

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-32**

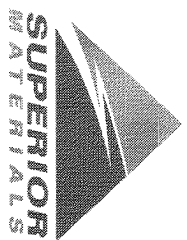
Sample Date: 10/11/21

Dates Test Represents: 10/12/2021 through 10/18/2021

Concrete Grade: **P1M**

Contractor: _____

MDOT No.: _____



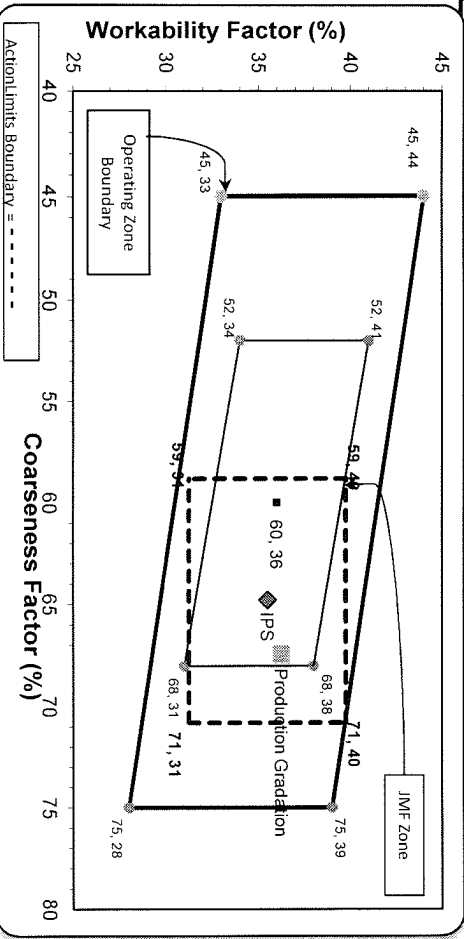
Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	870	5.32	2.62	28.3
NNS	95-013	Smelter Bay	1250	7.56	2.65	40.7
		Total Wt	3070	18.69		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"	94.5	100.0	100.0	98.3	1.7	1.7
1"	30.2	100.0	100.0	78.4	19.9	21.6
3/4"	6.9	100.0	100.0	71.2	28.8	28.8
1/2"	2.7	77.1	100.0	63.4	36.6	36.6
3/8"	2.4	54.8	100.0	57.0	43.0	43.0
#4	2.2	13.3	96.3	43.7	56.3	56.3
#8	2.2	5.8	83.3	36.2	63.8	70.6
#16	2.1	3.9	68.0	29.4	70.6	78.6
#30	2.1	3.3	48.7	21.4	78.6	88.5
#50	2.0	3.0	24.7	11.5	88.5	95.5
#100	1.8	2.7	7.8	4.5	95.5	98.2
LBW	1.5	2.2	1.8	1.8	98.2	98.2

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: **67** Workability Factor: **36**



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 1022-2NS GR - Smelter Bay
 Period: 10/10/2021 - 10/16/2021

Name/Title Doug Storey / QC Technician
 Report Date 10/14/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.3	%	95-100
	#8 (2.36mm)	83.3	%	65-95
	#16 (1.18mm)	68.0	%	35-75
	#30 (.6mm)	48.7	%	20-55
	#50 (.3mm)	24.7	%	10-30
	#100 (.15mm)	7.8	%	0-10
	#200 (75µm)	2.0	%	
	FM	2.71		2.6-3
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	4.3	%	

Plant 958-JMT

Product 7920-INTERMED AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 10/10/2021 - 10/16/2021

Report Date 10/14/2021

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)	100.0	%	
	1/2" (12.5mm)	77.1	%	
	3/8" (9.5mm)	54.8	%	
	#4 (4.75mm)	13.3	%	
	#8 (2.36mm)	5.8	%	
	#16 (1.18mm)	3.9	%	
	#30 (.6mm)	3.3	%	
	#50 (.3mm)	3.0	%	
	#100 (.15mm)	2.7	%	
	#200 (75µm)	2.3	%	
	Wash Loss (#200/75um)	2.2	%	0-3
	Total Moisture	2.0	%	

Edw. C. Levy Co.

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Plant: 958-JMT
Product: 7919-COARSE AGG P1M LS PI
Period: 10/10/2021 - 10/16/2021

Name/Title: Doug Storey / QC Technician
Report Date: 10/14/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	94.5	%	
	1" (25mm)	30.2	%	
	3/4" (19mm)	6.9	%	
	1/2" (12.5mm)	2.7	%	
	3/8" (9.5mm)	2.4	%	
	#4 (4.75mm)	2.2	%	
	#8 (2.36mm)	2.2	%	
	#16 (1.18mm)	2.1	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.8	%	
	#200 (75µm)	1.6	%	
	Wash Loss (#200/75um)	1.5	%	0-2
	Total Moisture	2.4	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-35**

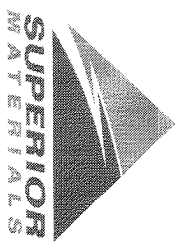
Sample Date: 10/11/21

Dates Test Represents: 10/12/2021 through 10/18/2021

Concrete Grade: **P1M**

Contractor: _____

MDOT No.: _____



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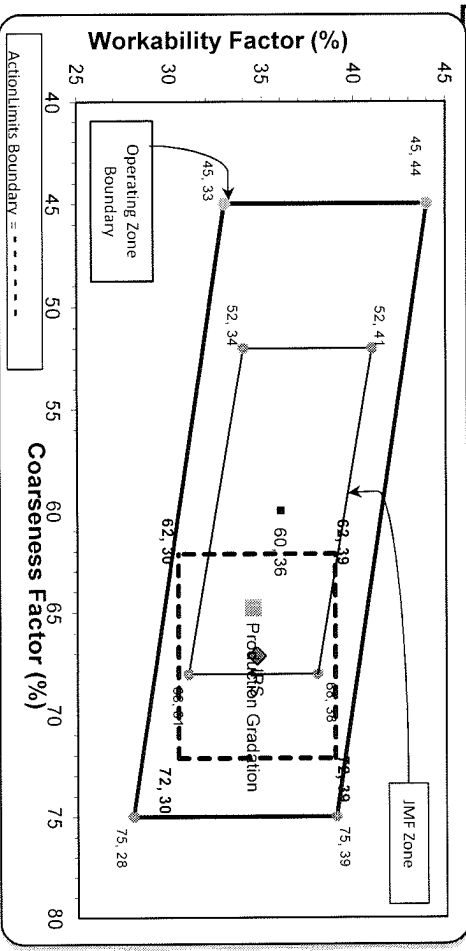
Aggr. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	550	3.28	2.69	17.6
ZNS	81-093	Burnmeister	1200	7.26	2.65	38.5
			Total Wt	18.70		100.0

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"	70.3	100.0	100.0	87.0	13.0	13.0
3/4"	32.0	100.0	100.0	70.1	16.8	29.9
1/2"	14.2	93.3	100.0	61.1	9.0	38.9
3/8"	8.2	87.8	100.0	57.5	3.6	42.5
#4	2.5	23.5	99.0	43.3	14.2	56.7
#8	1.6	3.8	86.1	34.5	8.8	65.5
#16	1.4	1.8	69.3	27.6	6.9	72.4
#30	1.3	1.4	50.6	20.3	7.3	79.7
#50	1.3	1.2	16.7	7.2	13.1	92.8
#100	1.2	1.2	3.8	2.2	5.0	97.8
LBW	1.0	1.0	1.4	1.2	1.0	98.8

*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: **34**



Initial Production Sample (IPS)

Sieve	Coarseness Factor:	Workability Factor:	% Retained	Cumulative % Retained
2"	67	35	0.0	0.0
1.5"			0.0	0.0
1"			13.1	13.1
3/4"			10.8	23.9
1/2"			12.4	36.3
3/8"			7.5	43.8
#4			13.0	56.8
#8			8.5	65.3
#16			7.2	72.5
#30			7.0	79.4
#50			11.6	91.0
#100			6.9	97.9
LBW			1.1	99.0

PREPARED BY: SM, LLC Technical Service

Approved By: _____



Plant S35-Superior Romulus

Product 1022-2NS GR

Name/Title Doug Storey / QC Technician

Period: 10/10/2021 - 10/16/2021

Report Date 10/14/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	99.0	%	95-100
	#8 (2.36mm)	86.1	%	65-95
	#16 (1.18mm)	69.3	%	35-75
	#30 (.6mm)	50.6	%	20-55
	#50 (.3mm)	16.7	%	10-30
	#100 (.15mm)	3.8	%	0-10
	#200 (75µm)	1.5	%	
	FM	2.74		2.6-3
AASHTO T11	-#200 (75um)	1.55	%	
	Wash Loss (#200/75um)	1.4	%	0-3
ASTM C566	Total Moisture	5.06	%	



Plant S35-Superior Romulus
 Product 7920-INTERMED AGG P1M LS
 Period: 10/10/2021 - 10/16/2021

Name/Title Doug Storey / QC Technician
 Report Date 10/14/2021

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)	100.0	%	
	1/2" (12.5mm)	93.3	%	
	3/8" (9.5mm)	87.8	%	
	#4 (4.75mm)	23.5	%	
	#8 (2.36mm)	3.8	%	
	#16 (1.18mm)	1.8	%	
	#30 (.6mm)	1.4	%	
	#50 (.3mm)	1.2	%	
	#100 (.15mm)	1.2	%	
	#200 (75µm)	1.1	%	
	Wash Loss (#200/75um)	1.0	%	0-3
ASTM C566	Total Moisture	4.29	%	



Plant S35-Superior Romulus
Product 7919-COARSE AGG P1M LS
Period: 10/10/2021 - 10/16/2021

Name/Title Doug Storey / QC Technician
Report Date 10/14/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	70.3	%	
	3/4" (19mm)	32.0	%	
	1/2" (12.5mm)	14.2	%	
	3/8" (9.5mm)	8.2	%	
	#4 (4.75mm)	2.5	%	
	#8 (2.36mm)	1.6	%	
	#16 (1.18mm)	1.4	%	
	#30 (.6mm)	1.3	%	
	#50 (.3mm)	1.3	%	
	#100 (.15mm)	1.2	%	
	#200 (75µm)	1.1	%	
	Wash Loss (#200/75um)	1.0	%	0-2
ASTM C566	Total Moisture	2.32	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-101

Sample Date: 10/11/21

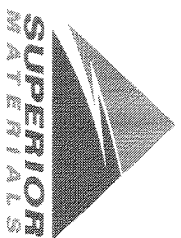
Dates Test Represents: 10/12/2021

through 10/18/2021

Concrete Grade: P1M

Contractor:

MDOT No.:



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

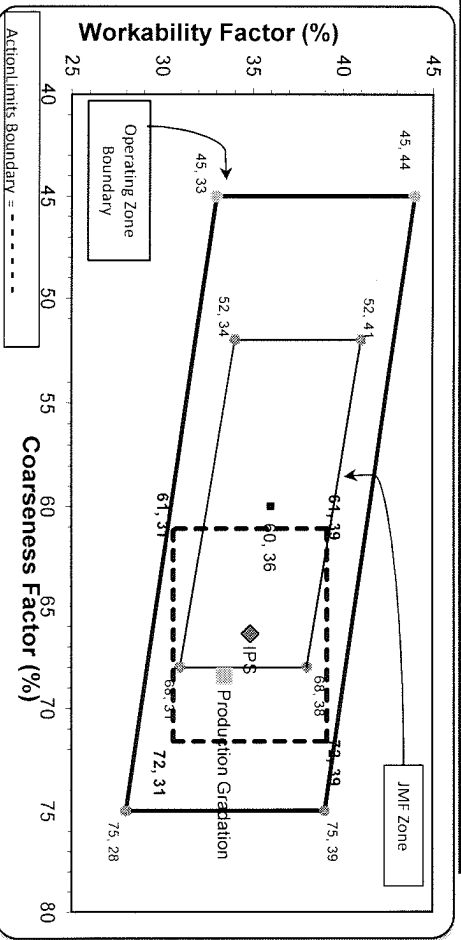
Agg. Class	Pit #	Source	Weight (ssd)	ft ³	Specific Gravity	Cumulative Contribution %
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	800	4.89	2.62	26.1
N2S	75-051	Mid-Michigan	1200	7.23	2.66	39.1
		Total Wt	3070			100.0

Sieve	CA	IA	N2S	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	98.1	1.9	1.9
1"	43.4	100.0	100.0	80.3	17.8	19.7
3/4"	9.6	97.7	100.0	67.9	12.4	32.1
1/2"	3.7	79.0	100.0	61.0	6.9	39.0
3/8"	3.1	54.9	100.0	54.5	6.5	45.5
#4	2.8	11.1	99.1	42.6	11.9	57.4
#8	2.7	4.3	80.3	33.4	9.2	66.6
#16	2.6	3.2	62.1	26.0	7.4	74.0
#30	2.5	3.0	46.8	19.9	6.1	80.1
#50	2.4	2.8	25.9	11.7	8.3	88.3
#100	2.2	2.7	7.9	4.6	7.1	95.4
LBW	1.8	2.4	0.9	1.6	3.0	98.4

*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: 68 **Workability Factor:** 33



Initial Production Sample (IPS)

Coarseness Factor: 66 **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"	84.3	15.3	15.7
3/4"	74.8	9.6	25.2
1/2"	64.3	10.4	35.7
3/8"	56.8	7.5	43.2
#4	43.0	13.8	57.0
#8	34.9	8.1	65.1
#16	26.4	8.5	73.6
#30	19.9	6.5	80.1
#50	10.4	9.5	89.6
#100	3.4	7.0	96.6
LBW	1.2	2.2	98.8

PREPARED BY:
SM, LLC Technical Service

Approved By:



Plant S101-Superior Mount Clemens

Product 1022-2NS GR

Name/Title Doug Storey / QC Technician

Period: 10/10/2021 - 10/16/2021

Report Date 10/14/2021

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	99.1	%	95-100
	#8 (2.36mm)	80.3	%	65-95
	#16 (1.18mm)	62.1	%	35-75
	#30 (.6mm)	46.8	%	20-55
	#50 (.3mm)	25.9	%	10-30
	#100 (.15mm)	7.9	%	0-10
	#200 (75µm)	1.2	%	
	FM	2.78		2.6-3
	Wash Loss (#200/75um)	0.9	%	0-3
	Total Moisture	5.55	%	



Plant S101-Superior Mount Clemens

Product 7920-INTERMED AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 10/10/2021 - 10/16/2021

Report Date 10/14/2021

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)	97.7	%	
	1/2" (12.5mm)	79.0	%	
	3/8" (9.5mm)	54.9	%	
	#4 (4.75mm)	11.1	%	
	#8 (2.36mm)	4.3	%	
	#16 (1.18mm)	3.2	%	
	#30 (.6mm)	3.0	%	
	#50 (.3mm)	2.8	%	
	#100 (.15mm)	2.7	%	
	#200 (75µm)	2.4	%	
	Wash Loss (#200/75um)	2.4	%	0-3
	Total Moisture	2.96	%	



Plant S101-Superior Mount Clemens

Product 7919-COARSE AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 10/10/2021 - 10/16/2021

Report Date 10/14/2021

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	94.5	%	
	1" (25mm)	43.4	%	
	3/4" (19mm)	9.6	%	
	1/2" (12.5mm)	3.7	%	
	3/8" (9.5mm)	3.1	%	
	#4 (4.75mm)	2.8	%	
	#8 (2.36mm)	2.7	%	
	#16 (1.18mm)	2.6	%	
	#30 (.6mm)	2.5	%	
	#50 (.3mm)	2.4	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	1.32	%	