

Summary of Residential ACM Tests (kTDV/ft2)

Comparison Date: 9/1/2016
 Comparison Author: Ken Nittler
 Candidate Software: CBECC-Res 2013 670
 Reference Software: CBECC-Res 2013 667
 Type of Software: Reference
 Type of Construction: Both
 Tolerance: 0.03

| Test | Pass/ Fail | Average Proposed kTDV/ft2 | Average Standard kTDV/ft2 | Description |
|------|---------------|---------------------------------|---------------------------------|---|
| T01 | Pass | 48.51 | 48.51 | Standard Design in All Zones for Prototype S2100ft2 |
| T02 | Pass | 45.47 | 45.47 | Standard Design in All Zones for Prototype S2700ft2 |
| T03 | Pass | 58.00 | 58.00 | Standard Design in All Zones for Prototype S6960ft2 |
| T04 | Pass | 45.07 | 48.51 | Proposed Design in All Zones for Prototype P2100ft2 |
| T05 | Pass | 41.61 | 45.47 | Proposed Design in All Zones for Prototype P2700ft2 |
| T06 | Pass | 54.34 | 58.00 | Proposed Design in All Zones for Prototype P6960ft2 |
| T07 | Pass | 46.62 | 51.32 | Common Measures in Zone 12 for Prototype P2100ft2 |
| T08 | Pass | 49.25 | 51.32 | Water Heating in Zone 12 for Prototype P2100ft2 |
| T09 | Pass | 51.23 | 51.32 | Multiple Orientation in Zone 12 for Prototype S2100ft2/P2100ft2 |
| T10 | Pass | 59.73 | 63.80 | Multi Family Water Heating in Zone 12 for Prototype P6960ft2 |
| T11 | Pass | 63.06 | 66.29 | Source Energy in Zone 12 for Prototype P2100ft2 |
| T12 | Pass | 165.44 | 172.97 | E+A+A Base & Windows in Zone 12 for Prototype P1665ft2 |
| T13 | Pass | 124.01 | 157.22 | E+A+A Walls & HVAC in Zone 12 for Prototype P1665ft2 |

Comparison between Reference & Candidate Software (kTDV/ft2)

Comparison Date: 9/1/2016

Comparison Author: Ken Nittler

Candidate Software: CBECC-Res 2013 670

| Test | Run | Description | Pass/Fail | Reference | Candidate | Percent | Within | Standard | Reference | Candidate | Percent | Within | Standard | Lookup | Margin |
|------------|-----|---|-----------|-----------|-----------|------------|-----------|----------|-----------------------------------|-----------|------------|-----------|----------|--------|--------|
| | | | | Proposed | Proposed | Difference | Tolerance | Equals | Standard | Standard | Difference | Tolerance | Equals | | |
| T01 | | Standard Design in All Zones for Prototype S2100ft2 | | | | | | | Standard = Proposed for this test | | | | | | |
| T01 | R01 | Zone 01 | Pass | 48.08 | 48.08 | 0.00% | Yes | 48.08 | 48.08 | 48.08 | 0.00% | Yes | | T01R01 | 0.00 |
| T01 | R02 | Zone 02 | Pass | 38.64 | 38.64 | 0.00% | Yes | 38.64 | 38.64 | 38.64 | 0.00% | Yes | | T01R02 | 0.00 |
| T01 | R03 | Zone 03 | Pass | 28.12 | 28.12 | 0.00% | Yes | 28.12 | 28.12 | 28.12 | 0.00% | Yes | | T01R03 | 0.00 |
| T01 | R04 | Zone 04 | Pass | 34.66 | 34.66 | 0.00% | Yes | 34.66 | 34.66 | 34.66 | 0.00% | Yes | | T01R04 | 0.00 |
| T01 | R05 | Zone 05 | Pass | 25.70 | 25.70 | 0.00% | Yes | 25.70 | 25.70 | 25.70 | 0.00% | Yes | | T01R05 | 0.00 |
| T01 | R06 | Zone 06 | Pass | 22.01 | 22.01 | 0.00% | Yes | 22.01 | 22.01 | 22.01 | 0.00% | Yes | | T01R06 | 0.00 |
| T01 | R07 | Zone 07 | Pass | 16.09 | 16.09 | 0.00% | Yes | 16.09 | 16.09 | 16.09 | 0.00% | Yes | | T01R07 | 0.00 |
| T01 | R08 | Zone 08 | Pass | 27.08 | 27.08 | 0.00% | Yes | 27.08 | 27.08 | 27.08 | 0.00% | Yes | | T01R08 | 0.00 |
| T01 | R09 | Zone 09 | Pass | 40.29 | 40.29 | 0.00% | Yes | 40.29 | 40.29 | 40.29 | 0.00% | Yes | | T01R09 | 0.00 |
| T01 | R10 | Zone 10 | Pass | 41.91 | 41.91 | 0.00% | Yes | 41.91 | 41.91 | 41.91 | 0.00% | Yes | | T01R10 | 0.00 |
| T01 | R11 | Zone 11 | Pass | 74.69 | 74.69 | 0.00% | Yes | 74.69 | 74.69 | 74.69 | 0.00% | Yes | | T01R11 | 0.00 |
| T01 | R12 | Zone 12 | Pass | 51.32 | 51.32 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | | T01R12 | 0.00 |
| T01 | R13 | Zone 13 | Pass | 77.17 | 77.17 | 0.00% | Yes | 77.17 | 77.17 | 77.17 | 0.00% | Yes | | T01R13 | 0.00 |
| T01 | R14 | Zone 14 | Pass | 70.53 | 70.53 | 0.00% | Yes | 70.53 | 70.53 | 70.53 | 0.00% | Yes | | T01R14 | 0.00 |
| T01 | R15 | Zone 15 | Pass | 112.06 | 112.06 | 0.00% | Yes | 112.06 | 112.06 | 112.06 | 0.00% | Yes | | T01R15 | 0.00 |
| T01 | R16 | Zone 16 | Pass | 67.77 | 67.77 | 0.00% | Yes | 67.77 | 67.77 | 67.77 | 0.00% | Yes | | T01R16 | 0.00 |
| Result T01 | | | Pass | 48.51 | 48.51 | 0.00% | | 48.51 | 48.51 | 48.51 | 0.00% | | Ave | Min | 0.00% |
| | | | | | | | | | | | | | Max | | 0.00% |
| T02 | | Standard Design in All Zones for Prototype S2700ft2 | | | | | | | Standard = Proposed for this test | | | | | | |
| T02 | R01 | Zone 01 | Pass | 38.53 | 38.53 | 0.00% | Yes | 38.53 | 38.53 | 38.53 | 0.00% | Yes | | T02R01 | 0.00 |
| T02 | R02 | Zone 02 | Pass | 35.41 | 35.41 | 0.00% | Yes | 35.41 | 35.41 | 35.41 | 0.00% | Yes | | T02R02 | 0.00 |
| T02 | R03 | Zone 03 | Pass | 23.38 | 23.38 | 0.00% | Yes | 23.38 | 23.38 | 23.38 | 0.00% | Yes | | T02R03 | 0.00 |
| T02 | R04 | Zone 04 | Pass | 31.75 | 31.75 | 0.00% | Yes | 31.75 | 31.75 | 31.75 | 0.00% | Yes | | T02R04 | 0.00 |
| T02 | R05 | Zone 05 | Pass | 20.76 | 20.76 | 0.00% | Yes | 20.76 | 20.76 | 20.76 | 0.00% | Yes | | T02R05 | 0.00 |
| T02 | R06 | Zone 06 | Pass | 19.73 | 19.73 | 0.00% | Yes | 19.73 | 19.73 | 19.73 | 0.00% | Yes | | T02R06 | 0.00 |
| T02 | R07 | Zone 07 | Pass | 14.14 | 14.14 | 0.00% | Yes | 14.14 | 14.14 | 14.14 | 0.00% | Yes | | T02R07 | 0.00 |
| T02 | R08 | Zone 08 | Pass | 25.44 | 25.44 | 0.00% | Yes | 25.44 | 25.44 | 25.44 | 0.00% | Yes | | T02R08 | 0.00 |
| T02 | R09 | Zone 09 | Pass | 38.98 | 38.98 | 0.00% | Yes | 38.98 | 38.98 | 38.98 | 0.00% | Yes | | T02R09 | 0.00 |
| T02 | R10 | Zone 10 | Pass | 41.15 | 41.15 | 0.00% | Yes | 41.15 | 41.15 | 41.15 | 0.00% | Yes | | T02R10 | 0.00 |
| T02 | R11 | Zone 11 | Pass | 73.18 | 73.18 | 0.00% | Yes | 73.18 | 73.18 | 73.18 | 0.00% | Yes | | T02R11 | 0.00 |
| T02 | R12 | Zone 12 | Pass | 50.80 | 50.80 | 0.00% | Yes | 50.80 | 50.80 | 50.80 | 0.00% | Yes | | T02R12 | 0.00 |
| T02 | R13 | Zone 13 | Pass | 75.19 | 75.19 | 0.00% | Yes | 75.19 | 75.19 | 75.19 | 0.00% | Yes | | T02R13 | 0.00 |
| T02 | R14 | Zone 14 | Pass | 69.35 | 69.35 | 0.00% | Yes | 69.35 | 69.35 | 69.35 | 0.00% | Yes | | T02R14 | 0.00 |
| T02 | R15 | Zone 15 | Pass | 106.16 | 106.16 | 0.00% | Yes | 106.16 | 106.16 | 106.16 | 0.00% | Yes | | T02R15 | 0.00 |
| T02 | R16 | Zone 16 | Pass | 63.57 | 63.57 | 0.00% | Yes | 63.57 | 63.57 | 63.57 | 0.00% | Yes | | T02R16 | 0.00 |
| Result T02 | | | Pass | 45.47 | 45.47 | 0.00% | | 45.47 | 45.47 | 45.47 | 0.00% | | Ave | Min | 0.00% |
| | | | | | | | | | | | | | Max | | 0.00% |

Comparison between Reference & Candidate Software (kTDV/ft2)

Comparison Date: 9/1/2016

Comparison Author: Ken Nittler

Candidate Software: CBECC-Res 2013 670

| Test | Run | Description | Pass/Fail | Reference | Candidate | Percent | Within | Standard | Reference | Candidate | Percent | Within | Standard | Lookup | Margin |
|------------|-----|---|-----------|-----------|-----------|------------|-----------|----------|---------------------------------------|-----------|------------|-----------|----------|--------|--------|
| | | | | Proposed | Proposed | Difference | Tolerance | Equals | Standard | Standard | Difference | Tolerance | Equals | | |
| T03 | | Standard Design in All Zones for Prototype S6960ft2 | | | | | | | Standard = Proposed for this test | | | | | | |
| T03 | R01 | Zone 01 | Pass | 44.64 | 44.64 | 0.00% | Yes | 44.64 | 44.64 | 44.64 | 0.00% | Yes | | T03R01 | 0.00 |
| T03 | R02 | Zone 02 | Pass | 46.61 | 46.61 | 0.00% | Yes | 46.61 | 46.61 | 46.61 | 0.00% | Yes | | T03R02 | 0.00 |
| T03 | R03 | Zone 03 | Pass | 34.74 | 34.74 | 0.00% | Yes | 34.74 | 34.74 | 34.74 | 0.00% | Yes | | T03R03 | 0.00 |
| T03 | R04 | Zone 04 | Pass | 44.25 | 44.25 | 0.00% | Yes | 44.25 | 44.25 | 44.25 | 0.00% | Yes | | T03R04 | 0.00 |
| T03 | R05 | Zone 05 | Pass | 33.33 | 33.33 | 0.00% | Yes | 33.33 | 33.33 | 33.33 | 0.00% | Yes | | T03R05 | 0.00 |
| T03 | R06 | Zone 06 | Pass | 34.66 | 34.66 | 0.00% | Yes | 34.66 | 34.66 | 34.66 | 0.00% | Yes | | T03R06 | 0.00 |
| T03 | R07 | Zone 07 | Pass | 31.66 | 31.66 | 0.00% | Yes | 31.66 | 31.66 | 31.66 | 0.00% | Yes | | T03R07 | 0.00 |
| T03 | R08 | Zone 08 | Pass | 45.47 | 45.47 | 0.00% | Yes | 45.47 | 45.47 | 45.47 | 0.00% | Yes | | T03R08 | 0.00 |
| T03 | R09 | Zone 09 | Pass | 56.24 | 56.24 | 0.00% | Yes | 56.24 | 56.24 | 56.24 | 0.00% | Yes | | T03R09 | 0.00 |
| T03 | R10 | Zone 10 | Pass | 57.75 | 57.75 | 0.00% | Yes | 57.75 | 57.75 | 57.75 | 0.00% | Yes | | T03R10 | 0.00 |
| T03 | R11 | Zone 11 | Pass | 82.57 | 82.57 | 0.00% | Yes | 82.57 | 82.57 | 82.57 | 0.00% | Yes | | T03R11 | 0.00 |
| T03 | R12 | Zone 12 | Pass | 65.23 | 65.23 | 0.00% | Yes | 65.23 | 65.23 | 65.23 | 0.00% | Yes | | T03R12 | 0.00 |
| T03 | R13 | Zone 13 | Pass | 84.05 | 84.05 | 0.00% | Yes | 84.05 | 84.05 | 84.05 | 0.00% | Yes | | T03R13 | 0.00 |
| T03 | R14 | Zone 14 | Pass | 78.40 | 78.40 | 0.00% | Yes | 78.40 | 78.40 | 78.40 | 0.00% | Yes | | T03R14 | 0.00 |
| T03 | R15 | Zone 15 | Pass | 118.93 | 118.93 | 0.00% | Yes | 118.93 | 118.93 | 118.93 | 0.00% | Yes | | T03R15 | 0.00 |
| T03 | R16 | Zone 16 | Pass | 69.50 | 69.50 | 0.00% | Yes | 69.50 | 69.50 | 69.50 | 0.00% | Yes | | T03R16 | 0.00 |
| Result T03 | | | Pass | 58.00 | 58.00 | 0.00% | | 58.00 | 58.00 | 58.00 | 0.00% | | Ave | Min | 0.00% |
| | | | | | | | | | | | | | Max | | 0.00% |
| T04 | | Proposed Design in All Zones for Prototype P2100ft2 | | | | | | | Standard = T01 Standard for this test | | | | | | |
| T04 | R01 | Zone 01 | Pass | 46.27 | 46.27 | 0.00% | Yes | 48.08 | 48.08 | 48.08 | 0.00% | Yes | | T01R01 | 1.81 |
| T04 | R02 | Zone 02 | Pass | 36.59 | 36.59 | 0.00% | Yes | 38.64 | 38.64 | 38.64 | 0.00% | Yes | | T01R02 | 2.05 |
| T04 | R03 | Zone 03 | Pass | 26.05 | 26.05 | 0.00% | Yes | 28.12 | 28.12 | 28.12 | 0.00% | Yes | | T01R03 | 2.07 |
| T04 | R04 | Zone 04 | Pass | 32.42 | 32.42 | 0.00% | Yes | 34.66 | 34.66 | 34.66 | 0.00% | Yes | | T01R04 | 2.24 |
| T04 | R05 | Zone 05 | Pass | 23.54 | 23.54 | 0.00% | Yes | 25.70 | 25.70 | 25.70 | 0.00% | Yes | | T01R05 | 2.16 |
| T04 | R06 | Zone 06 | Pass | 20.47 | 20.47 | 0.00% | Yes | 22.01 | 22.01 | 22.01 | 0.00% | Yes | | T01R06 | 1.54 |
| T04 | R07 | Zone 07 | Pass | 15.33 | 15.33 | 0.00% | Yes | 16.09 | 16.09 | 16.09 | 0.00% | Yes | | T01R07 | 0.76 |
| T04 | R08 | Zone 08 | Pass | 24.78 | 24.78 | 0.00% | Yes | 27.08 | 27.08 | 27.08 | 0.00% | Yes | | T01R08 | 2.30 |
| T04 | R09 | Zone 09 | Pass | 36.54 | 36.54 | 0.00% | Yes | 40.29 | 40.29 | 40.29 | 0.00% | Yes | | T01R09 | 3.75 |
| T04 | R10 | Zone 10 | Pass | 37.85 | 37.85 | 0.00% | Yes | 41.91 | 41.91 | 41.91 | 0.00% | Yes | | T01R10 | 4.06 |
| T04 | R11 | Zone 11 | Pass | 69.14 | 69.14 | 0.00% | Yes | 74.69 | 74.69 | 74.69 | 0.00% | Yes | | T01R11 | 5.55 |
| T04 | R12 | Zone 12 | Pass | 46.88 | 46.88 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | | T01R12 | 4.44 |
| T04 | R13 | Zone 13 | Pass | 71.43 | 71.43 | 0.00% | Yes | 77.17 | 77.17 | 77.17 | 0.00% | Yes | | T01R13 | 5.74 |
| T04 | R14 | Zone 14 | Pass | 63.83 | 63.83 | 0.00% | Yes | 70.53 | 70.53 | 70.53 | 0.00% | Yes | | T01R14 | 6.70 |
| T04 | R15 | Zone 15 | Pass | 106.49 | 106.49 | 0.00% | Yes | 112.06 | 112.06 | 112.06 | 0.00% | Yes | | T01R15 | 5.57 |
| T04 | R16 | Zone 16 | Pass | 63.56 | 63.56 | 0.00% | Yes | 67.77 | 67.77 | 67.77 | 0.00% | Yes | | T01R16 | 4.21 |
| Result T04 | | | Pass | 45.07 | 45.07 | 0.00% | | 48.51 | 48.51 | 48.51 | 0.00% | | Ave | Min | 0.00% |
| | | | | | | | | | | | | | Max | | 0.00% |

Comparison between Reference & Candidate Software (kTDV/ft2)

Comparison Date: 9/1/2016

Comparison Author: Ken Nittler

Candidate Software: CBECC-Res 2013 670

| Test | Run | Description | Pass/Fail | Reference | Candidate | Percent | Within | Standard | Reference | Candidate | Percent | Within | Standard | Lookup | Margin |
|------------|---|-------------|-----------|---------------------------------------|-----------|------------|-----------|----------|-----------|-----------|------------|-----------|------------|----------------|--------|
| | | | | Proposed | Proposed | Difference | Tolerance | Equals | Standard | Standard | Difference | Tolerance | Equals | | |
| T05 | Proposed Design in All Zones for Prototype P2700ft2 | | | Standard = T02 Standard for this test | | | | | | | | | | | |
| T05 | R01 | Zone 01 | Pass | 36.67 | 36.67 | 0.00% | Yes | 38.53 | 38.53 | 38.53 | 0.00% | Yes | T02R01 | 1.86 | |
| T05 | R02 | Zone 02 | Pass | 32.53 | 32.53 | 0.00% | Yes | 35.41 | 35.41 | 35.41 | 0.00% | Yes | T02R02 | 2.88 | |
| T05 | R03 | Zone 03 | Pass | 21.25 | 21.25 | 0.00% | Yes | 23.38 | 23.38 | 23.38 | 0.00% | Yes | T02R03 | 2.13 | |
| T05 | R04 | Zone 04 | Pass | 28.81 | 28.81 | 0.00% | Yes | 31.75 | 31.75 | 31.75 | 0.00% | Yes | T02R04 | 2.94 | |
| T05 | R05 | Zone 05 | Pass | 18.76 | 18.76 | 0.00% | Yes | 20.76 | 20.76 | 20.76 | 0.00% | Yes | T02R05 | 2.00 | |
| T05 | R06 | Zone 06 | Pass | 18.23 | 18.23 | 0.00% | Yes | 19.73 | 19.73 | 19.73 | 0.00% | Yes | T02R06 | 1.50 | |
| T05 | R07 | Zone 07 | Pass | 13.36 | 13.36 | 0.00% | Yes | 14.14 | 14.14 | 14.14 | 0.00% | Yes | T02R07 | 0.78 | |
| T05 | R08 | Zone 08 | Pass | 23.11 | 23.11 | 0.00% | Yes | 25.44 | 25.44 | 25.44 | 0.00% | Yes | T02R08 | 2.33 | |
| T05 | R09 | Zone 09 | Pass | 34.77 | 34.77 | 0.00% | Yes | 38.98 | 38.98 | 38.98 | 0.00% | Yes | T02R09 | 4.21 | |
| T05 | R10 | Zone 10 | Pass | 36.67 | 36.67 | 0.00% | Yes | 41.15 | 41.15 | 41.15 | 0.00% | Yes | T02R10 | 4.48 | |
| T05 | R11 | Zone 11 | Pass | 66.90 | 66.90 | 0.00% | Yes | 73.18 | 73.18 | 73.18 | 0.00% | Yes | T02R11 | 6.28 | |
| T05 | R12 | Zone 12 | Pass | 45.83 | 45.83 | 0.00% | Yes | 50.80 | 50.80 | 50.80 | 0.00% | Yes | T02R12 | 4.97 | |
| T05 | R13 | Zone 13 | Pass | 68.57 | 68.57 | 0.00% | Yes | 75.19 | 75.19 | 75.19 | 0.00% | Yes | T02R13 | 6.62 | |
| T05 | R14 | Zone 14 | Pass | 61.98 | 61.98 | 0.00% | Yes | 69.35 | 69.35 | 69.35 | 0.00% | Yes | T02R14 | 7.37 | |
| T05 | R15 | Zone 15 | Pass | 99.40 | 99.40 | 0.00% | Yes | 106.16 | 106.16 | 106.16 | 0.00% | Yes | T02R15 | 6.76 | |
| T05 | R16 | Zone 16 | Pass | 58.96 | 58.96 | 0.00% | Yes | 63.57 | 63.57 | 63.57 | 0.00% | Yes | T02R16 | 4.61 | |
| Result T05 | | | Pass | 41.61 | 41.61 | 0.00% | | 45.47 | 45.47 | 45.47 | 0.00% | | Min Ave | 0.00% 0.00% | 3.86 |
| T06 | Proposed Design in All Zones for Prototype P6960ft2 | | | Standard = T03 Standard for this test | | | | | | | | | | | |
| T06 | R01 | Zone 01 | Pass | 45.42 | 45.42 | 0.00% | Yes | 44.64 | 44.64 | 44.64 | 0.00% | Yes | T03R01 | -0.78 | |
| T06 | R02 | Zone 02 | Pass | 44.48 | 44.48 | 0.00% | Yes | 46.61 | 46.61 | 46.61 | 0.00% | Yes | T03R02 | 2.13 | |
| T06 | R03 | Zone 03 | Pass | 33.66 | 33.66 | 0.00% | Yes | 34.74 | 34.74 | 34.74 | 0.00% | Yes | T03R03 | 1.08 | |
| T06 | R04 | Zone 04 | Pass | 40.98 | 40.98 | 0.00% | Yes | 44.25 | 44.25 | 44.25 | 0.00% | Yes | T03R04 | 3.27 | |
| T06 | R05 | Zone 05 | Pass | 32.54 | 32.54 | 0.00% | Yes | 33.33 | 33.33 | 33.33 | 0.00% | Yes | T03R05 | 0.79 | |
| T06 | R06 | Zone 06 | Pass | 32.78 | 32.78 | 0.00% | Yes | 34.66 | 34.66 | 34.66 | 0.00% | Yes | T03R06 | 1.88 | |
| T06 | R07 | Zone 07 | Pass | 29.66 | 29.66 | 0.00% | Yes | 31.66 | 31.66 | 31.66 | 0.00% | Yes | T03R07 | 2.00 | |
| T06 | R08 | Zone 08 | Pass | 42.19 | 42.19 | 0.00% | Yes | 45.47 | 45.47 | 45.47 | 0.00% | Yes | T03R08 | 3.28 | |
| T06 | R09 | Zone 09 | Pass | 51.32 | 51.32 | 0.00% | Yes | 56.24 | 56.24 | 56.24 | 0.00% | Yes | T03R09 | 4.92 | |
| T06 | R10 | Zone 10 | Pass | 52.73 | 52.73 | 0.00% | Yes | 57.75 | 57.75 | 57.75 | 0.00% | Yes | T03R10 | 5.02 | |
| T06 | R11 | Zone 11 | Pass | 76.76 | 76.76 | 0.00% | Yes | 82.57 | 82.57 | 82.57 | 0.00% | Yes | T03R11 | 5.81 | |
| T06 | R12 | Zone 12 | Pass | 59.96 | 59.96 | 0.00% | Yes | 65.23 | 65.23 | 65.23 | 0.00% | Yes | T03R12 | 5.27 | |
| T06 | R13 | Zone 13 | Pass | 77.45 | 77.45 | 0.00% | Yes | 84.05 | 84.05 | 84.05 | 0.00% | Yes | T03R13 | 6.60 | |
| T06 | R14 | Zone 14 | Pass | 72.35 | 72.35 | 0.00% | Yes | 78.40 | 78.40 | 78.40 | 0.00% | Yes | T03R14 | 6.05 | |
| T06 | R15 | Zone 15 | Pass | 110.58 | 110.58 | 0.00% | Yes | 118.93 | 118.93 | 118.93 | 0.00% | Yes | T03R15 | 8.35 | |
| T06 | R16 | Zone 16 | Pass | 66.55 | 66.55 | 0.00% | Yes | 69.50 | 69.50 | 69.50 | 0.00% | Yes | T03R16 | 2.95 | |
| Result T06 | | | Pass | 54.34 | 54.34 | 0.00% | | 58.00 | 58.00 | 58.00 | 0.00% | | Min Ave | 0.00% 0.00% | 3.66 |

Comparison between Reference & Candidate Software (kTDV/ft2)

Comparison Date: 9/1/2016

Comparison Author: Ken Nittler

Candidate Software: CBECC-Res 2013 670

| Test | Run | Description | Pass/Fail | Reference Proposed | Candidate Proposed | Percent Difference | Within Tolerance | Standard Equals | Reference Standard | Candidate Standard | Percent Difference | Within Tolerance | Standard Equals | Lookup | Margin |
|------------|---|--|-----------|--------------------|--------------------|--------------------|------------------|---------------------------------------|--------------------|--------------------|--------------------|------------------|-----------------|--------|--------|
| | | | | | | | | Standard = T01 Standard for this test | | | | | | | |
| T07 | Common Measures in Zone 12 for Prototype P2100ft2 | | | | | | | | | | | | | | |
| T07 | R01 | Package | Pass | 46.88 | 46.88 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 4.44 | |
| T07 | R02 | Fenestration U 0.40/S 0.40 | Pass | 52.10 | 52.10 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | -0.78 | |
| T07 | R03 | Wall R13 | Pass | 47.60 | 47.60 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 3.72 | |
| T07 | R04 | Ceiling R49 | Pass | 45.78 | 45.78 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 5.54 | |
| T07 | R05 | Furnace AFUE 92 | Pass | 43.96 | 43.96 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 7.36 | |
| T07 | R06 | Air Conditioner SEER 16/EER 14 | Pass | 45.25 | 45.25 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 6.07 | |
| T07 | R07 | No Cool Vent | Pass | 51.10 | 51.10 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 0.22 | |
| T07 | R08 | Ducts 2% Leakage | Pass | 45.66 | 45.66 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 5.66 | |
| T07 | R09 | Insulation Construction Quality Improved | Pass | 42.18 | 42.18 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 9.14 | |
| T07 | R10 | Air Leakage ACH50 2.0 | Pass | 45.69 | 45.69 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 5.63 | |
| Result T07 | | | Pass | 46.62 | 46.62 | 0.00% | | 51.32 | 51.32 | 51.32 | 0.00% | | Min | 0.00% | 4.70 |
| | | | | | | | | | | | Ave | Max | 0.00% | | |
| | | | | | | | | Standard = T01 Standard for this test | | | | | | | |
| T08 | Water Heating in Zone 12 for Prototype P2100ft2 | | | | | | | | | | | | | | |
| T08 | R01 | Package | Pass | 46.88 | 46.88 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 4.44 | |
| T08 | R02 | Parallel Piping | Pass | 46.99 | 46.99 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 4.33 | |
| T08 | R03 | Small Tankless EF 0.80/Input 195000/0 gal | Pass | 43.08 | 43.08 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 8.24 | |
| T08 | R04 | Large Tankless RE 0.76/Input 300000/0 gal | Pass | 43.58 | 43.58 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 7.74 | |
| T08 | R05 | Large Storage RE 0.77/Input 100000/75gal/Stby 0.01 | Pass | 45.54 | 45.54 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 5.78 | |
| T08 | R06 | Large Storage RE 0.77/Input 100000/75gal/Stby 0.03 | Pass | 51.31 | 51.31 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 0.01 | |
| T08 | R07 | Electric Resistance EF 0.92/Input 4500 | Pass | 64.40 | 64.40 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | -13.08 | |
| T08 | R08 | Heat Pump EF 2.4/Input 4500 | Pass | 48.61 | 48.61 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 2.71 | |
| T08 | R09 | 2 Water Heaters using Multiplier | Pass | 51.06 | 51.06 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 0.26 | |
| T08 | R10 | 2 Water Heaters Using 2 entries | Pass | 51.06 | 51.06 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 0.26 | |
| Result T08 | | | Pass | 49.25 | 49.25 | 0.00% | | 51.32 | 51.32 | 51.32 | 0.00% | | Min | 0.00% | 2.07 |
| | | | | | | | | | | | Ave | Max | 0.00% | | |
| | | | | | | | | Standard = T01 Standard for this test | | | | | | | |
| T09 | Multiple Orientation in Zone 12 for Prototype S2100ft2/P2100ft2 | | | | | | | | | | | | | | |
| T09 | R01 | Single Standard Front 45 | Pass | 52.75 | 52.75 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | -1.43 | |
| T09 | R02 | East Standard | Pass | 51.32 | 51.32 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 0.00 | |
| T09 | R03 | South Standard | Pass | 51.32 | 51.32 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 0.00 | |
| T09 | R04 | West Standard | Pass | 51.32 | 51.32 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 0.00 | |
| T09 | R05 | North Standard | Pass | 51.32 | 51.32 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 0.00 | |
| T09 | R06 | Single Proposed front 45 | Pass | 52.39 | 52.39 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | -1.07 | |
| T09 | R07 | East Proposed | Pass | 54.17 | 54.17 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | -2.85 | |
| T09 | R08 | South Proposed | Pass | 47.82 | 47.82 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 3.50 | |
| T09 | R09 | West Proposed | Pass | 53.02 | 53.02 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | -1.70 | |
| T09 | R10 | North Proposed | Pass | 46.88 | 46.88 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | T01R12 | 4.44 | |
| Result T09 | | | Pass | 51.23 | 51.23 | 0.00% | | 51.32 | 51.32 | 51.32 | 0.00% | | Min | 0.00% | 0.09 |
| | | | | | | | | | | | Ave | Max | 0.00% | | |

Comparison between Reference & Candidate Software (kTDV/ft2)

Comparison Date: 9/1/2016

Comparison Author: Ken Nittler

Candidate Software: CBECC-Res 2013 670

| Test | Run | Description | Pass/Fail | Reference | Candidate | Percent | Within | Standard | Reference | Candidate | Percent | Within | Standard | Lookup | Margin |
|------------|-----|--|-----------|-----------|-----------|------------|-----------|----------|---------------------------------|-----------|------------|-----------|----------|--------|---------|
| | | | | Proposed | Proposed | Difference | Tolerance | Equals | Standard | Standard | Difference | Tolerance | Equals | | |
| T10 | | Multi Family Water Heating in Zone 12 for Prototype P6960ft2 | | | | | | | Standard = Varies for this test | | | | | | |
| T10 | R01 | 8 Storage | Pass | 59.96 | 59.96 | 0.00% | Yes | 65.23 | 65.23 | 65.23 | 0.00% | Yes | | T10R01 | 5.27 |
| T10 | R02 | 8 Storage 2 Systems | Pass | 59.96 | 59.96 | 0.00% | Yes | 65.23 | 65.23 | 65.23 | 0.00% | Yes | | T10R01 | 5.27 |
| T10 | R03 | 8 LgStor | Pass | 66.44 | 66.44 | 0.00% | Yes | 65.23 | 65.23 | 65.23 | 0.00% | Yes | | T10R01 | -1.21 |
| T10 | R04 | 2 LgStor Central Solar | Pass | 54.48 | 54.48 | 0.00% | Yes | 59.75 | 59.75 | 59.75 | 0.00% | Yes | | T10R04 | 5.27 |
| T10 | R05 | 2 LgStor Central Solar Recirc | Pass | 60.91 | 60.91 | 0.00% | Yes | 66.18 | 66.18 | 66.18 | 0.00% | Yes | | T10R05 | 5.27 |
| T10 | R06 | 2 LgStor Central Recirc | Pass | 65.19 | 65.19 | 0.00% | Yes | 66.18 | 66.18 | 66.18 | 0.00% | Yes | | T10R05 | 0.99 |
| T10 | R07 | 2 SmlInstantant Central Solar | Pass | 51.07 | 51.07 | 0.00% | Yes | 56.34 | 56.34 | 56.34 | 0.00% | Yes | | T10R07 | 5.27 |
| T10 | R08 | 2 SmlInstantant Central Solar Recirc | Pass | 57.79 | 57.79 | 0.00% | Yes | 63.06 | 63.06 | 63.06 | 0.00% | Yes | | T10R08 | 5.27 |
| T10 | R09 | 1 Indirect Central Solar | Pass | 57.35 | 57.35 | 0.00% | Yes | 61.96 | 61.96 | 61.96 | 0.00% | Yes | | T10R09 | 4.61 |
| T10 | R10 | 1 Indirect Central Solar Recirc | Pass | 64.19 | 64.19 | 0.00% | Yes | 68.80 | 68.80 | 68.80 | 0.00% | Yes | | T10R10 | 4.61 |
| Result T10 | | | Pass | 59.73 | 59.73 | 0.00% | | 63.80 | 63.80 | 63.80 | 0.00% | | | Min | 0.00% |
| | | | | | | | | | | | | | | Ave | 0.00% |
| | | | | | | | | | | | | | | Max | 0.00% |
| T11 | | Source Energy in Zone 12 for Prototype P2100ft2 | | | | | | | Standard = Varies for this test | | | | | | |
| T11 | R01 | Package | Pass | 46.88 | 46.88 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | | T04R12 | 4.44 |
| T11 | R02 | Package No Natural Gas | Pass | 97.34 | 97.34 | 0.00% | Yes | 103.36 | 103.36 | 103.36 | 0.00% | Yes | | T11R02 | 6.02 |
| T11 | R03 | Electric DHW | Pass | 63.24 | 63.24 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | | T04R12 | -11.92 |
| T11 | R04 | Electric DHW no Natural Gas | Pass | 92.65 | 92.65 | 0.00% | Yes | 88.28 | 88.28 | 88.28 | 0.00% | Yes | | T11R04 | -4.37 |
| T11 | R05 | Heatpump DHW | Pass | 48.61 | 48.61 | 0.00% | Yes | 51.32 | 51.32 | 51.32 | 0.00% | Yes | | T04R12 | 2.71 |
| T11 | R06 | Heatpump DHW no Natural Gas | Pass | 78.02 | 78.02 | 0.00% | Yes | 88.28 | 88.28 | 88.28 | 0.00% | Yes | | T11R04 | 10.26 |
| T11 | R07 | Heatpump HVAC | Pass | 44.83 | 44.83 | 0.00% | Yes | 50.49 | 50.49 | 50.49 | 0.00% | Yes | | T11R07 | 5.66 |
| T11 | R08 | Heatpump HVAC no Natural Gas | Pass | 65.88 | 65.88 | 0.00% | Yes | 71.54 | 71.54 | 71.54 | 0.00% | Yes | | T11R08 | 5.66 |
| T11 | R09 | Heatpump HVAC & DHW | Pass | 46.56 | 46.56 | 0.00% | Yes | 50.49 | 50.49 | 50.49 | 0.00% | Yes | | T11R07 | 3.93 |
| T11 | R10 | Heatpump HVAC & DHW no Natural Gas | Pass | 46.56 | 46.56 | 0.00% | Yes | 56.46 | 56.46 | 56.46 | 0.00% | Yes | | T11R10 | 9.90 |
| Result T11 | | | Pass | 63.06 | 63.06 | 0.00% | | 66.29 | 66.29 | 66.29 | 0.00% | | | Min | 0.00% |
| | | | | | | | | | | | | | | Ave | 0.00% |
| | | | | | | | | | | | | | | Max | 0.00% |
| T12 | | E+A+A Base & Windows in Zone 12 for Prototype P1665ft2 | | | | | | | Standard = Varies for this test | | | | | | |
| T12 | R01 | E 1440ft2 as New Construction | Pass | 225.60 | 225.60 | 0.00% | Yes | 72.55 | 72.55 | 72.55 | 0.00% | Yes | | T12R01 | -153.05 |
| T12 | R02 | E 1440ft2 as Addition/Alteration | Pass | 225.50 | 225.50 | 0.00% | Yes | 225.50 | 225.50 | 225.50 | 0.00% | Yes | | T12R02 | 0.00 |
| T12 | R03 | EA 1665ft2 | Pass | 194.22 | 194.22 | 0.00% | Yes | 193.62 | 193.62 | 193.62 | 0.00% | Yes | | T12R03 | -0.60 |
| T12 | R04 | EAA Ceiling R38 Verified | Pass | 170.48 | 170.48 | 0.00% | Yes | 193.62 | 193.62 | 193.62 | 0.00% | Yes | | T12R04 | 23.14 |
| T12 | R05 | EAA Ceiling R38 Verified Wind U0.41/S0.36 | Pass | 140.45 | 140.45 | 0.00% | Yes | 164.29 | 164.29 | 164.29 | 0.00% | Yes | | T12R05 | 23.84 |
| T12 | R06 | EAA Ceiling R38 Verified Wind U0.41/S0.36 Verified | Pass | 140.45 | 140.45 | 0.00% | Yes | 164.29 | 164.29 | 164.29 | 0.00% | Yes | | T12R05 | 23.84 |
| T12 | R07 | EAA Ceiling R38 Verified Wind U0.40/S0.35 | Pass | 139.74 | 139.74 | 0.00% | Yes | 164.29 | 164.29 | 164.29 | 0.00% | Yes | | T12R05 | 24.55 |
| T12 | R08 | EAA Ceiling R38 Verified Wind U0.40/S0.35 Verified | Pass | 139.74 | 139.74 | 0.00% | Yes | 193.62 | 193.62 | 193.62 | 0.00% | Yes | | T12R04 | 53.88 |
| T12 | R09 | EAA Ceiling R38 Verified Wind U0.39/S0.34 | Pass | 139.09 | 139.09 | 0.00% | Yes | 164.29 | 164.29 | 164.29 | 0.00% | Yes | | T12R05 | 25.20 |
| T12 | R10 | EAA Ceiling R38 Verified Wind U0.39/S0.34 Verified | Pass | 139.09 | 139.09 | 0.00% | Yes | 193.62 | 193.62 | 193.62 | 0.00% | Yes | | T12R04 | 54.53 |
| Result T12 | | | Pass | 165.44 | 165.44 | 0.00% | | 172.97 | 172.97 | 172.97 | 0.00% | | | Min | 0.00% |
| | | | | | | | | | | | | | | Ave | 0.00% |
| | | | | | | | | | | | | | | Max | 0.00% |

Comparison between Reference & Candidate Software (kTDV/ft2)

Comparison Date: 9/1/2016

Comparison Author: Ken Nittler

Candidate Software: CBECC-Res 2013 670

| Test | Run | Description | Pass/Fail | Reference | Candidate | Percent | Within | Standard | Reference | Candidate | Percent | Within | Standard | Lookup | Margin | |
|--------|--|---|-----------|-----------|-----------|------------|-----------|----------|---------------------------------|-----------|------------|-----------|----------|--------|--------|--|
| | | | | Proposed | Proposed | Difference | Tolerance | Equals | Standard | Standard | Difference | Tolerance | Equals | | | |
| T13 | E+A+A Walls & HVAC in Zone 12 for Prototype P1665ft2 | | | | | | | | Standard = Varies for this test | | | | | | | |
| T13 | R01 | EAA Ceiling R38 Verified Wall R11 | Pass | 137.61 | 137.61 | 0.00% | Yes | 160.41 | 160.41 | 160.41 | 0.00% | Yes | T13R01 | 22.80 | | |
| T13 | R02 | EAA Ceiling R38 Verified Wall R11 Verified | Pass | 137.61 | 137.61 | 0.00% | Yes | 160.41 | 160.41 | 160.41 | 0.00% | Yes | T13R01 | 22.80 | | |
| T13 | R03 | EAA Ceiling R38 Verified Wall R13 | Pass | 135.53 | 135.53 | 0.00% | Yes | 160.41 | 160.41 | 160.41 | 0.00% | Yes | T13R01 | 24.88 | | |
| T13 | R04 | EAA Ceiling R38 Verified Wall R13 Verified | Pass | 135.53 | 135.53 | 0.00% | Yes | 193.62 | 193.62 | 193.62 | 0.00% | Yes | T12R04 | 58.09 | | |
| T13 | R05 | EAA Ceiling R38 Verified HVAC Worse | Pass | 137.06 | 137.06 | 0.00% | Yes | 127.52 | 127.52 | 127.52 | 0.00% | Yes | T13R05 | -9.54 | | |
| T13 | R06 | EAA Ceiling R38 Verified HVAC Worse Verified | Pass | 137.06 | 137.06 | 0.00% | Yes | 127.52 | 127.52 | 127.52 | 0.00% | Yes | T13R05 | -9.54 | | |
| T13 | R07 | EAA Ceiling R38 Verified HVAC Equal | Pass | 113.36 | 113.36 | 0.00% | Yes | 127.52 | 127.52 | 127.52 | 0.00% | Yes | T13R05 | 14.16 | | |
| T13 | R08 | EAA Ceiling R38 Verified HVAC Equal Verified | Pass | 113.36 | 113.36 | 0.00% | Yes | 193.62 | 193.62 | 193.62 | 0.00% | Yes | T12R04 | 80.26 | | |
| T13 | R09 | EAA Ceiling R38 Verified HVAC Better | Pass | 96.48 | 96.48 | 0.00% | Yes | 127.52 | 127.52 | 127.52 | 0.00% | Yes | T13R05 | 31.04 | | |
| T13 | R10 | EAA Ceiling R38 Verified HVAC Better Verified | Pass | 96.48 | 96.48 | 0.00% | Yes | 193.62 | 193.62 | 193.62 | 0.00% | Yes | T12R04 | 97.14 | | |
| Result | T13 | | Pass | 124.01 | 124.01 | 0.00% | | 157.22 | 157.22 | 157.22 | 0.00% | Ave | Min | 0.00% | 33.21 | |
| | | | | | | | | | | | | Max | 0.00% | | | |