

# Aggregate Optimization Chart

**PLANT #:** **P-102**

Sample Date: 7/19/21

Concrete Grade: **S2M**

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

Dates Test Represents: 7/20/2021 through 7/26/2021

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

| Agg. Class      | Pit #  | Source   | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|----------|--------------|-----------------|------------------|----------------|
| 6AA             | 58-003 | Stoneco  | 1550         | 9.23            | 2.69             | 50.0           |
| 26A             | 58-003 | Stoneco  | 340          | 2.03            | 2.69             | 11.0           |
| 2NS             | 63-114 | Highland | 1210         | 7.32            | 2.65             | 39.0           |
| <b>Total Wt</b> |        |          | <b>3100</b>  | <b>18.58</b>    |                  | <b>100.0</b>   |

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



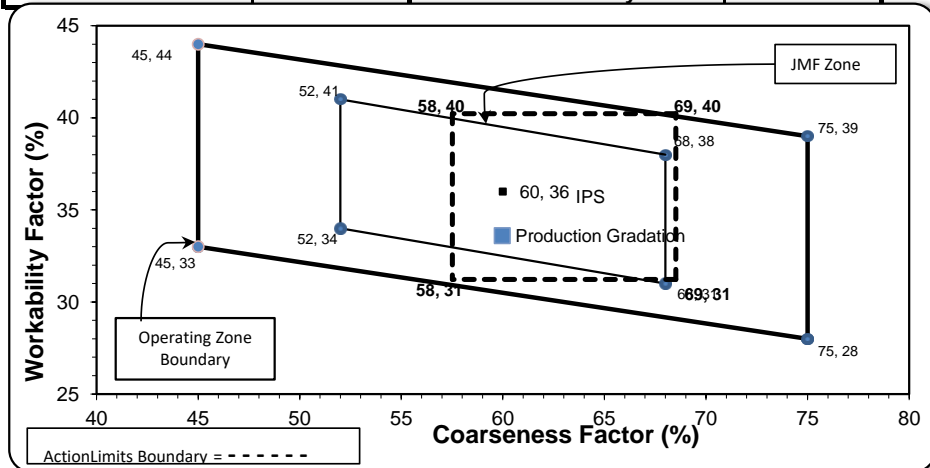
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 99.8  | 100.0 | 100.0 | 99.9                 | 0.1        | 0.1                   |
| 3/4"  | 87.4  | 100.0 | 100.0 | 93.7                 | 6.2        | 6.3                   |
| 1/2"  | 46.0  | 99.1  | 100.0 | 72.9                 | 20.8       | 27.1                  |
| 3/8"  | 24.4  | 81.6  | 100.0 | 60.2                 | 12.7       | 39.8                  |
| #4    | 3.8   | 11.2  | 98.8  | 41.7                 | 18.5       | 58.3                  |
| #8    | 1.7   | 2.9   | 83.1  | 33.6                 | 8.1        | 66.4                  |
| #16   | 1.2   | 2.0   | 64.2  | 25.9                 | 7.7        | 74.1                  |
| #30   | 1.0   | 1.7   | 45.7  | 18.5                 | 7.4        | 81.5                  |
| #50   | 0.8   | 1.6   | 24.4  | 10.1                 | 8.4        | 89.9                  |
| #100  | 0.8   | 1.5   | 5.9   | 2.9                  | 7.2        | 97.1                  |
| LBW   | 0.8   | 1.2   | 0.9   | 0.9                  | 2.0        | 99.1                  |

\*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

|                           |           |                            |           |
|---------------------------|-----------|----------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>60</b> | <b>Workability Factor:</b> | <b>34</b> |
|---------------------------|-----------|----------------------------|-----------|



Initial Production Sample (IPS)

| <b>Coarseness Factor:</b>  | <b>63</b>            |            |                       |
|----------------------------|----------------------|------------|-----------------------|
| <b>Workability Factor:</b> | <b>36</b>            |            |                       |
| Sieve                      | Cumulative % Passing | % Retained | Cumulative % Retained |
| 2"                         | 100.0                | 0.0        | 0.0                   |
| 1.5"                       | 100.0                | 0.0        | 0.0                   |
| 1"                         | 99.2                 | 0.8        | 0.8                   |
| 3/4"                       | 90.9                 | 8.3        | 9.1                   |
| 1/2"                       | 71.3                 | 19.6       | 28.7                  |
| 3/8"                       | 59.5                 | 11.8       | 40.5                  |
| #4                         | 43.8                 | 15.7       | 56.2                  |
| #8                         | 35.7                 | 8.1        | 64.3                  |
| #16                        | 27.0                 | 8.7        | 73.0                  |
| #30                        | 18.6                 | 8.4        | 81.4                  |
| #50                        | 6.8                  | 11.8       | 93.2                  |
| #100                       | 1.4                  | 5.4        | 98.6                  |
| LBW                        | 0.6                  | 0.8        | 99.4                  |

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** **P-20**

Sample Date: 7/19/21 Concrete Grade: **S2M**

Dates Test Represents: 7/20/2021 through 7/26/2021

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

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

| Agg. Class      | Pit # | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|-------|--------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47 | Presque Isle | 1700         | 10.40           | 2.62             | 55.7           |
| 26A             | 71-47 | Presque Isle | 100          | 0.61            | 2.62             | 3.3            |
| 2NS             | 63-92 | Grange Hall  | 1250         | 7.56            | 2.65             | 41.0           |
| <b>Total Wt</b> |       |              | <b>3050</b>  | <b>18.57</b>    |                  | <b>100.0</b>   |

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



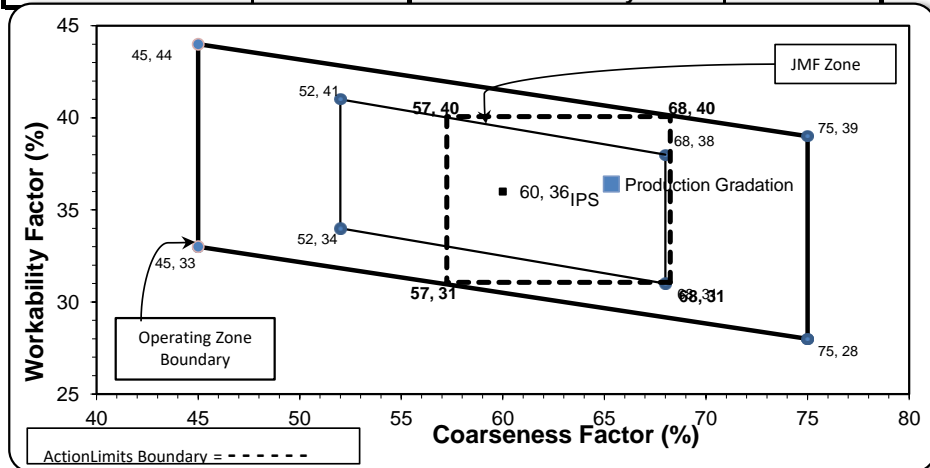
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 97.9  | 100.0 | 100.0 | 98.8                 | 1.2        | 1.2                   |
| 3/4"  | 84.2  | 100.0 | 100.0 | 91.2                 | 7.6        | 8.8                   |
| 1/2"  | 47.8  | 96.6  | 100.0 | 70.8                 | 20.4       | 29.2                  |
| 3/8"  | 26.0  | 90.8  | 100.0 | 58.5                 | 12.3       | 41.5                  |
| #4    | 4.2   | 28.8  | 98.4  | 43.6                 | 14.8       | 56.4                  |
| #8    | 1.8   | 7.4   | 85.8  | 36.4                 | 7.2        | 63.6                  |
| #16   | 1.4   | 2.8   | 70.3  | 29.7                 | 6.7        | 70.3                  |
| #30   | 1.3   | 2.2   | 49.8  | 21.2                 | 8.5        | 78.8                  |
| #50   | 1.2   | 2.0   | 20.0  | 8.9                  | 12.3       | 91.1                  |
| #100  | 1.1   | 1.8   | 3.0   | 1.9                  | 7.0        | 98.1                  |
| LBW   | 1.0   | 1.6   | 0.5   | 0.8                  | 1.1        | 99.2                  |

\*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:** **36**



Initial 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"    | 100.0                | 0.0        | 0.0                   |
| 3/4"  | 93.3                 | 6.7        | 6.7                   |
| 1/2"  | 70.6                 | 22.6       | 29.4                  |
| 3/8"  | 59.6                 | 11.0       | 40.4                  |
| #4    | 43.9                 | 15.7       | 56.1                  |
| #8    | 35.6                 | 8.4        | 64.4                  |
| #16   | 28.4                 | 7.2        | 71.6                  |
| #30   | 19.4                 | 9.0        | 80.6                  |
| #50   | 7.5                  | 11.9       | 92.5                  |
| #100  | 0.9                  | 6.6        | 99.1                  |
| LBW   | 0.9                  | 0.1        | 99.1                  |

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** **P-32**

Sample Date: 7/19/21 Concrete Grade: **S2M**

Dates Test Represents: 7/20/2021 through 7/26/2021

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

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

| Agg. Class      | Pit #  | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47  | Presque Isle | 1500         | 9.17            | 2.62             | 49.2           |
| 26A             | 71-47  | Presque Isle | 320          | 1.96            | 2.62             | 10.5           |
| 2NS             | 95-013 | Smelter Bay  | 1230         | 7.44            | 2.65             | 40.3           |
| <b>Total Wt</b> |        |              | <b>3050</b>  | <b>18.57</b>    |                  | <b>100.0</b>   |

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



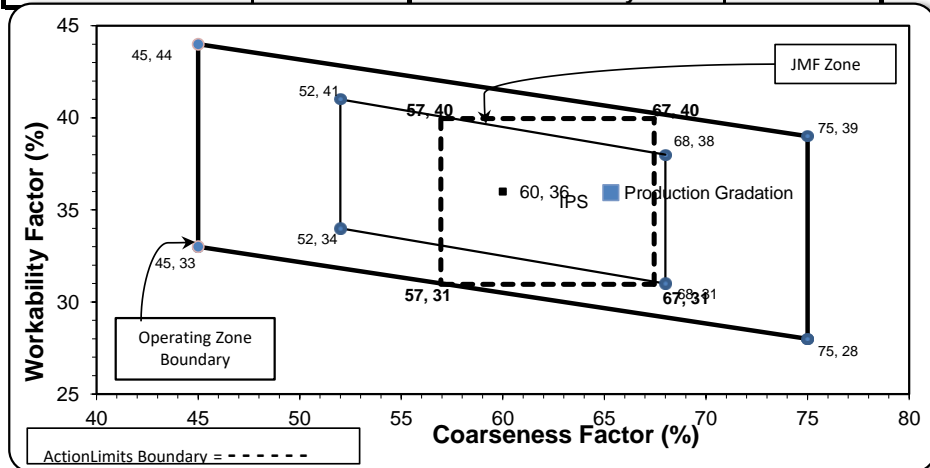
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 98.2  | 100.0 | 100.0 | 99.1                 | 0.9        | 0.9                   |
| 3/4"  | 78.4  | 100.0 | 100.0 | 89.4                 | 9.7        | 10.6                  |
| 1/2"  | 38.0  | 97.7  | 100.0 | 69.3                 | 20.1       | 30.7                  |
| 3/8"  | 17.1  | 89.8  | 100.0 | 58.2                 | 11.1       | 41.8                  |
| #4    | 3.8   | 29.6  | 96.2  | 43.8                 | 14.4       | 56.2                  |
| #8    | 2.6   | 7.9   | 83.9  | 35.9                 | 7.8        | 64.1                  |
| #16   | 2.2   | 5.5   | 71.2  | 30.4                 | 5.6        | 69.6                  |
| #30   | 2.0   | 4.4   | 47.9  | 20.8                 | 9.6        | 79.2                  |
| #50   | 1.9   | 3.7   | 21.0  | 9.8                  | 11.0       | 90.2                  |
| #100  | 1.8   | 3.1   | 5.2   | 3.3                  | 6.5        | 96.7                  |
| LBW   | 1.5   | 2.2   | 1.7   | 1.7                  | 1.7        | 98.3                  |

\*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:** **36**



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"  | 94.0                 | 6.0        | 6.0                   |
| 1/2"  | 70.2                 | 23.7       | 29.8                  |
| 3/8"  | 59.9                 | 10.4       | 40.1                  |
| #4    | 42.7                 | 17.2       | 57.3                  |
| #8    | 35.5                 | 7.2        | 64.5                  |
| #16   | 28.4                 | 7.0        | 71.6                  |
| #30   | 19.2                 | 9.2        | 80.8                  |
| #50   | 8.9                  | 10.3       | 91.1                  |
| #100  | 3.1                  | 5.9        | 96.9                  |
| LBW   | 1.4                  | 1.7        | 98.6                  |

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** **P-35**

Sample Date: 7/19/21

Concrete Grade: **S2M**

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

Dates Test Represents: 7/20/2021 through 7/26/2021

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

| Agg. Class      | Pit #  | Source     | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|------------|--------------|-----------------|------------------|----------------|
| 6AA             | 58-003 | Stoneco    | 1625         | 9.68            | 2.69             | 52.4           |
| 26A             | 58-003 | Stoneco    | 275          | 1.64            | 2.69             | 8.9            |
| 2NS             | 81-093 | Burmeister | 1200         | 7.26            | 2.65             | 38.7           |
| <b>Total Wt</b> |        |            | <b>3100</b>  | <b>18.58</b>    |                  | <b>100.0</b>   |

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



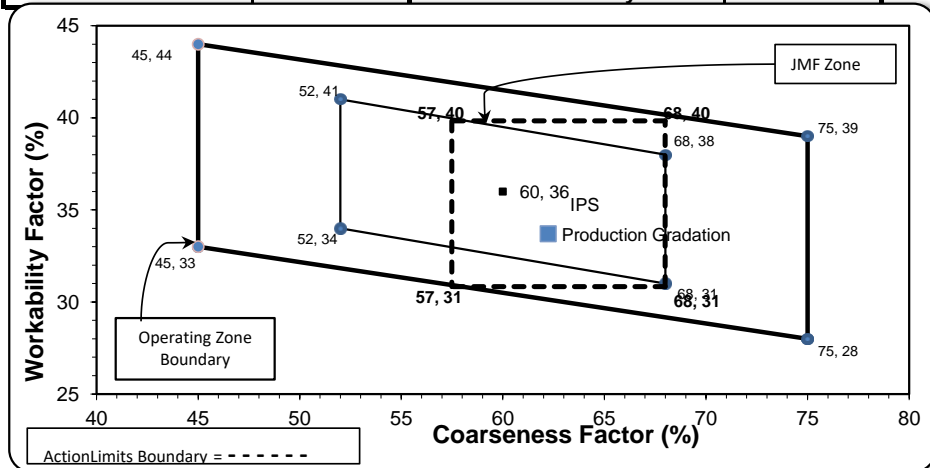
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 99.8  | 100.0 | 100.0 | 99.9                 | 0.1        | 0.1                   |
| 3/4"  | 87.4  | 100.0 | 100.0 | 93.4                 | 6.5        | 6.6                   |
| 1/2"  | 46.0  | 99.1  | 100.0 | 71.6                 | 21.8       | 28.4                  |
| 3/8"  | 24.4  | 81.6  | 100.0 | 58.7                 | 12.9       | 41.3                  |
| #4    | 3.8   | 11.2  | 98.8  | 41.2                 | 17.5       | 58.8                  |
| #8    | 1.7   | 2.9   | 84.1  | 33.7                 | 7.5        | 66.3                  |
| #16   | 1.2   | 2.0   | 65.1  | 26.0                 | 7.7        | 74.0                  |
| #30   | 1.0   | 1.7   | 43.9  | 17.7                 | 8.3        | 82.3                  |
| #50   | 0.8   | 1.6   | 15.7  | 6.6                  | 11.0       | 93.4                  |
| #100  | 0.8   | 1.5   | 2.6   | 1.6                  | 5.1        | 98.4                  |
| LBW   | 0.8   | 1.2   | 0.8   | 0.8                  | 0.7        | 99.2                  |

\*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

|                           |           |                            |           |
|---------------------------|-----------|----------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>62</b> | <b>Workability Factor:</b> | <b>34</b> |
|---------------------------|-----------|----------------------------|-----------|



Intial Production Sample (IPS)

| <b>Coarseness Factor:</b>  | <b>63</b>            |            |                       |
|----------------------------|----------------------|------------|-----------------------|
| <b>Workability Factor:</b> | <b>35</b>            |            |                       |
| Sieve                      | Cumulative % Passing | % Retained | Cumulative % Retained |
| 2"                         | 100.0                | 0.0        | 0.0                   |
| 1.5"                       | 100.0                | 0.0        | 0.0                   |
| 1"                         | 99.2                 | 0.8        | 0.8                   |
| 3/4"                       | 90.9                 | 8.3        | 9.1                   |
| 1/2"                       | 71.3                 | 19.6       | 28.7                  |
| 3/8"                       | 59.4                 | 11.9       | 40.6                  |
| #4                         | 43.0                 | 16.5       | 57.0                  |
| #8                         | 35.3                 | 7.6        | 64.7                  |
| #16                        | 28.2                 | 7.1        | 71.8                  |
| #30                        | 21.6                 | 6.6        | 78.4                  |
| #50                        | 9.1                  | 12.5       | 90.9                  |
| #100                       | 1.7                  | 7.4        | 98.3                  |
| LBW                        | 1.1                  | 0.6        | 98.9                  |

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** **P-02**

Sample Date: 7/19/21

Concrete Grade: **S2M**

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

Dates Test Represents: 7/20/2021 through 7/26/2021

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

| Agg. Class      | Pit #  | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47  | Presque Isle | 1500         | 9.17            | 2.62             | 49.2           |
| 26A             | 71-47  | Presque Isle | 300          | 1.83            | 2.62             | 9.8            |
| 2NS             | 63-115 | Ray Rd       | 1250         | 7.56            | 2.65             | 41.0           |
| <b>Total Wt</b> |        |              | <b>3050</b>  | <b>18.57</b>    |                  | <b>100.0</b>   |

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



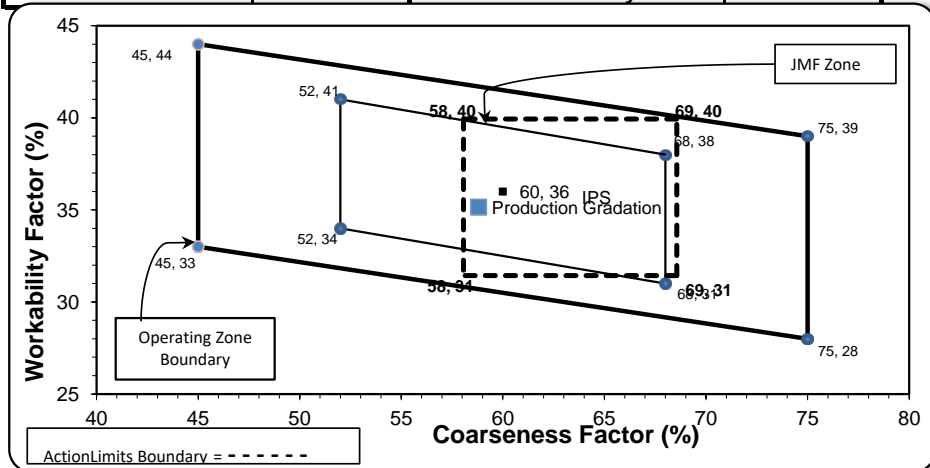
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 97.9  | 100.0 | 100.0 | 99.0                 | 1.0        | 1.0                   |
| 3/4"  | 86.2  | 100.0 | 100.0 | 93.2                 | 5.8        | 6.8                   |
| 1/2"  | 48.5  | 97.7  | 100.0 | 74.4                 | 18.8       | 25.6                  |
| 3/8"  | 24.5  | 89.8  | 100.0 | 61.9                 | 12.6       | 38.1                  |
| #4    | 4.6   | 29.6  | 96.5  | 44.7                 | 17.1       | 55.3                  |
| #8    | 2.9   | 7.9   | 80.4  | 35.2                 | 9.6        | 64.8                  |
| #16   | 2.4   | 5.5   | 65.1  | 28.4                 | 6.8        | 71.6                  |
| #30   | 2.3   | 4.4   | 48.7  | 21.5                 | 6.9        | 78.5                  |
| #50   | 2.2   | 3.7   | 24.9  | 11.7                 | 9.9        | 88.3                  |
| #100  | 2.1   | 3.1   | 5.8   | 3.7                  | 7.9        | 96.3                  |
| LBW   | 1.7   | 2.2   | 0.8   | 1.4                  | 2.3        | 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.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

|                           |           |                            |           |
|---------------------------|-----------|----------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>59</b> | <b>Workability Factor:</b> | <b>35</b> |
|---------------------------|-----------|----------------------------|-----------|



Intial Production Sample (IPS)

| <b>Coarseness Factor:</b>  | <b>63</b>            |            |                       |
|----------------------------|----------------------|------------|-----------------------|
| <b>Workability Factor:</b> | <b>36</b>            |            |                       |
| 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"                       | 95.6                 | 4.4        | 4.4                   |
| 1/2"                       | 73.1                 | 22.6       | 26.9                  |
| 3/8"                       | 59.3                 | 13.8       | 40.7                  |
| #4                         | 42.8                 | 16.5       | 57.2                  |
| #8                         | 35.7                 | 7.1        | 64.3                  |
| #16                        | 28.9                 | 6.8        | 71.1                  |
| #30                        | 20.7                 | 8.2        | 79.3                  |
| #50                        | 9.9                  | 10.8       | 90.1                  |
| #100                       | 2.1                  | 7.8        | 97.9                  |
| LBW                        | 0.9                  | 1.2        | 99.1                  |

PREPARED BY:  
 SM, LLC Technical Service

Approved By: