Quality and satisfaction of thermal comfort in Dutch offices

Theory

Personal variables
- Activity level
- Assumption: 1.2 met

Environmental variables
- Assumption: 1.0 clo
- Physical variables
  - Thermal resistance of the clothing
  - Assumption: 1.0 clo
  - Air temperature
  - Assumption: 1.0 clo
  - Water vapour pressure in ambient air
  - Assumption: 1.0 clo
  - Mean radiant temperature
  - Assumption: 0.09 m s⁻¹
  - Vertical air temperature difference and distance to window

Assumption

Measurement

Environmental variables
- Air temperature
- Measured
- Water vapour pressure in ambient air
- Measured
- Mean radiant temperature
- Measured
- Vertical air temperature difference and distance to window
- Assumption: 0.09 m s⁻¹

Assumption

Measurement

Standard

Results

 outdoor temperature (°C)

<table>
<thead>
<tr>
<th>Outdoor temperature (°C)</th>
<th>Temperature difference (°C)</th>
<th>Vertical air temperature difference (°C)</th>
<th>Distance between the occupant and the nearest window (m)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>2.3</td>
<td>0.50</td>
<td>0.14</td>
<td>1.00</td>
</tr>
<tr>
<td>22</td>
<td>2.3</td>
<td>0.50</td>
<td>0.14</td>
<td>1.00</td>
</tr>
<tr>
<td>23</td>
<td>2.3</td>
<td>0.50</td>
<td>0.14</td>
<td>1.00</td>
</tr>
</tbody>
</table>

An Atal ENV-MB350NV temperature sensor, humidity sensor, carbon dioxide sensor and a ruler were used to collect data

The occupant completed an 18-item satisfaction questionnaire

Conclusion

This study indicates that an indoor temperature higher than 22°C might be too warm for office workers in The Netherlands during wintertime and that application might influence workers' satisfaction negatively.