Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-20

Sample Date: 10/26/20

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 10/27/2020 through 11/2/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	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
		Total Wt	**3070**	**18.70**		100.0

<----- Verify this number is 100%

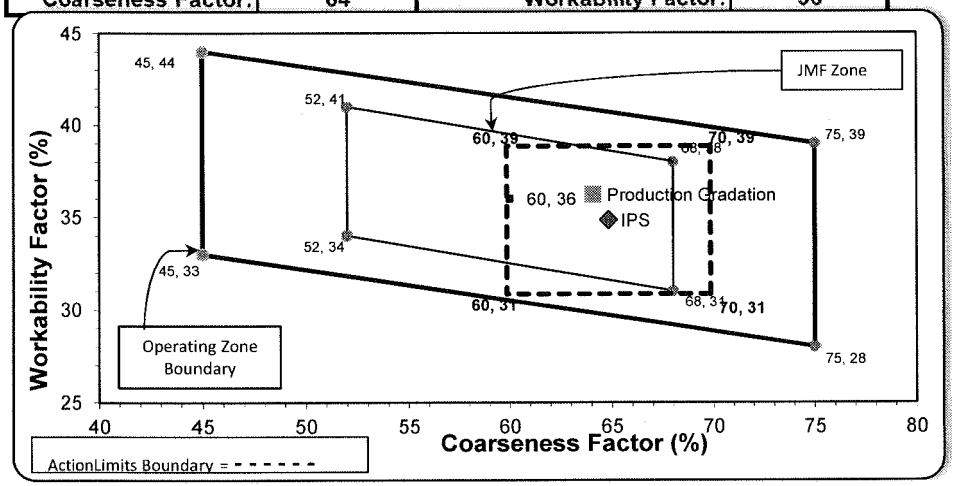
Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.8	100.0	100.0	99.0	1.0	1.0
1"	47.9	100.0	100.0	83.9	15.1	16.1
3/4"	15.9	100.0	100.0	74.0	9.9	26.0
1/2"	5.2	96.0	100.0	69.5	4.5	30.5
3/8"	4.1	62.6	100.0	59.1	10.3	40.9
#4	3.1	27.1	96.0	46.6	12.5	53.4
#8	2.6	8.6	84.0	36.2	10.4	63.8
#16	2.2	2.5	69.5	28.6	7.6	71.4
#30	2.1	2.2	45.2	19.0	9.6	81.0
#50	1.8	2.0	11.2	5.5	13.4	94.5
#100	1.7	2.0	5.3	3.2	2.3	96.8
LBW	1.4	1.6	1.8	1.6	1.6	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.

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

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	64	Workability Factor:	36



Intial Production Sample (IPS)

Coarseness Factor:	65
Workability Factor:	35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.1	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

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/30/2020

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	96.8	%	
	1" (25mm)	47.9	%	
	3/4" (19mm)	15.9	%	
	1/2" (12.5mm)	5.2	%	
	3/8" (9.5mm)	4.1	%	
	#4 (4.75mm)	3.1	%	
	#8 (2.36mm)	2.6	%	
	#16 (1.18mm)	2.2	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	1.8	%	
	#100 (.15mm)	1.7	%	
	#200 (75µm)	1.6	%	
	Wash Loss (#200/75um)	1.4	%	0-2
	Total Moisture	8.28	%	

SUPERIOR MATERIALS

Plant S20-Superior Flint

Product 7920-INTERMED AGG P1M LS

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/30/2020

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)	100.0	%	
	1/2" (12.5mm)	96.0	%	
	3/8" (9.5mm)	62.6	%	
	#4 (4.75mm)	27.1	%	
	#8 (2.36mm)	8.6	%	
	#16 (1.18mm)	2.5	%	
	#30 (.6mm)	2.2	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	2.0	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75um)	1.6	%	0-3
	Total Moisture	2.99	%	

SUPERIOR MATERIALS

Plant S20-Superior Flint

Product 1022-2NS GR

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/30/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.0	%	95-100
	#8 (2.36mm)	84.0	%	65-95
	#16 (1.18mm)	69.5	%	35-75
	#30 (.6mm)	45.2	%	20-55
	#50 (.3mm)	11.2	%	10-30
	#100 (.15mm)	5.3	%	0-10
	#200 (75µm)	2.2	%	
	FM	2.89		2.6-3
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	0.27	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-32

Contractor: _____

Sample Date: 10/26/20

Concrete Grade: **P1M**

Dates Test Represents: 10/27/2020 through 11/2/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	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
		Total Wt	**3070**	**18.69**		100.0

<----- Verify this number is 100%

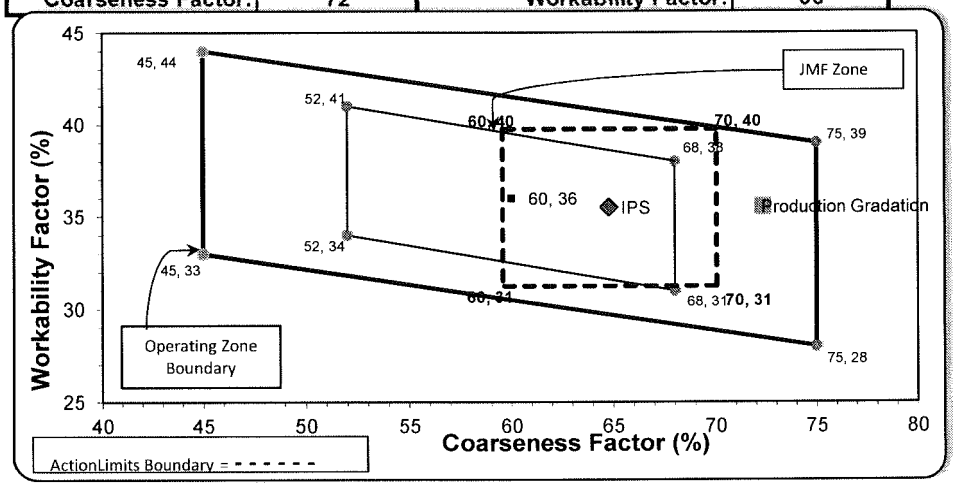
Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.1	100.0	100.0	98.8	1.2	1.2
1"	37.6	100.0	100.0	81.3	17.5	18.7
3/4"	13.7	96.5	100.0	73.1	8.2	26.9
1/2"	4.8	67.1	100.0	61.8	11.3	38.2
3/8"	3.7	39.4	100.0	53.4	8.5	46.6
#4	2.7	5.8	95.3	41.3	12.1	58.7
#8	2.6	2.6	83.5	35.5	5.8	64.5
#16	2.5	1.9	69.6	29.6	5.9	70.4
#30	2.4	1.9	49.9	21.6	8.1	78.4
#50	2.3	1.8	21.7	10.1	11.5	89.9
#100	2.2	1.7	5.8	3.5	6.5	96.5
LBW	1.8	1.3	1.8	1.7	1.9	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

Coarseness Factor:	72	Workability Factor:	36



Intial 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:

Edw. C. Levy Co.

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

Plant 958-JMT

Product 7919-COARSE AGG P1M LS PI

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/30/2020

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	96.1	%	
	1" (25mm)	37.6	%	
	3/4" (19mm)	13.7	%	
	1/2" (12.5mm)	4.8	%	
	3/8" (9.5mm)	3.7	%	
	#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)	1.8	%	0-2
	Total Moisture	3.0	%	

Edw. C. Levy Co.

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

Plant 958-JMT

Product 7920-INTERMED AGG P1M LS PI

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/30/2020

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)	96.5	%	
	1/2" (12.5mm)	67.1	%	
	3/8" (9.5mm)	39.4	%	
	#4 (4.75mm)	5.8	%	
	#8 (2.36mm)	2.6	%	
	#16 (1.18mm)	1.9	%	
	#30 (.6mm)	1.9	%	
	#50 (.3mm)	1.8	%	
	#100 (.15mm)	1.7	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75um)	1.3	%	0-3
	Total Moisture	2.7	%	

Edw. C. Levy Co.

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

Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/30/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	95.3	%	95-100
	#8 (2.36mm)	83.5	%	65-95
	#16 (1.18mm)	69.6	%	35-75
	#30 (.6mm)	49.9	%	20-55
	#50 (.3mm)	21.7	%	10-30
	#100 (.15mm)	5.8	%	0-10
	#200 (75µm)	2.1	%	
	FM	2.74		2.6-3
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	5.0	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-36

Contractor: _____

Sample Date: 10/26/20

Concrete Grade: P1M

Dates Test Represents: 10/27/2020 through 11/2/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	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
		Total Wt	**3070**	**18.70**		100.0

<----- Verify this number is 100%

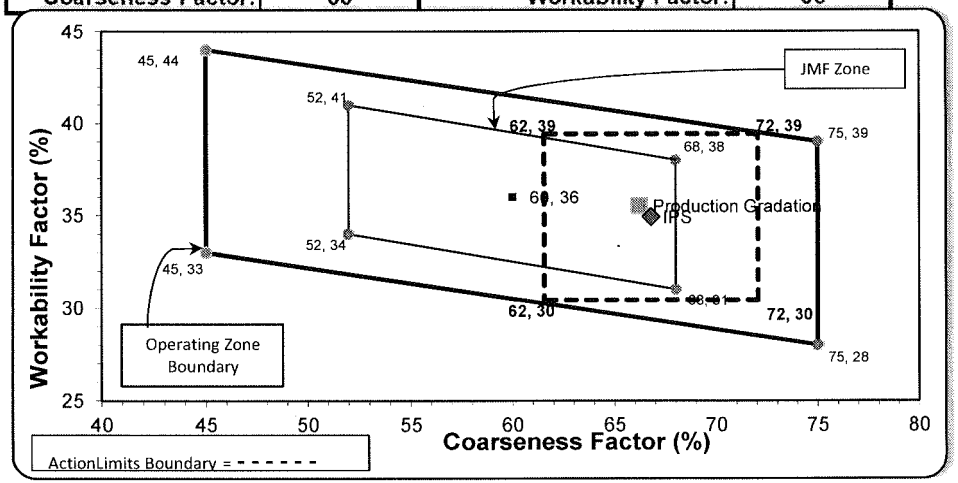
Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	93.2	100.0	100.0	97.9	2.1	2.1
1"	22.5	100.0	100.0	76.0	21.9	24.0
3/4"	4.4	98.2	100.0	69.9	6.1	30.1
1/2"	2.3	81.0	100.0	64.1	5.8	35.9
3/8"	2.3	58.4	100.0	57.3	6.8	42.7
#4	2.2	11.6	97.6	42.3	15.0	57.7
#8	2.1	3.9	86.2	35.5	6.8	64.5
#16	2.1	2.8	73.0	30.0	5.5	70.0
#30	2.1	2.6	48.8	20.5	9.5	79.5
#50	2.0	2.5	17.4	8.2	12.3	91.8
#100	1.9	2.4	5.8	3.6	4.6	96.4
LBW	1.5	2.0	1.9	1.8	1.8	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.

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

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	66	Workability Factor:	36



Intial Production Sample (IPS)

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

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/30/2020

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	93.2	%	
	1" (25mm)	22.5	%	
	3/4" (19mm)	4.4	%	
	1/2" (12.5mm)	2.3	%	
	3/8" (9.5mm)	2.3	%	
	#4 (4.75mm)	2.2	%	
	#8 (2.36mm)	2.1	%	
	#16 (1.18mm)	2.1	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.6	%	
	Wash Loss (#200/75um)	1.5	%	0-2
	Total Moisture	2.25	%	

2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 7920-INTERMED AGG P1M LS

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/30/2020

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)	98.2	%	
	1/2" (12.5mm)	81.0	%	
	3/8" (9.5mm)	58.4	%	
	#4 (4.75mm)	11.6	%	
	#8 (2.36mm)	3.9	%	
	#16 (1.18mm)	2.8	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.5	%	
	#200 (75µm)	2.3	%	
	Wash Loss (#200/75um)	2.0	%	0-3
	Total Moisture	4.11	%	

2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1022-2NS GR

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/30/2020

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.6	%	95-100
	#8 (2.36mm)	86.2	%	65-95
	#16 (1.18mm)	73.0	%	35-75
	#30 (.6mm)	48.8	%	20-55
	#50 (.3mm)	17.4	%	10-30
	#100 (.15mm)	5.8	%	0-10
	#200 (75µm)	2.0	%	
	FM	2.71		2.6-3
	Wash Loss (#200/75um)	1.9	%	0-3
	Total Moisture	0.84	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-O2

Sample Date: 10/26/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/27/2020 through 11/2/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	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	63-115	Ray Rd	1250	7.56	2.65	40.7
		Total Wt	**3070**	**18.69**		100.0

<----- Verify this number is 100%

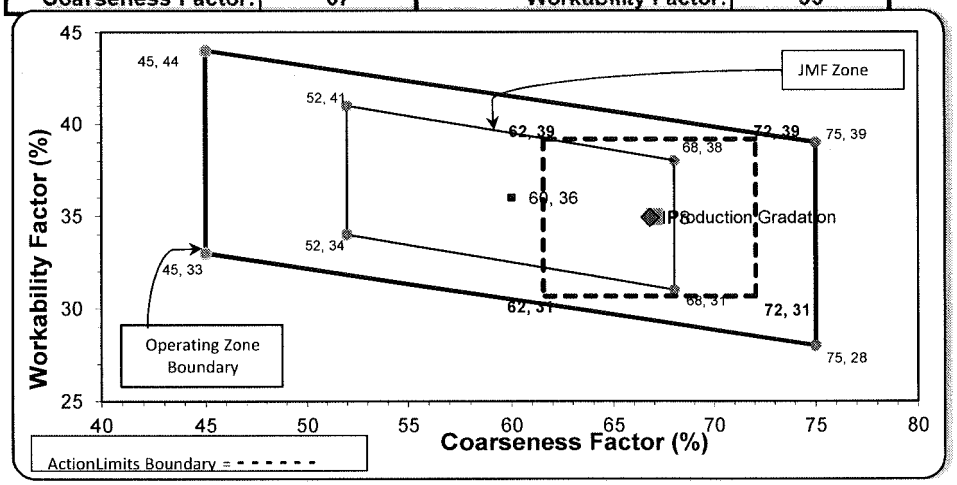
Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.8	100.0	100.0	99.0	1.0	1.0
1"	27.9	100.0	100.0	78.4	20.6	21.6
3/4"	1.9	99.7	100.0	70.5	7.9	29.5
1/2"	1.3	80.3	100.0	64.6	5.9	35.4
3/8"	1.3	52.2	100.0	56.4	8.2	43.6
#4	1.3	11.4	98.1	43.7	12.7	56.3
#8	1.2	4.0	82.1	35.0	8.7	65.0
#16	1.2	3.0	66.9	28.5	6.5	71.5
#30	1.2	2.7	50.6	21.8	6.7	78.2
#50	1.1	2.6	22.6	10.3	11.5	89.7
#100	1.0	2.4	3.7	2.5	7.8	97.5
LBW	0.8	2.0	0.7	1.1	1.4	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.

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

Production Gradation ◉ Batch Plant Gradations ○ Aggregate SupplierGradations

Coarseness Factor:	67	Workability Factor:	35



Intial Production Sample (IPS)

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"	72.3	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:

Plant S02-Superior Hoover

Product 7919-COARSE AGG P1M LS

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/31/2020

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	96.8	%	
	1" (25mm)	27.9	%	
	3/4" (19mm)	1.9	%	
	1/2" (12.5mm)	1.3	%	
	3/8" (9.5mm)	1.3	%	
	#4 (4.75mm)	1.3	%	
	#8 (2.36mm)	1.2	%	
	#16 (1.18mm)	1.2	%	
	#30 (.6mm)	1.2	%	
	#50 (.3mm)	1.1	%	
	#100 (.15mm)	1.0	%	
	#200 (75µm)	0.8	%	
	Wash Loss (#200/75um)	0.8	%	0-2
	Total Moisture	2.22	%	

Plant S02-Superior Hoover

Product 7920-INTERMED AGG P1M LS

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/31/2020

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)	99.7	%	
	1/2" (12.5mm)	80.3	%	
	3/8" (9.5mm)	52.2	%	
	#4 (4.75mm)	11.4	%	
	#8 (2.36mm)	4.0	%	
	#16 (1.18mm)	3.0	%	
	#30 (.6mm)	2.7	%	
	#50 (.3mm)	2.6	%	
	#100 (.15mm)	2.4	%	
	#200 (75µm)	2.1	%	
	Wash Loss (#200/75um)	2.0	%	0-3
	Total Moisture	3.82	%	

Plant S02-Superior Hoover

Product 1022-2NS GR

Period: 10/25/2020 - 10/31/2020

Name/Title Doug Storey / QC Technician

Report Date 10/31/2020

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)	82.1	%	65-95
	#16 (1.18mm)	66.9	%	35-75
	#30 (.6mm)	50.6	%	20-55
	#50 (.3mm)	22.6	%	10-30
	#100 (.15mm)	3.7	%	0-10
	#200 (75µm)	0.8	%	
	FM	2.76		2.6-3
	Wash Loss (#200/75um)	0.7	%	0-3
	Total Moisture	4.05	%	