# Aggregate Optimization Chart

Production Gradation Report

**PLANT #:** 20

Sample Date: 9/18/23

Concrete Grade: **P1M, 3500HP**

Contractor: _____

Dates Test Represents: 9/19/2023 through 9/25/2023

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| CA | 71-47 | Presque Isle | 970 | 5.93 | 2.62 | 31.6 |
| IA | 71-47 | Presque Isle | 900 | 5.50 | 2.62 | 29.3 |
| 2NS | 63-92 | Grange Hall | 1200 | 7.26 | 2.65 | 39.1 |
| | | **Total Wt** | **3070** | **18.70** | | 100.0 |

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

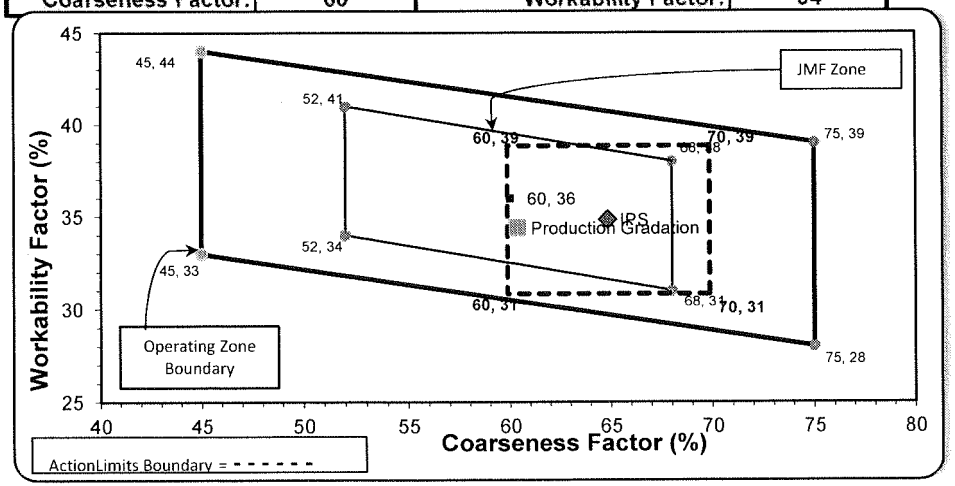
| Sieve | CA | IA | 2NS | Cumulative % Passing | % Retained | Cumulative % Retained |
|---|---|---|---|---|---|---|
| 2" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 1.5" | 93.9 | 100.0 | 100.0 | 98.1 | 1.9 | 1.9 |
| 1" | 46.4 | 100.0 | 100.0 | 83.1 | 15.0 | 16.9 |
| 3/4" | 11.2 | 100.0 | 100.0 | 71.9 | 11.1 | 28.1 |
| 1/2" | 2.3 | 89.4 | 100.0 | 66.0 | 5.9 | 34.0 |
| 3/8" | 1.8 | 70.8 | 100.0 | 60.4 | 5.6 | 39.6 |
| #4 | 1.3 | 19.6 | 97.0 | 44.1 | 16.3 | 55.9 |
| #8 | 1.1 | 5.8 | 82.8 | 34.4 | 9.7 | 65.6 |
| #16 | 0.9 | 3.3 | 67.8 | 27.8 | 6.7 | 72.2 |
| #30 | 0.8 | 2.8 | 49.9 | 20.6 | 7.2 | 79.4 |
| #50 | 0.8 | 2.6 | 20.1 | 8.9 | 11.7 | 91.1 |
| #100 | 0.6 | 2.3 | 3.5 | 2.2 | 6.6 | 97.8 |
| LBW | 0.4 | 2.0 | 1.3 | 1.2 | 1.0 | 98.8 |


**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.
*% 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: | 60 | Workability Factor: | 34 |
|---|---|---|---|




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:** 09/17/2023 - 09/23/2023

**Name/Title** Doug Storey / QC Technician

**Report Date** 09/23/2023

| Procedure | Sieve/Test | Result | Unit | Coarse Agg P1M LS Target |
|---|---|---|---|---|
| | 2" (50mm) | 100.0 | % | |
| | 1 1/2" (37.5mm) | 93.9 | % | |
| | 1" (25mm) | 46.4 | % | |
| | 3/4" (19mm) | 11.2 | % | |
| | 1/2" (12.5mm) | 2.3 | % | |
| | 3/8" (9.5mm) | 1.8 | % | |
| | #4 (4.75mm) | 1.3 | % | |
| | #8 (2.36mm) | 1.1 | % | |
| | #16 (1.18mm) | 0.9 | % | |
| | #30 (.6mm) | 0.8 | % | |
| | #50 (.3mm) | 0.8 | % | |
| | #100 (.15mm) | 0.6 | % | |
| | #200 (75µm) | 0.5 | % | |
| | Wash Loss (#200/75um) | 0.4 | % | 0-2 |
| | Total Moisture | 0.47 | % | |

Plant S20-Superior Flint

Product 7920-INTERMED AGG P1M LS

Period: 09/17/2023 - 09/23/2023

Name/Title Doug Storey / QC Technician

Report Date 09/23/2023

| 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) | 89.4 | % | |
| | 3/8" (9.5mm) | 70.8 | % | |
| | #4 (4.75mm) | 19.6 | % | |
| | #8 (2.36mm) | 5.8 | % | |
| | #16 (1.18mm) | 3.3 | % | |
| | #30 (.6mm) | 2.8 | % | |
| | #50 (.3mm) | 2.6 | % | |
| | #100 (.15mm) | 2.3 | % | |
| | #200 (75µm) | 2.2 | % | |
| | Wash Loss (#200/75um) | 2.0 | % | 0-3 |
| | Total Moisture | 1.94 | % | |

Plant S20-Superior Flint

Product 1022-2NS GR

Period: 09/17/2023 - 09/23/2023

Name/Title Doug Storey / QC Technician

Report Date 09/23/2023

| Procedure | Sieve/Test | Result | Unit | 2NS GR Spec |
|---|---|---|---|---|
| | 3/8" (9.5mm) | 100.0 | % | 100-100 |
| | #4 (4.75mm) | 97.0 | % | 95-100 |
| | #8 (2.36mm) | 82.8 | % | 65-95 |
| | #16 (1.18mm) | 67.8 | % | 35-75 |
| | #30 (.6mm) | 49.9 | % | 20-55 |
| | #50 (.3mm) | 20.1 | % | 10-30 |
| | #100 (.15mm) | 3.5 | % | 0-10 |
| | #200 (75µm) | 1.5 | % | |
| | FM | 2.79 | | 2.6-3 |
| | Wash Loss (#200/75um) | 1.3 | % | 0-3 |
| | Total Moisture | 2.77 | % | |

# Aggregate Optimization Chart

Production Gradation Report

**PLANT #:** P-102

Contractor: _____

Sample Date: 9/18/23

Concrete Grade: **P1M, 3500HP**

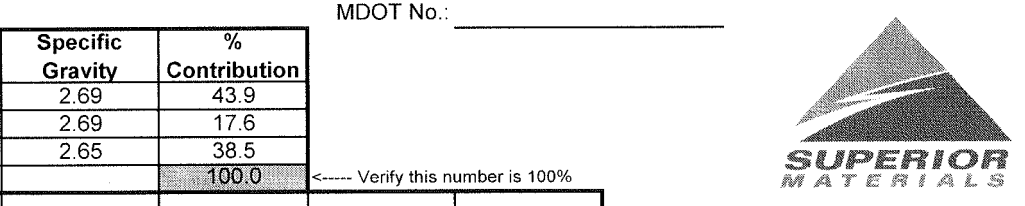
Dates Test Represents: 9/19/2023 through 9/25/2023

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | 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 |
| 2NS | 81-019 | Pleasant Lake | 1200 | 7.26 | 2.65 | 38.5 |
| | | **Total Wt** | **3120** | **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" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 1" | 67.4 | 100.0 | 100.0 | 85.7 | 14.3 | 14.3 |
| 3/4" | 41.2 | 99.7 | 100.0 | 74.1 | 11.6 | 25.9 |
| 1/2" | 22.5 | 86.1 | 100.0 | 63.5 | 10.6 | 36.5 |
| 3/8" | 13.4 | 69.3 | 100.0 | 56.6 | 7.0 | 43.4 |
| #4 | 2.8 | 18.3 | 98.2 | 42.2 | 14.3 | 57.8 |
| #8 | 1.8 | 6.0 | 83.6 | 34.0 | 8.2 | 66.0 |
| #16 | 1.5 | 3.3 | 66.0 | 26.6 | 7.4 | 73.4 |
| #30 | 1.3 | 2.7 | 48.1 | 19.5 | 7.1 | 80.5 |
| #50 | 1.2 | 2.5 | 23.7 | 10.1 | 9.5 | 89.9 |
| #100 | 1.2 | 2.4 | 6.1 | 3.3 | 6.8 | 96.7 |
| LBW | 1.1 | 2.3 | 1.5 | 1.5 | 1.8 | 98.5 |

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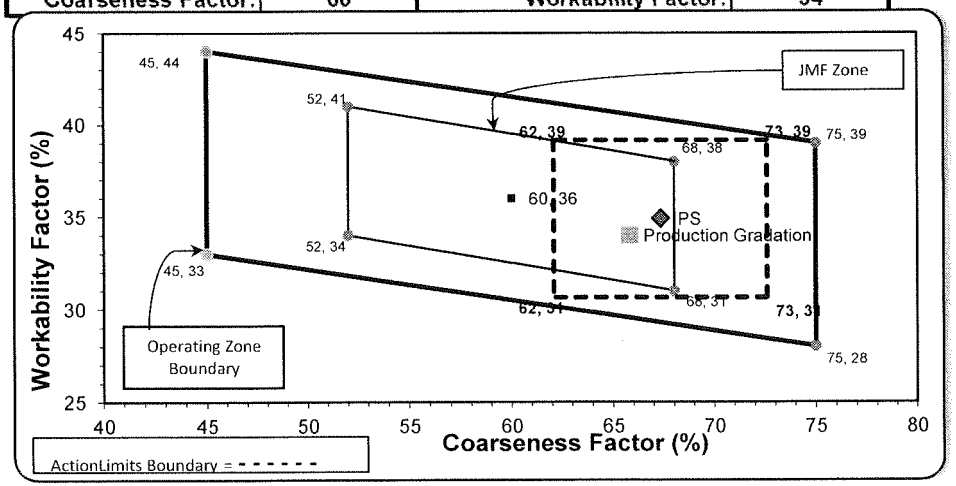
Farmington Hills, MI 48336

*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.
*% 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: | 66 | Workability Factor: | 34 |
|---|---|---|---|




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" | 85.5 | 14.5 | 14.5 |
| 3/4" | 73.4 | 12.1 | 26.6 |
| 1/2" | 61.0 | 12.4 | 39.0 |
| 3/8" | 56.2 | 4.8 | 43.8 |
| #4 | 43.1 | 13.1 | 56.9 |
| #8 | 34.9 | 8.2 | 65.1 |
| #16 | 29.4 | 5.5 | 70.6 |
| #30 | 21.6 | 7.8 | 78.4 |
| #50 | 8.1 | 13.4 | 91.9 |
| #100 | 2.2 | 5.9 | 97.8 |
| LBW | 1.4 | 0.8 | 98.6 |

PREPARED BY:
SM, LLC Technical Service

Approved By:

**Plant** S102-Superior Novi

**Product** 7919-COARSE AGG P1M LS

**Period:** 09/17/2023 - 09/23/2023

**Name/Title** Doug Storey / QC Technician

**Report Date** 09/23/2023

| Procedure | Sieve/Test | Result | Unit | Coarse Agg P1M LS Target |
|---|---|---|---|---|
| | 2" (50mm) | 100.0 | % | |
| | 1 1/2" (37.5mm) | 100.0 | % | |
| | 1" (25mm) | 67.4 | % | |
| | 3/4" (19mm) | 41.2 | % | |
| | 1/2" (12.5mm) | 22.5 | % | |
| | 3/8" (9.5mm) | 13.4 | % | |
| | #4 (4.75mm) | 2.8 | % | |
| | #8 (2.36mm) | 1.8 | % | |
| | #16 (1.18mm) | 1.5 | % | |
| | #30 (.6mm) | 1.3 | % | |
| | #50 (.3mm) | 1.2 | % | |
| | #100 (.15mm) | 1.2 | % | |
| | #200 (75µm) | 1.1 | % | |
| | Wash Loss (#200/75um) | 1.1 | % | 0-2 |

Plant S102-Superior Novi

Product 7920-INTERMED AGG P1M LS

Period: 09/17/2023 - 09/23/2023

Name/Title Doug Storey / QC Technician

Report Date 09/23/2023

| 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) | 86.1 | % | |
| | 3/8" (9.5mm) | 69.3 | % | |
| | #4 (4.75mm) | 18.3 | % | |
| | #8 (2.36mm) | 6.0 | % | |
| | #16 (1.18mm) | 3.3 | % | |
| | #30 (.6mm) | 2.7 | % | |
| | #50 (.3mm) | 2.5 | % | |
| | #100 (.15mm) | 2.4 | % | |
| | #200 (75µm) | 2.3 | % | |
| | Wash Loss (#200/75um) | 2.3 | % | 0-3 |
| | Total Moisture | 2.48 | % | |

SUPERIOR MATERIALS

Plant S102-Superior Novi

Product 1022-2NS GR

Period: 09/17/2023 - 09/23/2023

Name/Title Doug Storey / QC Technician

Report Date 09/23/2023

| Procedure | Sieve/Test | Result | Unit | 2NS GR Spec |
|---|---|---|---|---|
| | 3/8" (9.5mm) | 100.0 | % | 100-100 |
| | #4 (4.75mm) | 98.2 | % | 95-100 |
| | #8 (2.36mm) | 83.6 | % | 65-95 |
| | #16 (1.18mm) | 66.0 | % | 35-75 |
| | #30 (.6mm) | 48.1 | % | 20-55 |
| | #50 (.3mm) | 23.7 | % | 10-30 |
| | #100 (.15mm) | 6.1 | % | 0-10 |
| | #200 (75µm) | 1.7 | % | |
| | FM | 2.74 | | 2.6-3 |
| | Wash Loss (#200/75um) | 1.5 | % | 0-3 |
| | Total Moisture | 3.15 | % | |