Reference: 2022 Denver Energy Code (DEC) Sections C402.2.1.1 and C402.2.1.2

Scope: This is a policy for identifying roof insulation R-values and thickness in construction drawing permit sets and during inspection for tapered, above-deck insulation on commercial and multifamily buildings.

Policy:

For prescriptive and performance compliance paths, insulation shall be identified in the construction drawing permit set in accordance with one of the two options below:

Option 1. If the R-value of the minimum insulation thickness at the low points of any roof is used to demonstrate compliance, the insulation thickness at the low points of above-deck insulation and the R-value shall be identified.

Option 2. If the R-value of the minimum insulation thickness at the low points are less than the value used to demonstrate compliance:
   1. Per section C402.2.1.2, the minimum thickness of the above-deck roof insulation at its lowest point, gutter edge, roof drain, or scupper shall not be less than 1 inch, AND
   2. For as many different insulation volumes that are used to describe the sloped insulation roofing system, identify parameters similar to:
      a. Figures 1 and 2 for one- and two-way roof slopes and/or
      b. Figures 3 and 4 for symmetrical four-way roof slopes and/or
      c. Figure 5 for all other sloped roof insulation systems, with the volumetric average thickness calculated in accordance with the following equation:

\[
\text{Volumetric Average Thickness} = LP + \frac{2}{3}(HP - LP)
\]

Where

\[
LP = \text{Lowest Point is insulation system minimum thickness}
\]
\[
HP = \text{Highest Point is insulation system maximum thickness}
\]

Note that insulation used for roof features for drainage in limited areas shall not contribute to the R-value for compliance.
Subject: Denver Energy Code Compliance for Tapered Insulation

Approved: Eric Browning, PE, Chief Building Official
Drafted by: Morrison, Et al.

Number: DEC C402.2.1.1 & DEC 402.2.1.2
Prior Version: None
Revision Date: February 6, 2024
3. Specification and details for Option 2 shall include the following:
   
i. The minimum insulation thicknesses and R-values are shown on drawings and the low point locations are identified on the roof plan.
   
ii. The maximum insulation thicknesses and R-values are shown on drawings and the high point locations are identified on the roof plan.
   
iii. The average R-value of each insulation volume used to demonstrate compliance shall be shown on drawings. Calculations shall be provided if requested.
   
iv. A table of roof insulation areas similar to Figure 6 that includes low point, high point, average thickness, and material R-value-per-inch shall be provided.

**FIGURE 6**

<table>
<thead>
<tr>
<th>ROOF AREA</th>
<th>INSULATION HIGH POINT (inches)</th>
<th>INSULATION LOW POINT (inches)</th>
<th>INSULATION AVERAGE THICKNESS (inches)</th>
<th>INSULATION MATERIAL R-VALUE PER INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>AREA 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>AREA 2</td>
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<tr>
<td>AREA 3</td>
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</tbody>
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