



GCC of America
 600 S. Cherry Street, Suite 1000, Glendale, CO 80246
 Sales (303) 739-5900, Customer Service (800) 225-5422

MATERIAL CERTIFICATION REPORT

Plant: Samalayuca
Address: Km 332 Carr. 45
 Samalayuca, Chih. MX 32720
Contact: Guillermo Luna
Phone: 52 656 6495000

Cement Type: I/II, Low Alkali, GU
Date Issued: 30-Apr-19
Production Period: 1-Apr-19
To: 30-Apr-19

STANDARD REQUIREMENTS ASTM C150/AASHTO M85/ASTM C1157

| CHEMICAL | | | |
|------------------------------------|------------------|-----------------------|-------------|
| Item | ASTM Test Method | ASTM C150 Spec. Limit | Test Result |
| SiO ₂ (%) | C114 | - | 19.7 |
| Al ₂ O ₃ (%) | C114 | 6.0 max | 4.9 |
| Fe ₂ O ₃ (%) | C114 | 6.0 max | 3.3 |
| CaO (%) | C114 | - | 63.6 |
| MgO (%) | C114 | 6.0 max | 2.0 |
| SO ₃ (%) | C114 | 3.0 max ^A | 2.6 |
| Loss On Ignition (%) ^B | C114 | 3.5 max | 2.8 |
| Na ₂ O (%) | C114 | - | 0.20 |
| K ₂ O (%) | C114 | - | 0.50 |
| Insoluble Residue (%) | C114 | 1.5 max | 0.5 |
| CO ₂ (%) ^B | C114 | - | 2.0 |
| Limestone (%) | C150 | 5.0 max | 4.7 |
| Corrected Limestone (%) | C151 | 5.0 max | 4.1 |
| CaCO ₃ in Limestone (%) | C114 | 70 min | 94 |
| Inorganic Processing Addition | C150 | 5.0 max | - |
| Potential Phase Composition | | | |
| C ₃ S (%) | C150 | - | 55 |
| C ₂ S (%) | C150 | - | 17 |
| C ₃ A (%) | C150 | 8 max | 7 |
| C ₄ AF (%) | C150 | - | 10 |

| PHYSICAL | | | | |
|--------------------------------------|------------------|-----------------------|------------------------|-------------|
| Item | ASTM Test Method | ASTM C150 Spec. Limit | ASTM C1157 Spec. Limit | Test Result |
| Air Content (% vol) | C185 | 12 max | 12 max | 8.5 |
| Blaine Fineness (m ² /kg) | C204 | 260 min | - | 383 |
| Residue 45 μm (No.325) Sieve (%) | C430 | - | - | 5.7 |
| Autoclave Expansion (%) | C151 | 0.80 max | 0.80 max | 0.02 |
| Compressive Strength | | | | |
| 3 days, MPa (psi) | C109 | 12.0 (1740) min | 13.0 (1890) min | 25.3 (3675) |
| 7 days, MPa (psi) | C109 | 19.0 (2760) min | 20.0 (2900) min | 31.7 (4600) |
| 28 days, MPa (psi) ^C | C109 | 28.0 (4060) min | 28.0 (4060) min | 39.3 (5705) |
| Time of Setting, Initial Vicat (min) | C191 | 45min / 375 max | 45 min / 420 max | 149 |
| Mortar Bar Expansion (%) | C1038 | 0.020 max | 0.020 max | 0.004 |

| ADDITIONAL DATA | | | | | |
|------------------------------------|-----------|-------------|------------------------|------------------|-------------|
| Type | Limestone | Test Method | Base Phase Composition | ASTM Test Method | Test Result |
| SiO ₂ (%) | 3.7 | Internal | C ₃ S (%) | C150 | 57 |
| Al ₂ O ₃ (%) | 1.1 | Internal | C ₂ S (%) | C150 | 18 |
| Fe ₂ O ₃ (%) | 0.8 | Internal | C ₃ A (%) | C150 | 8 |
| CaO (%) | 52.5 | Internal | C ₄ AF (%) | C150 | 10 |
| SO ₃ (%) | 0.1 | Internal | | | |

OPTIONAL REQUIREMENTS ASTM C150/AASHTO M85/ASTM C1157

| CHEMICAL | | | |
|-------------------------|------------------|-----------------------|-------------|
| Item | ASTM Test Method | ASTM C150 Spec. Limit | Test Result |
| Equivalent Alkalies (%) | C114 | 0.60 max | 0.53 |

| PHYSICAL | | | | |
|---------------|------------------|-----------------------|------------------------|-------------|
| Item | ASTM Test Method | ASTM C150 Spec. Limit | ASTM C1157 Spec. Limit | Test Result |
| False Set (%) | C451 | 50 min | 50 min | 81 |

^A It is permissible to exceed the specification limit provided that ASTM 1038 Mortar Bar Expansion does not exceed 0.020 % at 14 days.

^B This alternative analysis has been qualified in accordance with ASTM C114 and meets the requirements of Table 1.

Time to achieve constant mass was experimentally determined rather than performing subsequent reheating of the sample.

^C Test result of prior month

^D Equivalent Alkalies (%): Minimum: 0.51 Maximum: 0.57

GCC of America Cement is warranted to conform at the time of shipment with current ASTM C150/AASHTO M85/ASTM C1157. No other warranty is made or implied. Having no control over the use of its cements, GCC of America does not guarantee finished work.