



# Oklahoma Department of Transportation Mix Design Report

Asphalt Concrete, Type S4 (PG 76-28 OK) Mat'l. Code: asco010  
 (Material Full Name and Material Code)  
 Caswell Contracting Inc. P/S # m00551  
 (Producer/Supplier Name and Producer/Supplier Code)  
 Caswell Contracting (Elk City, OK) - 350TPH PLANT ID # m00551-02  
 (Plant Name and Plant ID)

Insoluble ID: I1  
 (Design Type and Design Type ID)  
 WS4pv0441600701  
 (Mix ID)

| Aggregate   | Producer/Supplier                             | % USED |
|---|---|--------|
| 5/8" Chips  | Martin-Marietta (Snyder, OK) P/S # m002323802 | 45     |
| Man. Sand   | Martin-Marietta (Snyder, OK) P/S # m002323802 | 10     |
| Scrns.  | Martin-Marietta (Snyder, OK) P/S # m002323802 | 35     |
| Sand (Unlisted Source)  | McLemore Sand (Elk City, OK)                  | 10     |
| Warm Mix Asphalt (WMA) Technology: EVOTHERM (Chem. Add.) qual028 Ingevity m00941<br>(Product Name, Material Code, Producer/Supplier Name, Producer/Supplier Code)               |   |        |
| Asphalt Cement: Asphaltic Cement Type PG 76-28 OK, acem001, Valero (Ardmore, OK), m00352<br>(Material Full Name, Material Code, Producer/Supplier Name, Producer/Supplier Code) |   |        |

| Sieve Size       | Producer/Supplier:                            |   |   |                              | Sand (Unlisted Source) | Comb. Agg. | %   |      |      | Tol. (±) |
|------------------|---|---|---|------------------------------|------------------------|------------|-----|------|------|----------|
|                  | Martin-Marietta (Snyder, OK) P/S # m002323802 | Martin-Marietta (Snyder, OK) P/S # m002323802 | Martin-Marietta (Snyder, OK) P/S # m002323802 | McLemore Sand (Elk City, OK) |                        |            | JMF | Min. | Max. |          |
| 3/4 in (19 mm)   | 100   | 100   | 100   | 100                          | 100                    | 100        | 100 | 100  | 0    |          |
| 1/2 in (12.5 mm) | 82  | 100   | 100   | 100                          | 92                     | 92         | 85  | 99   | 7    |          |
| 3/8 in (9.5 mm)  | 57  | 100   | 100   | 100                          | 81                     | 81         | 74  | 88   | 7    |          |
| #4 (4.75 mm)     | 11  | 95  | 98  | 100                          | 59                     | 59         | 52  | 66   | 7    |          |
| #8 (2.36 mm)     | 2   | 70  | 73  | 99                           | 43                     | 43         | 38  | 48   | 5    |          |
| #16 (1.18 mm)    | 1   | 44  | 43  | 98                           | 30                     | 30         | 26  | 34   | 4    |          |
| #30 (.600 mm)    | 1   | 26  | 30  | 87                           | 22                     | 22         | 18  | 26   | 4    |          |
| #50 (.300 mm)    | 1   | 13  | 23  | 37                           | 14                     | 14         | 10  | 18   | 4    |          |
| #100 (.150 mm)   | 1   | 5   | 17  | 14                           | 8                      | 8          | 5   | 11   | 3    |          |
| #200 (.075 mm)   | 0.7   | 2.6   | 10.3  | 5.6                          | 4.7                    | 4.7        | 2.7 | 6.7  | 2    |          |
| AC Content %     |   |   |   |                              | 5.1                    | 4.8        | 4.4 | 5.2  | 0.4  |          |

Requires Form 93-E0 signed by the Department for production use. -Oklahoma D.O.T. Materials-

Warm Mix Asphalt (WMA) Additive % 0.4

Mix temperature @ discharge from mixer: 275 (135) ± 20 °F (± 10 °C) **Required**  
 Optimum roadway compaction temperature: 260 (127)  
 Laboratory mixing temperature: 300 (149)  
 Laboratory compaction temperature: 275 (135)

| Tests on Aggregates | Required | Units                           |
|---------------------|----------|---------------------------------|
| Durability Index    | 86       | 40 min. %                       |
| F.A.A. %U           | N/A      | %                               |
| Flat and Elongated  | 3        | 10 max. %                       |
| Fractured Faces     | 100/100  | 98/95 min. %                    |
| Insoluble Residue   | 97.7     | 40 min. %                       |
| LA Abrasion         | 20.1     | 40 max. %                       |
| Micro-Deval         | 4.1      | 25 max. %                       |
| Permeability        | 9.8      | 12.5 max. 10 <sup>-5</sup> cm/s |
| Sand Equivalent     | 81       | 50 min. %                       |
| Pba                 | 0.16     |                                 |
| IOC                 | 0.05     | %                               |
| Gse                 | 2.629    |                                 |
| Gsb                 | 2.618    |                                 |
| Specimen Weight     | 4737     | g                               |

| Tests on Asphalt Cement   | Found  |
|---------------------------|--------|
| Specific Gravity @ 77 ° F | 1.0100 |

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| Tests on Compressed Mixtures (@ Design AC) |        |                  |                    |
|--|--------|------------------|--------------------|
|  | # Gyr. | % Density of Gmm | % Density Required |
| Nini                                       | 8      | 89.4             | 85.5 - 89.0        |
| Ndes                                       | 80     |                  | 96.0               |

| Tests on Compressed Mixtures |       |       |                  |                    |       |                |       |
|------------------------------|-------|-------|------------------|--------------------|-------|----------------|-------|
| %AC                          | Gmb   | Gmm   | % Density of Gmm | % Density Required | % VMA | % VMA Required | % VFA |
| 4.5                          | 2.307 | 2.452 | 94.1             | Design / Field     | 15.8  | Design / Field | 62.7  |
| 5.0                          | 2.330 | 2.434 | 95.7             | 96.0 / 94.5 - 97.4 | 15.5  | 14.5 / 14.0    | 72.3  |
| 5.5                          | 2.345 | 2.416 | 97.1             |                    | 15.4  |                | 81.2  |

**Dust Prop.**  
 1.1 **Dust Prop. Req.**  
 1.0 0.6 - 1.6  
 0.9

**ITS (PSI)** 79.3 75 min.  
**TSR** 0.93 0.80 / 0.75 min. (Design / Field)  
 Compacted Wt. (lbs/sy/1" thick) = 107.4 @ 5.1 % Asphalt Cement

x 1st JMF Revision

Hamburg Rut Test Depth (mm) 2.14 12.50 max. @ 20,000 cycles

MEETS SPECIFICATION REQUIREMENTS PER SPECIAL PROVISION 708-26(a-f) 09

Comments: REVISED (AC) Effective 9/21/16 per contractor's request.

Last Modified By: Schratwieser, Edward P. eschratw  
 (User Name and User ID)

Date: 9/21/2016  
 (mm/dd/yyyy)