Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-101 Contractor:

Concrete Grade: DM, 4500HP Sample Date: 6/13/22 Dates Test Represents: 6/14/2022 6/20/2022 MDOT No.: through

20100 10011	toprocontor	· · · · · · · · · · · · · · · · · · ·	un o a g	0,20,2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1560	9.54	2.62	53.6
26A	71-47	Presque Isle	200	1.22	2.62	6.9
2NS	75-051	Mid Michigan	1150	6.93	2.66	39.5
		Total Wt	2910	17.69		100.0



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Suite 500
Farmington Hills, MI 48336

	Total Wt	2910 17.69		100.0	< Verify 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"	98.1	100.0	100.0	99.0	1.0	1.0
3/4"	84.8	100.0	100.0	91.9	7.1	8.1
1/2"	40.9	97.9	100.0	68.2	23.7	31.8
3/8"	21.5	88.1	100.0	57.1	11.1	42.9
#4	2.4	23.1	98.6	41.8	15.3	58.2
#8	1.4	5.7	82.8	33.9	8.0	66.1
#16	1.2	3.0	66.9	27.3	6.6	72.7
#30	1.2	2.6	50.5	20.8	6.5	79.2 ı
#50	1.1	2.3	24.6	10.5	10.3	89.5
#100	1.1	2.1	6.3	3.2	7.2	96.8
LBW	1.0	1.9	0.9	1.0	2.2	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.

Production Gradation (Batch Plant Grad	dations	itions	Adjusted WF	Initial Produc	tion Sample (IPS	3)
Coarseness Factor:	65	Workability Factor:	34	36.4	Coars	seness Factor:	
45 —					Worl	kability Factor:	
45, 44			JMF Zone	7	Sieve	Cumulative	Γ
1 1	50.44			_	Oicvc	% Passing	F
	52, 41			- 11	2"	100.0	
(a) 40		57, 39 68, 38	75, 39	- 11	1.5"	100.0	Г
		00,30		- 11	1"	100.0	Г
		■ 60, 36s ■ Production Gr	adation	- 11	3/4"	95.0	Г
Factor (%)		1PS		- 11	1/2"	70.5	Г
1 /	52, 34	-!		- 11	3/8"	60.0	П
45, 33				- 11	#4	44.4	П
		57, 31 67 6 3 ,1 ₃₁		- 11	#8	35.5	П
Atj, 33 Operating Zone Boundary	7			- 11	#16	28.5	П
Boundary			75, 28	- 11	#30	21.5	П
≥ ₂₅ □					#50	10.2	П
40 45	50 5	5 60 65 70	75	80	#100	3.1	П
		Coarseness Factor (%)	75		LBW	1.3	
ActionLimits Boundary =		` ,			-		

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

62

Production Gradation

Sample Date: 6/13/22 Concrete Grade: DM, 4500HP

Dates Test Represents: 6/14/2022 through 6/20/2022

Dates Test Represents:		6/14/2022	through	6/20/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	52.5
26A	58-003	Stoneco	250	1.49	2.69	8.5
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2050	17.60		100.0

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.6



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Farmington Hills, MI 48336	

	Total Wt	2950	17.68		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	100	0.0	100.0	100.0	0.0	0.0
1"	100.0	100	0.0	100.0	100.0	0.0	0.0
3/4"	83.7	100	0.0	100.0	91.4	8.6	8.6
1/2"	50.3	99	.7	100.0	73.9	17.6	26.1
3/8"	23.3	89	.5	100.0	58.8	15.1	41.2
#4	4.7	11	.0	98.7	41.9	16.9	58.1
#8	1.5	4.	2	84.6	34.1	7.8	65.9
#16	1.4	2.	8	68.5	27.7	6.4	72.3
#30	1.2	2.	2	51.7	21.0	6.7	79.0
#50	1.0	2.	1	24.5	10.3	10.7	89.7
#100	0.9	2.	0	7.2	3.4	6.8	96.6
LBW	0.7	1.	9	1.2	1.0	2.5	99.0

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.

*% 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	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 60 38 Production Gradatio	75, 39	
Boundary 25 40 45 ActionLimits Boundary =	50 55 	Coarseness Factor (%)	75, 28 75	80

Batch Plant Gradations

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"	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:

Production Gradation

Sample Date: 6/13/22 Concrete Grade: DM, 4500HP

Dates Test F	Represents:	6/14/2022	through	6/20/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	52.5

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.6

MDOT No.:

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	52.5
26A	58-003	Stoneco	250	1.49	2.69	8.5
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	2950	17.68	_	100.0

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	i otai wt	2950 17.68		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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	83.7	100.0	100.0	91.4	8.6	8.6
1/2"	50.3	99.7	100.0	73.9	17.6	26.1
3/8"	23.3	89.5	100.0	58.8	15.1	41.2
#4	4.7	11.0	98.7	41.9	16.9	58.1
#8	1.5	4.2	84.6	34.1	7.8	65.9 r
#16	1.4	2.8	68.5	27.7	6.4	72.3
#30	1.2	2.2	51.7	21.0	6.7	79.0 r
#50	1.0	2.1	24.5	10.3	10.7	89.7
#100	0.9	2.0	7.2	3.4	6.8	96.6
LBW	0.7	1.9	1.2	1.0	2.5	99.0

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.

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

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

Coars	seness Factor:	63	Workability Factor:	34	
45	45, 44			JMF Zone	
(%) Ju		52, 41 56	68, 38	75, 39	
Workability Factor (%)	45, 33	52, 34	■ 60月26 Production Gradation		
	Operating Zone Boundary	30,	67 , 32, 31	75, 28	
	0 45 mits Boundary =	50 55	Coarseness Factor (%)	75	80

O Batch Plant Gradations

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:

Sample Date:

6/13/22 Concrete Grade: DM, 4500HP 6/20/2022

36.5

Dates Test F	Represents:	6/14/2022	through	6/20/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	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	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2005	17 60		100.0

MDOT No.:

Coarseness Factor:

Contractor:

SUPERIOR MATERIALS	

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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.

2110	03-115	Ray Ru	1150	6.95	2.00	39.6		
		Total Wt	2905	17.69		100.0	< Verify this n	umber is 100%
Sieve		6AA	26	A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	1	0.00	100	0.0	100.0	100.0	0.0	0.0
1.5"	1	0.00	100	0.0	100.0	100.0	0.0	0.0
1"	1	0.00	100	0.0	100.0	100.0	0.0	0.0
3/4"	8	86.6	100	0.0	100.0	93.3	6.7	6.7
1/2"	4	48.0	95	5.4	100.0	73.5	19.8	26.5
3/8"		26.2	81	.7	100.0	61.1	12.3	38.9
#4		5.9	24	.9	96.8	43.8	17.3	56.2
#8		2.7	8.	.3	80.3	34.0	9.8	66.0
#16		2.2	4.	.0	63.7	26.7	7.3	73.3
#30		2.1	2.	.9	47.6	20.2	6.5	79.8
#50		2.0	2.	.6	25.5	11.4	8.8	88.6
#100		2.0	2.	4	5.3	3.3	8.0	96.7
LBW		1.6	2.	.0	1.0	1.4	1.9	98.6
roduction (Gradation	Batch Plant Grad	dations	regate Supplier Gra	dations	Adjusted WF	Intial Production	on Sample (IP:

Production Gradation Adjusted WF Intial Production Sample (IPS) **Coarseness Factor:** 59 **Workability Factor:** 34 JMF Zone 75. 39 Workability Factor (%) 52, 34 Operating Zone 75, 28 Boundary 45 50 Coarseness Factor (%) 70 75 80 ActionLimits Boundary = - - - - -

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"	89.0	10.3	11.0
1/2"	70.3	18.7	29.7
3/8"	59.9	10.4	40.1
#4	41.9	18.0	58.1
#8	35.9	6.0	64.1
#16	27.8	8.2	72.2
#30	18.9	8.8	81.1
#50	6.3	12.6	93.7
#100	1.7	4.6	98.3
LBW	1.0	0.7	99.0

Total Wt

Batch Plant Gradations

PLANT #: P-32

Sample Date:

LBW

Production Gradation

6/13/22 Concrete Grade: **DM**, **4500HP**

17.69

Dates Test Represents:		6/14/2022	through	6/20/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1305	7.98	2.62	44.9
26A	71-47	Presque Isle	450	2.75	2.62	15.5
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6

2905

Contractor:

MDOT No.:

2.5

Adjusted WF Intial Production Sample (IPS)

100.0

1.2

38.1



0

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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	ı
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	ı
1"	96.3	100.0	100.0	98.3	1.7	1.7	ı
3/4"	74.3	100.0	100.0	88.5	9.9	11.5	ı
1/2"	30.5	95.4	100.0	68.1	20.4	31.9	ı
3/8"	12.6	81.7	100.0	57.9	10.2	42.1	ı
#4	1.9	24.9	97.0	43.1	14.8	56.9	
#8	1.4	8.3	85.1	35.6	7.5	64.4	n
#16	1.3	4.0	70.6	29.2	6.5	70.8	ı
#30	1.2	2.9	51.0	21.2	8.0	78.8	n
#50	1.2	2.6	24.8	10.8	10.4	89.2	ı
#100	1.1	24	7.3	3.8	7.0	96.2	a

Aggregate Supplier Gradations

1.4

2.0

*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.

62

*% 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:	36	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	66, 40 67, 40 68, 38 60, 38S 60, 38S	75, 39 radation 75, 28	
40 45 ActionLimits Boundary =	50 5	5 Coarseness Factor (%) ⁷⁰	75	80

Work	ability Factor:	36	
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"	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

98.8

Coarseness Factor:

PREPARED BY: SM, LLC Technical Service

0.8

Approved By

Sample Date:

#100

LBW

6/13/22 Concrete Grade: DM, 4500HP

nts:	6/14/2022	through	6/20/2022		
4	Source	Weight (SSD)	ft ³	Specific	%
+	Source	weight (SSD)	It	Gravity	Contribution
)3	Stoneco	1550	9.23	2.69	52.5

6.8

2.5

Contractor:

MDOT No.:

96.6

99.0

Dates Test Represents:		6/14/2022	through	6/20/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	52.5
26A	58-003	Stoneco	250	1.49	2.69	8.5
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
Total Wt			2950	17.68		100.0

---- Verify this number is 100%

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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	ĺ
1.5"	100.0	100.0	100.0	100.0	0.0	0.0	ĺ
1"	100.0	100.0	100.0	100.0	0.0	0.0	ĺ
3/4"	83.7	100.0	100.0	91.4	8.6	8.6	ĺ
1/2"	50.3	99.7	100.0	73.9	17.6	26.1	ĺ
3/8"	23.3	89.5	100.0	58.8	15.1	41.2	ĺ
#4	4.7	11.0	98.7	41.9	16.9	58.1	ĺ
#8	1.5	4.2	84.6	34.1	7.8	65.9	n
#16	1.4	2.8	68.5	27.7	6.4	72.3	ĺ
#30	1.2	2.2	51.7	21.0	6.7	79.0	n
#50	1.0	2.1	24.5	10.3	10.7	89.7	ĺ

2.0

1.9

7.2

3.4

*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 Gradation	s • Aggregate Supplier Gradati	ons	Adjusted WF	Intial Product	ion Sample (IPS	;)
Coarseness Factor:	63	Workability Factor:	34	36.6	Coars	seness Factor:	
45 -					Worl	kability Factor:	
45, 44			JMF Zone	7] 	Sieve	Cumulative	
1 40,44			31411 20110	-	Sieve	% Passing	
	52, 41	27.40			2"	100.0	
(a) 40 f	56, 40	20.00	75, 39	- 11	1.5"	100.0	
&	!	68, 38	I		1"	99.3	
5		■ 60,136 Production Gradation		- 11	3/4"	89.1	
Factor (%)		- 00, PS			1/2"	70.5	
₩ →	52, 34	<u> </u>		- 11	3/8"	60.5	
45, 33					#4	44.1	
Morkability 30 Operating Zone Boundary	56, 31	67, 88 , 31			#8	35.6	
Operating Zone				- 11	#16	27.7	
Boundary			75, 28		#30	20.6	
					#50	8.7	
25 +					#100	1.6	
40 45	50 55 C c	parseness Factor (%)	75	80	LBW	1.1	

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"	89.1	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

ActionLimits Boundary = - - - - -

0.9

0.7

Sample Date:

Concrete Grade: DM, 4500HP 6/13/22

6/20/2022

MDOT No.:	

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.8

Dates Test Represents:		6/14/2022	through	6/20/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1450	8.87	2.62	49.9
26A	71-47	Presque Isle	355	2.17	2.62	12.2
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
		Total Wt	2905	17.69		100.0

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	i otai vvt	2905 17.69		100.0	< Verify 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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	86.6	100.0	100.0	93.3	6.7	6.7
1/2"	48.0	95.4	100.0	73.5	19.8	26.5
3/8"	26.2	81.7	100.0	60.9	12.6	39.1
#4	5.9	24.9	97.2	42.8	18.1	57.2
#8	2.7	8.3	81.6	33.3	9.5	66.7
#16	2.2	4.0	67.0	27.0	6.3	73.0
#30	2.1	2.9	49.6	20.2	6.8	79.8
#50	2.0	2.6	23.0	10.0	10.2	90.0
#100	2.0	2.4	2.5	2.2	7.8	97.8
LBW	1.6	2.0	0.3	1.2	1.1	98.8
Production Gradation						

*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.

Coarseness Factor:	59	Workability Factor:	33	
45 45, 44 45, 44 Operating Zone Boundary	52, 41	58, 39 58, 39 68, 38 68, 38 68, 38 68, 38 68, 31 68, 31	75, 39	
40 45 ActionLimits Boundary =	50	Coarseness Factor (%)	75	80

Work	ability Factor:	35	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.1	0.9	0.9
3/4"	90.3	8.8	9.7
1/2"	69.2	21.1	30.8
3/8"	59.1	10.1	40.9
#4	41.8	17.3	58.2
#8	35.1	6.6	64.9
#16	28.5	6.6	71.5
#30	21.2	7.3	78.8
#50	8.7	12.5	91.3
#100	1.8	7.0	98.2
LBW	0.7	1.0	99.3

Sample Date:

Production Gradation

6/13/22

Contractor:

Concrete Grade: DM, 4500HP

MDOT No.:

Dates Test Represents:		6/14/2022	through	6/20/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	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	44-051	Krake Willis Rd	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

34.2

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Farmington Hills, MI 48336

	i otai vvt	2905 17.69		100.0	< Verify 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"	98.1	100.0	100.0	99.0	1.0	1.0
3/4"	84.8	100.0	100.0	91.6	7.3	8.4
1/2"	40.9	97.9	100.0	67.2	24.4	32.8
3/8"	21.5	88.1	100.0	55.8	11.4	44.2
#4	2.4	23.1	96.1	39.3	16.5	60.7
#8	1.4	5.7	80.7	31.7	7.6	68.3
#16	1.2	3.0	66.1	25.9	5.8	74.1
#30	1.2	2.6	50.0	19.8	6.1	80.2
#50	1.1	2.3	26.1	10.6	9.1	89.4
#100	1.1	2.1	10.0	4.5	6.1	95.5
LBW	1.0	1.9	2.1	1.5	3.1	98.5
Production Gradati	ion Batch Plant Grada	tions • 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.

63

*% 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:	32	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 68, 38 Production Gra 58, 32	JMF Zone 75, 39 dation 75, 28	
40 45 ActionLimits Boundary =	50 55	Coarseness Factor (%) ⁷⁰	75	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"	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

Sample Date:

Concrete Grade: DM, 4500HP 6/13/22

Dates Test F	Represents:	6/14/2022	through	6/20/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	2905	17.69		100.0

MDOT No.:

Contractor:

36.5

Coarseness Factor:

Superior Materials, LLC
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Suite 500
Farmington Hills, MI 48336

	Total Wt	2905	17.69		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	100	0.0	100.0	100.0	0.0	0.0
1"	100.0	100	0.0	100.0	100.0	0.0	0.0
3/4"	86.6	100	0.0	100.0	93.3	6.7	6.7
1/2"	48.0	95	.4	100.0	73.5	19.8	26.5
3/8"	26.2	81	.7	100.0	61.1	12.3	38.9
#4	5.9	24	.9	96.8	43.8	17.3	56.2
#8	2.7	8.	3	80.3	34.0	9.8	66.0
#16	2.2	4.	0	63.7	26.7	7.3	73.3
#30	2.1	2.	9	47.6	20.2	6.5	79.8
#50	2.0	2.	6	25.5	11.4	8.8	88.6
#100	2.0	2.	4	5.3	3.3	8.0	96.7
LBW	1.6	2.	0	1.0	1.4	1.9	98.6
Production Gra	dation O Batch Plant Gradat	ions	regate SupplierGra	idations	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.

63

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

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

Coarseness Factor:	59	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 39 68, 39 68, 38 68, 38 Production Gradation IPS	75, 39 75, 28	
40 45 ActionLimits Boundary =	50	55 Coarseness Factor (%)	75	80

Work	ability Factor:	35	
Sieve	Sieve Cumulative % Passing		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