



Wigan's Thermocill Experience

October 2022

Session

- ✓ **The Challenges**
- ✓ **Thermocill**
- ✓ **The Science**
- ✓ **Wigan Council's Experience**

The Challenges

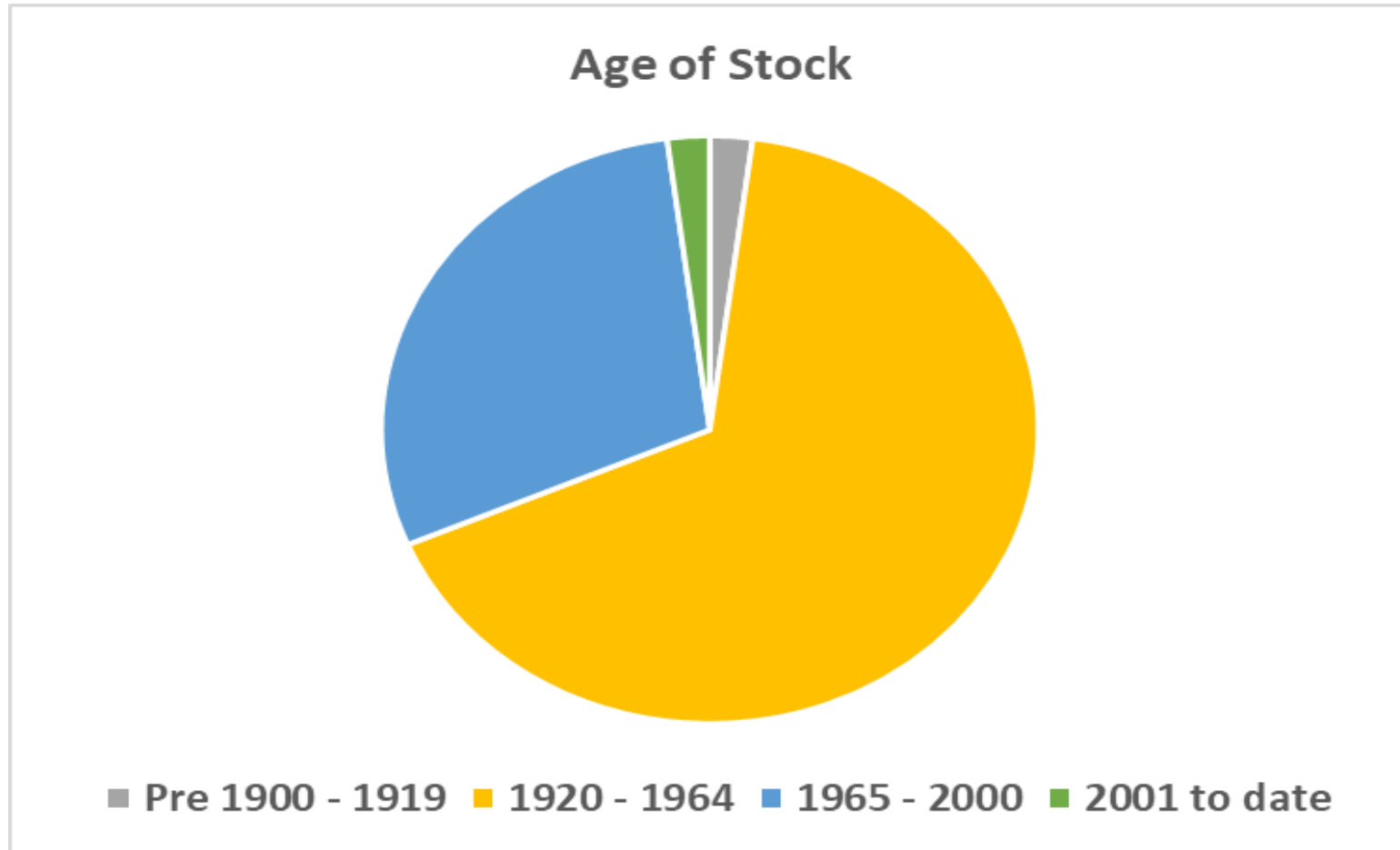
- **Climate Emergency**
- **Age of Housing Stock**
 - **Heat Loss / Condensation / Tenant Health / Disrepair Claims**
- **COST OF LIVING CRISIS**

Climate Emergency

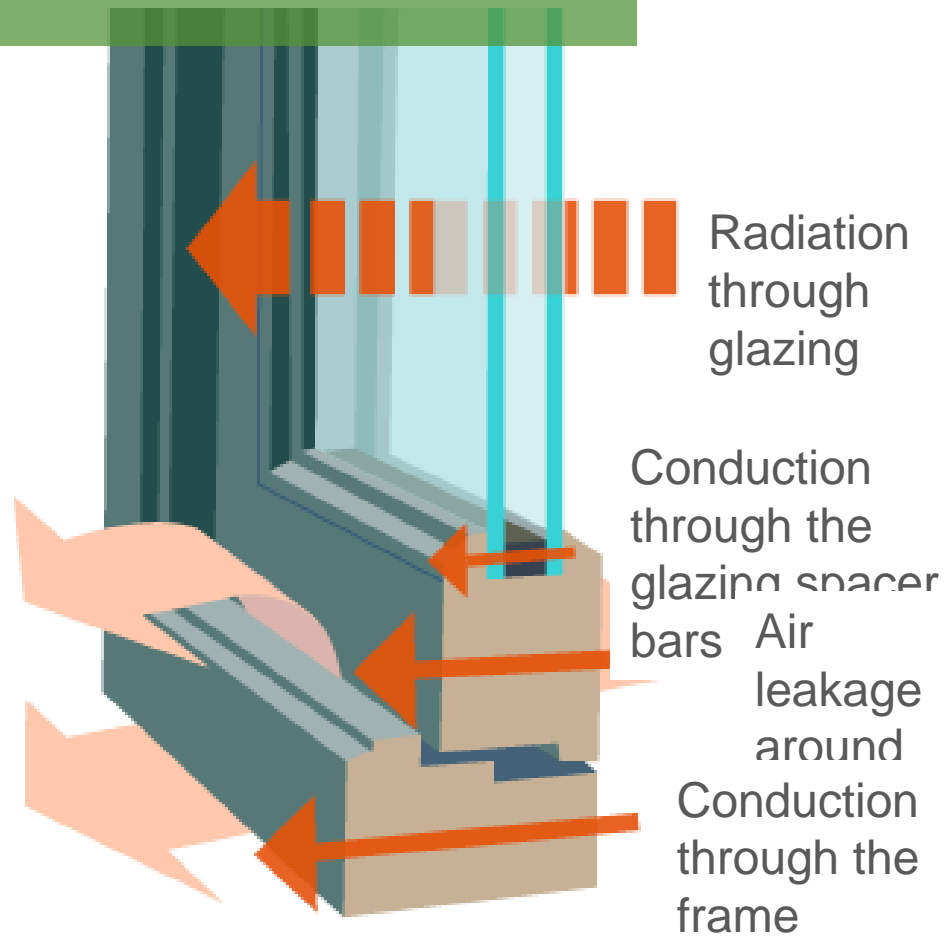
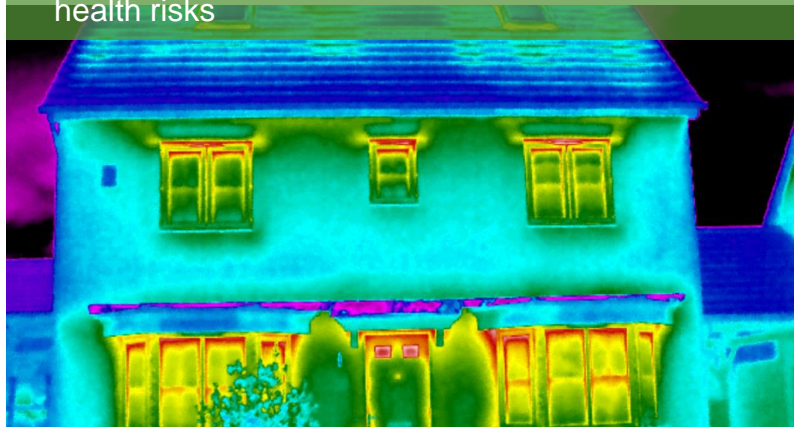
A key motivator for the Council, with our residents, community groups and young people identifying that the state of the environment was a key issue and presented a major concern.

Council Vision for Net Zero Carbon by 2038.

Age of Housing Stock



- Windows are major sources of energy loss in buildings
- Windows are significant sources of condensation/damp/mould with well-established and long-term health risks





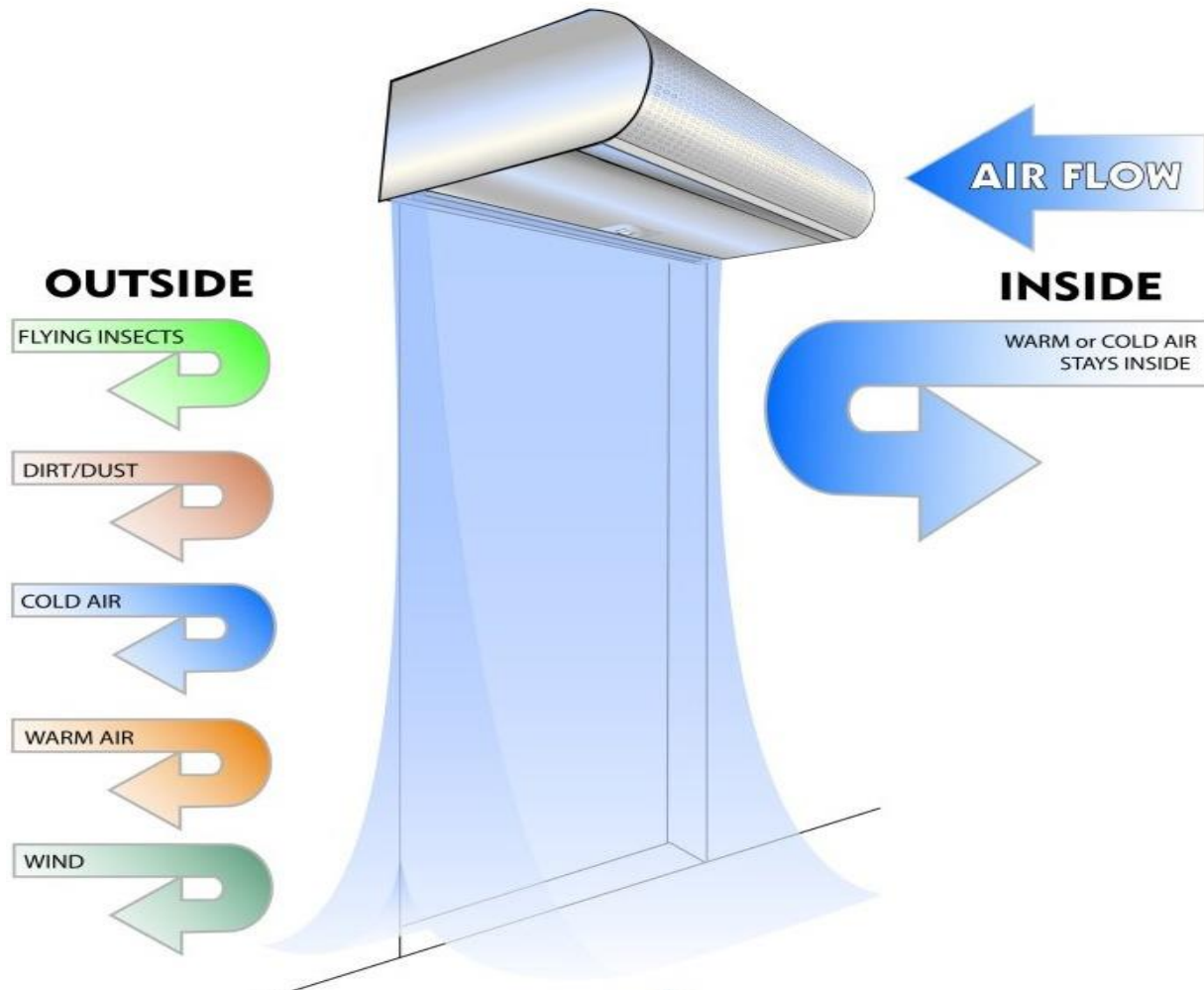
COST OF LIVING CRISIS

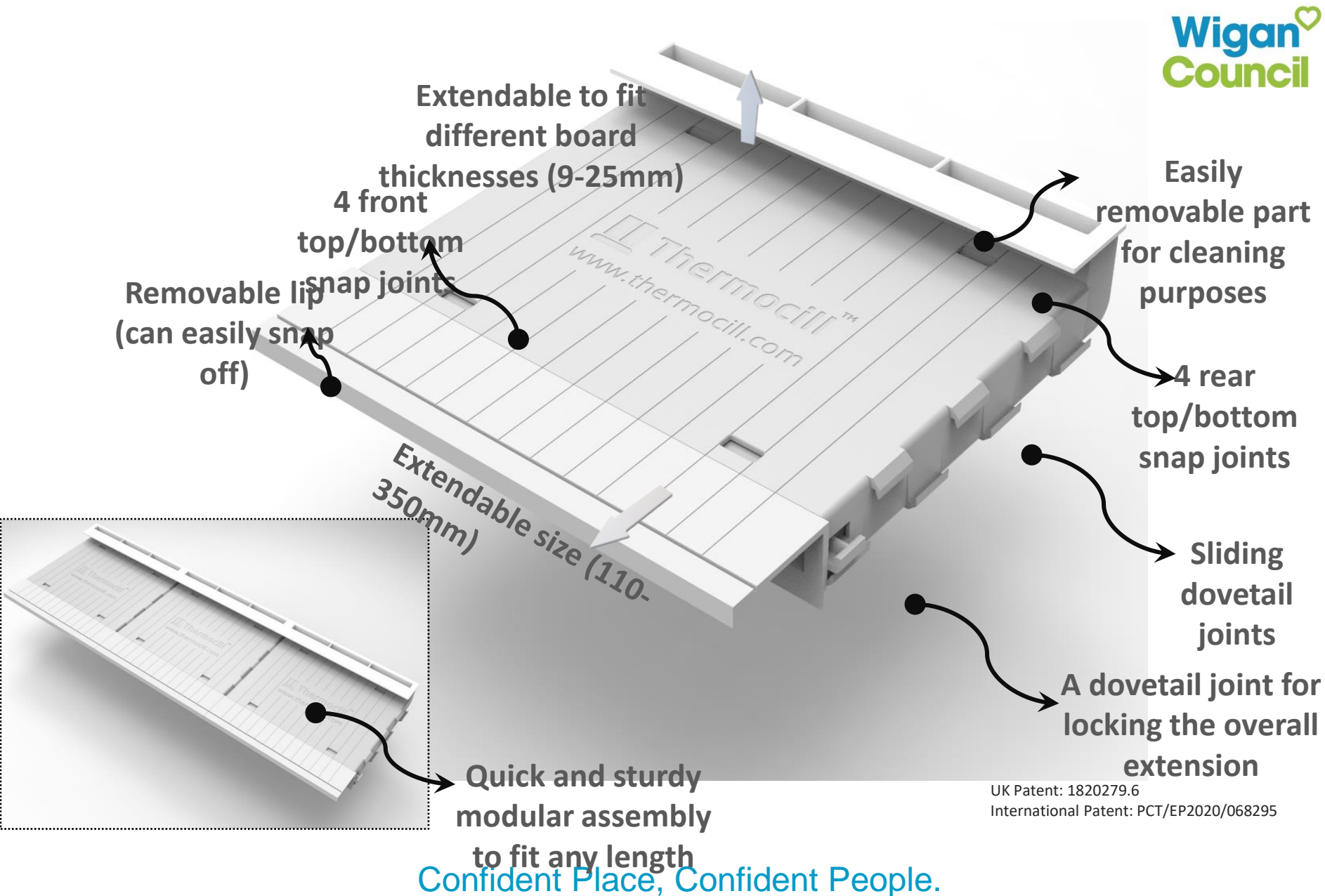
- **Financial difficulties faced by tenants always high on list when making decisions**
- **Cost of Living Crisis has brought financial difficulties to a much larger proportion of tenants and will they turn on their heating?**

Thermocill

- ❑ Thermocill Ltd. have developed an innovative passive energy efficiency product called Thermocill which is placed underneath a window board in a home. It replaces the standard window board with a similar looking unit which contains a channel to redirect warm air from a radiator underneath a window, up towards the windowpane. This creates a wall of warm air adjacent to the windowpane.
- ❑ The wall of warm air generated by Thermocill is claimed to reduce the amount of heat loss through the window, thus reducing the dwelling's heating demand. Raising the temperature around the window frames is also claimed to reduce problems associated with condensation and moisture.

Air Curtain





Extendable to fit
different board
thicknesses (9-25mm)

4 front
top/bottom
snap joints

Removable lip
(can easily snap
off)

Extendable size (110-
350mm)

Easily
removable part
for cleaning
purposes

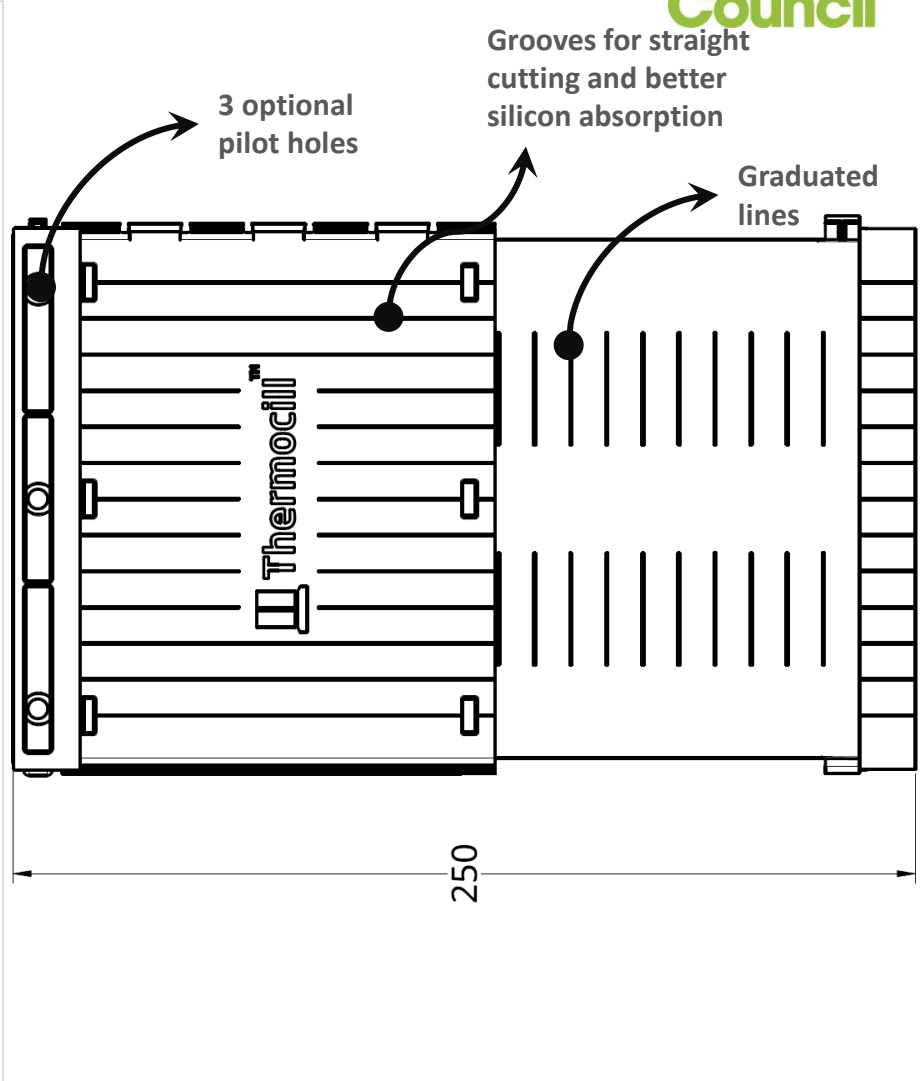
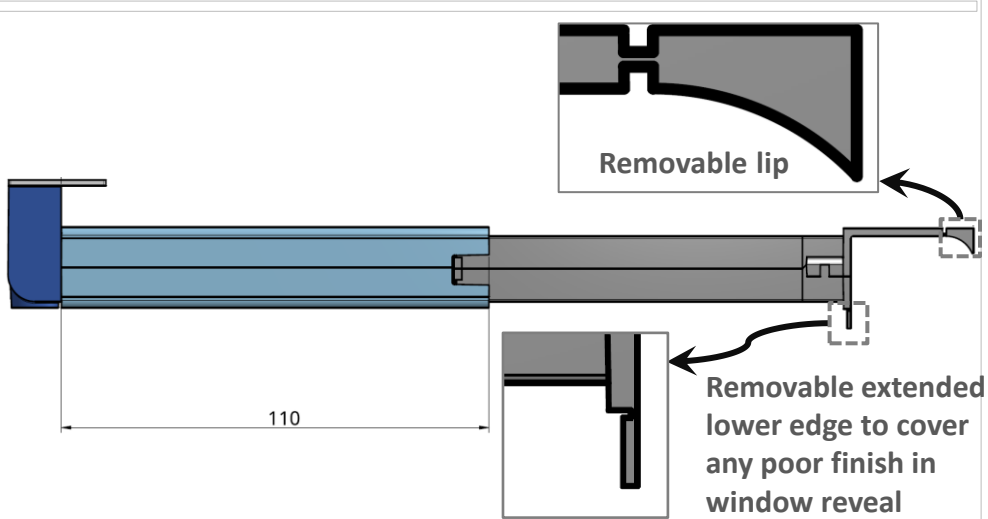
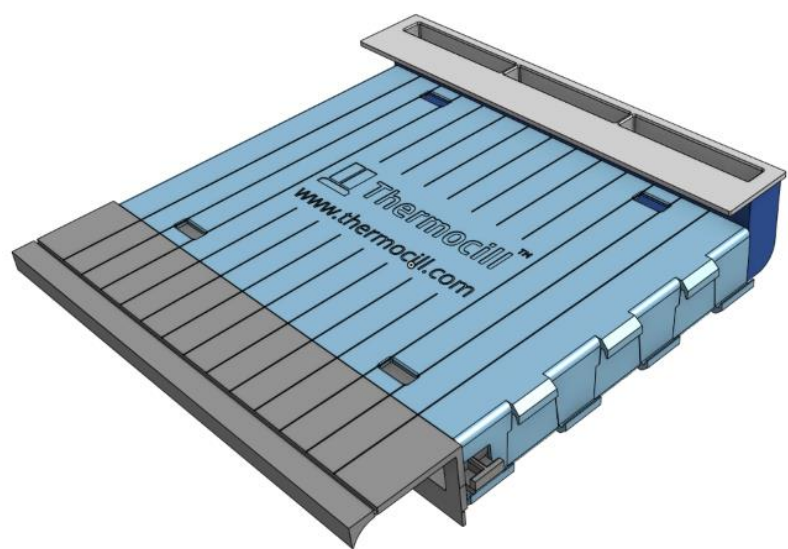
4 rear
top/bottom
snap joints

Sliding
dovetail
joints

A dovetail joint for
locking the overall
extension

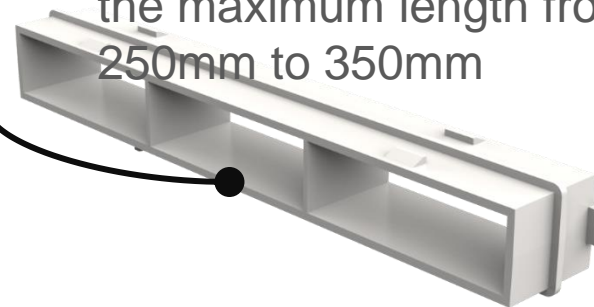
Quick and sturdy
modular assembly
to fit any length

UK Patent: 1820279.6
International Patent: PCT/EP2020/068295

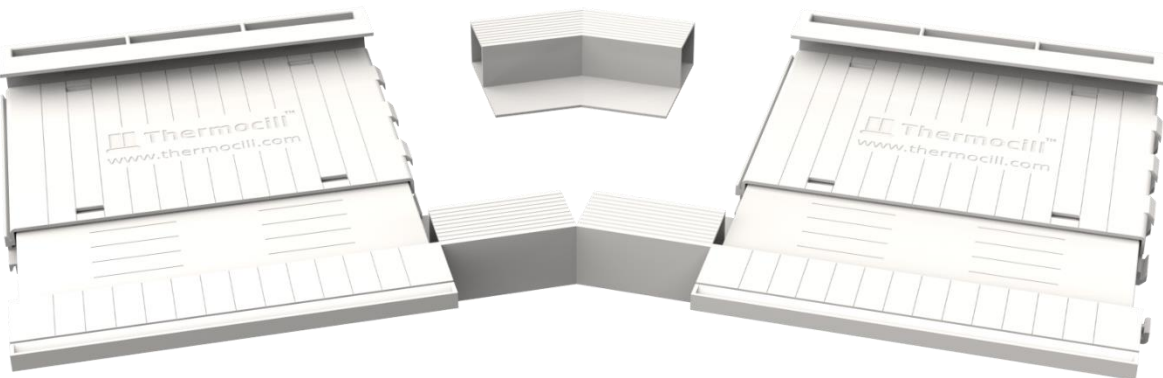
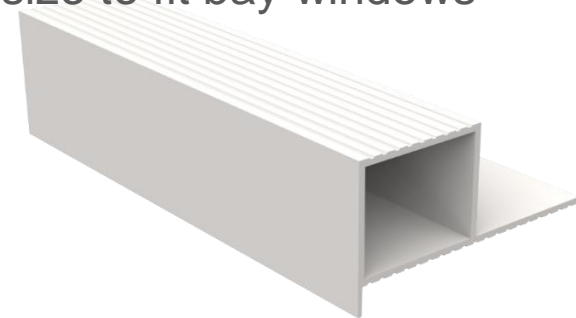


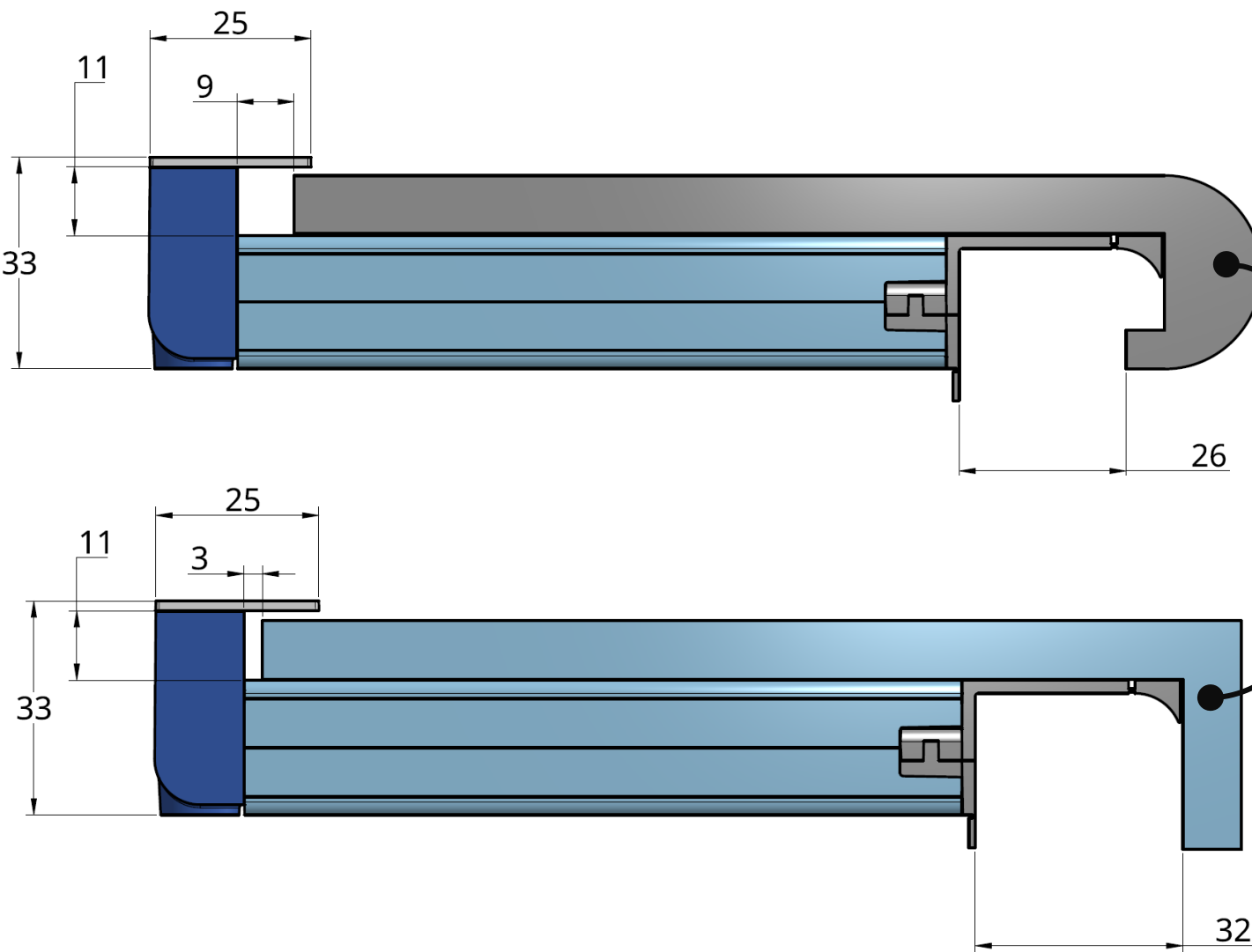


Extension piece to take the maximum length from 250mm to 350mm



Extruded piece to cut to size to fit bay windows





Compatible with most window board designs

Thermocill Install

<https://youtu.be/wkzRsTlqzQA>

Thermocill Claims

Thermocill claims that where a Thermocill unit is installed to a window above a radiator:

1. The energy required to heat a room is reduced by up to 14%
2. The time taken for a room to heat up is reduced by up to 19%
3. The likelihood of condensation at the bottom of the window is significantly reduced
4. Space heating demand could reduce by up to 8% per year
5. 150 kg CO₂e per year could be saved

The Science

- ✓ Energy Savings Trust were asked to verify the products performance in Nov 2020 – based on submitted evidence from Thermocill, that their product provides financial, carbon and energy savings, as well as reduced condensation within the home.
- ✓ Thermocill's original iteration of the product was originally tested at Salford University's Salford Energy House.
- ✓ Optimised version created through an optimisation process by University of Manchester.
- ✓ Optimised version reviewed by EST, regarding its performance compared to original version, as experimental evidence only available on the original version.

The Science

- Experiments carried out in the Thermal Comfort Laboratory. Measurements were carried out with room temperature set points of 21°C and 23°C for test cases where Thermocill was installed on a window which had a radiator underneath it. These were compared to control scenarios where Thermocill was not installed. Each scenario was run for 9 hours.
- It should be noted that the results at 23°C are lower than the 21°C scenario, with the heat up time being worse for the Thermocill case. EST highlighted any claims should therefore make it clear that performance is highly susceptible to the set point temperature of the room.

The Science

EST in their verification of Thermocill's claims explained the basis of the claims and caveats:

CLAIM 1: The energy required to heat a room is reduced by up to 14%

CLAIM 2: The time taken for a room to heat up is reduced by up to 19%

These savings are based on testing carried out at the Salford Energy House on the original Thermocill design.

Computational Fluid Dynamics simulations demonstrate the optimised new design improves the performance of Thermocill with respect to air flow rate and temperature at the base of the window which could potentially improve the energy savings and time taken to heat up a room.

Caveat: The values are based on a 9-hour heating cycle from experimental work carried out at the Salford Energy House on the original Thermocill design. This assumes a room with double glazed windows, a typical external brick wall construction and a temperature set point of 21°C. Different temperatures and configurations may produce higher or lower savings.

The Science

CLAIM 3: The likelihood of condensation at the bottom of the window is significantly reduced

This is based on Computational Fluid Dynamics (CFD) simulations carried out by the University of Manchester which show an increase in the temperature around the bottom of the window, a common area for condensation to form. This increase in temperature corresponds to a 92% increase in vapour pressure which increases the evaporation rate of the water directly reducing the likelihood of condensation.

Caveat: Based on numerical studies, the addition of a Thermocill unit increases the temperature around the bottom of the window which produces a higher vapour pressure and therefore reduces the risk of condensation.

The Science

CLAIM 4: Space heating demand could reduce by up to 8% per year

These were calculated using EnergyPlus modelling software. Occupancy profiles, equipment use, and heating schedules use the default methodology in the software which are derived from the UK National Calculation Methodology. All heating sources were included in the calculation (i.e. heating from people, lighting and appliances were included alongside the heating system). Average efficiencies of 85% for space heating and 70% for domestic hot water were used to convert the raw heating demand for the property into actual kWh of gas used.

Caveat: Savings based on modelling carried out using the EnergyPlus software for a typical 3-bedroom semi-detached property with double glazed windows and an annual gas usage of 12,500 kWh before Thermocill is installed. When Thermocill is installed in the 3 bedrooms and the living room, this reduces the space heating energy by 14% in each of these rooms, based on experimental work carried out at Salford Energy House on the original Thermocill design. A heating set point of 21°C and a setback temperature of 16°C are assumed for the modelling. Other temperatures may result in different savings values.

The Science

CLAIM 5: 150 kg CO₂e per year could be saved

Calculated using EnergyPlus modelling software. Occupancy profiles, equipment use, and heating schedules use the default methodology in the software which are derived from the UK National Calculation Methodology. All heating sources were included in the calculation (i.e. heating from people, lighting and appliances were included alongside the heating system). Average efficiencies of 85% for space heating and 70% for domestic hot water were used to convert the raw heating demand for the property into actual kWh of gas used.

Caveat: Savings based on modelling carried out using the EnergyPlus software for a typical 3-bedroom semi-detached property with double glazed windows and an annual gas usage of 12,500 kWh before Thermocill is installed. Thermocill installed in the 3 bedrooms and the living room, reduces the space heating energy by 14% in each of these rooms, based on experimental work carried out at Salford Energy House on the original Thermocill design. A heating set point of 21°C and a setback temperature of 16°C are assumed for the modelling. Other temperatures may result in different savings values. An average GB gas CO₂ factor of 0.208 kgCO₂e/kWh is used for the savings.

Wigan Council's Experience

- Staff trained by Thermocill
- Not a difficult installation process – fiddly
- Installing when properties are void
- Restrictions on which windowsills it is installed on
- Unsure how the effectiveness will be analysed e.g. need a property and tenants with the same heating and living habits to compare against
- Heating cost rise implications – heating needs to be on !



**Thank you for your time
and attention.**