The Benefits of Increasing Insulation During Roof Replacement
For Canadian Climate Zone 4 – Vancouver, British Columbia

Why is Proper Insulation Critical During Building Roof Replacement?

Insulation, whether in a public or commercial building, has a tremendous impact on the energy efficiency, resilience, cost savings, and the comfort of a space. While insulation can be an inconspicuous and sometimes overlooked building feature, it spans the entire surface area of a building’s roof and helps to protect other features of building performance.

Roof insulation is particularly important for building performance as the roof comprises the largest single side of most buildings. Recognizing the importance of an energy-efficient building thermal envelope, modern Canadian energy codes have set minimum requirements for the thermal performance of roof assemblies for new construction.

For low-sloped roofs, typical of public and commercial buildings, roof replacement provides an opportunity to increase insulation to meet the overall thermal transmittance requirement as prescribed in modern Canadian energy codes applicable to new construction.

Finding the Right Insulation for Canadian Climate Zone 4

When selecting the proper roof insulation for your building, it is critical to consider the climate zone for your location. Cities located in Canadian Climate Zone 4 are characterized as mixed climates, which is defined as a region that has approximately 3,000 or fewer heating degree days on an 18 degrees Celsius basis.

Insulation for cities located in Climate Zone 4, such as Vancouver, British Columbia, must consider factors such as moisture control to prevent mold growth and condensation, in addition to temperature regulation to accommodate a range of temperatures by season.
The Benefits of Increasing Insulation During Roof Replacement
For Canadian Climate Zone 4 – Vancouver, British Columbia

Potential Savings Estimates for Buildings in Climate Zone 4
During a roof replacement, installing additional roof insulation to meet the prescribed maximum overall thermal transmittance requirement established by building energy standards for new construction in your region is estimated to yield cost savings and enhance overall performance for each of the building types modeled below. For buildings located in Climate Zone 4, the modeling was performed using a target maximum roof assembly overall transmittance value of 0.156 W/(m²-K) for roofs with insulation installed entirely above the deck.

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Annual Total Energy Savings</th>
<th>Cumulative Total Energy Cost Savings (CAD)</th>
<th>Cumulative Energy Cost Savings per m²</th>
<th>Cumulative Total CO₂e per m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary School</td>
<td>8%</td>
<td>$245,427</td>
<td>$35.72</td>
<td>110 kg.</td>
</tr>
<tr>
<td>Retail Store</td>
<td>5%</td>
<td>$58,328</td>
<td>$25.15</td>
<td>60 kg.</td>
</tr>
<tr>
<td>Strip Mall</td>
<td>6%</td>
<td>$70,970</td>
<td>$33.95</td>
<td>90 kg.</td>
</tr>
<tr>
<td>Small Office</td>
<td>4%</td>
<td>$11,021</td>
<td>$21.57</td>
<td>20 kg.</td>
</tr>
</tbody>
</table>

In mixed climate zones where building energy expenditure fluctuates between cooling and heating processes, an inefficient thermal building envelope can waste gas and electricity, generating unnecessarily high utility bills.

The estimated payback of using the modeled target levels of insulation at the time of roof replacement can help companies and building owners realize a faster return on investment, while also locking in long-term energy savings at no additional operation and maintenance cost for the life of the investment – typically 30 to 40 years. The result is greater cost savings, improved building performance, and downstream emissions benefits, as well as decreased risk and likelihood of premature maintenance and repairs. When viewed as a long-term investment, increased levels of roof insulation can help companies reach energy reduction goals while cutting costs and carbon emissions in the process. This analysis was prepared by ICF. For more information on insulation and to access the full report, visit www.polyiso.org.

About PIMA
Since 1987, the Polyisocyanurate Insulation Manufacturers Association (PIMA) has served as the voice of the rigid polyiso industry, proactively advocating for safe, cost-effective, sustainable, and energy-efficient construction. PIMA is an association of polyiso manufacturers and industry suppliers. Polyiso is one of North America’s most widely-used and cost-effective insulation products.

Polyisocyanurate Insulation Manufacturers Association (PIMA)