Where, R is the thermal resistance (m^2k/W), d is the thickness of material (m) and λ is the thermal conductivity (W/m.K) of the material.

The fact that glazing area is an important consideration in a building and larger areas will require better glazing characteristics is recognised by this regulation. This regulation defines glazing area ranges: up to 40% of the façade, between 40% and 60% of the façade and greater than 60%. It also considers glazing area ranges on roof. Glazing performance criteria as indicated and as applicable from Table 501.01 (2) to 501.01 (7) must be considered.

U-values for windows are for the entire window assembly, which includes the frame, glass and any bridging elements. If aluminium window frames are to be used, it would need to incorporate thermal breaks to comply with the required standards.

Transmission of heat in a building also takes place through windows by direct and indirect solar radiation. Ability to control this heat gain through windows could be measured in terms of the shading coefficient and the solar heat gain coefficient.

Shading Coefficient (SC) is the ratio of the amount of heat passing through glazing compared with that through a single clear pane of glass. Shading coefficient is a measure of the heat gain through glass from solar radiation and a lower shading coefficient indicates lower solar gain. SC is expressed as a number between 0 and 1.

Solar heat gain coefficient (SHGC) indicates the percentage of solar radiation (across the entire spectrum) incident upon a glazing assembly (window or skylight) that ends up inside a building as thermal energy (heat). SHGC represents the ability of glazing assembly to resist heat gain from solar radiation. A high value of SHGC means poor resistance for heat gain.

The relationship between shading coefficient (SC) and solar heat gain coefficient (SHGC) can be expressed as:

SHGC=SC*0.87

Another important factor that must be considered for glazed element is minimum light transmittance value. It is important to achieve a balance between restricting the amount of heat transmitted into the building and achieving a good level of natural light to provide suitable levels of illumination while reducing energy use. By requiring a minimum level of light transmittance to complement the shading coefficient, a balance should be achieved.

Duly filled DM Thermal transmittance calculation sheet (U-value) along with envelope sectional details demonstrating compliance with the regulation, must be submitted to DM. DM Thermal transmittance calculation sheet contains a database of materials and systems and their DCL approved K-value (or R-value), for reference. Project teams can utilise this database for selection of envelope configuration in compliance to the targeted U-value. Materials and systems provided in the database have a unique reference number, which the project teams must input in the DM Thermal transmittance calculation sheet along with thickness, to compute the U-value for the envelope.

As part of procurement of materials during construction stage, thermal and optical specifications of materials should be obtained from manufacturers and suppliers. Based on these specifications, compliance to this regulation should be demonstrated. These specifications also allow for calculation of performance criteria for composite building materials. Project teams can also opt for better thermal performance than those required in this regulation, as it would yield higher energy savings.