Aggregate Optimization Chart

Production Gradation Report

PLANT #: 12

Sample Date: 5/29/23

Concrete Grade: **DM, 4500HP**

Contractor: _____

Dates Test Represents: 5/30/2023 through 6/5/2023

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1655	10.12	2.62	57.0
26A	71-47	Presque Isle	100	0.61	2.62	3.4
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
		Total Wt	**2905**	**17.69**		100.0

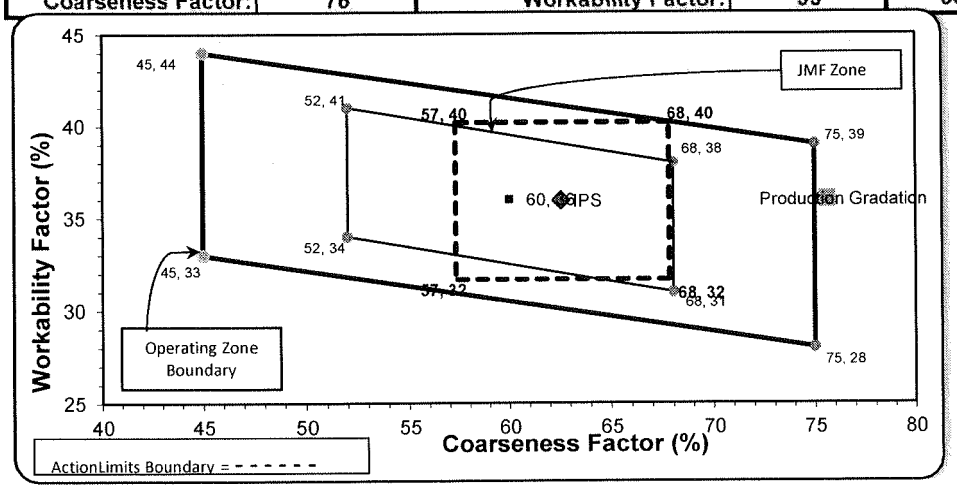
<----- Verify this number is 100%

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"	76.9	100.0	100.0	86.8	12.0	13.2
1/2"	30.0	96.3	100.0	60.0	26.8	40.0
3/8"	12.6	85.4	100.0	49.7	10.3	50.3
#4	2.7	27.1	96.5	40.7	9.0	59.3
#8	2.3	9.1	80.5	33.5	7.2	66.5
#16	2.2	4.6	65.1	27.2	6.3	72.8
#30	2.1	3.6	49.5	20.9	6.3	79.1
#50	2.0	3.1	25.4	11.3	9.6	88.7
#100	1.9	2.8	4.8	3.1	8.2	96.9
LBW	1.4	2.3	0.8	1.2	1.9	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:	76	Workability Factor:	33	Adjusted WF	36.0



Intial Production Sample (IPS)

Coarseness Factor:	63
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"	89.0	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

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Suite 500
Farmington Hills, MI 48336

PREPARED BY:
SM, LLC Technical Service

Approved By:

Plant S12-Superior Onsite Southfield

Product 1051-6AA LS

Period: 05/28/2023 - 06/03/2023

Name/Title Doug Storey / QC Technician

Report Date 06/02/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	98.0	%	95-100
	3/4" (19mm)	76.9	%	
	1/2" (12.5mm)	30.0	%	30-60
	3/8" (9.5mm)	12.6	%	
	#4 (4.75mm)	2.7	%	0-8
	#8 (2.36mm)	2.3	%	
	#16 (1.18mm)	2.2	%	
	#30 (.6mm)	2.1	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.9	%	
	#200 (75µm)	1.55	%	
	Wash Loss (#200/75um)	1.4	%	0-2
	Total Moisture	3.27	%	

Plant S12-Superior Onsite Southfield

Product 1067-26A Mod LS

Period: 05/28/2023 - 06/03/2023

Name/Title Doug Storey / QC Technician

Report Date 06/02/2023

Procedure	Sieve/Test	Result	Unit	26A LS Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	100-100
	1/2" (12.5mm)	96.3	%	95-100
	3/8" (9.5mm)	85.4	%	60-95
	#4 (4.75mm)	27.1	%	5-30
	#8 (2.36mm)	9.1	%	0-12
	#16 (1.18mm)	4.6	%	
	#30 (.6mm)	3.6	%	
	#50 (.3mm)	3.1	%	
	#100 (.15mm)	2.8	%	
	#200 (75µm)	2.5	%	
	Wash Loss (#200/75um)	2.3	%	0-3
	Total Moisture	2.35	%	

Plant S12-Superior Onsite Southfield

Product 1022-2NS GR

Period: 05/28/2023 - 06/03/2023

Name/Title Doug Storey / QC Technician

Report Date 06/02/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.5	%	95-100
	#8 (2.36mm)	80.5	%	65-95
	#16 (1.18mm)	65.1	%	35-75
	#30 (.6mm)	49.5	%	20-55
	#50 (.3mm)	25.4	%	10-30
	#100 (.15mm)	4.8	%	0-10
	#200 (75µm)	0.9	%	
	FM	2.78		2.6-3
	Wash Loss (#200/75um)	0.8	%	0-3
	Total Moisture	2.71	%	

Corrective actions when Plant Gradations are not within Operating Zone Boundaries for the Plants Supplier Gradations plotted CF/WF.

Week of:	Action Taken:
1/2/2023	Nothing produced.
1/9/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
1/16/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
1/23/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
1/30/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
2/6/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
2/13/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
2/20/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
2/27/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
3/6/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
3/13/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed. Had issues with Mid Michigan 2NS at 101. Switched to Ray Rd temporarily (starting week of 3-20-23) until MM could correct the problem.
3/20/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
3/27/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
4/3/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
4/10/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
4/17/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
4/24/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
5/1/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
5/8/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
5/15/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
5/22/2023	All plants fell within OPERATING Zone, so no action required. I will continue to monitor and adjust as needed.
5/29/2023	Plant 12 fell out of OPERATING Zone. Proportions will be adjusted to get it back in OPERATING Zone for following week for new supplier gradations as well as this weeks plant gradations. Supplier is aware , and I will continue to monitor and adjust as needed.

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-101

Sample Date: 5/29/23

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 5/30/2023 through 6/5/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	51.7
26A	71-47	Presque Isle	250	1.53	2.62	8.6
2NS	75-051	Mid Michigan	1150	6.93	2.66	39.7
		Total Wt	**2900**	**17.63**		100.0

<----- Verify this number 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"	99.0	100.0	100.0	99.5	0.5	0.5
3/4"	82.9	100.0	100.0	91.2	8.3	8.8
1/2"	44.4	94.9	100.0	70.8	20.4	29.2
3/8"	28.2	84.6	100.0	61.5	9.3	38.5
#4	6.6	17.1	96.6	43.2	18.3	56.8
#8	3.3	4.7	83.5	35.2	8.0	64.8
#16	2.8	3.3	69.4	29.3	6.0	70.7
#30	2.6	3.0	51.9	22.2	7.1	77.8
#50	2.5	2.7	22.4	10.4	11.8	89.6
#100	2.4	2.5	4.9	3.4	7.0	96.6
LBW	1.8	2.2	0.6	1.4	2.0	98.6

*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.

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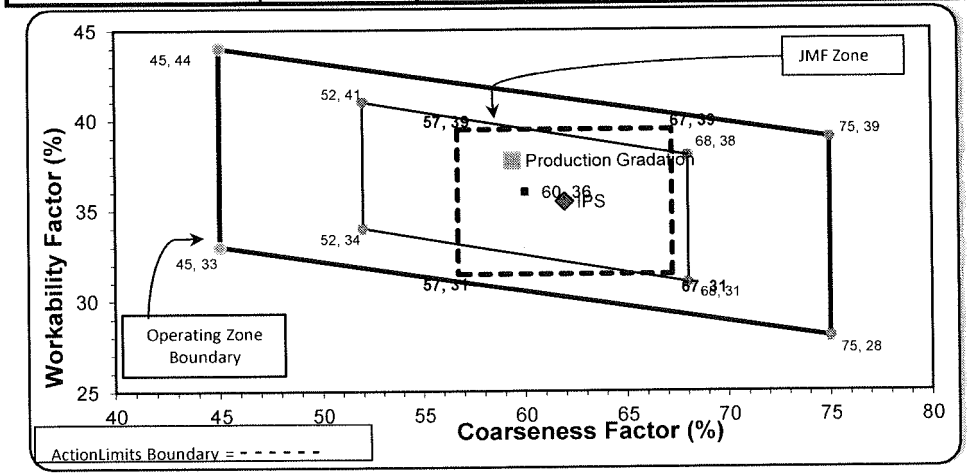
Farmington Hills, MI 48336

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	59	Workability Factor:	35	Adjusted WF: 37.7



Initial Production Sample (IPS)

Coarseness Factor:	62
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"	95.0	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 S101-Superior Mount Clemens

Product 1051-6AA LS

Period: 05/28/2023 - 06/03/2023

Name/Title Doug Storey / QC Technician

Report Date 06/02/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	99.0	%	95-100
	3/4" (19mm)	82.9	%	
	1/2" (12.5mm)	44.4	%	30-60
	3/8" (9.5mm)	28.2	%	
	#4 (4.75mm)	6.6	%	0-8
	#8 (2.36mm)	3.3	%	
	#16 (1.18mm)	2.8	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.5	%	
	#100 (.15mm)	2.4	%	
	#200 (75µm)	2.01	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	3.49	%	

Plant S101-Superior Mount Clemens

Product 1067-26A Mod LS

Period: 05/28/2023 - 06/03/2023

Name/Title Doug Storey / QC Technician

Report Date 06/02/2023

Procedure	Sieve/Test	Result	Unit	26A Mod LS Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	100-100
	1/2" (12.5mm)	94.9	%	95-100
	3/8" (9.5mm)	84.6	%	60-95
	#4 (4.75mm)	17.1	%	5-30
	#8 (2.36mm)	4.7	%	0-12
	#16 (1.18mm)	3.3	%	
	#30 (.6mm)	3.0	%	
	#50 (.3mm)	2.7	%	
	#100 (.15mm)	2.5	%	
	#200 (75µm)	2.3	%	
	Wash Loss (#200/75um)	2.2	%	0-3
	Total Moisture	1.27	%	

Plant S101-Superior Mount Clemens

Product 1022-2NS GR

Period: 05/28/2023 - 06/03/2023

Name/Title Doug Storey / QC Technician

Report Date 06/02/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.6	%	95-100
	#8 (2.36mm)	83.5	%	65-95
	#16 (1.18mm)	69.4	%	35-75
	#30 (.6mm)	51.9	%	20-55
	#50 (.3mm)	22.4	%	10-30
	#100 (.15mm)	4.9	%	0-10
	#200 (75µm)	0.9	%	
	FM	2.71		2.6-3
	Wash Loss (#200/75um)	0.6	%	0-3
	Total Moisture	2.98	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-102

Sample Date: 5/29/23

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 5/30/2023 through 6/5/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	200	1.19	2.69	6.8
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
		Total Wt	**2950**	**17.68**		100.0

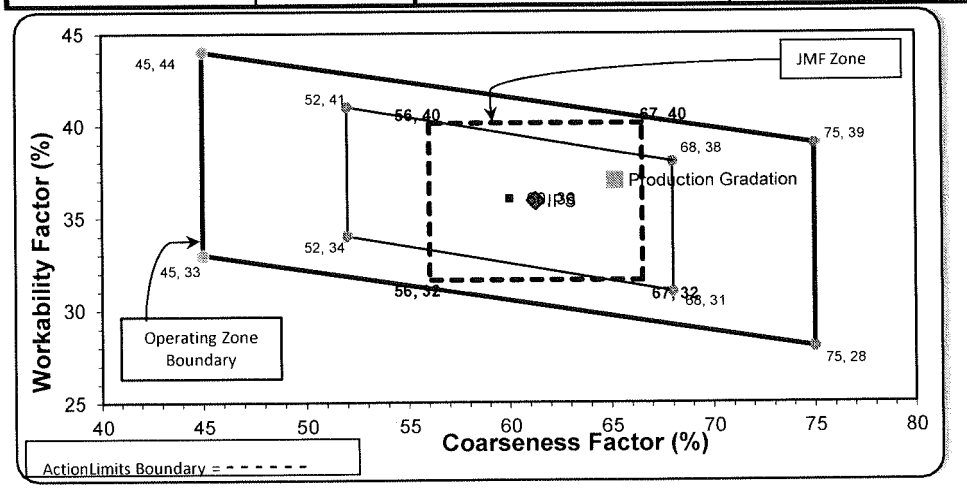
<----- Verify this number is 100%

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"	97.7	100.0	100.0	98.8	1.2	1.2
3/4"	68.2	100.0	100.0	82.8	16.0	17.2
1/2"	36.8	100.0	100.0	65.7	17.0	34.3
3/8"	22.0	94.1	100.0	57.3	8.4	42.7
#4	4.8	18.9	98.7	42.4	14.9	57.6
#8	2.4	7.0	83.9	34.5	7.9	65.5
#16	2.0	4.4	66.5	27.3	7.2	72.7
#30	1.9	3.5	47.4	19.7	7.6	80.3
#50	1.8	3.2	21.9	9.7	10.0	90.3
#100	1.7	3.0	6.3	3.6	6.1	96.4
LBW	1.4	2.9	1.5	1.5	2.0	98.5

*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	Adjusted WF 37.0



Intial Production Sample (IPS)

Coarseness Factor:	61
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

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PREPARED BY:
SM, LLC Technical Service

Approved By:

Plant S102-Superior Novi

Product 1051-6AA LS

Period: 05/28/2023 - 06/03/2023

Name/Title Doug Storey / QC Technician

Report Date 06/02/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	97.7	%	95-100
	3/4" (19mm)	68.2	%	
	1/2" (12.5mm)	36.8	%	30-60
	3/8" (9.5mm)	22.0	%	
	#4 (4.75mm)	4.8	%	0-8
	#8 (2.36mm)	2.4	%	
	#16 (1.18mm)	2.0	%	
	#30 (.6mm)	1.9	%	
	#50 (.3mm)	1.8	%	
	#100 (.15mm)	1.7	%	
	#200 (75µm)	1.59	%	
	Wash Loss (#200/75um)	1.4	%	0-2
	Total Moisture	3.36	%	

Plant S102-Superior Novi

Product 1067-26A Mod LS

Period: 05/28/2023 - 06/03/2023

Name/Title Doug Storey / QC Technician

Report Date 06/02/2023

Procedure	Sieve/Test	Result	Unit	26A Mod LS Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	100-100
	1/2" (12.5mm)	100.0	%	95-100
	3/8" (9.5mm)	94.1	%	60-95
	#4 (4.75mm)	18.9	%	5-30
	#8 (2.36mm)	7.0	%	0-12
	#16 (1.18mm)	4.4	%	
	#30 (.6mm)	3.5	%	
	#50 (.3mm)	3.2	%	
	#100 (.15mm)	3.0	%	
	#200 (75µm)	2.9	%	
	Wash Loss (#200/75um)	2.9	%	0-3
	Total Moisture	1.52	%	

Plant S102-Superior Novi

Product 1022-2NS GR

Period: 05/28/2023 - 06/03/2023

Name/Title Doug Storey / QC Technician

Report Date 06/02/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.7	%	95-100
	#8 (2.36mm)	83.9	%	65-95
	#16 (1.18mm)	66.5	%	35-75
	#30 (.6mm)	47.4	%	20-55
	#50 (.3mm)	21.9	%	10-30
	#100 (.15mm)	6.3	%	0-10
	#200 (75µm)	1.7	%	
	FM	2.75		2.6-3
	Wash Loss (#200/75um)	1.5	%	0-3
	Total Moisture	3.52	%	