Overview
The heat requirements for an INTERTEC enclosure is determined based on a consideration of surface area, insulation properties of the materials of construction, and the temperature difference between the desired inside temperature and the outside design ambient.

To simplify the calculation, INTERTEC has tested and calculated the combination of surface area vs. heat loss for all of its enclosures. This value is shown on the chart below and gives variations for windows. This number can then be put into the formula below with the temperature difference in Celsius to determine the heat required in watts.

Customers should include a safety factor that will include consideration for wind chill and normal entry methods. This varies depending upon the customer, but 25 to 30% is usual.

For high temperature applications (over 30 deg. C or 85 deg. F) please contact the factory.

Enclosure Formula:

\[
P = K \times \Delta T \times SF
\]

Where:
- \( P \) = required power in watts
- \( K \) = Heat loss factor for enclosure
- \( \Delta T \) = Temp. difference in Deg. C
- \( SF \) = safety factor

<table>
<thead>
<tr>
<th>Enclosure Type</th>
<th>87</th>
<th>107</th>
<th>137</th>
<th>21/25</th>
<th>48</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>100</th>
<th>150</th>
<th>170</th>
<th>250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain without window</td>
<td>5.4</td>
<td>6.5</td>
<td>7.5</td>
<td>2.5</td>
<td>4.4</td>
<td>4.5</td>
<td>5.4</td>
<td>6.5</td>
<td>6.8</td>
<td>8.5</td>
<td>9.1</td>
<td>11.4</td>
</tr>
<tr>
<td>Plain with window</td>
<td>5.8</td>
<td>7.0</td>
<td>8.2</td>
<td>2.9</td>
<td>4.9</td>
<td>5.1</td>
<td>6.0</td>
<td>7.2</td>
<td>7.4</td>
<td>9.2</td>
<td>9.8</td>
<td>12.2</td>
</tr>
<tr>
<td>Arctic “SS” without window</td>
<td>0.9</td>
<td>1.1</td>
<td>1.2</td>
<td>0.9</td>
<td>1.2</td>
<td>1.3</td>
<td>1.7</td>
<td>1.8</td>
<td>1.9</td>
<td>2.3</td>
<td>2.4</td>
<td>3.0</td>
</tr>
<tr>
<td>Arctic “SS” with window</td>
<td>1.3</td>
<td>1.6</td>
<td>1.9</td>
<td>1.3</td>
<td>1.6</td>
<td>1.9</td>
<td>2.3</td>
<td>2.5</td>
<td>2.5</td>
<td>3.0</td>
<td>3.1</td>
<td>3.6</td>
</tr>
</tbody>
</table>

Cabinet Formula:
It is recommended that Cabinets be sized either by the factory or the INTERTEC “S” program. You can manually size Classic, Basic and Arctic shelters by the following formula:

Classic & Basic > \[ P = A \times \Delta T \times 1.65 \]

Arctic > \[ P = A \times \Delta T \times 0.7 \]

Other Enclosures:
Where heaters are used for enclosures other than INTERTEC, and are less than 100 ft² in surface area, the following, conservative values for heat loss can be used.

Formula: \[ \text{Watts} = \left[ \Delta T \text{ (°F)} / 10 \right] \times A \text{ (ft}^2) \times W \text{ (from table)} \]

Example:
Insulated cabinet, 4’ x 3’ x 1’
Outside Temp = -10 °F, Inside Temp = 50 °F
Temperature diff. = 50 – (-10) = 60 °F
\[ [(4 \times 3 \times 2) + (3 \times 1 \times 2) + (4 \times 1 \times 2)] = 38 \text{ ft}^2 \]

\[ \text{Watts Req’d} = (60/10) \times 38 \times 1.2 = 274 \text{ watts} \]