

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-32**

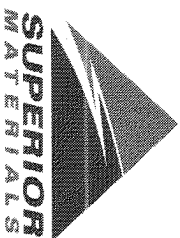
Sample Date: **3/29/21**

Dates Test Represents: **3/30/2021** through **4/5/2021**

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	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	750	4.59	2.62	24.4
NNS	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>

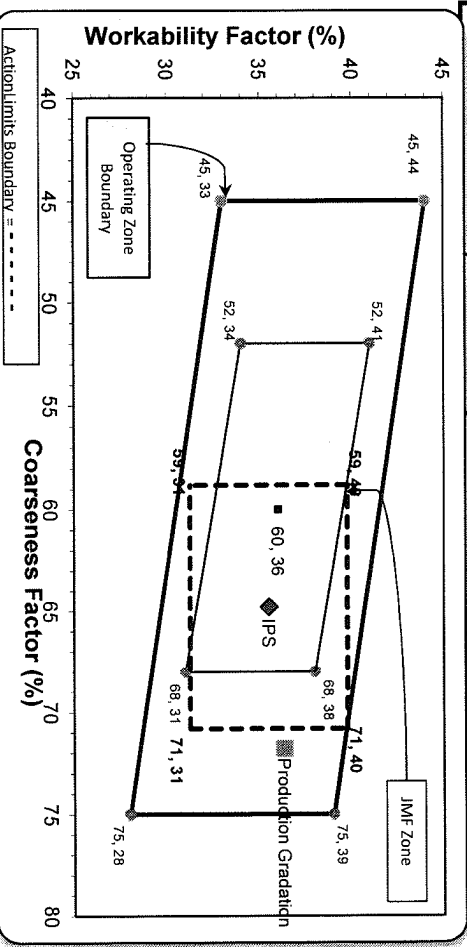
  

Sieve	CA	IA	NNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.3	100.0	100.0	98.0	2.0	2.0
1"	39.0	100.0	100.0	78.7	19.3	21.3
3/4"	11.1	98.1	100.0	68.6	10.2	31.4
1/2"	3.7	74.5	100.0	60.2	8.3	39.8
3/8"	2.9	51.4	100.0	54.3	5.9	45.7
#4	2.4	12.4	96.2	43.0	11.2	57.0
#8	2.3	5.2	84.1	36.3	6.7	63.7
#16	2.2	3.6	68.4	29.5	6.8	70.5
#30	2.1	2.7	48.7	21.2	8.3	78.8
#50	2.0	2.2	21.7	10.1	11.2	89.9
#100	1.9	1.9	5.6	3.4	6.7	96.6
LBW	1.6	1.5	1.3	1.5	2.0	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

Coarseness Factor: **72** Workability Factor: **36**



Initial Production Sample (IPS)

Sieve	% Retained	Cumulative % Retained
2"	0.0	0.0
1.5"	0.6	0.6
1"	15.3	16.0
3/4"	10.5	26.5
1/2"	8.2	34.8
3/8"	7.1	41.8
#4	14.1	55.9
#8	8.6	64.5
#16	6.4	70.9
#30	7.3	78.1
#50	12.2	90.4
#100	7.1	97.4
LBW	1.6	99.0

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Edw. C. Levy Co.

JMT  
8911 W. Jefferson  
Detroit, 48209  
(313) 429-2429

Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Name/Title Doug Storey / QC Technician

Period: 03/28/2021 - 04/03/2021

Report Date 04/03/2021

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)	84.1	%	65-95
	#16 (1.18mm)	68.4	%	35-75
	#30 (.6mm)	48.7	%	20-55
	#50 (.3mm)	21.7	%	10-30
	#100 (.15mm)	5.6	%	0-10
	#200 (75µm)	1.7	%	
	FM	2.75		2.6-3
	Wash Loss (#200/75um)	1.3	%	0-3
	Total Moisture	5.5	%	

**Plant** 958-JMT

**Product** 7920-INTERMED AGG P1M LS PI

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

**Period:** 03/28/2021 - 04/03/2021

**Report Date** 04/03/2021

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)	98.1	%	
	1/2" (12.5mm)	74.5	%	
	3/8" (9.5mm)	51.4	%	
	#4 (4.75mm)	12.4	%	
	#8 (2.36mm)	5.2	%	
	#16 (1.18mm)	3.6	%	
	#30 (.6mm)	2.7	%	
	#50 (.3mm)	2.2	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.6	%	
	Wash Loss (#200/75um)	1.5	%	0-3
	Total Moisture	3.9	%	

**Plant** 958-JMT

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

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

**Period:** 03/28/2021 - 04/03/2021

**Report Date** 04/03/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	94.3	%	
	1" (25mm)	39.0	%	
	3/4" (19mm)	11.1	%	
	1/2" (12.5mm)	3.7	%	
	3/8" (9.5mm)	2.9	%	
	#4 (4.75mm)	2.4	%	
	#8 (2.36mm)	2.3	%	
	#16 (1.18mm)	2.2	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75um)	1.6	%	0-2
	Total Moisture	0.4	%	

# Aggregate Optimization Chart

PLANT #: **P-36**

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

Sample Date: 3/29/21

Concrete Grade: **P1M**

Dates Test Represents: 3/30/2021 through 4/5/2021

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

Agg. Class	Pit #	Source	Weight (ssd)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	800	4.89	2.62	26.1
N2S	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>

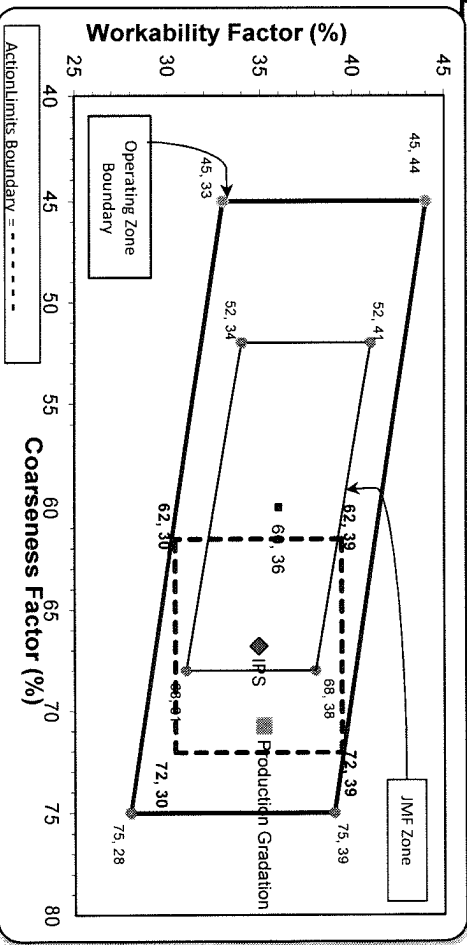
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Sieve	CA	IA	N2S	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	76.4	100.0	100.0	91.8	8.2	8.2
3/4"	27.9	97.2	100.0	74.1	17.6	25.9
1/2"	5.6	75.2	100.0	60.6	13.5	39.4
3/8"	3.6	53.0	100.0	54.2	6.5	45.8
#4	2.4	11.6	98.1	42.2	11.9	57.8
#8	2.3	3.9	85.4	35.2	7.0	64.8
#16	2.2	2.8	71.0	29.2	6.0	70.8
#30	2.2	2.6	49.8	20.9	8.3	79.1
#50	2.1	2.4	24.3	10.9	10.1	89.1
#100	1.9	2.3	3.3	2.6	8.3	97.4
LBW	1.6	1.8	0.6	1.3	1.3	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

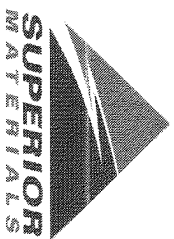
Initial Production Sample (IPS)



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: \_\_\_\_\_



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



Superior Auburn Hills  
2470 Auburn Road  
Auburn Hills, MI 48432

**Plant** S36-Superior Auburn Hills

**Product** 1022-2NS GR

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

**Period:** 03/28/2021 - 04/03/2021

**Report Date** 04/03/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.1	%	95-100
	#8 (2.36mm)	85.4	%	65-95
	#16 (1.18mm)	71.0	%	35-75
	#30 (.6mm)	49.8	%	20-55
	#50 (.3mm)	24.3	%	10-30
	#100 (.15mm)	3.3	%	0-10
	#200 (75µm)	0.8	%	
	FM	2.68		2.6-3
	Wash Loss (#200/75um)	0.6	%	0-3



Superior Auburn Hills  
2470 Auburn Road  
Auburn Hills, MI 48432

**Plant** S36-Superior Auburn Hills

**Product** 7920-INTERMED AGG P1M LS

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

**Period:** 03/28/2021 - 04/03/2021

**Report Date** 04/03/2021

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)	97.2	%	
	1/2" (12.5mm)	75.2	%	
	3/8" (9.5mm)	53.0	%	
	#4 (4.75mm)	11.6	%	
	#8 (2.36mm)	3.9	%	
	#16 (1.18mm)	2.8	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.4	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	2.0	%	
	Wash Loss (#200/75um)	1.8	%	0-3



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:** 03/28/2021 - 04/03/2021

**Report Date** 04/03/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	76.4	%	
	3/4" (19mm)	27.9	%	
	1/2" (12.5mm)	5.6	%	
	3/8" (9.5mm)	3.6	%	
	#4 (4.75mm)	2.4	%	
	#8 (2.36mm)	2.3	%	
	#16 (1.18mm)	2.2	%	
	#30 (.6mm)	2.2	%	
	#50 (.3mm)	2.1	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.8	%	
	Wash Loss (#200/75um)	1.6	%	0-2



# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-02**

Sample Date: **3/29/21**

Dates Test Represents: **3/30/2021** through **4/5/2021**

Concrete Grade: **P1M**

MDOT No.:

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	750	4.59	2.62	24.4
ZNS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

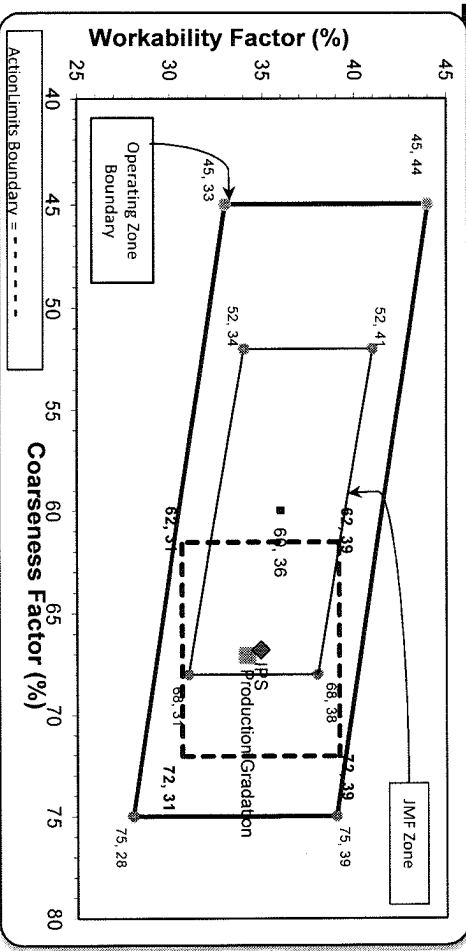
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Sieve	CA	IA	ZNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.6	100.0	100.0	99.5	0.5	0.5
1"	43.9	100.0	100.0	80.4	19.1	19.6
3/4"	10.7	98.8	100.0	68.6	11.9	31.4
1/2"	2.8	80.9	100.0	61.5	7.1	38.5
3/8"	2.3	58.7	100.0	55.9	5.6	44.1
#4	2.0	16.4	95.6	43.6	12.2	56.4
#8	1.9	5.5	79.0	34.2	9.5	65.8
#16	1.8	3.0	64.6	27.7	6.5	72.3
#30	1.7	2.6	49.4	21.3	6.3	78.7
#50	1.6	2.2	25.0	11.3	10.1	88.7
#100	1.5	1.9	5.1	3.1	8.2	96.9
LBW	1.2	1.4	1.2	1.2	1.8	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.

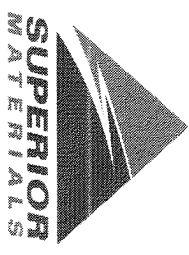
Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **67** Workability Factor: **34**



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"			72.3	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



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 30701 W. 10 Mile Rd.  
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 Farmington Hills, MI 48336

PREPARED BY:  
 SM, LLC Technical Service

Approved By:



**Plant** S02-Superior Hoover

**Product** 1022-2NS GR

**Period:** 03/29/2021 - 04/10/2021

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

**Report Date** 04/05/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	95.6	%	95-100
	#8 (2.36mm)	79.0	%	65-95
	#16 (1.18mm)	64.6	%	35-75
	#30 (.6mm)	49.4	%	20-55
	#50 (.3mm)	25.0	%	10-30
	#100 (.15mm)	5.1	%	0-10
	#200 (75µm)	1.5	%	
	FM	2.81		2.6-3
	Wash Loss (#200/75um)	1.2	%	0-3
	Total Moisture	4.50	%	



Plant S02-Superior Hoover

Product 7920-INTERMED AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 03/29/2021 - 04/10/2021

Report Date 04/05/2021

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)	98.8	%	
	1/2" (12.5mm)	80.9	%	
	3/8" (9.5mm)	58.7	%	
	#4 (4.75mm)	16.4	%	
	#8 (2.36mm)	5.5	%	
	#16 (1.18mm)	3.0	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.2	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75um)	1.4	%	0-3
	Total Moisture	3.56	%	



Plant S02-Superior Hoover

Product 7919-COARSE AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 03/29/2021 - 04/10/2021

Report Date 04/05/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	98.6	%	
	1" (25mm)	43.9	%	
	3/4" (19mm)	10.7	%	
	1/2" (12.5mm)	2.8	%	
	3/8" (9.5mm)	2.3	%	
	#4 (4.75mm)	2.0	%	
	#8 (2.36mm)	1.9	%	
	#16 (1.18mm)	1.8	%	
	#30 (.6mm)	1.7	%	
	#50 (.3mm)	1.6	%	
	#100 (.15mm)	1.5	%	
	#200 (75µm)	1.3	%	
	Wash Loss (#200/75um)	1.2	%	0-2
	Total Moisture	3.48	%	