

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-32**

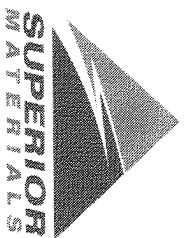
Sample Date: 9/12/22

Dates Test Represents: 9/13/2022 through 9/19/2022

Concrete Grade: **P1M, 3500HP**

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>

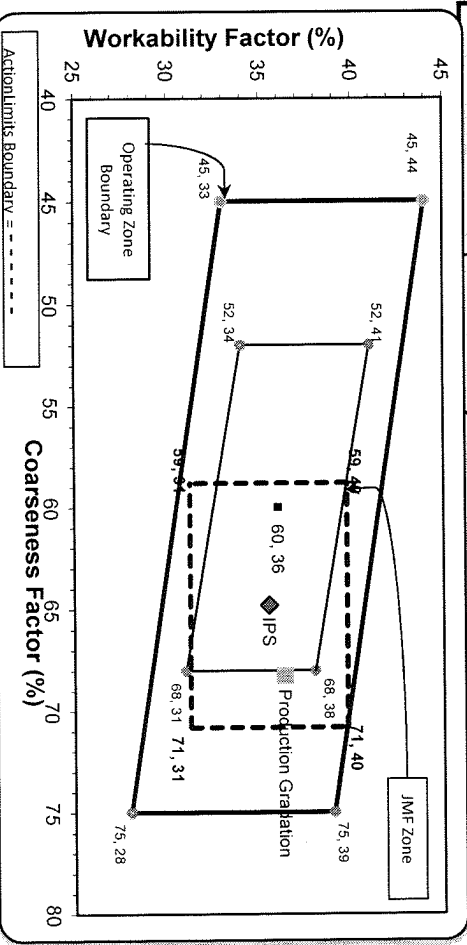
Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.2	100.0	100.0	99.5	0.5	0.5
1"	57.8	100.0	100.0	87.4	12.1	12.6
3/4"	18.1	100.0	100.0	75.0	25.0	25.0
1/2"	5.1	76.3	100.0	64.6	35.4	35.4
3/8"	3.8	50.1	100.0	56.5	43.5	43.5
#4	3.0	10.6	96.5	43.3	56.7	56.7
#8	2.6	3.8	84.6	36.3	63.7	63.7
#16	2.4	2.8	69.7	29.9	70.1	70.1
#30	2.3	2.5	50.5	22.0	78.0	78.0
#50	2.2	2.4	23.8	11.1	88.9	88.9
#100	2.0	2.3	6.7	4.0	96.0	96.0
LBW	1.6	1.8	1.1	1.5	98.5	98.5

<----- 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: **68** Workability Factor: **36**



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  
 Period: 09/11/2022 - 09/17/2022

Name/Title Doug Storey / QC Technician  
 Report Date 09/16/2022

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.5	%	95-100
	#8 (2.36mm)	84.6	%	65-95
	#16 (1.18mm)	69.7	%	35-75
	#30 (.6mm)	50.5	%	20-55
	#50 (.3mm)	23.8	%	10-30
	#100 (.15mm)	6.7	%	0-10
	#200 (75µm)	1.5	%	
	FM	2.68		2.6-3
	Wash Loss (#200/75um)	1.1	%	0-3
	Total Moisture	4.2	%	

Plant 958-JMT

Product 7920-INTERMED AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 09/11/2022 - 09/17/2022

Report Date 09/16/2022

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)	98.3	%	
	1/2" (12.5mm)	76.3	%	
	3/8" (9.5mm)	50.1	%	
	#4 (4.75mm)	10.6	%	
	#8 (2.36mm)	3.8	%	
	#16 (1.18mm)	2.8	%	
	#30 (.6mm)	2.5	%	
	#50 (.3mm)	2.4	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	2.0	%	
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	2.7	%	

# Edw. C. Levy Co.

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

**Plant** 958-JMT  
**Product** 7919-COARSE AGG P1M LS PI  
**Period:** 09/11/2022 - 09/17/2022

**Name/Title** Doug Storey / QC Technician  
**Report Date** 09/16/2022

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	98.2	%	
	1" (25mm)	57.8	%	
	3/4" (19mm)	18.1	%	
	1/2" (12.5mm)	5.1	%	
	3/8" (9.5mm)	3.8	%	
	#4 (4.75mm)	3.0	%	
	#8 (2.36mm)	2.6	%	
	#16 (1.18mm)	2.4	%	
	#30 (.6mm)	2.3	%	
	#50 (.3mm)	2.2	%	
	#100 (.15mm)	2.0	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75um)	1.6	%	0-2
	Total Moisture	2.1	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-36**

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

Sample Date: 9/12/22

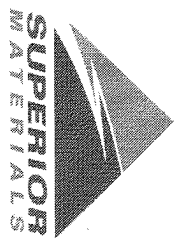
Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 9/13/2022 through 9/19/2022

MIDOT No.: \_\_\_\_\_

Aggr. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	920	5.63	2.62	30.0
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>

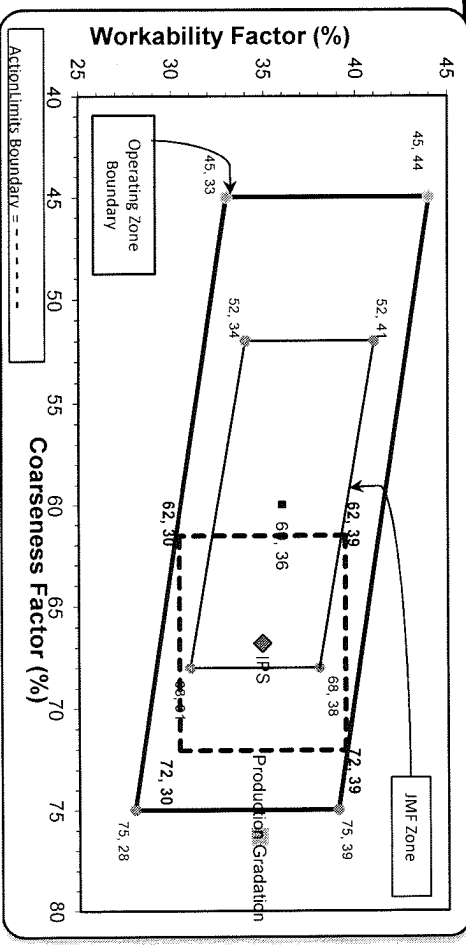
Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	93.5	100.0	100.0	98.0	2.0	2.0
1"	30.3	100.0	100.0	78.4	19.6	21.6
3/4"	5.7	96.1	100.0	69.7	8.8	30.3
1/2"	2.3	64.6	100.0	59.2	10.5	40.8
3/8"	2.2	34.7	100.0	50.2	9.0	49.8
#4	2.2	6.2	98.1	40.9	9.3	59.1
#8	2.2	3.2	84.6	34.7	6.2	65.3
#16	2.2	2.6	70.6	29.1	5.7	70.9
#30	2.2	2.4	52.9	22.1	7.0	77.9
#50	2.0	2.3	22.1	9.9	12.1	90.1
#100	1.9	2.1	4.2	2.9	7.1	97.1
LBW	1.6	1.8	0.7	1.3	1.6	98.7



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

\*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: **76** Workability Factor: **35**



Initial Production Sample (IPS)

Sieve	Cumulative % 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"	72.1	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 Auburn Hills  
2470 Auburn Road  
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills  
Product 1022-2NS GR  
Period: 09/11/2022 - 09/17/2022

Name/Title Doug Storey / QC Technician  
Report Date 09/16/2022

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)	84.6	%	65-95
	#16 (1.18mm)	70.6	%	35-75
	#30 (.6mm)	52.9	%	20-55
	#50 (.3mm)	22.1	%	10-30
	#100 (.15mm)	4.2	%	0-10
	#200 (75µm)	0.8	%	
	FM	2.67		2.6-3
	Wash Loss (#200/75um)	0.7	%	0-3
	Total Moisture	3.38	%	



Superior Auburn Hills  
 2470 Auburn Road  
 Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills  
 Product 7920-INTERMED AGG P1M LS  
 Period: 09/11/2022 - 09/17/2022

Name/Title Doug Storey / QC Technician  
 Report Date 09/16/2022

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)	96.1	%	
	1/2" (12.5mm)	64.6	%	
	3/8" (9.5mm)	34.7	%	
	#4 (4.75mm)	6.2	%	
	#8 (2.36mm)	3.2	%	
	#16 (1.18mm)	2.6	%	
	#30 (.6mm)	2.4	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.1	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	3.05	%	



Superior Auburn Hills  
2470 Auburn Road  
Auburn Hills, MI 48432

**Plant** S36-Superior Auburn Hills  
**Product** 7919-COARSE AGG P1M LS  
**Period:** 09/11/2022 - 09/17/2022

**Name/Title** Doug Storey / QC Technician  
**Report Date** 09/16/2022

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	93.5	%	
	1" (25mm)	30.3	%	
	3/4" (19mm)	5.7	%	
	1/2" (12.5mm)	2.3	%	
	3/8" (9.5mm)	2.2	%	
	#4 (4.75mm)	2.2	%	
	#8 (2.36mm)	2.2	%	
	#16 (1.18mm)	2.2	%	
	#30 (.6mm)	2.2	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.6	%	
	Wash Loss (#200/75um)	1.6	%	0-2
	Total Moisture	2.10	%	



# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-39**

Sample Date: 9/12/22

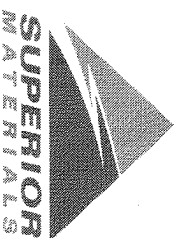
Dates Test Represents: 9/13/2022

through 9/19/2022

Concrete Grade: **P1M, 3500HP**

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

MIDOT 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	1020	6.24	2.62	33.2
IA	71-47	Presque Isle	800	4.89	2.62	26.1
ZNS	44-051	Krake Willis Rd	1250	7.56	2.65	40.7
<b>Total Wt</b>			<b>3070</b>	<b>18.69</b>		<b>100.0</b>

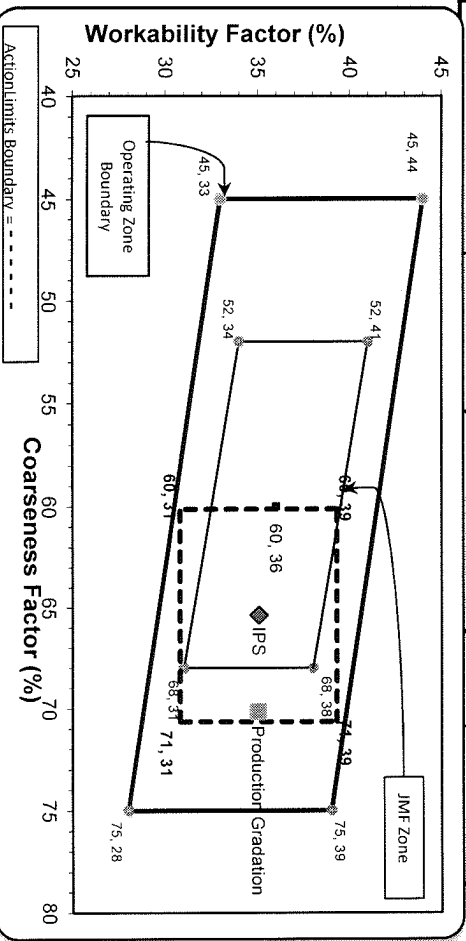
  

Sieve	CA	IA	ZNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.1	100.0	100.0	98.0	2.0	2.0
1"	44.4	100.0	100.0	81.5	16.5	18.5
3/4"	14.7	94.9	100.0	70.3	11.2	29.7
1/2"	6.4	68.5	100.0	60.7	9.6	39.3
3/8"	4.5	46.8	100.0	54.4	6.3	45.6
#4	3.2	10.4	97.1	43.3	11.1	56.7
#8	2.8	4.4	80.9	35.0	8.3	65.0
#16	2.7	3.1	66.0	28.6	6.4	71.4
#30	2.5	2.8	50.2	22.0	6.6	78.0
#50	2.4	2.5	28.2	12.9	9.1	87.1
#100	2.2	2.3	9.8	5.3	7.6	94.7
LBW	1.7	1.8	1.8	1.8	3.6	98.2

\*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: **70** Workability Factor: **35**



Initial Production Sample (IPS)

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 1022-2NS GR  
Period: 09/11/2022 - 09/17/2022

Name/Title Doug Storey / QC Technician  
Report Date 09/16/2022

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.1	%	95-100
	#8 (2.36mm)	80.9	%	65-95
	#16 (1.18mm)	66.0	%	35-75
	#30 (.6mm)	50.2	%	20-55
	#50 (.3mm)	28.2	%	10-30
	#100 (.15mm)	9.8	%	0-10
	#200 (75µm)	2.3	%	
	FM	2.68		2.6-3
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	4.75	%	



Plant S39-Superior Sterling Heights  
 Product 7920-INTERMED AGG P1M LS  
 Period: 09/11/2022 - 09/17/2022

Name/Title Doug Storey / QC Technician  
 Report Date 09/16/2022

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)	94.9	%	
	1/2" (12.5mm)	68.5	%	
	3/8" (9.5mm)	46.8	%	
	#4 (4.75mm)	10.4	%	
	#8 (2.36mm)	4.4	%	
	#16 (1.18mm)	3.1	%	
	#30 (.6mm)	2.8	%	
	#50 (.3mm)	2.5	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	2.0	%	
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	2.90	%	



**Plant** S39-Superior Sterling Heights  
**Product** 7919-COARSE AGG P1M LS  
**Period:** 09/11/2022 - 09/17/2022

**Name/Title** Doug Storey / QC Technician  
**Report Date** 09/16/2022

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	94.1	%	
	1" (25mm)	44.4	%	
	3/4" (19mm)	14.7	%	
	1/2" (12.5mm)	6.4	%	
	3/8" (9.5mm)	4.5	%	
	#4 (4.75mm)	3.2	%	
	#8 (2.36mm)	2.8	%	
	#16 (1.18mm)	2.7	%	
	#30 (.6mm)	2.5	%	
	#50 (.3mm)	2.4	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.7	%	0-2
	Total Moisture	2.46	%	