

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-32**

Contractor: _____

Sample Date: 10/17/22

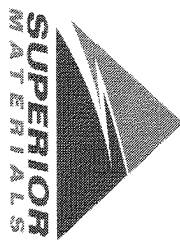
Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 10/18/2022 through 10/24/2022

MDOT No.: _____

Aggr. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %
CA	71-47	Presque Isle	900	5.50	2.62	29.3
IA	71-47	Presque Isle	920	5.63	2.62	30.0
NNS	95-013	Smelter Bay	1250	7.56	2.65	40.7
Total Wt.			3070			100.0

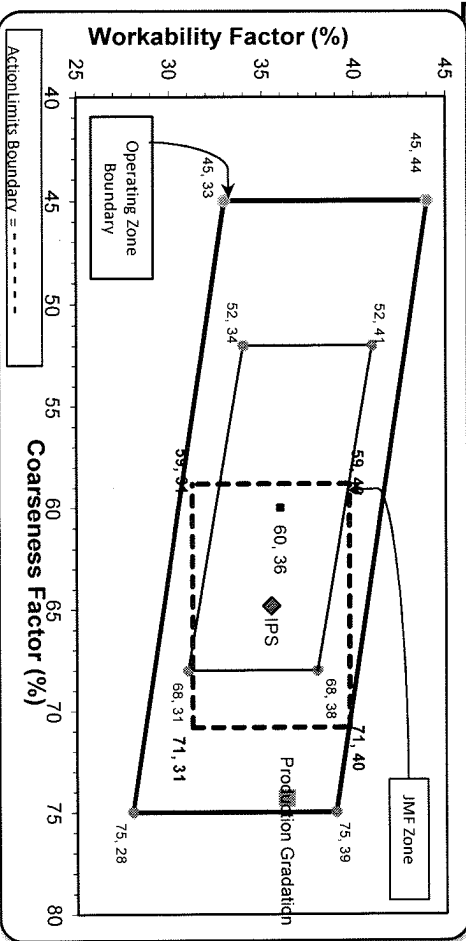
Sieve	CA	IA	NNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	90.9	100.0	100.0	97.3	2.7	2.7
1"	36.5	100.0	100.0	81.4	15.9	18.6
3/4"	13.3	97.8	100.0	73.9	7.5	26.1
1/2"	5.6	62.3	100.0	61.0	12.9	39.0
3/8"	4.2	35.8	100.0	52.7	8.4	47.3
#4	3.3	6.9	96.1	42.2	10.5	57.8
#8	3.0	3.7	84.3	36.3	5.9	63.7
#16	2.8	2.9	69.9	30.2	6.2	69.8
#30	2.6	2.7	50.6	22.2	8.0	77.8
#50	2.5	2.6	25.1	11.7	10.4	88.3
#100	2.4	2.4	7.6	4.5	7.2	95.5
LBW	2.0	1.7	1.8	1.8	2.7	98.2



Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
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Production Gradation		Batch Plant Gradations		Aggregate Supplier Gradations		
Coarseness Factor:	74	Workability Factor:	36	Coarseness Factor:	65	
Sieve	CA	IA	NNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	90.9	100.0	100.0	97.3	2.7	2.7
1"	36.5	100.0	100.0	81.4	15.9	18.6
3/4"	13.3	97.8	100.0	73.9	7.5	26.1
1/2"	5.6	62.3	100.0	61.0	12.9	39.0
3/8"	4.2	35.8	100.0	52.7	8.4	47.3
#4	3.3	6.9	96.1	42.2	10.5	57.8
#8	3.0	3.7	84.3	36.3	5.9	63.7
#16	2.8	2.9	69.9	30.2	6.2	69.8
#30	2.6	2.7	50.6	22.2	8.0	77.8
#50	2.5	2.6	25.1	11.7	10.4	88.3
#100	2.4	2.4	7.6	4.5	7.2	95.5
LBW	2.0	1.7	1.8	1.8	2.7	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.



Initial Production Sample (IPS)		Coarseness Factor: 65		Workability Factor: 36	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained	Sieve	Cumulative % Passing
2"	100.0	0.0	0.0	2"	100.0
1.5"	99.0	0.6	0.6	1.5"	99.0
1"	84.0	15.3	16.0	1"	84.0
3/4"	73.5	10.5	26.5	3/4"	73.5
1/2"	65.2	8.2	34.8	1/2"	65.2
3/8"	58.2	7.1	41.8	3/8"	58.2
#4	44.1	14.1	55.9	#4	44.1
#8	35.5	8.6	64.5	#8	35.5
#16	29.1	6.4	70.9	#16	29.1
#30	21.9	7.3	78.1	#30	21.9
#50	9.6	12.2	90.4	#50	9.6
#100	2.6	7.1	97.4	#100	2.6
LBW	1.0	1.6	99.0	LBW	1.0

PREPARED BY:
 SM, LLC Technical Service

Approved By: _____

Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Name/Title Doug Storey / QC Technician

Period: 10/16/2022 - 10/22/2022

Report Date 10/21/2022

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)	84.3	%	65-95
	#16 (1.18mm)	69.9	%	35-75
	#30 (.6mm)	50.6	%	20-55
	#50 (.3mm)	25.1	%	10-30
	#100 (.15mm)	7.6	%	0-10
	#200 (75µm)	2.1	%	
	FM	2.66		2.6-3
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	3.2	%	

Plant 958-JMT

Product 7920-INTERMED AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 10/16/2022 - 10/22/2022

Report Date 10/21/2022

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)	97.8	%	
	1/2" (12.5mm)	62.3	%	
	3/8" (9.5mm)	35.8	%	
	#4 (4.75mm)	6.9	%	
	#8 (2.36mm)	3.7	%	
	#16 (1.18mm)	2.9	%	
	#30 (.6mm)	2.7	%	
	#50 (.3mm)	2.6	%	
	#100 (.15mm)	2.4	%	
	#200 (75µm)	2.0	%	
	Wash Loss (#200/75um)	1.7	%	0-3
	Total Moisture	1.9	%	

Edw. C. Levy Co.

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Plant 958-JMT

Product 7919-COARSE AGG P1M LS PI

Period: 10/16/2022 - 10/22/2022

Name/Title Doug Storey / QC Technician

Report Date 10/22/2022

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	90.9	%	
	1" (25mm)	36.5	%	
	3/4" (19mm)	13.3	%	
	1/2" (12.5mm)	5.6	%	
	3/8" (9.5mm)	4.2	%	
	#4 (4.75mm)	3.3	%	
	#8 (2.36mm)	3.0	%	
	#16 (1.18mm)	2.8	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.5	%	
	#100 (.15mm)	2.4	%	
	#200 (75µm)	2.0	%	
	Wash Loss (#200/75µm)	2.0	%	0-2
	Total Moisture	1.6	%	

Aggregate Optimization Chart

PLANT #: **P-35**

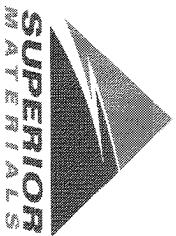
Sample Date: 10/17/22

Dates Test Represents: 10/18/2022 through 10/24/2022

Concrete Grade: **P1M, 3500HP**

Contractor: _____

MDOT No.: _____



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

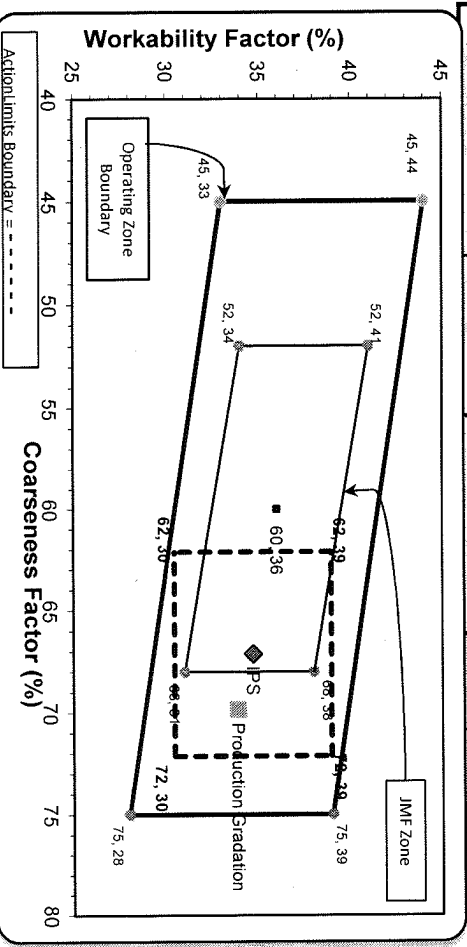
Aggr. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %
CA	58-003	Stonoco	1370	8.16	2.69	43.9
IA	58-003	Stonoco	550	3.28	2.69	17.6
2NS	81-019	Pleasant Lake	1200	7.26	2.65	38.5
Total Wt.						18.70
						100.0

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	55.8	100.0	100.0	80.6	19.4	19.4
3/4"	24.6	100.0	100.0	66.9	33.1	33.1
1/2"	12.0	92.6	100.0	60.1	39.9	39.9
3/8"	6.1	72.0	100.0	53.8	46.2	46.2
#4	2.2	12.0	98.8	41.1	58.9	58.9
#8	1.6	3.6	84.6	33.9	66.1	66.1
#16	1.4	2.1	67.9	27.1	72.9	72.9
#30	1.4	1.6	49.5	19.9	80.1	80.1
#50	1.2	1.4	23.1	9.7	90.3	90.3
#100	1.0	1.3	6.7	3.2	96.8	96.8
LBW	0.8	1.2	1.4	1.1	98.9	98.9

*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: **34**



Initial Production Sample (IPS)

Sieve	Coarseness Factor:	Workability Factor:	% Cumulative Passing	% Retained	Cumulative % Retained
2"	70	35	100.0	0.0	0.0
1.5"	70	35	100.0	0.0	0.0
1"	70	35	86.9	13.1	13.1
3/4"	70	35	76.1	23.9	23.9
1/2"	70	35	63.7	36.3	36.3
3/8"	70	35	56.2	43.8	43.8
#4	70	35	43.2	56.8	56.8
#8	70	35	34.7	65.3	65.3
#16	70	35	27.5	72.5	72.5
#30	70	35	20.6	79.4	79.4
#50	70	35	9.0	91.0	91.0
#100	70	35	2.1	97.9	97.9
LBW	70	35	1.0	99.0	99.0

PREPARED BY:
SM, LLC Technical Service

Approved By: _____



Plant S35-Superior Romulus
 Product 1022-2NS GR
 Period: 10/16/2022 - 10/22/2022

Name/Title Doug Storey / QC Technician
 Report Date 10/21/2022

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.8	%	95-100
	#8 (2.36mm)	84.6	%	65-95
	#16 (1.18mm)	67.9	%	35-75
	#30 (.6mm)	49.5	%	20-55
	#50 (.3mm)	23.1	%	10-30
	#100 (.15mm)	6.7	%	0-10
	#200 (75µm)	1.8	%	
	FM	2.70		2.6-3
AASHTO T11	-#200 (75um)	1.83	%	
	Wash Loss (#200/75um)	1.4	%	0-3
ASTM C566	Total Moisture	4.12	%	



Plant S35-Superior Romulus
 Product 7920-INTERMED AGG P1M LS
 Period: 10/16/2022 - 10/22/2022

Name/Title Doug Storey / QC Technician
 Report Date 10/21/2022

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)	100.0	%	
	1/2" (12.5mm)	92.6	%	
	3/8" (9.5mm)	72.0	%	
	#4 (4.75mm)	12.0	%	
	#8 (2.36mm)	3.6	%	
	#16 (1.18mm)	2.1	%	
	#30 (.6mm)	1.6	%	
	#50 (.3mm)	1.4	%	
	#100 (.15mm)	1.3	%	
	#200 (75µm)	1.3	%	
	Wash Loss (#200/75um)	1.2	%	0-3
ASTM C566	Total Moisture	4.26	%	



Plant S35-Superior Romulus
Product 7919-COARSE AGG P1M LS
Period: 10/16/2022 - 10/22/2022

Name/Title Doug Storey / QC Technician
Report Date 10/21/2022

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	55.8	%	
	3/4" (19mm)	24.6	%	
	1/2" (12.5mm)	12.0	%	
	3/8" (9.5mm)	6.1	%	
	#4 (4.75mm)	2.2	%	
	#8 (2.36mm)	1.6	%	
	#16 (1.18mm)	1.4	%	
	#30 (.6mm)	1.4	%	
	#50 (.3mm)	1.2	%	
	#100 (.15mm)	1.0	%	
	#200 (75µm)	1.0	%	
	Wash Loss (#200/75um)	0.8	%	0-2
ASTM C566	Total Moisture	2.78	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-36

Sample Date: 10/17/22
 Dates Test Represents: 10/18/2022 through 10/24/2022
 Concrete Grade: P1M, 3500HP

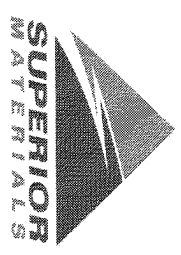
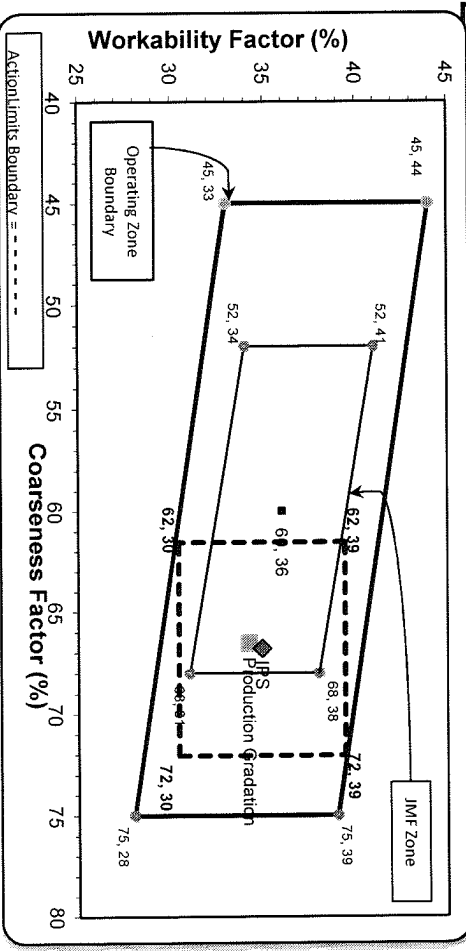
Contractor: _____
 MDOT No.: _____

Aggr. Class	Pit #	Source	Weight (SSD)	ft ³	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
NNS	63-92	Grange Hall	1200	7.26	2.65	39.1
			Total Wt	3070		100.0

Sieve	CA	IA	NNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	90.0	100.0	100.0	96.9	3.1	3.1
1"	36.4	100.0	100.0	80.3	16.6	19.7
3/4"	9.2	100.0	100.0	71.7	8.7	28.3
1/2"	3.0	79.7	100.0	63.9	7.8	36.1
3/8"	2.4	54.7	100.0	56.2	7.7	43.8
#4	2.2	12.4	97.9	42.7	13.6	57.3
#8	2.0	3.7	83.1	34.2	8.5	65.8
#16	2.0	2.6	67.1	27.6	6.6	72.4
#30	2.0	2.3	47.5	19.9	7.8	80.1
#50	1.9	2.2	17.9	8.2	11.6	91.8
#100	1.8	2.0	3.5	2.5	5.7	97.5
LBW	1.4	1.7	0.6	1.2	1.3	98.8

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: 67 Workability Factor: 34



Superior Materials, LLC
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 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. Max. 1.5") aggregate is used.

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

Initial Production Sample (IPS) Coarseness Factor: 67 Workability Factor: 35

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: 10/16/2022 - 10/22/2022

Name/Title Doug Storey / QC Technician
Report Date 10/21/2022

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.9	%	95-100
	#8 (2.36mm)	83.1	%	65-95
	#16 (1.18mm)	67.1	%	35-75
	#30 (.6mm)	47.5	%	20-55
	#50 (.3mm)	17.9	%	10-30
	#100 (.15mm)	3.5	%	0-10
	#200 (75µm)	0.8	%	
	FM	2.83		2.6-3
	Wash Loss (#200/75um)	0.6	%	0-3
	Total Moisture	4.75	%	



Superior Auburn Hills
 2470 Auburn Road
 Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills
 Product 7920-INTERMED AGG P1M LS
 Period: 10/16/2022 - 10/22/2022

Name/Title Doug Storey / QC Technician
 Report Date 10/21/2022

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)	99.2	%	
	1/2" (12.5mm)	79.7	%	
	3/8" (9.5mm)	54.7	%	
	#4 (4.75mm)	12.4	%	
	#8 (2.36mm)	3.7	%	
	#16 (1.18mm)	2.6	%	
	#30 (.6mm)	2.3	%	
	#50 (.3mm)	2.2	%	
	#100 (.15mm)	2.0	%	
	#200 (75µm)	1.8	%	
	Wash Loss (#200/75µm)	1.7	%	0-3
	Total Moisture	3.40	%	



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: 10/16/2022 - 10/22/2022

Report Date 10/21/2022

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	90.0	%	
	1" (25mm)	36.4	%	
	3/4" (19mm)	9.2	%	
	1/2" (12.5mm)	3.0	%	
	3/8" (9.5mm)	2.4	%	
	#4 (4.75mm)	2.2	%	
	#8 (2.36mm)	2.0	%	
	#16 (1.18mm)	2.0	%	
	#30 (.6mm)	2.0	%	
	#50 (.3mm)	1.9	%	
	#100 (.15mm)	1.8	%	
	#200 (75µm)	1.5	%	
	Wash Loss (#200/75um)	1.4	%	0-2
	Total Moisture	2.00	%	