

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-20**

Sample Date: **8/24/20**

Dates Test Represents: **8/25/2020** through **8/31/2020**

Concrete Grade: **P1M**

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

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

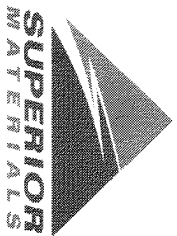
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	1000	6.12	2.62	32.6
IA	71-47	Presque Isle	870	5.32	2.62	28.3
NNS	63-92	Grange Hall	1200	7.26	2.65	39.1
Total Wt.			<b>3070</b>	<b>18.70</b>		<b>100.0</b>

Verify this number is 100%

Sieve	CA	IA	NNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.4	100.0	100.0	98.2	1.8	1.8
1"	60.5	100.0	100.0	87.1	11.0	12.9
3/4"	25.8	98.9	100.0	75.5	11.6	24.5
1/2"	10.9	83.8	100.0	66.4	9.1	33.6
3/8"	6.7	61.0	100.0	58.6	7.8	41.4
#4	3.7	18.1	97.1	44.3	14.3	55.7
#8	3.5	7.1	84.4	36.1	8.1	63.9
#16	3.3	4.5	69.4	29.5	6.7	70.5
#30	3.1	3.9	48.8	21.2	8.3	78.8
#50	2.9	3.6	21.2	10.3	10.9	89.7
#100	2.7	3.3	3.0	3.0	7.3	97.0
LBW	1.9	2.7	0.8	1.7	1.3	98.3

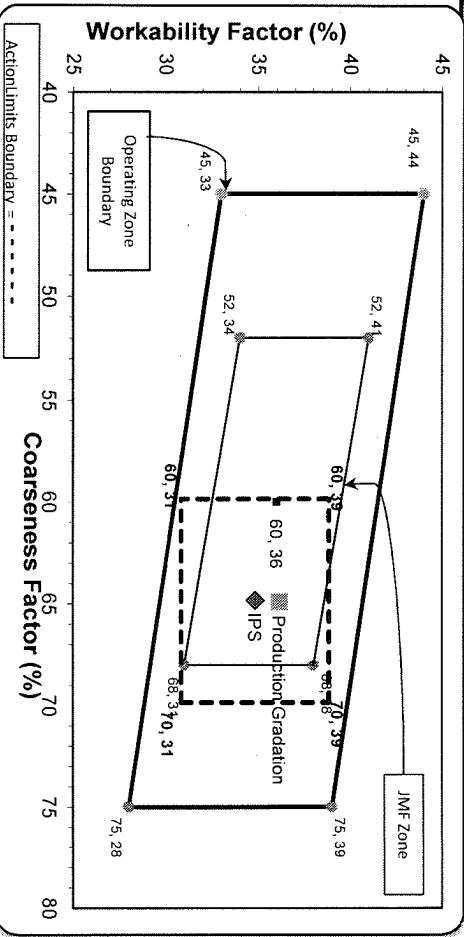
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max.  
 nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max.  
 nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when 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

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



Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Initial Production Sample (IPS)



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.1	0.9	0.9
1"	80.8	18.2	19.2
3/4"	71.3	9.6	28.7
1/2"	64.0	7.3	36.0
3/8"	57.7	6.2	42.3
#4	42.8	15.0	57.2
#8	34.8	7.9	65.2
#16	28.4	6.4	71.6
#30	20.2	8.2	79.8
#50	7.6	12.6	92.4
#100	1.6	6.0	98.4
LBW	1.0	0.6	99.0

PREPARED BY:  
 SM, LLC Technical Service

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



Plant S20-Superior Flint

Product 7919-COARSE AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 08/23/2020 - 08/29/2020

Report Date 08/29/2020

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	94.4	%	
	1" (25mm)	60.5	%	
	3/4" (19mm)	25.8	%	
	1/2" (12.5mm)	10.9	%	
	3/8" (9.5mm)	6.7	%	
	#4 (4.75mm)	3.7	%	
	#8 (2.36mm)	3.5	%	
	#16 (1.18mm)	3.3	%	
	#30 (.6mm)	3.1	%	
	#50 (.3mm)	2.9	%	
	#100 (.15mm)	2.7	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75µm)	1.8	%	0-2
	Total Moisture	0.75	%	



Plant S20-Superior Flint

Product 7920-INTERMED AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 08/23/2020 - 08/29/2020

Report Date 08/29/2020

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)	98.9	%	
	1/2" (12.5mm)	83.8	%	
	3/8" (9.5mm)	61.0	%	
	#4 (4.75mm)	18.1	%	
	#8 (2.36mm)	7.1	%	
	#16 (1.18mm)	4.5	%	
	#30 (.6mm)	3.9	%	
	#50 (.3mm)	3.6	%	
	#100 (.15mm)	3.3	%	
	#200 (75µm)	2.7	%	
	Wash Loss (#200/75um)	2.6	%	0-3
	Total Moisture	0.00	%	



**Plant** S20-Superior Flint  
**Product** 1022-2NS GR  
**Period:** 08/23/2020 - 08/29/2020

**Name/Title** Doug Storey / QC Technician  
**Report Date** 08/29/2020

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)	84.4	%	65-95
	#16 (1.18mm)	69.4	%	35-75
	#30 (.6mm)	48.8	%	20-55
	#50 (.3mm)	21.2	%	10-30
	#100 (.15mm)	3.0	%	0-10
	#200 (75µm)	0.8	%	
	FM	2.76		2.6-3
	Wash Loss (#200/75um)	0.8	%	0-3
	Total Moisture	3.03	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-36**

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

Sample Date: **8/24/20**

Concrete Grade: **P1M**

Dates Test Represents: **8/25/2020** through **8/31/2020**

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	750	4.59	2.62	24.4
IA	71-47	Presque Isle	1120	6.85	2.62	36.5
2NS	63-92	Grange Hall	1200	7.26	2.65	39.1
<b>Total Wt</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"	98.4	100.0	100.0	99.6	0.4	0.4
1"	42.7	100.0	100.0	86.0	13.6	14.0
3/4"	12.7	97.6	100.0	77.8	8.2	22.2
1/2"	5.0	76.4	100.0	68.2	9.6	31.8
3/8"	3.8	48.7	100.0	57.8	10.4	42.2
#4	3.0	12.0	97.3	43.1	14.6	56.9
#8	2.6	5.9	84.9	36.0	7.2	64.0
#16	2.2	4.5	70.2	29.6	6.4	70.4
#30	1.9	4.1	49.4	21.3	8.3	78.7
#50	1.7	3.8	20.9	10.0	11.3	90.0
#100	1.6	3.5	3.1	2.9	7.1	97.1
LBW	0.9	2.9	0.8	1.6	1.3	98.4



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Suite 500  
Farmington Hills, MI 48336

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	99.6	0.4	0.4
1"	42.7	100.0	100.0	86.0	13.6	14.0
3/4"	12.7	97.6	100.0	77.8	8.2	22.2
1/2"	5.0	76.4	100.0	68.2	9.6	31.8
3/8"	3.8	48.7	100.0	57.8	10.4	42.2
#4	3.0	12.0	97.3	43.1	14.6	56.9
#8	2.6	5.9	84.9	36.0	7.2	64.0
#16	2.2	4.5	70.2	29.6	6.4	70.4
#30	1.9	4.1	49.4	21.3	8.3	78.7
#50	1.7	3.8	20.9	10.0	11.3	90.0
#100	1.6	3.5	3.1	2.9	7.1	97.1
LBW	0.9	2.9	0.8	1.6	1.3	98.4

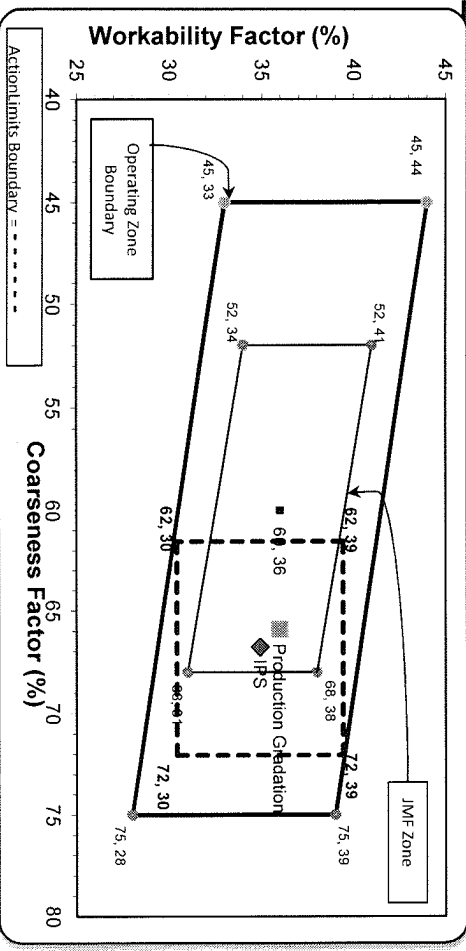
\*Maximum % Retained must be above the 3/8" sieve.  
\*Any two adjacent sieves must equal 10% except max.  
\*Any two adjacent sieves must equal 4% except max.  
\*% Retained must be at least 4% for each sieve except max.  
\*% Retained must be at least 4% for each sieve except max.  
\*% Retained must 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: **66** Workability Factor: **36**

Coarseness Factor: **67** Workability Factor: **35**



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: \_\_\_\_\_



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: 08/23/2020 - 08/29/2020

Report Date 08/29/2020

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	98.4	%	
	1" (25mm)	42.7	%	
	3/4" (19mm)	12.7	%	
	1/2" (12.5mm)	5.0	%	
	3/8" (9.5mm)	3.8	%	
	#4 (4.75mm)	3.0	%	
	#8 (2.36mm)	2.6	%	
	#16 (1.18mm)	2.2	%	
	#30 (.6mm)	1.9	%	
	#50 (.3mm)	1.7	%	
	#100 (.15mm)	1.6	%	
	#200 (75µm)	0.9	%	
	Wash Loss (#200/75um)	0.8	%	0-2
	Total Moisture	3.55	%	



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: 08/23/2020 - 08/29/2020

Report Date 08/29/2020

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)	97.6	%	
	1/2" (12.5mm)	76.4	%	
	3/8" (9.5mm)	48.7	%	
	#4 (4.75mm)	12.0	%	
	#8 (2.36mm)	5.9	%	
	#16 (1.18mm)	4.5	%	
	#30 (.6mm)	4.1	%	
	#50 (.3mm)	3.8	%	
	#100 (.15mm)	3.5	%	
	#200 (75µm)	2.9	%	
	Wash Loss (#200/75um)	2.7	%	0-3
	Total Moisture	4.12	%	



2470 Auburn Road  
Auburn Hills, MI 48432

**Plant** S36-Superior Auburn Hills

**Product** 1022-2NS GR

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

**Period:** 08/23/2020 - 08/29/2020

**Report Date** 08/29/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.3	%	95-100
	#8 (2.36mm)	84.9	%	65-95
	#16 (1.18mm)	70.2	%	35-75
	#30 (.6mm)	49.4	%	20-55
	#50 (.3mm)	20.9	%	10-30
	#100 (.15mm)	3.1	%	0-10
	#200 (75µm)	0.8	%	
	FM	2.74		2.6-3
	Wash Loss (#200/75µm)	0.8	%	0-3
	Total Moisture	3.11	%	



# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-39**

Sample Date: **8/24/20**

Dates Test Represents: **8/25/2020** through **8/31/2020**

Concrete Grade: **P1M**

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

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

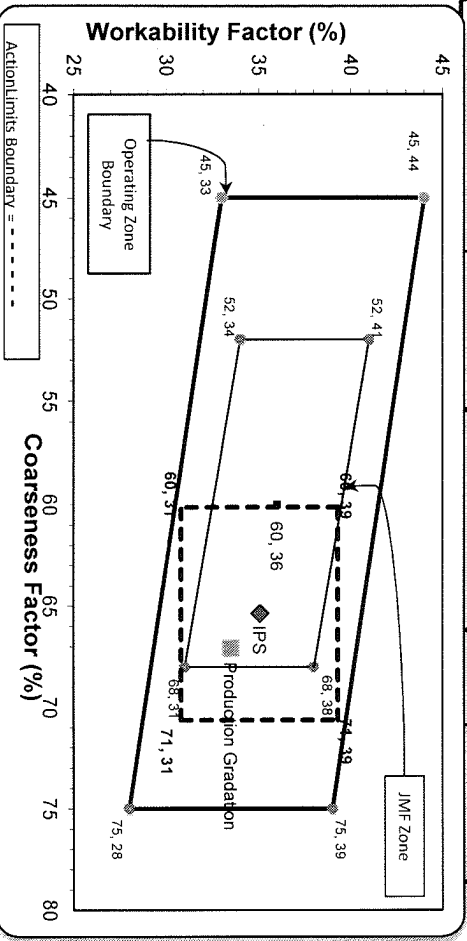
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	750	4.59	2.62	24.4
IA	71-47	Presque Isle	1100	6.73	2.62	35.8
N2S	44-051	Krake Willis Rd	1220	7.38	2.65	39.7
Total Wt			3070	18.69		100.0

Verify this number is 100%

Sieve	CA	IA	N2S	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	99.6	0.4	0.4
1"	96.5	100.0	100.0	99.1	0.4	0.9
3/4"	41.4	96.2	100.0	84.3	14.8	15.7
1/2"	14.8	64.7	100.0	66.5	17.8	33.5
3/8"	4.8	40.4	100.0	55.4	11.1	44.6
#4	3.3	9.3	95.6	42.1	13.3	57.9
#8	2.1	4.3	79.1	33.5	8.6	66.5
#16	1.9	3.0	64.4	27.1	6.4	72.9
#30	1.5	2.3	49.4	20.8	6.3	79.2
#50	1.4	2.1	24.3	10.8	10.1	89.2
#100	1.2	1.8	6.5	3.5	7.2	96.5
LBW	0.9	1.4	1.7	1.4	2.1	98.6

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **67** Workability Factor: **33**

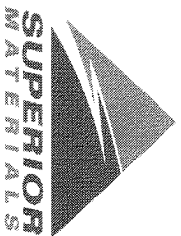


Initial Production Sample (IPS)

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

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\*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 S39-Superior Sterling Heights  
 Product 7919-COARSE AGG P1M LS  
 Period: 08/23/2020 - 08/29/2020

Name/Title Doug Storey / QC Technician  
 Report Date 08/29/2020

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	98.2	%	
	1" (25mm)	96.5	%	
	3/4" (19mm)	41.4	%	
	1/2" (12.5mm)	14.8	%	
	3/8" (9.5mm)	4.8	%	
	#4 (4.75mm)	3.3	%	
	#8 (2.36mm)	2.1	%	
	#16 (1.18mm)	1.9	%	
	#30 (.6mm)	1.5	%	
	#50 (.3mm)	1.4	%	
	#100 (.15mm)	1.2	%	
	#200 (75µm)	0.9	%	
	Wash Loss (#200/75um)	0.7	%	0-2
	Total Moisture	3.15	%	



Plant S39-Superior Sterling Heights

Product 7920-INTERMED AGG P1M LS

Period: 08/23/2020 - 08/29/2020

Name/Title Doug Storey / QC Technician

Report Date 08/29/2020

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)	96.2	%	
	1/2" (12.5mm)	64.7	%	
	3/8" (9.5mm)	40.4	%	
	#4 (4.75mm)	9.3	%	
	#8 (2.36mm)	4.3	%	
	#16 (1.18mm)	3.0	%	
	#30 (.6mm)	2.3	%	
	#50 (.3mm)	2.1	%	
	#100 (.15mm)	1.8	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75um)	1.2	%	0-3
	Total Moisture	4.24	%	



Plant S39-Superior Sterling Heights

Product 1022-2NS GR

Name/Title Doug Storey / QC Technician

Period: 08/23/2020 - 08/29/2020

Report Date 08/29/2020

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)	79.1	%	65-95
	#16 (1.18mm)	64.4	%	35-75
	#30 (.6mm)	49.4	%	20-55
	#50 (.3mm)	24.3	%	10-30
	#100 (.15mm)	6.5	%	0-10
	#200 (75µm)	1.7	%	
	FM	2.81		2.6-3
	Wash Loss (#200/75um)	1.2	%	0-3
	Total Moisture	2.79	%	