

# Aggregate Optimization Chart

## Production Gradation Report

PLANT #: **P-32**

Sample Date: **4/12/21**

Dates Test Represents: **4/13/2021** through **4/19/2021**

Concrete Grade: **P1M**

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

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



Superior Materials, LLC  
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Suite 500  
Farmington Hills, MI 48336

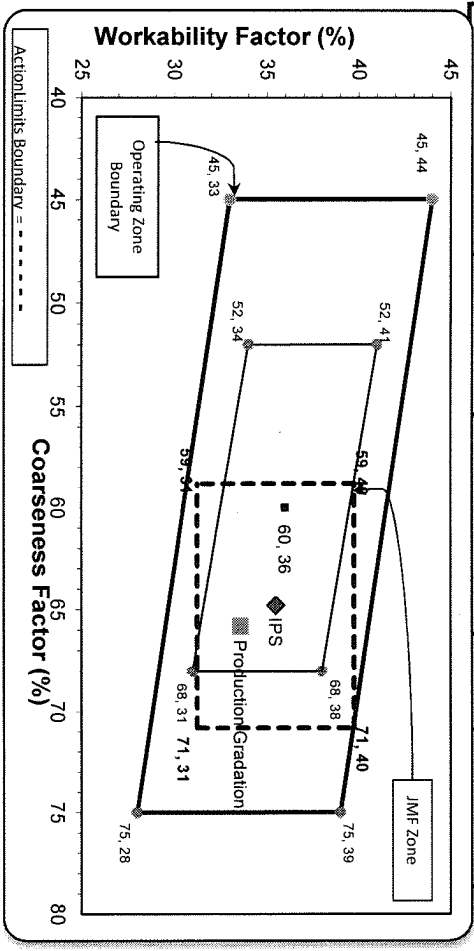
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	750	4.59	2.62	24.4
2NS	95-013	Smelter Bay	1250	7.56	2.65	40.7
<b>Total Wt:</b>			<b>3070</b>	<b>18.69</b>		<b>100.0</b>

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	95.3	100.0	100.0	98.4	1.6	1.6
1"	40.8	100.0	100.0	79.4	19.0	20.6
3/4"	10.2	98.9	100.0	68.4	10.9	31.6
1/2"	3.1	82.7	100.0	62.0	6.4	38.0
3/8"	2.2	60.6	100.0	56.3	5.7	43.7
#4	1.8	13.2	95.2	42.6	13.7	57.4
#8	1.7	4.4	78.4	33.6	9.0	66.4
#16	1.7	3.2	63.5	27.2	6.4	72.8
#30	1.6	2.8	47.9	20.7	6.5	79.3
#50	1.6	2.3	27.4	12.3	8.5	87.7
#100	1.5	2.1	2.6	2.1	10.2	97.9
LBW	1.1	1.6	1.4	1.3	0.8	98.7

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **66** Workability Factor: **34**



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

\*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.

PREPARED BY:  
SM, LLC Technical Service

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

Plant 958-JMT

Product 7919-COARSE AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 04/11/2021 - 04/17/2021

Report Date 04/16/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	95.3	%	
	1" (25mm)	40.8	%	
	3/4" (19mm)	10.2	%	
	1/2" (12.5mm)	3.1	%	
	3/8" (9.5mm)	2.2	%	
	#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)	1.1	%	0-2
	Total Moisture	2.6	%	

Plant 958-JMT

Product 7920-INTERMED AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 04/11/2021 - 04/17/2021

Report Date 04/16/2021

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)	82.7	%	
	3/8" (9.5mm)	60.6	%	
	#4 (4.75mm)	13.2	%	
	#8 (2.36mm)	4.4	%	
	#16 (1.18mm)	3.2	%	
	#30 (.6mm)	2.8	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.1	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75um)	1.6	%	0-3
	Total Moisture	4.7	%	

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Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Name/Title Doug Storey / QC Technician

Period: 04/11/2021 - 04/17/2021

Report Date 04/16/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	95.2	%	95-100
	#8 (2.36mm)	78.4	%	65-95
	#16 (1.18mm)	63.5	%	35-75
	#30 (.6mm)	47.9	%	20-55
	#50 (.3mm)	27.4	%	10-30
	#100 (.15mm)	2.6	%	0-10
	#200 (75µm)	1.5	%	
	FM	2.85		2.6-3
	Wash Loss (#200/75um)	1.4	%	0-3
	Total Moisture	5.7	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-39**

Sample Date: **4/12/21**

Dates Test Represents: **4/13/2021** through **4/19/2021**

Concrete Grade: **P1M**

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

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

Agg. Class	Pit #	Source	Weight (ssd)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	800	4.89	2.62	26.1
ZNS	44-051	Krake Willis Rd	1200	7.26	2.65	39.1
Total Wt			<b>3070</b>	<b>18.70</b>		<b>100.0</b>

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

Sieve	CA	IA	ZNS	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"	43.5	100.0	100.0	80.3	19.7	19.7
3/4"	14.8	98.1	100.0	69.8	10.5	30.2
1/2"	7.3	76.0	100.0	61.4	8.4	38.6
3/8"	5.6	54.7	100.0	55.3	6.1	44.7
#4	3.8	14.3	97.7	43.2	12.1	56.8
#8	3.2	5.5	80.4	34.0	9.3	66.0
#16	2.9	3.8	63.7	26.9	7.1	73.1
#30	2.8	3.4	47.6	20.5	6.4	79.5
#50	2.6	3.2	24.2	11.2	9.3	88.8
#100	2.4	3.0	6.6	4.2	7.0	95.8
LBW	1.8	2.3	1.2	1.7	2.5	98.3

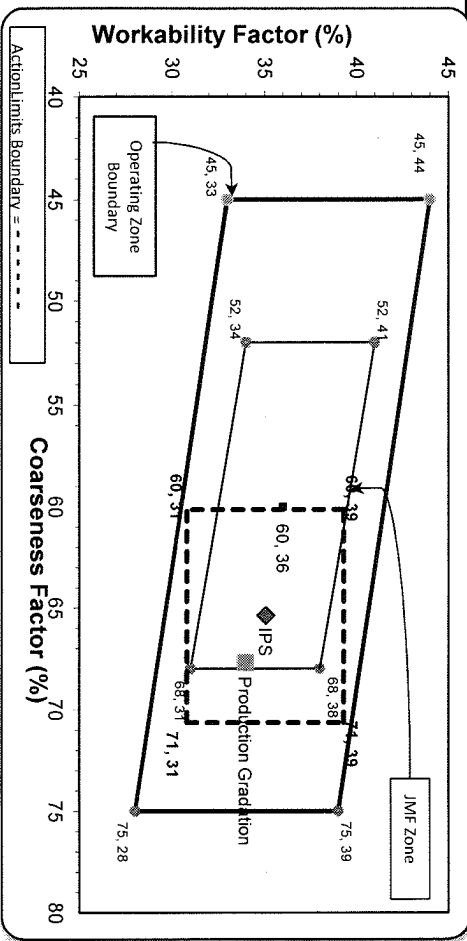
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Initial Production Sample (IPS)

Coarseness Factor: **68** Workability Factor: **34**

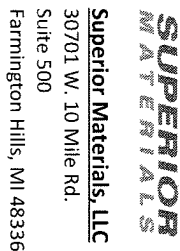
Coarseness Factor: **65** Workability Factor: **35**



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.6	0.4	0.4
1"	83.9	15.7	16.1
3/4"	74.1	9.8	25.9
1/2"	64.3	9.7	35.7
3/8"	57.5	6.8	42.5
#4	44.5	13.1	55.5
#8	35.1	9.4	64.9
#16	27.9	7.2	72.1
#30	21.7	6.2	78.3
#50	12.6	9.1	87.4
#100	3.5	9.1	96.5
LBW	1.2	2.4	98.8

PREPARED BY:  
SM, LLC Technical Service

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



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 Suite 500  
 Farmington Hills, MI 48336



Plant S39-Superior Sterling Heights

Product 7919-COARSE AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 04/11/2021 - 04/17/2021

Report Date 04/16/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	43.5	%	
	3/4" (19mm)	14.8	%	
	1/2" (12.5mm)	7.3	%	
	3/8" (9.5mm)	5.6	%	
	#4 (4.75mm)	3.8	%	
	#8 (2.36mm)	3.2	%	
	#16 (1.18mm)	2.9	%	
	#30 (.6mm)	2.8	%	
	#50 (.3mm)	2.6	%	
	#100 (.15mm)	2.4	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	1.09	%	



Plant S39-Superior Sterling Heights

Product 7920-INTERMED AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 04/11/2021 - 04/17/2021

Report Date 04/16/2021

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)	98.1	%	
	1/2" (12.5mm)	76.0	%	
	3/8" (9.5mm)	54.7	%	
	#4 (4.75mm)	14.3	%	
	#8 (2.36mm)	5.5	%	
	#16 (1.18mm)	3.8	%	
	#30 (.6mm)	3.4	%	
	#50 (.3mm)	3.2	%	
	#100 (.15mm)	3.0	%	
	#200 (75µm)	2.5	%	
	Wash Loss (#200/75um)	2.3	%	0-3
	Total Moisture	2.88	%	



**Plant** S39-Superior Sterling Heights

**Product** 1022-2NS GR

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

**Period:** 04/11/2021 - 04/17/2021

**Report Date** 04/16/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.7	%	95-100
	#8 (2.36mm)	80.4	%	65-95
	#16 (1.18mm)	63.7	%	35-75
	#30 (.6mm)	47.6	%	20-55
	#50 (.3mm)	24.2	%	10-30
	#100 (.15mm)	6.6	%	0-10
	#200 (75µm)	1.5	%	
	FM	2.80		2.6-3
	Wash Loss (#200/75um)	1.2	%	0-3
	Total Moisture	4.64	%	