

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-32**

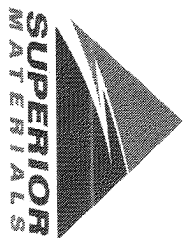
Sample Date: 11/16/20

Dates Test Represents: 11/17/2020 through 11/23/2020

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	920	5.63	2.62	30.0
IA	71-47	Presque Isle	900	5.50	2.62	29.3
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"	94.5	100.0	100.0	98.4	1.6	1.6
1"	39.5	100.0	100.0	81.9	16.5	18.1
3/4"	10.3	100.0	100.0	72.7	9.2	27.3
1/2"	3.6	100.0	100.0	64.8	7.9	35.2
3/8"	3.1	56.0	100.0	58.1	6.7	41.9
#4	2.7	12.0	95.2	43.1	15.0	56.9
#8	2.6	5.2	81.2	35.4	7.7	64.6
#16	2.5	3.9	64.8	28.3	7.1	71.7
#30	2.4	3.2	42.8	19.1	9.2	80.9
#50	2.3	2.9	22.8	10.8	8.3	89.2
#100	2.2	2.7	9.7	5.4	5.4	94.6
LBW	1.7	2.3	1.2	1.7	3.7	98.3

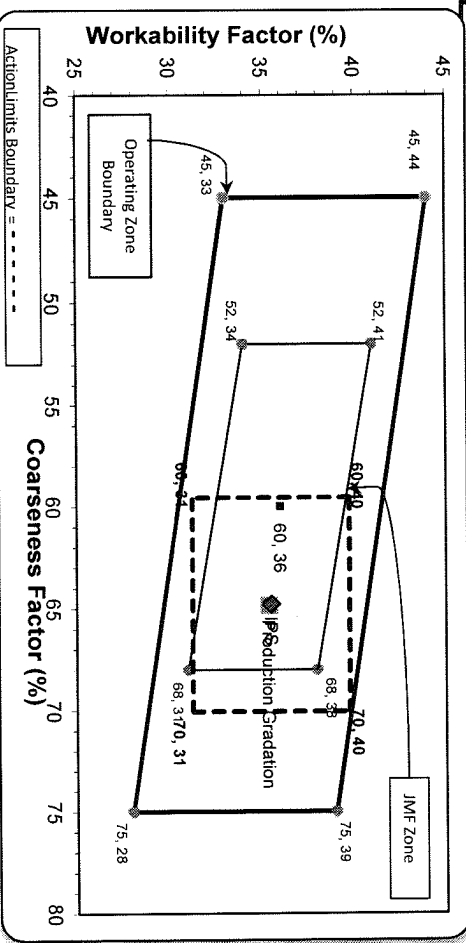
Verify this number is 100%

\*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: **35**



Initial Production Sample (IPS)

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

Plant 958-JMT  
 Product 7919-COARSE AGG P1M LS PI  
 Period: 11/15/2020 - 11/21/2020

Name/Title Doug Storey / QC Technician  
 Report Date 11/20/2020

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	94.5	%	
	1" (25mm)	39.5	%	
	3/4" (19mm)	10.3	%	
	1/2" (12.5mm)	3.6	%	
	3/8" (9.5mm)	3.1	%	
	#4 (4.75mm)	2.7	%	
	#8 (2.36mm)	2.6	%	
	#16 (1.18mm)	2.5	%	
	#30 (.6mm)	2.4	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	2.0	%	
	Wash Loss (#200/75um)	1.7	%	0-2
	Total Moisture	1.8	%	

Plant 958-JMT  
 Product 7920-INTERMED AGG P1M LS PI  
 Period: 11/15/2020 - 11/21/2020

Name/Title Doug Storey / QC Technician  
 Report Date 11/20/2020

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)	98.6	%	
	1/2" (12.5mm)	78.5	%	
	3/8" (9.5mm)	56.0	%	
	#4 (4.75mm)	12.0	%	
	#8 (2.36mm)	5.2	%	
	#16 (1.18mm)	3.9	%	
	#30 (.6mm)	3.2	%	
	#50 (.3mm)	2.9	%	
	#100 (.15mm)	2.7	%	
	#200 (75µm)	2.5	%	
	Wash Loss (#200/75um)	2.3	%	0-3
	Total Moisture	3.0	%	

# Edw. C. Levy Co.

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**Plant** 958-JMT  
**Product** 1022-2NS GR - Smelter Bay  
**Period:** 11/15/2020 - 11/21/2020

**Name/Title** Doug Storey / QC Technician  
**Report Date** 11/20/2020

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)	81.2	%	65-95
	#16 (1.18mm)	64.8	%	35-75
	#30 (.6mm)	42.8	%	20-55
	#50 (.3mm)	22.8	%	10-30
	#100 (.15mm)	9.7	%	0-10
	#200 (75µm)	1.6	%	
	FM	2.84		2.6-3
	Wash Loss (#200/75um)	1.2	%	0-3
	Total Moisture	5.0	%	

# Aggregate Optimization Chart

**PLANT #:** P-39

Sample Date: 11/16/20

Dates Test Represents: 11/17/2020 through 11/23/2020

Concrete Grade: P1M

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

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

Agg. Class	Pit #	Source	Weight (ssd)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	970	5.93	2.62	31.6
IA	71-47	Presque Isle	900	5.50	2.62	29.3
2NS	44-051	Krake Willis Rd	1200	7.26	2.65	39.1
Total Wt:			3070			100.0

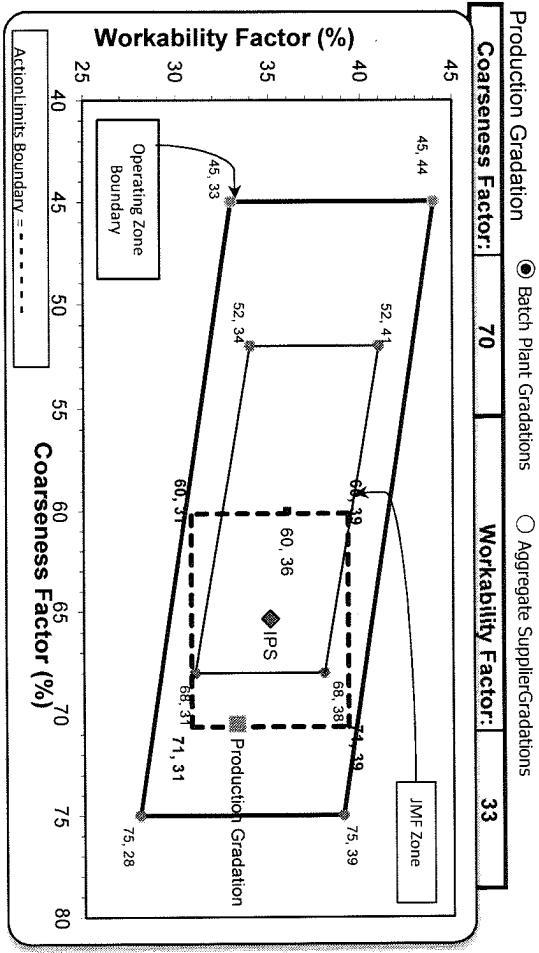
Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.4	100.0	100.0	99.5	0.5	0.5
1"	57.7	100.0	100.0	86.6	12.9	13.4
3/4"	23.1	97.1	100.0	74.9	11.8	25.1
1/2"	5.3	66.5	100.0	60.3	14.6	39.7
3/8"	3.7	43.3	100.0	53.0	7.3	47.0
#4	2.5	10.0	96.1	41.3	11.7	58.7
#8	2.2	4.4	80.0	33.3	8.0	66.7
#16	2.0	3.0	64.4	26.7	6.6	73.3
#30	1.8	2.6	49.3	20.6	6.1	79.4
#50	1.6	2.4	25.1	11.0	9.6	89.0
#100	1.5	2.2	9.9	5.0	6.0	95.0
LBW	1.1	1.5	0.9	1.1	3.8	98.9



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

Production Gradation	Batch Plant Gradations	Aggregate Supplier Gradations
Coarseness Factor: 70	Workability Factor: 33	

\*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.



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: \_\_\_\_\_



Plant S39-Superior Sterling Heights  
 Product 7919-COARSE AGG P1M LS  
 Period: 11/15/2020 - 11/21/2020

Name/Title Doug Storey / QC Technician  
 Report Date 11/20/2020

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	98.4	%	
	1" (25mm)	57.7	%	
	3/4" (19mm)	23.1	%	
	1/2" (12.5mm)	5.3	%	
	3/8" (9.5mm)	3.7	%	
	#4 (4.75mm)	2.5	%	
	#8 (2.36mm)	2.2	%	
	#16 (1.18mm)	2.0	%	
	#30 (.6mm)	1.8	%	
	#50 (.3mm)	1.6	%	
	#100 (.15mm)	1.5	%	
	#200 (75µm)	1.3	%	
	Wash Loss (#200/75um)	1.1	%	0-2
	Total Moisture	1.65	%	



Plant S39-Superior Sterling Heights  
 Product 7920-INTERMED AGG P1M LS  
 Period: 11/15/2020 - 11/21/2020

Name/Title Doug Storey / QC Technician  
 Report Date 11/20/2020

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)	97.1	%	
	1/2" (12.5mm)	66.5	%	
	3/8" (9.5mm)	43.3	%	
	#4 (4.75mm)	10.0	%	
	#8 (2.36mm)	4.4	%	
	#16 (1.18mm)	3.0	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.4	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	1.8	%	
	Wash Loss (#200/75um)	1.5	%	0-3
	Total Moisture	3.27	%	



**Plant** S39-Superior Sterling Heights  
**Product** 1022-2NS GR  
**Period:** 11/15/2020 - 11/21/2020

**Name/Title** Doug Storey / QC Technician  
**Report Date** 11/20/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.1	%	95-100
	#8 (2.36mm)	80.0	%	65-95
	#16 (1.18mm)	64.4	%	35-75
	#30 (.6mm)	49.3	%	20-55
	#50 (.3mm)	25.1	%	10-30
	#100 (.15mm)	9.9	%	0-10
	#200 (75µm)	1.5	%	
	FM	2.75		2.6-3
	Wash Loss (#200/75um)	0.9	%	0-3
	Total Moisture	5.58	%	



# Aggregate Optimization Chart

PLANT #: **P-02**

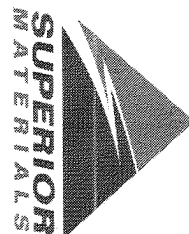
Sample Date: 11/16/20

Dates Test Represents: 11/17/2020 through 11/23/2020

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	920	5.63	2.62	30.0
IA	71-47	Presque Isle	900	5.50	2.62	29.3
NNS	63-115	Ray Rd	1250	7.56	2.65	40.7
		<b>Total Wt</b>	<b>3070</b>			<b>100.0</b>

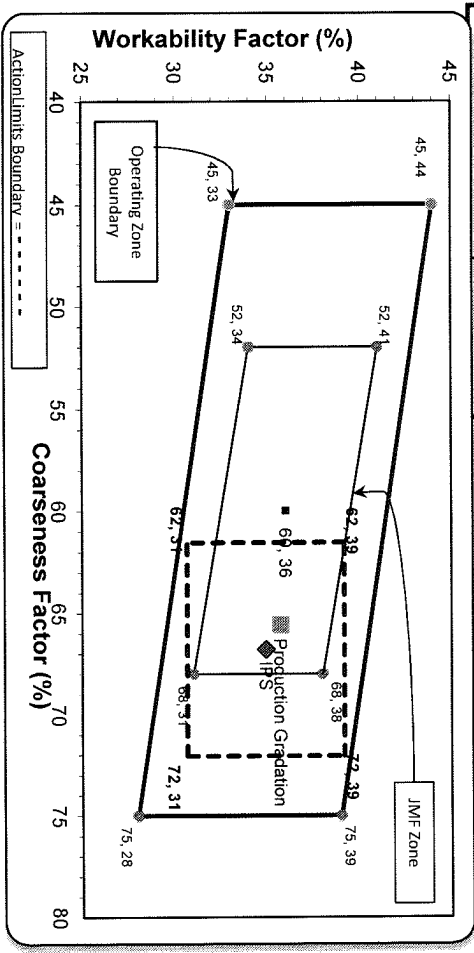
Sieve	CA	IA	NNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	99.6	100.0	100.0	99.9	0.1	0.1
1"	41.8	100.0	100.0	82.6	17.3	17.4
3/4"	13.8	99.0	100.0	73.9	8.7	26.1
1/2"	4.5	78.2	100.0	65.0	8.9	35.0
3/8"	3.6	54.7	100.0	57.8	7.2	42.2
#4	2.7	12.5	97.6	44.2	13.6	55.8
#8	2.4	4.6	82.6	35.7	8.5	64.3
#16	2.2	3.2	68.4	29.4	6.3	70.6
#30	2.2	2.8	53.3	23.2	6.3	76.8
#50	2.1	2.6	25.0	11.6	11.6	88.4
#100	1.9	2.4	4.3	3.0	8.5	97.0
LBW	1.5	2.0	0.7	1.3	1.7	98.7

Verify this number is 100%

\*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: **36**



Initial Production Sample (IPS)

Sieve	% 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: \_\_\_\_\_



## Basic Quality Statistical Summary Report

**Plant** S02-Superior Hoover  
**Product** 7919-COARSE AGG P1M LS  
**Specification** Coarse Agg P1M LS Target  
**Period** 11/01/2020 - 11/23/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	2	100.0	0.00	100-100	
1 1/2" (37.5mm)	2	99.6	0.57		
1" (25mm)	2	41.8	1.63		
3/4" (19mm)	2	13.8	4.45		
1/2" (12.5mm)	2	4.5	2.12		
3/8" (9.5mm)	2	3.6	1.56		
#4 (4.75mm)	2	2.7	0.57		
#8 (2.36mm)	2	2.4	0.28		
#16 (1.18mm)	2	2.2	0.21		
#30 (.6mm)	2	2.2	0.14		
#50 (.3mm)	2	2.1	0.14		
#100 (.15mm)	2	1.9	0.14		
#200 (75µm)	2	1.7	0.14	0-2	
Pan	2	0.0	0.00		
Wash Loss (#200/75um)	2	1.5	0.28		0-2
Total Moisture	2	2.04	0.106		



## Basic Quality Statistical Summary Report

**Plant** S02-Superior Hoover  
**Product** 7920-INTERMED AGG P1M LS  
**Specification** Intermed Agg P1M LS Target  
**Period** 11/01/2020 - 11/23/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
2" (50mm)	2	100.0	0.00		
1 1/2" (37.5mm)	2	100.0	0.00		
1" (25mm)	2	100.0	0.00	100-100	
3/4" (19mm)	2	99.0	0.35		
1/2" (12.5mm)	2	78.2	7.35		
3/8" (9.5mm)	2	54.7	8.20		
#4 (4.75mm)	2	12.5	2.55		
#8 (2.36mm)	2	4.6	0.07		
#16 (1.18mm)	2	3.2	0.35		
#30 (.6mm)	2	2.8	0.35		
#50 (.3mm)	2	2.6	0.28		
#100 (.15mm)	2	2.4	0.28		
#200 (75µm)	2	2.1	0.28	0-3	
Pan	2	0.0	0.00		
Wash Loss (#200/75um)	2	2.0	0.21		0-3
Total Moisture	2	4.02	1.655		



## Basic Quality Statistical Summary Report

**Plant** S02-Superior  
**Product** Hoover 1102-2NS  
**Specification** 2NS GR Spec  
**Period** 11/01/2020 - 11/23/2020

Sieve/Test	Tests	Average	St Dev	Target	Specification
3/8" (9.5mm)	2	100.0	0.00		100-100
#4 (4.75mm)	2	97.6	0.92		95-100
#8 (2.36mm)	2	82.6	0.78		65-95
#16 (1.18mm)	2	68.4	0.57		35-75
#30 (.6mm)	2	53.3	0.99	40-50	20-55
#50 (.3mm)	2	25.0	2.55		10-30
#100 (.15mm)	2	4.3	0.99		0-10
#200 (75µm)	2	0.9	0.14		
Pan	2	0.0	0.00		
FM	2	2.69	0.071	2.7-2.9	2.6-3
Wash Loss (#200/75um)	2	0.7	0.00		0-3
Total Moisture	2	5.02	0.785		