# Aggregate Optimization Chart

Production Gradation Report

**PLANT #:** 12

Contractor: _____

Sample Date: 6/26/23

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 6/27/2023 through 7/3/2023

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 71-47 | Presque Isle | 1550 | 9.48 | 2.62 | 53.4 |
| 26A | 71-47 | Presque Isle | 205 | 1.25 | 2.62 | 7.1 |
| 2NS | 63-115 | Ray Rd | 1150 | 6.95 | 2.65 | 39.6 |
| | | **Total Wt** | **2905** | **17.69** | | 100.0 |

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

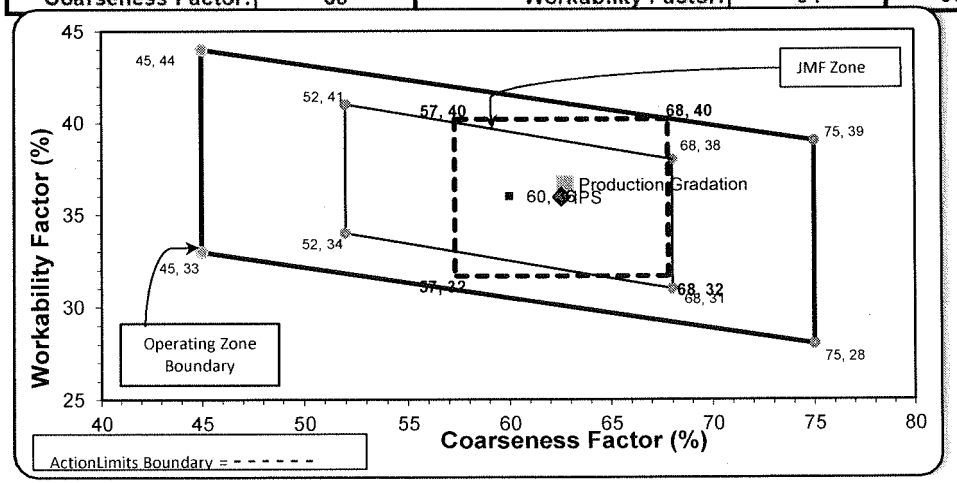
| Sieve | 6AA | 26A | 2NS | Cumulative % Passing | % Retained | Cumulative % Retained |
|---|---|---|---|---|---|---|
| 2" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 1.5" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 1" | 97.1 | 100.0 | 100.0 | 98.5 | 1.5 | 1.5 |
| 3/4" | 84.1 | 100.0 | 100.0 | 91.5 | 6.9 | 8.5 |
| 1/2" | 46.3 | 91.5 | 100.0 | 70.7 | 20.8 | 29.3 |
| 3/8" | 25.6 | 76.9 | 100.0 | 58.7 | 12.1 | 41.3 |
| #4 | 3.8 | 12.7 | 96.1 | 41.0 | 17.7 | 59.0 |
| #8 | 2.5 | 4.8 | 82.0 | 34.1 | 6.8 | 65.9 |
| #16 | 2.3 | 3.6 | 68.0 | 28.4 | 5.7 | 71.6 |
| #30 | 2.2 | 3.1 | 52.3 | 22.1 | 6.3 | 77.9 |
| #50 | 2.1 | 2.6 | 25.2 | 11.3 | 10.8 | 88.7 |
| #100 | 2.0 | 2.2 | 5.3 | 3.3 | 8.0 | 96.7 |
| LBW | 1.6 | 1.8 | 0.6 | 1.2 | 2.1 | 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.


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


Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

| Coarseness Factor: | 63 | Workability Factor: | 34 | Adjusted WF | 36.6 |
|---|---|---|---|---|---|




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 |

PREPARED BY:
SM, LLC Technical Service

Approved By:

SUPERIOR MATERIALS

Plant S12-Onsite Southfield

Product 1051-6AA LS

Period: 06/25/2023 - 07/01/2023

Name/Title Doug Storey / QC Technician

Report Date 06/30/2023

| Procedure | Sieve/Test | Result | Unit | 6AA LS |
|---|---|---|---|---|
| | 2" (50mm) | 100.0 | % | |
| | 1 1/2" (37.5mm) | 100.0 | % | 100-100 |
| | 1" (25mm) | 97.1 | % | 95-100 |
| | 3/4" (19mm) | 84.1 | % | |
| | 1/2" (12.5mm) | 46.3 | % | 30-60 |
| | 3/8" (9.5mm) | 25.6 | % | |
| | #4 (4.75mm) | 3.8 | % | 0-8 |
| | #8 (2.36mm) | 2.5 | % | |
| | #16 (1.18mm) | 2.3 | % | |
| | #30 (.6mm) | 2.2 | % | |
| | #50 (.3mm) | 2.1 | % | |
| | #100 (.15mm) | 2.0 | % | |
| | #200 (75µm) | 1.81 | % | |
| | Wash Loss (#200/75um) | 1.6 | % | 0-2 |
| | Total Moisture | 2.81 | % | |

SUPERIOR MATERIALS

Plant S12-Onsite Southfield

Product 1067-26A Mod LS

Period: 06/25/2023 - 07/01/2023

Name/Title Doug Storey / QC Technician

Report Date 06/30/2023

| 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) | 91.5 | % | 95-100 |
| | 3/8" (9.5mm) | 76.9 | % | 60-95 |
| | #4 (4.75mm) | 12.7 | % | 5-30 |
| | #8 (2.36mm) | 4.8 | % | 0-12 |
| | #16 (1.18mm) | 3.6 | % | |
| | #30 (.6mm) | 3.1 | % | |
| | #50 (.3mm) | 2.6 | % | |
| | #100 (.15mm) | 2.2 | % | |
| | #200 (75µm) | 1.9 | % | |
| | Wash Loss (#200/75um) | 1.8 | % | 0-3 |
| | Total Moisture | 2.47 | % | |

SUPERIOR MATERIALS

Plant S12-Onsite Southfield

Product 1022-2NS GR

Period: 06/25/2023 - 07/01/2023

Name/Title Doug Storey / QC Technician

Report Date 06/30/2023

| Procedure | Sieve/Test | Result | Unit | 2NS GR Spec |
|---|---|---|---|---|
| | 3/8" (9.5mm) | 100.0 | % | 100-100 |
| | #4 (4.75mm) | 96.1 | % | 95-100 |
| | #8 (2.36mm) | 82.0 | % | 65-95 |
| | #16 (1.18mm) | 68.0 | % | 35-75 |
| | #30 (.6mm) | 52.3 | % | 20-55 |
| | #50 (.3mm) | 25.2 | % | 10-30 |
| | #100 (.15mm) | 5.3 | % | 0-10 |
| | #200 (75µm) | 0.9 | % | |
| | FM | 2.71 | | 2.6-3 |
| | Wash Loss (#200/75um) | 0.6 | % | 0-3 |
| | Total Moisture | 3.89 | % | |

# Aggregate Optimization Chart

Production Gradation Report

**PLANT #:** P-32

Sample Date: 6/26/23

Concrete Grade: **DM, 4500HP**

Contractor: _____

Dates Test Represents: 6/27/2023 through 7/3/2023

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 71-47 | Presque Isle | 1500 | 9.17 | 2.62 | 51.6 |
| 26A | 71-47 | Presque Isle | 255 | 1.56 | 2.62 | 8.8 |
| 2NS | 95-013 | Smelter Bay | 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" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 3/4" | 79.5 | 100.0 | 100.0 | 89.4 | 10.6 | 10.6 |
| 1/2" | 35.5 | 95.5 | 100.0 | 66.3 | 23.1 | 33.7 |
| 3/8" | 19.8 | 87.6 | 100.0 | 57.5 | 8.8 | 42.5 |
| #4 | 4.1 | 23.7 | 96.6 | 42.4 | 15.1 | 57.6 |
| #8 | 2.3 | 5.3 | 85.3 | 35.4 | 7.0 | 64.6 |
| #16 | 2.1 | 2.5 | 70.4 | 29.2 | 6.2 | 70.8 |
| #30 | 2.0 | 2.1 | 50.3 | 21.1 | 8.0 | 78.9 |
| #50 | 1.9 | 1.9 | 24.9 | 11.0 | 10.1 | 89.0 |
| #100 | 1.7 | 1.7 | 7.5 | 4.0 | 7.0 | 96.0 |
| LBW | 1.2 | 1.5 | 1.3 | 1.3 | 2.7 | 98.7 |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*Maximum % Retained must be above the 3/8" sieve.
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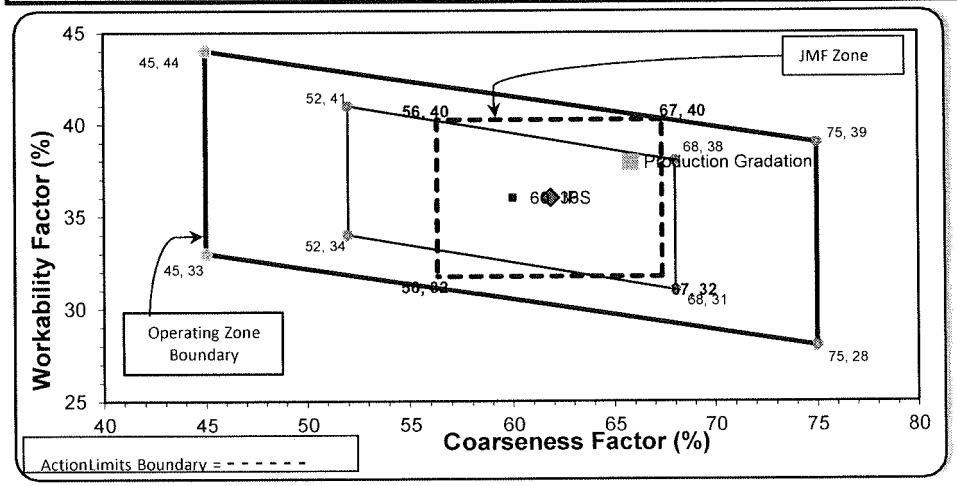
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

| Coarseness Factor: | 66 | Workability Factor: | 35 | Adjusted WF: 37.9 |
|---|---|---|---|---|




Intial Production Sample (IPS)

| Coarseness Factor: | 62 |
|---|---|
| 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" | 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

Approved By:

# Edw. C. Levy Co.

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

Plant 958-JMT

Product 1054-6AA LS PI

Period: 06/25/2023 - 07/01/2023

Name/Title Doug Storey / QC Technician

Report Date 06/30/2023

| Procedure | Sieve/Test | Result | Unit | 6AA LS PI Spec |
|---|---|---|---|---|
| | 2" (50mm) | 100.0 | % | |
| | 1 1/2" (37.5mm) | 100.0 | % | 100-100 |
| | 1" (25mm) | 100.0 | % | 95-100 |
| | 3/4" (19mm) | 79.5 | % | |
| | 1/2" (12.5mm) | 35.5 | % | 30-60 |
| | 3/8" (9.5mm) | 19.8 | % | |
| | #4 (4.75mm) | 4.1 | % | 0-8 |
| | #8 (2.36mm) | 2.3 | % | |
| | #16 (1.18mm) | 2.1 | % | |
| | #30 (.6mm) | 2.0 | % | |
| | #50 (.3mm) | 1.9 | % | |
| | #100 (.15mm) | 1.7 | % | |
| | #200 (75µm) | 1.4 | % | |
| | Wash Loss (#200/75um) | 1.2 | % | 0-2 |
| | Total Moisture | 2.9 | % | |

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8911 W. Jefferson
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(313) 429-2429

Plant 958-JMT

Product 1067-26A Mod LS

Period: 06/25/2023 - 07/01/2023

Name/Title Doug Storey / QC Technician

Report Date 06/30/2023

| 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) | 95.5 | % | 95-100 |
| | 3/8" (9.5mm) | 87.6 | % | 60-95 |
| | #4 (4.75mm) | 23.7 | % | 5-30 |
| | #8 (2.36mm) | 5.3 | % | 0-12 |
| | #16 (1.18mm) | 2.5 | % | |
| | #30 (.6mm) | 2.1 | % | |
| | #50 (.3mm) | 1.9 | % | |
| | #100 (.15mm) | 1.7 | % | |
| | #200 (75µm) | 1.6 | % | |
| | Wash Loss (#200/75um) | 1.5 | % | 0-3 |
| | Total Moisture | 3.3 | % | |

# Edw. C. Levy Co.

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

Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Period: 06/25/2023 - 07/01/2023

Name/Title Doug Storey / QC Technician

Report Date 06/30/2023

| 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) | 85.3 | % | 65-95 |
| | #16 (1.18mm) | 70.4 | % | 35-75 |
| | #30 (.6mm) | 50.3 | % | 20-55 |
| | #50 (.3mm) | 24.9 | % | 10-30 |
| | #100 (.15mm) | 7.5 | % | 0-10 |
| | #200 (75µm) | 1.8 | % | |
| | FM | 2.65 | | 2.6-3 |
| | Wash Loss (#200/75um) | 1.3 | % | 0-3 |
| | Total Moisture | 5.0 | % | |

# Aggregate Optimization Chart

Production Gradation Report

**PLANT #:** P-103

Contractor: _____

Sample Date: 6/26/23

Concrete Grade: **DM, 4500HP**

Dates Test Represents: 6/27/2023 through 7/3/2023

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 58-003 | Stoneco | 1500 | 8.94 | 2.69 | 50.8 |
| 26A | 58-003 | Stoneco | 300 | 1.79 | 2.69 | 10.2 |
| 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" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 3/4" | 89.0 | 100.0 | 100.0 | 94.4 | 5.6 | 5.6 |
| 1/2" | 49.5 | 99.7 | 100.0 | 74.3 | 20.1 | 25.7 |
| 3/8" | 25.8 | 89.8 | 100.0 | 61.2 | 13.1 | 38.8 |
| #4 | 6.1 | 12.7 | 98.9 | 42.9 | 18.3 | 57.1 |
| #8 | 2.7 | 4.2 | 84.7 | 34.8 | 8.1 | 65.2 |
| #16 | 2.1 | 2.9 | 66.4 | 27.2 | 7.6 | 72.8 |
| #30 | 1.9 | 2.4 | 47.7 | 19.8 | 7.4 | 80.2 |
| #50 | 1.8 | 2.2 | 23.0 | 10.1 | 9.7 | 89.9 |
| #100 | 1.7 | 2.1 | 7.0 | 3.8 | 6.3 | 96.2 |
| LBW | 1.6 | 2.0 | 1.6 | 1.6 | 2.2 | 98.4 |


**Superior Materials, LLC**
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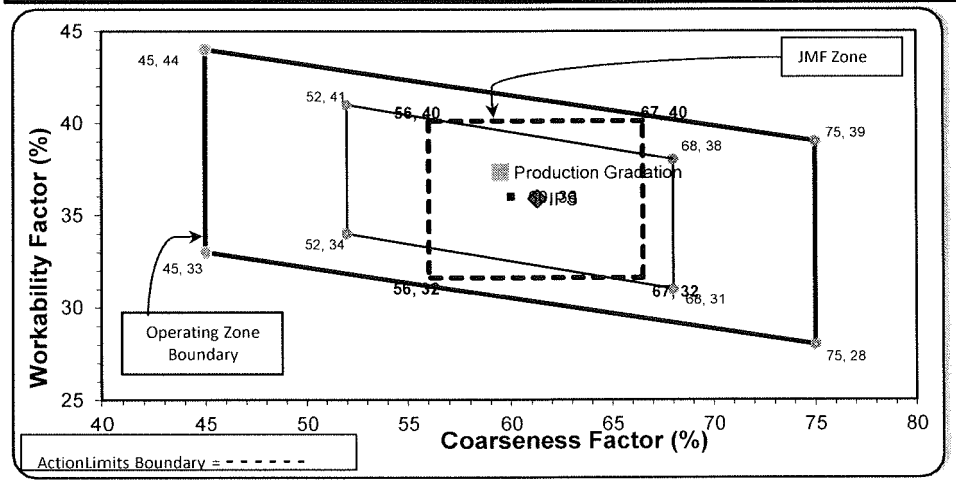
Farmington Hills, MI 48336


*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: | 59 | Workability Factor: | 35 | Adjusted WF: 37.3 |
|---|---|---|---|---|




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 |

PREPARED BY:
SM, LLC Technical Service

Approved BY:

**Plant** S103-Superior Brighton

**Product** 1051-6AA LS

**Period:** 06/25/2023 - 07/01/2023

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

**Report Date** 06/30/2023

| Procedure | Sieve/Test | Result | Unit | 6AA LS |
|---|---|---|---|---|
| | 2" (50mm) | 100.0 | % | |
| | 1 1/2" (37.5mm) | 100.0 | % | 100-100 |
| | 1" (25mm) | 100.0 | % | 95-100 |
| | 3/4" (19mm) | 89.0 | % | |
| | 1/2" (12.5mm) | 49.5 | % | 30-60 |
| | 3/8" (9.5mm) | 25.8 | % | |
| | #4 (4.75mm) | 6.1 | % | 0-8 |
| | #8 (2.36mm) | 2.7 | % | |
| | #16 (1.18mm) | 2.1 | % | |
| | #30 (.6mm) | 1.9 | % | |
| | #50 (.3mm) | 1.8 | % | |
| | #100 (.15mm) | 1.7 | % | |
| | #200 (75µm) | 1.65 | % | |
| | Wash Loss (#200/75um) | 1.6 | % | 0-2 |
| | Total Moisture | 2.85 | % | |

SUPERIOR MATERIALS

Plant S103-Superior Brighton

Product 1067-26A Mod LS

Period: 06/25/2023 - 07/01/2023

Name/Title Doug Storey / QC Technician

Report Date 06/30/2023

| 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) | 99.7 | % | 95-100 |
| | 3/8" (9.5mm) | 89.8 | % | 60-95 |
| | #4 (4.75mm) | 12.7 | % | 5-30 |
| | #8 (2.36mm) | 4.2 | % | 0-12 |
| | #16 (1.18mm) | 2.9 | % | |
| | #30 (.6mm) | 2.4 | % | |
| | #50 (.3mm) | 2.2 | % | |
| | #100 (.15mm) | 2.1 | % | |
| | #200 (75µm) | 2.0 | % | |
| | Wash Loss (#200/75um) | 2.0 | % | 0-3 |
| | Total Moisture | 4.33 | % | |

Plant S103-Superior Brighton

Product 1022-2NS GR

Period: 06/25/2023 - 07/01/2023

Name/Title Doug Storey / QC Technician

Report Date 06/30/2023

| Procedure | Sieve/Test | Result | Unit | 2NS GR Spec |
|---|---|---|---|---|
| | 3/8" (9.5mm) | 100.0 | % | 100-100 |
| | #4 (4.75mm) | 98.9 | % | 95-100 |
| | #8 (2.36mm) | 84.7 | % | 65-95 |
| | #16 (1.18mm) | 66.4 | % | 35-75 |
| | #30 (.6mm) | 47.7 | % | 20-55 |
| | #50 (.3mm) | 23.0 | % | 10-30 |
| | #100 (.15mm) | 7.0 | % | 0-10 |
| | #200 (75µm) | 2.2 | % | |
| | FM | 2.72 | | 2.6-3 |
| | Wash Loss (#200/75um) | 1.6 | % | 0-3 |
| | Total Moisture | 4.86 | % | |