

## Technical Note No 49

# U-values of curtain walls



*This Technical Note is one of four on the effect of building envelope performance on energy use in buildings. The series comprises:*

- TN 46 Introduction to building envelope energy transfer*
- TN 47 Overall building envelope U-values*
- TN 48 U-values of windows*
- TN 49 U-values of curtain walls*

### Introduction

This Technical Note gives the background to the calculation of U-values for curtain walls. It refers to 'The thermal assessment of window assemblies, curtain walling and non-traditional building envelopes' published by CWCT.

It gives guidance on the calculation of U-values and describes how curtain walls may be improved to reduce their U-values.

### Curtain wall types

This Technical Note relates to the following construction types. A fuller description of each is given in TN 14.

#### Stick curtain walling

Stick curtain walling comprises a frame of mullions and transoms with infill of glass and insulated panels. The U-value is dominated by the glass and the frame, particularly if it is an aluminium frame. Modifications to the insulated infill panels or fit out have limited effect on the overall U-value.

Stick curtain walls are commonly largely glazed constructions. The overall U-value will be greatly affected by the ratio of glazing area to area of opaque infill panels, which is called the glazing ratio.

#### Unitised walling

Unitised walling is similar to stick curtain walling but assembled into units prior to installation. Its thermal performance is similar to that of stick curtain walling. Framing members are generally wider than for stick curtain walling so have lower frame

U-values. However, the overall U-value is similar for the same glazing ratio.

#### Panelised walls

Panelised walls are constructed as prefabricated storey height panels spanning bays of the main structural frame of the building. They are generally based on a structural steel frame or precast concrete panels and are less commonly used than stick and unitised walls. Panelised walls are fundamentally different from stick and unitised walls both in their construction and calculation of thermal performance and are not considered in this Technical note.

#### Rainscreen

A rainscreen is an outer layer of panels with a ventilated cavity behind. They may be used as a decorative finish hung in front of the opaque areas of stick or unitised curtain walls. The panels make no contribution to thermal insulation and are omitted from U-value calculations. However, the panel support rails and brackets may form linear and point thermal bridges and must be included in U-value calculations.

#### Energy transfer

The total energy transfer through a building envelope is due to:

- Temperature difference between the warm and cold environments;
- Solar radiation;
- Air leakage.

This Technical Note only deals with the heat transfer due to temperature difference, which is expressed in terms of U values

