

# Aggregate Optimization Chart

## Production Gradation Report

**PLANT #:** P-20

Contractor: \_\_\_\_\_

Sample Date: 8/31/20

Concrete Grade: P1M

Dates Test Represents: 9/1/2020 through 9/7/2020

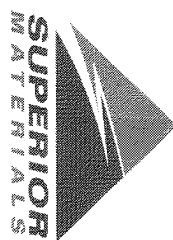
MIDOT No.: \_\_\_\_\_

| Agg. Class      | Pit # | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | Contribution % |
|-----------------|-------|--------------|--------------|-----------------|------------------|----------------|
| CA              | 71-47 | Presque Isle | 1000         | 6.12            | 2.62             | 32.6           |
| IA              | 71-47 | Presque Isle | 870          | 5.32            | 2.62             | 28.3           |
| NNS             | 63-92 | Grange Hall  | 1200         | 7.26            | 2.65             | 39.1           |
| <b>Total Wt</b> |       |              | <b>3070</b>  | <b>18.70</b>    |                  | <b>100.0</b>   |

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

| Sieve | CA    | IA    | NNS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 92.0  | 100.0 | 100.0 | 97.4                 | 2.6        | 2.6                   |
| 1"    | 58.8  | 100.0 | 100.0 | 86.6                 | 10.8       | 13.4                  |
| 3/4"  | 37.6  | 98.8  | 100.0 | 79.3                 | 7.2        | 20.7                  |
| 1/2"  | 12.8  | 79.1  | 100.0 | 65.7                 | 13.7       | 34.3                  |
| 3/8"  | 6.1   | 55.8  | 100.0 | 56.9                 | 8.8        | 43.1                  |
| #4    | 4.3   | 14.0  | 97.3  | 43.4                 | 13.5       | 56.6                  |
| #8    | 3.6   | 6.2   | 84.7  | 36.0                 | 7.4        | 64.0                  |
| #16   | 3.3   | 4.3   | 69.9  | 29.6                 | 6.4        | 70.4                  |
| #30   | 2.9   | 3.8   | 49.7  | 21.4                 | 8.2        | 78.6                  |
| #50   | 2.6   | 3.1   | 19.8  | 9.5                  | 12.0       | 90.5                  |
| #100  | 2.3   | 2.8   | 4.2   | 3.2                  | 6.3        | 96.8                  |
| LBW   | 1.8   | 2.4   | 2.4   | 2.2                  | 1.0        | 97.8                  |

\*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.



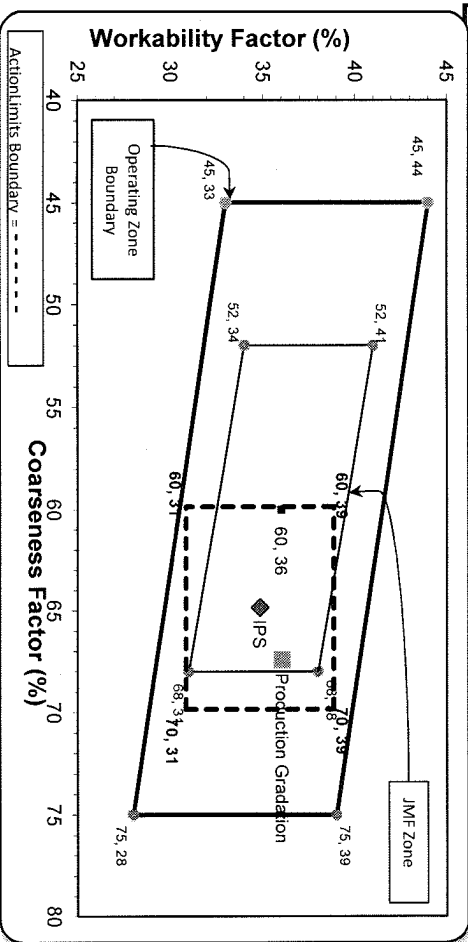
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Initial Production Sample (IPS)

Coarseness Factor: 67 Workability Factor: 36

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: 08/30/2020 - 09/05/2020

Name/Title Doug Storey / QC Technician

Report Date 09/04/2020

| Procedure | Sieve/Test            | Result | Unit | Coarse Agg P1M LS Target |
|-----------|-----------------------|--------|------|--------------------------|
|           | 2" (50mm)             | 100.0  | %    |                          |
|           | 1 1/2" (37.5mm)       | 92.0   | %    |                          |
|           | 1" (25mm)             | 58.8   | %    |                          |
|           | 3/4" (19mm)           | 37.6   | %    |                          |
|           | 1/2" (12.5mm)         | 12.8   | %    |                          |
|           | 3/8" (9.5mm)          | 6.1    | %    |                          |
|           | #4 (4.75mm)           | 4.3    | %    |                          |
|           | #8 (2.36mm)           | 3.6    | %    |                          |
|           | #16 (1.18mm)          | 3.3    | %    |                          |
|           | #30 (.6mm)            | 2.9    | %    |                          |
|           | #50 (.3mm)            | 2.6    | %    |                          |
|           | #100 (.15mm)          | 2.3    | %    |                          |
|           | #200 (75µm)           | 1.8    | %    |                          |
|           | Wash Loss (#200/75um) | 1.7    | %    | 0-2                      |
|           | Total Moisture        | 1.64   | %    |                          |



Plant S20-Superior Flint  
 Product 7920-INTERMED AGG P1M LS  
 Period: 08/30/2020 - 09/05/2020

Name/Title Doug Storey / QC Technician  
 Report Date 09/04/2020

| 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)           | 98.8   | %    |                            |
|           | 1/2" (12.5mm)         | 79.1   | %    |                            |
|           | 3/8" (9.5mm)          | 55.8   | %    |                            |
|           | #4 (4.75mm)           | 14.0   | %    |                            |
|           | #8 (2.36mm)           | 6.2    | %    |                            |
|           | #16 (1.18mm)          | 4.3    | %    |                            |
|           | #30 (.6mm)            | 3.8    | %    |                            |
|           | #50 (.3mm)            | 3.1    | %    |                            |
|           | #100 (.15mm)          | 2.8    | %    |                            |
|           | #200 (75µm)           | 2.4    | %    |                            |
|           | Wash Loss (#200/75um) | 2.2    | %    | 0-3                        |
|           | Total Moisture        | 3.46   | %    |                            |



**Plant:** S20-Superior Flint  
**Product:** 1022-2NS GR  
**Period:** 08/30/2020 - 09/05/2020

**Name/Title:** Doug Storey / QC Technician  
**Report Date:** 09/04/2020

| Procedure | Sieve/Test            | Result | Unit | 2NS GR Spec |
|-----------|-----------------------|--------|------|-------------|
|           | 3/8" (9.5mm)          | 100.0  | %    | 100-100     |
|           | #4 (4.75mm)           | 97.3   | %    | 95-100      |
|           | #8 (2.36mm)           | 84.7   | %    | 65-95       |
|           | #16 (1.18mm)          | 69.9   | %    | 35-75       |
|           | #30 (.6mm)            | 49.7   | %    | 20-55       |
|           | #50 (.3mm)            | 19.8   | %    | 10-30       |
|           | #100 (.15mm)          | 4.2    | %    | 0-10        |
|           | #200 (75µm)           | 2.4    | %    |             |
|           | FM                    | 2.74   |      | 2.6-3       |
|           | Wash Loss (#200/75µm) | 2.4    | %    | 0-3         |
|           | Total Moisture        | 5.34   | %    |             |

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-32**

Sample Date: **8/31/20**

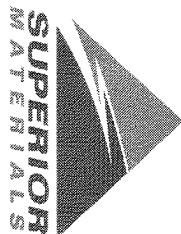
Dates Test Represents: **9/1/2020**

through **9/7/2020**

Concrete Grade: **P1M**

Contractor: \_\_\_\_\_

MDOT No.: \_\_\_\_\_



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

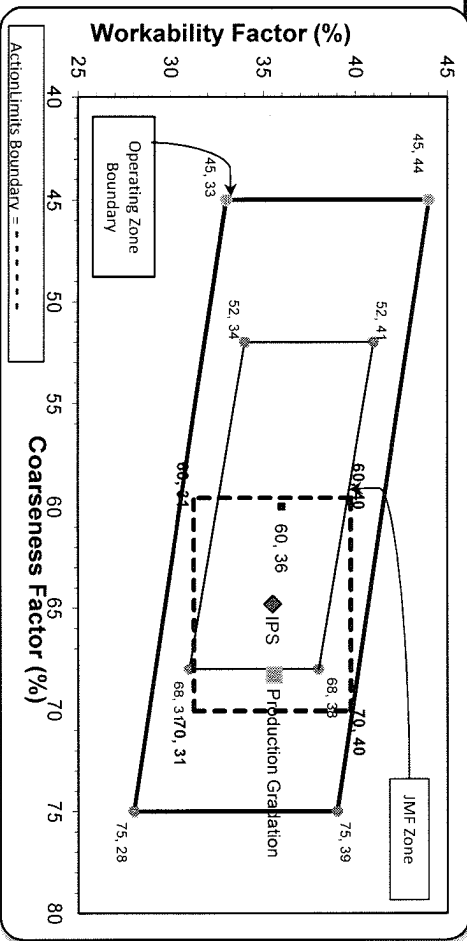
| Agg. Class | Pit #  | Source       | Weight (ssd) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|------------|--------|--------------|--------------|-----------------|------------------|----------------|
| CA         | 71-47  | Presque Isle | 870          | 5.32            | 2.62             | 28.3           |
| IA         | 71-47  | Presque Isle | 950          | 5.81            | 2.62             | 30.9           |
| ZNS        | 95-013 | Smeller Bay  | 1250         | 7.56            | 2.65             | 40.7           |
| Total Wt   |        |              | <b>3070</b>  | <b>18.69</b>    |                  | <b>100.0</b>   |

| Sieve | CA    | IA    | ZNS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 93.0  | 100.0 | 100.0 | 98.0                 | 2.0        | 2.0                   |
| 1"    | 35.1  | 100.0 | 100.0 | 81.6                 | 16.4       | 18.4                  |
| 3/4"  | 11.2  | 97.7  | 100.0 | 74.1                 | 7.5        | 25.9                  |
| 1/2"  | 4.9   | 74.1  | 100.0 | 65.0                 | 9.1        | 35.0                  |
| 3/8"  | 3.7   | 46.0  | 100.0 | 56.0                 | 9.0        | 44.0                  |
| #4    | 1.9   | 8.6   | 96.5  | 42.5                 | 13.5       | 57.5                  |
| #8    | 1.5   | 4.1   | 83.2  | 35.6                 | 6.9        | 64.4                  |
| #16   | 1.4   | 3.4   | 67.6  | 29.0                 | 6.6        | 71.0                  |
| #30   | 1.4   | 3.1   | 47.1  | 20.5                 | 8.4        | 79.5                  |
| #50   | 1.3   | 3.0   | 21.5  | 10.1                 | 10.5       | 89.9                  |
| #100  | 1.2   | 2.8   | 5.6   | 3.5                  | 6.6        | 96.5                  |
| LBW   | 0.9   | 2.3   | 1.4   | 1.5                  | 1.9        | 98.5                  |

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **68** Workability Factor: **36**



Initial Production Sample (IPS)

Coarseness Factor: **65** Workability Factor: **36**

| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|----------------------|------------|-----------------------|
| 2"    | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 99.0                 | 0.6        | 0.6                   |
| 1"    | 84.0                 | 15.3       | 16.0                  |
| 3/4"  | 73.5                 | 10.5       | 26.5                  |
| 1/2"  | 65.2                 | 8.2        | 34.8                  |
| 3/8"  | 58.2                 | 7.1        | 41.8                  |
| #4    | 44.1                 | 14.1       | 55.9                  |
| #8    | 35.5                 | 8.6        | 64.5                  |
| #16   | 29.1                 | 6.4        | 70.9                  |
| #30   | 21.9                 | 7.3        | 78.1                  |
| #50   | 9.6                  | 12.2       | 90.4                  |
| #100  | 2.6                  | 7.1        | 97.4                  |
| LBW   | 1.0                  | 1.6        | 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. 1.5") aggregate is used.

PREPARED BY:  
SM, LLC Technical Service

Approved By: \_\_\_\_\_

Plant 958-JMT

Product 7919-COARSE AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 08/30/2020 - 09/05/2020

Report Date 09/04/2020

| Procedure | Sieve/Test            | Result | Unit | Coarse Agg P1M LS PI Target |
|-----------|-----------------------|--------|------|-----------------------------|
|           | 2" (50mm)             | 100.0  | %    |                             |
|           | 1 1/2" (37.5mm)       | 93.0   | %    |                             |
|           | 1" (25mm)             | 35.1   | %    |                             |
|           | 3/4" (19mm)           | 11.2   | %    |                             |
|           | 1/2" (12.5mm)         | 4.9    | %    |                             |
|           | 3/8" (9.5mm)          | 3.7    | %    |                             |
|           | #4 (4.75mm)           | 1.9    | %    |                             |
|           | #8 (2.36mm)           | 1.5    | %    |                             |
|           | #16 (1.18mm)          | 1.4    | %    |                             |
|           | #30 (.6mm)            | 1.4    | %    |                             |
|           | #50 (.3mm)            | 1.3    | %    |                             |
|           | #100 (.15mm)          | 1.2    | %    |                             |
|           | #200 (75µm)           | 0.9    | %    |                             |
|           | Wash Loss (#200/75um) | 0.7    | %    | 0-2                         |
|           | Total Moisture        | 3.6    | %    |                             |

Plant 958-JMT

Product 7920-INTERMED AGG P1M LS PI

Name/Title Doug Storey / QC Technician

Period: 08/30/2020 - 09/05/2020

Report Date 09/04/2020

| Procedure | Sieve/Test            | Result | Unit | Intermed Agg P1M LS PI Target |
|-----------|-----------------------|--------|------|-------------------------------|
|           | 2" (50mm)             | 100.0  | %    |                               |
|           | 1 1/2" (37.5mm)       | 100.0  | %    |                               |
|           | 1" (25mm)             | 100.0  | %    |                               |
|           | 3/4" (19mm)           | 97.7   | %    |                               |
|           | 1/2" (12.5mm)         | 74.1   | %    |                               |
|           | 3/8" (9.5mm)          | 46.0   | %    |                               |
|           | #4 (4.75mm)           | 8.6    | %    |                               |
|           | #8 (2.36mm)           | 4.1    | %    |                               |
|           | #16 (1.18mm)          | 3.4    | %    |                               |
|           | #30 (.6mm)            | 3.1    | %    |                               |
|           | #50 (.3mm)            | 3.0    | %    |                               |
|           | #100 (.15mm)          | 2.8    | %    |                               |
|           | #200 (75µm)           | 2.3    | %    |                               |
|           | Wash Loss (#200/75um) | 2.0    | %    | 0-3                           |
|           | Total Moisture        | 3.1    | %    |                               |

# Edw. C. Levy Co.

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

**Plant** 958-JMT

**Product** 1022-2NS GR - Smelter Bay

**Period:** 08/30/2020 - 09/05/2020

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

**Report Date** 09/04/2020

| 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)           | 83.2   | %    | 65-95       |
|           | #16 (1.18mm)          | 67.6   | %    | 35-75       |
|           | #30 (.6mm)            | 47.1   | %    | 20-55       |
|           | #50 (.3mm)            | 21.5   | %    | 10-30       |
|           | #100 (.15mm)          | 5.6    | %    | 0-10        |
|           | #200 (75µm)           | 1.4    | %    |             |
|           | FM                    | 2.79   |      | 2.6-3       |
|           | Wash Loss (#200/75um) | 1.4    | %    | 0-3         |
|           | Total Moisture        | 4.5    | %    |             |