** 03/14/2021 - 03/20/2021

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	1	100.0		100-100	
1 1/2" (37.5mm)	1	96.4			
1" (25mm)	1	41.0			
3/4" (19mm)	1	12.6			
1/2" (12.5mm)	1	3.7			
3/8" (9.5mm)	1	3.0			
#4 (4.75mm)	1	2.4			
#8 (2.36mm)	1	2.1			
#16 (1.18mm)	1	2.0			
#30 (.6mm)	1	1.9			
#50 (.3mm)	1	1.7			
#100 (.15mm)	1	1.6			
#200 (75µm)	1	1.3		0-2	
Pan	1	0.0			
Wash Loss (#200/75um)	1	1.3			0-2