LBW

**Production Gradation** 

1.1

O Batch Plant Gradations

#### **Production Gradation Report**

PLANT #: P-101 Contractor:

Sample Date: 1/31/22 Concrete Grade: DM

Dates Test Represents: 2/1/2022 through 2/7/2022 MDO

2.1

Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	51.5
26A	71-47	Presque Isle	260	1.59	2.62	8.9
2NS	75-051	Mid-Michigan	1150	6.93	2.66	39.5
		Total Wt	2910	17.69		100.0

MDOT No.:

99.0

**Coarseness Factor:** 

Adjusted WF Initial Production Sample (IPS)

SUPERION MATERIAL

Superior Materials, LLC 30701 W. 10 Mile Rd. Suite 500

Farmington Hills, MI 48336

Cumulative

Sieve	6AA	26A	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"	98.8	100.0	100.0	99.4	0.6	0.6
3/4"	85.5	100.0	100.0	92.5	6.9	7.5
1/2"	42.9	98.5	100.0	70.4	22.1	29.6
3/8"	22.3	87.9	100.0	58.9	11.6	41.1
#4	3.2	20.1	98.5	42.4	16.5	57.6
#8	1.7	5.3	83.3	34.3	8.1	65.7
#16	1.5	3.0	68.3	28.0	6.2	72.0
#30	1.4	2.7	53.3	22.0	6.0	78.0
#50	1.3	2.5	29.2	12.4	9.6	87.6
#100	1.2	2.4	7.3	3.7	8.7	96.3

Aggregate Supplier Gradations

0.6

1.0

\*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.

Coarseness Factor:	63	Workability Factor:	34	36.8
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 68, 38 67, 39 68, 38 67, 39 67, 39 67, 39 67, 39	75, 39	
40 45  ActionLimits Boundary =	50	Coarseness Factor (%)	75	80

Work	ability Factor:	35	
Sieve	Cumulative	%	Cumulative
Sieve	% Passing	Retained	% Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	70.5	24.5	29.5
3/8"	60.0	10.5	40.0
#4	44.4	15.6	55.6
#8	35.5	9.0	64.5
#16	28.5	7.0	71.5
#30	21.5	7.0	78.5
#50	10.2	11.3	89.8
#100	3.1	7.1	96.9
LBW	1.3	1.8	98.7

PREPARED BY:
SM, LLC Technical Service

Approved By

PLANT #: P-102

Sample Date:

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**Coarseness Factor:** 

Dates Test F	Represents:	2/1/2022	through	2/7/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.4
26A	58-003	Stoneco	405	2.41	2.69	13.7
2NS	63-114	Highland	1150	6.95	2.65	38.9
		Total Wt	2955	17.71		100.0

MDOT No.:

<---- Verify this number is 100%

Contractor:

38.1

SUP	ER	10	R

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

	i otai wi	2000		100.0	< Verily tills fi	umber 13 10070
Sieve	6AA	26A	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	81.4	100.0	100.0	91.2	8.8	8.8
1/2"	44.3	98.9	100.0	73.5	17.7	26.5
3/8"	19.2	70.9	100.0	57.7	15.7	42.3
#4	1.8	9.3	99.6	40.9	16.8	59.1
#8	1.0	3.4	89.0	35.6	5.3	64.4
#16	0.8	2.1	72.4	28.8	6.7	71.2
#30	0.6	1.8	50.2	20.1	8.8	79.9
#50	0.5	1.7	20.7	8.5	11.5	91.5
#100	0.4	1.5	3.0	1.6	7.0	98.4
LBW	0.3	1.4	0.5	0.5	1.0	99.5
Production Grad	dation	ons	radations	Adjusted WF	Intial Production	on Sample (IPS

\*Maximum % Retained must be above the 3/8" sieve.

\*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

 $^{\star}\%$  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.

Coarseness Factor:	66	Workability Factor:	36	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 Green Ction G		
25 40 45  ActionLimits Boundary =	50 55	Coarseness Factor (%)	75, 28	80

Work	ability Factor:	36	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.2	10.1	10.8
1/2"	70.7	18.5	29.3
3/8"	60.7	10.0	39.3
#4	44.4	16.3	55.6
#8	35.9	8.5	64.1
#16	27.3	8.6	72.7
#30	19.1	8.2	80.9
#50	7.4	11.7	92.6
#100	1.9	5.6	98.1
LBW	0.7	1.2	99.3

PREPARED BY: SM, LLC Technical Service Approved By:

PLANT #: P-32
Sample Date: 1/31/22

Concrete Grade: DM

Dates Test Represents: 2/1/2022 through 2/7/2022

MDOT	No.:	

Contractor:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

Agg. Class	Pit#	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1455	8.90	2.62	50.1
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

<---- Verify this number is 100%

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

	Total Wt	2303 17.03		100.0	C Verily tills if	ulliber is 100 %
Sieve	6AA	26A	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"	99.2	100.0	100.0	99.6	0.4	0.4
3/4"	80.0	100.0	100.0	90.0	9.6	10.0
1/2"	33.0	96.7	100.0	66.1	23.9	33.9
3/8"	17.7	89.1	100.0	57.7	8.4	42.3
#4	4.8	28.5	96.0	43.4	14.3	56.6
#8	3.9	7.0	83.3	35.7	7.7	64.3
#16	3.5	4.4	68.2	29.2	6.4	70.8
#30	3.2	3.3	48.0	20.9	8.3	79.1
#50	2.8	2.9	23.1	10.8	10.1	89.2
#100	2.5	2.6	6.7	4.2	6.7	95.8
LBW	1.5	1.7	1.2	1.4	2.8	98.6

Aggregate Supplier Gradations

\*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.

62

\*% Retained must be at least 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

45 45, 44 45, 44 52, 41 56, 40 60, 3BS 60, 3BS 75, 39 768, 31	Coarseness Factor:	66	Workability Factor:	36	38.2
Operating Zone Boundary  75, 28	45, 44 (%) 35 (%) 45, 33 (%) Operating Zone Boundary	52, 34	■ 60, 38S	75, 39 Gradation	

Coarseness Factor (%) $^{70}$ 

75

80

Batch Plant Gradations

**Production Gradation** 

Workability Factor:		36	
Sieve	Cumulative	% Retained	Cumulative % Retained
	% Passing		
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	72.3	22.8	27.7
3/8"	60.4	11.8	39.6
#4	42.6	17.8	57.4
#8	36.0	6.6	64.0
#16	29.5	6.5	70.5
#30	20.3	9.2	79.7
#50	9.5	10.8	90.5
#100	3.4	6.1	96.6
LBW	1.3	2.1	98.7

PREPARED BY: SM, LLC Technical Service

ActionLimits Boundary = - - - - -

Approved By

PLANT #: P-35

Sample Date:

1/31/22 DM Concrete Grade: 2/7/2022

MDOT No.:

Contractor:

35.5

Dates Test F	Represents:	2/1/2022	through	2/7/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1450	8.64	2.69	49.1
26A	58-003	Stoneco	405	2.41	2.69	13.7
2NS	81-019	Pleasant Lake	1100	6.65	2.65	37.2
	-	Total Wt	2955	17.70		100.0

---- Verify this number is 100%

**Coarseness Factor:** 

SUPER	IOR

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

						di 110070
Sieve	6AA	26A	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	81.4	100.0	100.0	90.9	9.1	9.1
1/2"	44.3	98.9	100.0	72.5	18.4	27.5
3/8"	19.2	70.9	100.0	56.4	16.2	43.6
#4	1.8	9.3	97.7	38.5	17.8	61.5
#8	1.0	3.4	86.0	33.0	5.6	67.0 r
#16	0.8	2.1	70.7	27.0	6.0	73.0
#30	0.6	1.8	52.4	20.0	7.0	80.0 r
#50	0.5	1.7	22.0	8.7	11.4	91.3
#100	0.4	1.5	4.5	2.1	6.6	97.9 a
LBW	0.3	1.4	1.7	1.0	1.1	99.0
Production C	Gradation O Batch Plant Grad	dations    Aggregate Supplier Gra	adations	Adjusted WF	Intial Production	on Sample (IPS)

\*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.

61

\*% Retained must be at least 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

Coarseness Factor:	65	Workability Factor:	33	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	$\neg$	68, 38 60,136 Production Grada	JMF Zone 75, 39	
Boundary  25  40  45		55 60 65 70	75, 28 75	80
ActionLimits Boundary =		<sup>65</sup> Coarseness Factor (%) <sup>70</sup>		

Work	Workability Factor:		
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.1	10.2	10.9
1/2"	70.5	18.6	29.5
3/8"	60.5	10.0	39.5
#4	44.1	16.4	55.9
#8	35.6	8.5	64.4
#16	27.7	7.9	72.3
#30	20.6	7.1	79.4
#50	8.7	11.8	91.3
#100	1.6	7.1	98.4
LBW	1.1	0.6	98.9

PREPARED BY: SM, LLC Technical Service

PLANT #: P-39

Sample Date:

**Production Gradation** 

1/31/22 DM Concrete Grade:

Contractor:

Adjusted WF Intial Production Sample (IPS)

**Coarseness Factor:** 

35.2

Dates Test F	Represents:	2/1/2022	through	2/7/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1605	9.82	2.62	55.2
26A	71-47	Presque Isle	200	1.22	2.62	6.9
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
		Total Wt	2905	17.69		100.0

MDOT No.:

--- Verify this number is 100%

SUPERIO	R
MATERIAL	S

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

					,	
Sieve	6AA	26A	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"	98.8	100.0	100.0	99.3	0.7	0.7
3/4"	85.5	100.0	100.0	92.0	7.3	8.0
1/2"	42.9	98.5	100.0	68.3	23.6	31.7
3/8"	22.3	87.9	100.0	56.2	12.1	43.8
#4	3.2	20.1	97.8	40.2	16.1	59.8
#8	1.7	5.3	82.8	32.7	7.5	67.3
#16	1.5	3.0	66.8	26.3	6.3	73.7
#30	1.4	2.7	48.4	19.3	7.0	80.7 ı
#50	1.3	2.5	22.8	9.5	9.8	90.5
#100	1.2	2.4	3.7	2.2	7.3	97.8
LBW	1.1	2.1	0.6	1.0	1.2	99.0
Production G	radation O Batch Plant Gra	dations	dations	Adjusted WF	Intial Production	on Sample (IPS)

\*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.

Coarseness Fa	actor: 65	Workability Factor:	33	
	52, 41 52, 34 sing Zone	58, 40 68, 36 68, 38 Production Gr	2	
25	45 50	55 Coarseness Factor (%) <sup>70</sup>	<sup>75, 28</sup> 75	80

Workability Factor:		36	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	89.7	10.3	10.3
1/2"	70.3	19.4	29.7
3/8"	59.1	11.2	40.9
#4	42.8	16.3	57.2
#8	35.5	7.3	64.5
#16	29.0	6.5	71.0
#30	21.2	7.7	78.8
#50	9.8	11.5	90.2
#100	3.7	6.1	96.3
LBW	1.2	2.5	98.8

63

PREPARED BY: SM, LLC Technical Service

Batch Plant Gradations

PLANT #: P-02

Sample Date:

DM 1/31/22 Concrete Grade: 2/7/2022

le Graue.	DIVI	
		MDO

Dates Test F	Represents:	2/1/2022	through	2/7/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1555	9.51	2.62	53.5
26A	71-47	Presque Isle	250	1.53	2.62	8.6
2NS	63-115	Ray Rd	1100	6.65	2.65	37.9
	•	Total Wt	2005	17.60		100.0

MDOT No.:

Verify this number is 100%

**Coarseness Factor:** 

Contractor:

SUPERIOR

### **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.

63

\*% Retained must be at least 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

	i otai wt	2905 17	.69	100.0	< Verity this n	umber is 100%
Sieve	6AA	26A	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"	98.0	100.0	100.0	98.9	1.1	1.1
3/4"	73.8	100.0	100.0	86.0	13.0	14.0
1/2"	32.6	96.7	100.0	63.6	22.3	36.4
3/8"	15.7	89.1	100.0	53.9	9.7	46.1
#4	1.5	28.5	96.7	39.9	14.1	60.1
#8	1.3	7.0	79.9	31.6	8.3	68.4
#16	1.3	4.4	66.0	26.1	5.5	73.9
#30	1.2	3.3	47.5	18.9	7.2	81.1
#50	1.1	2.9	27.4	11.2	7.7	88.8
#100	1.1	2.6	5.7	3.0	8.2	97.0
LBW	0.6	1.7	1.2	0.9	2.0	99.1
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Aggregate SupplierGradations

**Production Gradation** Adjusted WF Intial Production Sample (IPS) **Coarseness Factor:** 67 **Workability Factor:** 32 34.1 45 JMF Zone 45, 44 52, 41 Workability Factor (%) ■ 60, 36 Production Gradation 52, 34 Operating Zone Boundary 75, 28 25 Coarseness Factor (%) $^{70}$ 45 50 55 75 80

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"	100.0	0.0	0.0
3/4"	95.1	4.9	4.9
1/2"	74.6	20.5	25.4
3/8"	59.3	15.3	40.7
#4	42.1	17.2	57.9
#8	35.1	7.1	64.9
#16	29.2	5.9	70.8
#30	21.9	7.3	78.1
#50	9.6	12.4	90.4
#100	2.4	7.2	97.6
LBW	0.9	1.5	99.1

PREPARED BY: SM, LLC Technical Service

ActionLimits Boundary = - - -