



BY JOHN BURGESS,
BRANZ SUSTAINABILITY
SCIENTIST

Surface coefficients for windows

CONFUSION CALCULATING R-VALUES FOR WINDOWS SHOULD BE ELIMINATED NOW BRANZ HAS DETERMINED THE SURFACE COEFFICIENTS.

THE THERMAL INSULATION VALUE of any building product or system is the sum of the thermal resistance of the materials plus the effective thermal resistance of the thin layer of air that sticks to the surfaces (the surface coefficients).

Although the actual thermal resistance of an element or system is constantly changing, a constant R-value is needed for construction and regulatory purposes. Table 1 displays the three most common sets of surface coefficients used for the U/R value of glazing systems in New Zealand.

For a wall insulation product, for example, with an R-value of 2 m²K/W, the surface coefficients may be 8% of the R-value, but for single glazing with an R-value of 0.17 m²K/W, the surface coefficients are virtually 100% of the R-value!

NZS 4214:2006 *Methods of determining the total thermal resistance of parts of buildings* says that surface coefficients of 0.03 and 0.09 m²K/W

shall be used for all building products except windows or glazing, for which other methods should be used – hence the confusion.

Appropriate surface coefficients

A recent Building Research Levy-funded project by BRANZ, in conjunction with the Window Association of New Zealand, determined appropriate surface coefficients for windows and glazing. This found the CEN values in EN 673:2011 – as called

up by the ISO 10077-1:2006 standard – should be used (see Table 1). The definition of these surface coefficients has potential implications for some New Zealand standards.

However, the R-value of 0.26 m²K/W for clear double glazing in aluminium frames is unlikely to change.

For more ▶ Further details will be available in a BRANZ Study Report at www.branz.co.nz, then BRANZ Shop. ◀

Table 1

SURFACE COEFFICIENTS (m²K/W)

METHOD	OUTDOOR COEFFICIENT	INDOOR COEFFICIENT	TOTAL COEFFICIENT
NZS 4214, 4243	0.03	0.09	0.12
ASHRAE/NFRC (USA)	0.038	0.12	0.16
CEN (Europe)	0.04	0.13	0.17
Glazing in NZ (new)	0.04	0.13	0.17