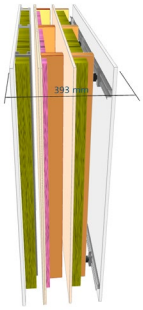
INSUL

Sound Insulation Prediction Software Version 10

insul.co.nz

INSUL is a quick, reliable and easy-to-use app that's ideal for modelling the sound insulation performance of partitions, glazing, floors, ceilings and porous materials.

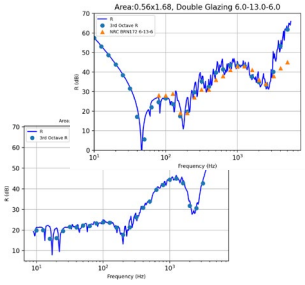
+ **STC** and $\mathbf{R_w}$ airborne sound insulation predictions for Single, Double, Triple and Quad systems
+ **IIC** and $\mathbf{L_{n,w}}$ impact sound pressure level predictions for Single, Double and Triple systems
+ Rain noise predictions for Single and Double systems for natural rain and laboratory rain
+ A powerful suite of supporting features and tools including auralisation, a materials editor and export options for SoundPLAN, CadnaB and SonArchitect
+ Dedicated calculators for outdoor-indoor noise and composite transmission loss

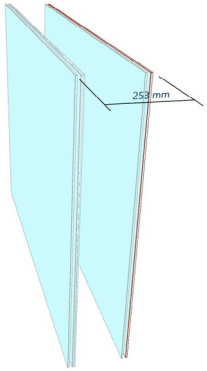


Quad modelling

The INSUL Version 10 algorithms have been rebuilt from the ground up extending INSUL's existing sound insulation models for Single, Double and Triple systems to now include Quad system models too.

The new Quad models can accommodate three separate air cavities, each with its own combination of frame and infill material. And like any INSUL model, the panels for a Quad model can be chosen from INSUL's built-in database which has hundreds of different materials and products.





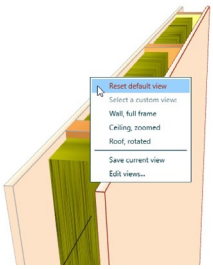
All new waved-based glazing model

Glazing systems present unique challenges in predicting sound insulation due to the inherent low levels of internal damping in glass and edge-only pane support. The absence of intermediate framing and acoustically absorptive infill in the cavities of multiple-layer glazing systems exacerbates resonance effects, making conventional models less reliable.

Version 10 introduces a new, cutting-edge wave-based glazing model that complements INSUL's existing algorithms.

+ **Modal Response Integration** The new model accounts for the modal responses of both the glass panes and the air cavities (when present), capturing the intricate interplay between them.
+ **Dimensional Dependence** A standout feature of the new model is its refined sensitivity to the dimensions of the glass panes, accommodating related cavity cross modes.
+ **Framing and Spacer Options** The model accounts for the vibration coupling through window frames and glazing unit spacers, with a range of different frame types available to model.

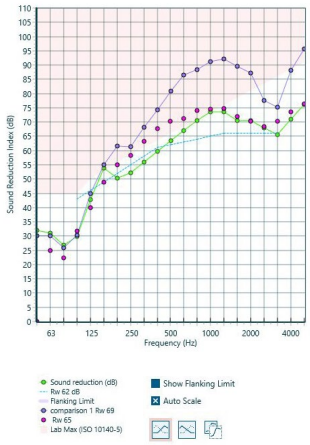
In essence, the wave-based glazing model amplifies INSUL's prediction capabilities, offering a more sophisticated tool for sound insulation prediction in the domain of window and glazing systems.



Favourite views

The 3D illustration is the heart of INSULs user interface. It shows the system being modelled in INSUL, it's used to access material properties and it's also an important feature on print outs.

It's now possible to save the view of the illustration and recall it later. The panned, zoomed and rotated point of view of the illustration is bundled together with a custom name and can easily be restored later in a modelling session at the click of a button.



Models for the real world

INSUL includes several new features designed to help keep sound insulation models anchored to real world expectations.

+ **Refined material properties** Youngs Modulus and damping values for hundreds of the materials in INSUL's database have been refined for better alignment with real-world values. In tandem, INSUL's algorithms have been adjusted to match these refinements meaning modelling outcomes are as reliable as always.
+ **New frames** Several new frame types have been introduced to represent potential secondary laboratory flanking paths that can constrain measured sound insulation values in some laboratory tests.
+ **Lab limits** The INSUL chart for airborne sound insulation includes typical R'_{max} values for laboratory measurements of Type C walls and floors as detailed in ISO 10140-5:2010: *Acoustics – Laboratory measurements of sound insulation of building elements – Part 5: Requirements for test facilities and equipment.*

As INSUL's airborne sound insulation modelling capabilities extend from Triple to Quad, these tools are an increasingly important feature in INSUL's tool chest, helping to link models back to real-life acoustic outcomes.