# GLOBAL BUILDING SYSTEMS

June 29, 2007

William Pennington, Chris Gekas
California Energy Commission
1516 Ninth Street, MS-28
Sacramento, CA 95814-5512

RE: Docket #05-BSTD-2, 2008 Building Energy Efficiency Standards (Comments)

Gentlemen,

This letter is in response to the Proposed changes in Joint Appendices 4 as they relate to U-Factors for Metal Framed Walls for Residential Construction and Commercial Construction. There appears to be a serious oversight on the Commissions part to limit the upper range of R-Values of Continuous Insulation per chart 4.3.4 at R-7. (See Attached) In the 2005 standards, JA4, Table IV.11, the upper limit was R-14. The commission appears to continue using the data in this table but for non-residential Construction only. (See Attached)

I would request that staff review our request to increase the upper limit for Continuous Insulation R values on table 4.3.4 to R-15, as our testing data reveals. As well, please **recalculate and include the data for Foamed Plastic or Cellulose Insulation, through this extension.** This table is incomplete and clearly not indicative of the advances in building materials and methods that are available today.

Since there are no provisions in these tables for hybrid technologies incorporating thermally isolated/coated steel frames, and monocoque walls with superior performance capabilities, we request that the Commission consider and include these as well, in writing.

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The commission does a better job addressing this concept in its treatment of SIPS (JA4, Table 4.2.3), but this section 4.3.4 is woefully inadequate. We welcome the opportunity to review this in person with you and to address any questions regarding details you may have.

In support of the letter dated June 11, 2007, from John Evans of Icynene Inc, we know that Foam Plastics have properties that allow for tighter duct systems, and the U-factors inherent in these materials are conducive to meeting the needs of Residential Distribution System Leakage in cost effective manners. We request that the Commission consider and include hybrid ducts utilizing Rigid EPS, as alternatives to Insulated Flex, Sheet Metal, and Sealed Duct Board.

We would like to thank you for the opportunity to submit these corrections and additions to the 2008 Title 24 Efficiency Standards, and look forward to discussing them with you in person at your earliest convenience.

Sincerely,

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**Table ~~IV4.3.311NR~~ – U-factors of Metal Framed Walls for Nonresidential Construction**

| Spacing | Cavity Insulation R-Value: | Nominal Framing Size | | Rated R-value of Continuous Insulation [2] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R-0 | R-2 | R-4 | R-6 | R-7 | R-8 | R-10 | R-14 |
| | | | | A | B | C | D | E | F | G | H |
| 16 in. OC | None | Any | 1 | 0.458 | 0.239 | 0.162 | 0.122 | 0.109 | 0.098 | 0.082 | 0.062 |
| | R-11 | 2x4 | 2 | 0.224 | 0.155 | 0.118 | 0.096 | 0.087 | 0.080 | 0.069 | 0.054 |
| | R-13 | 2x4 | 3 | 0.217 | 0.151 | 0.116 | 0.094 | 0.086 | 0.079 | 0.068 | 0.054 |
| | R-15 | 2x4 | 4 | 0.211 | 0.148 | 0.114 | 0.093 | 0.085 | 0.078 | 0.068 | 0.053 |
| | R-19 | 2x6 | 5 | 0.183 | 0.134 | 0.106 | 0.087 | 0.080 | 0.074 | 0.065 | 0.051 |
| | R-21[1] | 2x6 | 6 | 0.178 | 0.131 | 0.104 | 0.086 | 0.079 | 0.073 | 0.064 | 0.051 |
| | R-19 | 2x8 | 7 | 0.164 | 0.123 | 0.099 | 0.083 | 0.076 | 0.071 | 0.062 | 0.050 |
| | R-22 | 2x8 | 8 | 0.160 | 0.121 | 0.098 | 0.082 | 0.075 | 0.070 | 0.062 | 0.049 |
| | R-25 | 2x8 | 9 | 0.158 | 0.120 | 0.097 | 0.081 | 0.075 | 0.070 | 0.061 | 0.049 |
| | R-30[1] | 2x8 | 10 | 0.157 | 0.119 | 0.096 | 0.081 | 0.075 | 0.070 | 0.061 | 0.049 |
| | R-30 | 2x10 | 11 | 0.140 | 0.109 | 0.090 | 0.076 | 0.071 | 0.066 | 0.058 | 0.047 |
| | R-38[1] | 2x10 | 12 | 0.139 | 0.109 | 0.089 | 0.076 | 0.070 | 0.066 | 0.058 | 0.047 |
| | R-38 | 2 x 12 | 13 | 0.124 | 0.099 | 0.083 | 0.071 | 0.066 | 0.062 | 0.055 | 0.045 |
| | Foamed Plastic or Cellulose Insulation[3] | 2 x 4 | 14 | 0.218 | 0.152 | 0.116 | 0.094 | 0.086 | 0.079 | 0.069 | 0.054 |
| | | 2 x 6 | 15 | 0.179 | 0.132 | 0.104 | 0.086 | 0.079 | 0.074 | 0.064 | 0.051 |
| | | 2 x 8 | 16 | 0.157 | 0.119 | 0.096 | 0.081 | 0.075 | 0.070 | 0.061 | 0.049 |
| | | 2 x 10 | 17 | 0.138 | 0.108 | 0.089 | 0.075 | 0.070 | 0.066 | 0.058 | 0.047 |
| | | 2 x 12 | 18 | 0.123 | 0.099 | 0.082 | 0.071 | 0.066 | 0.062 | 0.055 | 0.045 |
| 24 in. OC | None | Any | 24 | 0.455 | 0.238 | 0.161 | 0.122 | 0.109 | 0.098 | 0.082 | 0.062 |
| | R-11 | 2x4 | 25 | 0.210 | 0.148 | 0.114 | 0.093 | 0.085 | 0.078 | 0.068 | 0.053 |
| | R-13 | 2x4 | 26 | 0.203 | 0.144 | 0.112 | 0.092 | 0.084 | 0.077 | 0.067 | 0.053 |
| | R-15 | 2x4 | 27 | 0.197 | 0.141 | 0.110 | 0.090 | 0.083 | 0.076 | 0.066 | 0.052 |
| | R-19 | 2x6 | 28 | 0.164 | 0.123 | 0.099 | 0.083 | 0.076 | 0.071 | 0.062 | 0.050 |
| | R-21[1] | 2x6 | 29 | 0.161 | 0.122 | 0.098 | 0.082 | 0.076 | 0.070 | 0.062 | 0.049 |
| | R-19 | 2x8 | 30 | 0.153 | 0.117 | 0.095 | 0.080 | 0.074 | 0.069 | 0.060 | 0.049 |
| | R-22 | 2x8 | 21 | 0.149 | 0.115 | 0.093 | 0.079 | 0.073 | 0.068 | 0.060 | 0.048 |
| | R-25 | 2x8 | 32 | 0.147 | 0.114 | 0.093 | 0.078 | 0.072 | 0.068 | 0.060 | 0.048 |
| | R-30[1] | 2x8 | 33 | 0.146 | 0.113 | 0.092 | 0.078 | 0.072 | 0.067 | 0.059 | 0.048 |
| | R-30 | 2x10 | 34 | 0.130 | 0.103 | 0.086 | 0.073 | 0.068 | 0.064 | 0.057 | 0.046 |
| | R-38[1] | 2x10 | 35 | 0.128 | 0.102 | 0.085 | 0.072 | 0.068 | 0.063 | 0.056 | 0.046 |
| | R-38 | 2 x 12 | 36 | 0.115 | 0.093 | 0.079 | 0.068 | 0.064 | 0.060 | 0.053 | 0.044 |
| | Foamed Plastic or Cellulose Insulation[3] | 2 x 4 | 37 | 0.204 | 0.145 | 0.112 | 0.092 | 0.084 | 0.078 | 0.067 | 0.053 |
| | | 2 x 6 | 38 | 0.167 | 0.125 | 0.100 | 0.083 | 0.077 | 0.071 | 0.063 | 0.050 |
| | | 2 x 8 | 39 | 0.146 | 0.113 | 0.092 | 0.078 | 0.072 | 0.067 | 0.059 | 0.048 |
| | | 2 x 10 | 40 | 0.128 | 0.102 | 0.085 | 0.072 | 0.068 | 0.063 | 0.056 | 0.046 |
| | | 2 x 12 | 41 | 0.114 | 0.093 | 0.078 | 0.068 | 0.063 | 0.060 | 0.053 | 0.044 |

**Notes**

1. Higher density fiberglass batt is required in these cases.
2. Continuous insulation may be installed on either the inside or the exterior of the wall, or both.
3. Foamed plastic and cellulose shall fill the entire cavity. Cellulose shall have a binder to prevent sagging.

This table contains U-factors for steel or metal-framed walls, which are typical of nonresidential buildings. The table may be used for any construction assembly where the primary insulation is installed in a metal-framed wall, e.g. uninsulated curtain walls with metal furring on the inside.



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## Table 4.3.4 – U-factors of Metal Framed Walls for Residential Construction

| Spacing | Cavity Insulation R-Value: | Nominal Framing Size | | R-0 | R-2 | R-4 | R-5 | R-6 | R-7 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F |
| 16 in. OC | None | Any | 1 | NA | NA | NA | NA | NA | NA |
| | R-11 | 2x4 | 2 | 0.200 | 0.137 | 0.107 | 0.097 | 0.088 | 0.081 |
| | R-13 | 2x4 | 3 | 0.192 | 0.132 | 0.105 | 0.095 | 0.087 | 0.080 |
| | R-15 | 2x4 | 4 | 0.186 | 0.129 | 0.102 | 0.093 | 0.085 | 0.078 |
| | R-19 | 2x6 | 5 | 0.154 | 0.112 | 0.092 | 0.084 | 0.077 | 0.072 |
| | R-21[1] | 2x6 | 6 | 0.151 | 0.110 | 0.090 | 0.083 | 0.076 | 0.071 |
| | R-19 | 2x8 | 7 | 0.134 | 0.102 | 0.085 | 0.078 | 0.072 | 0.067 |
| | R-22 | 2x8 | 8 | 0.129 | 0.099 | 0.082 | 0.076 | 0.071 | 0.066 |
| | R-25 | 2x8 | 9 | 0.125 | 0.096 | 0.081 | 0.075 | 0.069 | 0.065 |
| | R-30[1] | 2x8 | 10 | 0.120 | 0.093 | 0.078 | 0.073 | 0.068 | 0.063 |
| | R-30 | 2x10 | 11 | 0.109 | 0.086 | 0.073 | 0.068 | 0.064 | 0.060 |
| | R-38[1] | 2x10 | 12 | 0.104 | 0.082 | 0.071 | 0.066 | 0.062 | 0.058 |
| | R-38 | 2 x 12 | 13 | 0.095 | 0.077 | 0.067 | 0.062 | 0.059 | 0.055 |
| | Foamed Plastic or Cellulose Insulation[3] | 2 x 4 | 14 | NA | NA | NA | NA | NA | NA |
| | | 2 x 6 | 15 | NA | NA | NA | NA | NA | NA |
| | | 2 x 8 | 16 | NA | NA | NA | NA | NA | NA |
| | | 2 x 10 | 17 | NA | NA | NA | NA | NA | NA |
| | | 2 x 12 | 18 | NA | NA | NA | NA | NA | NA |
| 24 in. OC | None | Any | 24 | NA | NA | NA | NA | NA | NA |
| | R-11 | 2x4 | 25 | 0.189 | 0.131 | 0.104 | 0.094 | 0.086 | 0.079 |
| | R-13 | 2x4 | 26 | 0.181 | 0.127 | 0.101 | 0.092 | 0.084 | 0.078 |
| | R-15 | 2x4 | 27 | 0.175 | 0.123 | 0.099 | 0.090 | 0.082 | 0.076 |
| | R-19 | 2x6 | 28 | 0.144 | 0.107 | 0.088 | 0.081 | 0.075 | 0.070 |
| | R-21[1] | 2x6 | 29 | 0.141 | 0.105 | 0.086 | 0.080 | 0.074 | 0.069 |
| | R-19 | 2x8 | 30 | 0.126 | 0.097 | 0.081 | 0.075 | 0.070 | 0.065 |
| | R-22 | 2x8 | 31 | 0.121 | 0.094 | 0.079 | 0.073 | 0.068 | 0.064 |
| | R-25 | 2x8 | 32 | 0.117 | 0.091 | 0.077 | 0.071 | 0.067 | 0.063 |
| | R-30[1] | 2x8 | 33 | 0.112 | 0.088 | 0.075 | 0.069 | 0.065 | 0.061 |
| | R-30 | 2x10 | 34 | 0.102 | 0.081 | 0.070 | 0.065 | 0.061 | 0.058 |
| | R-38[1] | 2x10 | 35 | 0.096 | 0.077 | 0.067 | 0063 | 0.059 | 0.056 |
| | R-38 | 2 x 12 | 36 | 0.088 | 0.072 | 0.063 | 0.059 | 0.056 | 0.053 |
| | Foamed Plastic or Cellulose Insulation[3] | 2 x 4 | 37 | NA | NA | NA | NA | NA | NA |
| | | 2 x 6 | 38 | NA | NA | NA | NA | NA | NA |
| | | 2 x 8 | 39 | NA | NA | NA | NA | NA | NA |
| | | 2 x 10 | 40 | NA | NA | NA | NA | NA | NA |
| | | 2 x 12 | 41 | NA | NA | NA | NA | NA | NA |



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