

EuroLine
Windows INC.

PASSION FOR
PASSIVE

4700-series

Thermo *plus*



ThermoPlus™ – Ideal for Passive House

Passive House (or Passivhaus, as it is known in Germany) is the European concept of a performance based building standard that dramatically reduces – or completely eliminates – the need for an active heating or cooling system to maintain a comfortable environment indoors. This is achieved through the use of an optimized building envelope and passive heating and cooling techniques.

Key components are the windows and doors – areas where significant energy losses occur.

The Window of the Future – Today

The new generation ThermoPlus window and door system uses Passive House Institute certified GENEÓ® window and door profiles by REHAU®. With its sophisticated chamber and seal design and multi-point locking ROTO® NT hardware, ThermoPlus forms a virtually impenetrable barrier for wind, rain, and cold. Add in high-performance glazing with a Super Spacer®, and you'll get the most energy efficient, versatile and durable system in its class.

Strength & Stability

RAU-FIPRO® is an innovative composite material formulation created by REHAU based on its extensive experience with composite materials for aircraft and Formula 1® race cars, and in the design and extrusion of high-performance uPVC window and door profiles. The result is a profile with high stability, torsion stiffness, and structural properties – all characteristics not formerly possible in vinyl systems without the addition of steel reinforcement. The hybrid core forms a continuous, weldable reinforcement that yields superior inner strength, allowing for larger

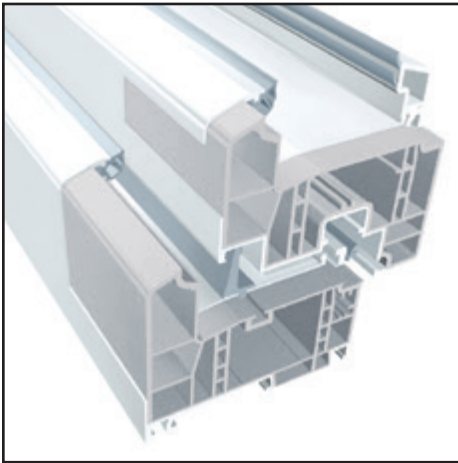
windows than previously possible without additional reinforcement. The outer layer of high-grade uPVC offers a smooth, pore-free, low-maintenance surface that only high-grade uPVC can provide. Both layers are inseparably fused during the extrusion process, forming a monolithic structure with a thermal expansion ratio that is 60% lower than that of regular uPVC.

Security, Peace of Mind, Convenience

ThermoPlus window and door systems come with robust multi-point locking hardware that seals out harsh weather, noise (up to STC = 47 (SSK 5) with standard IGU) and – when combined with laminated security glass – makes it virtually impossible for intruders to gain access. Striker plates on the frame are screwed into profile integrated screw channels that provide higher pull-out strength, while the tough, high impact strength profiles help resist break-in attempts. For added security, standard glass stops can only be removed from the interior.

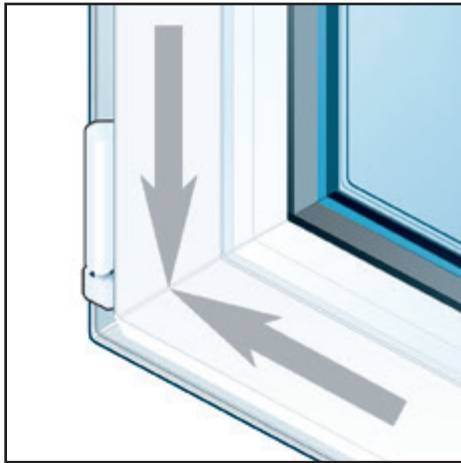
One easy-to-operate lever handle locks the window on all sides for a tighter seal and increased security. With standard hardware windows meet Grade 20 Forced Entry Resistance requirements of NAFS 11 and Enhanced Security WK2; WK3 is achievable with additional measures.

In the tilt position, part of the hardware is engaged to limit the opening, so windows can be left open for ventilation while still providing a basic level of security. In the turn position, the outside glass pane can be easily and safely cleaned – from the interior. The open window also provides quick egress in case of emergency.



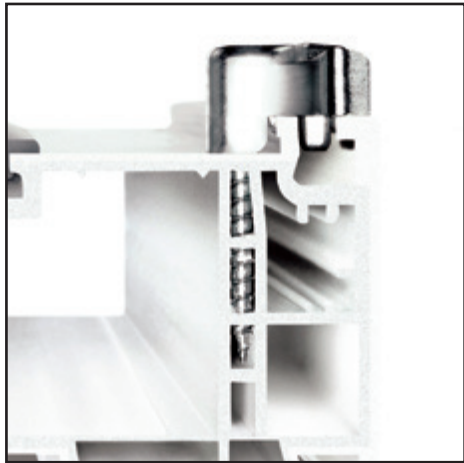
RAU-FIPRO Profile Core

The hybrid profile core, made from high-tech material RAU-FIPRO, gives the ThermoPlus system its strength and stability, making it possible to build larger windows without steel reinforcement.



Corner Stability

In contrast to other systems, ThermoPlus is reinforced right up into the corner and completely welded to ensure absolute water tightness - this welded corner is actually stronger than the material itself.



ISS - Integrated Stiffening System

Instead of chamber reinforcing, GENEÓ uses a patented stiffening system with integrated screw channels and additional torsion stability, resulting in higher pull-out strength and enhanced profile stability.



Credit: Bernhardt Contracting

BERNHARDT PASSIVE HOME

Compared to most Passive House designs, this house has a relatively complex form due to the lot shape and orientation. The complexity of the building form arises from the “T” shape, an enclosed garage outside the thermal envelope, and a number of other features incorporated to meet zoning requirements. As the front of the lot faces west, the building must maintain a suitable presence from the street, while maximizing the southern orientation for solar heat gain in winter. In addition, the building is a two-family residence for a young family of four, with active grandparents in a suite. To provide separation of living spaces, the upper suite uses the front yard as outdoor space. The secondary suite on the lower level is on grade, with the backyard as its outdoor living space.

While PHPP calculations indicated that the building would meet Passive House energy efficiency standards with increased insulation levels – which would result in some incremental construction costs – the goal for this project was to build a residence within a budget typical of residential construction. Due to this, costly design options were minimized and readily available building products were used.

Project Location: Victoria, BC
Type of Construction: Two-Family Residence
Architect: Cascadia Architects Inc.
General Contractor: Bernhardt Contracting Ltd.
Scope of Project: 23 windows, 7 doors

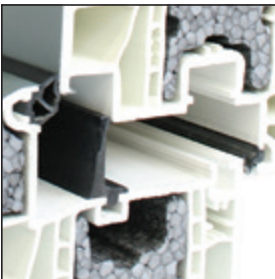
“Although it is possible to meet the Passive House Standard with good – rather than great – windows and doors, we have chosen to install great windows. A true Passive House standard window not only performs better, but provides superior thermal comfort, assures long term air tightness, permits more design flexibility and larger window areas”, says Mark Bernhardt, president of Bernhardt Contracting. “We have been living in the home for over a year and it has performed almost exactly as predicted. What we could not grasp prior to living in it was the amazing comfort, indoor air quality and quiet interior environment of a Passive House. We have never experienced anything like it”.

The Bernhardt Passive Home achieved a final blower door test result of 0.48 ACH, and was certified by the Passivhaus Institute in Darmstadt, Germany.

Designed for High Thermal Performance

With an 86mm (3 3/8”) deep, 6-chamber design, GENEО profiles achieve exceptional thermal performance just on their own. Eliminating steel reinforcement also means avoiding a thermal bridge within the profile, and with reinforcement not necessary for most applications, EPS thermal modules can be added for even better insulation, meeting stringent Passive House standards. Tested to EN 12412-2, a u_f of 0.77 W/m²K (0.14 BTU/h*ft²*°F) is achieved.

The large 66mm (2 5/8”) glazing rebate enables the use of sealed units or panels with an overall depth of up to 52mm (2 1/16”). Standard glazing is a minimum of 4mm (3/16”) thick per pane (thickness increases based on structural demands), with structural TriSeal™ Super Spacer and argon gas between the panes standard. TriSeal has the highest gas retention amongst spacers currently on the market.



Optimized Thermal Insulation

GENEO’s 6-chamber design includes functional chambers that can be stuffed with optional thermal modules to maximize insulation properties.

Triple Seal System

With their three co-extruded, continuous seals, ThermoPlus windows and doors have pressure-equalized chambers that are air and water tight. Hardware is located in the dry interior cavity, providing added protection from corrosion.

Performance Results

Tested to NFRC 100-2014 standards

Double pane:

4mm E270 - 16mm argon - 4mm clear

U_w 1.37 W/m²K (0.24 BTU/h*ft²*°F)

Triple pane:

4mm E366 - 16mm argon - 4mm clear - 16mm argon - 4mm E366

U_w 0.79 W/m²K (0.14 BTU/h*ft²*°F)

NAFS (AAMA/WDMA/CSA 101/1.S.2/A440-11)

Primary:

Class CW-PG3360-Size Tested 1200 x 2180mm (47” x 86”) – Type DAW

Secondary:

Positive Design Pressure (DP) 3360 Pa (70 psf)

Negative Design Pressure (DP) 3360 Pa (70 psf)

Water Penetration Resistance 720 Pa (15 psf)

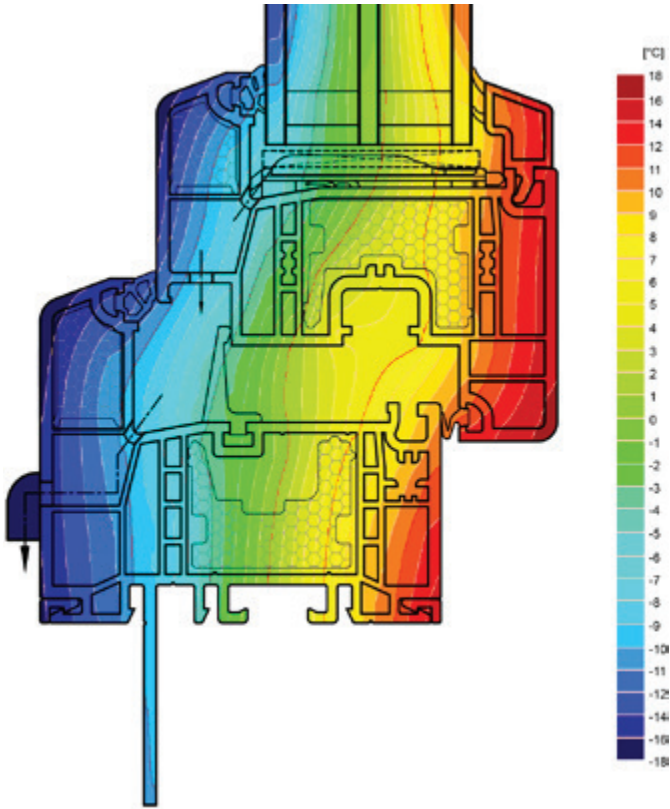
Air In/Exfiltration* A3[†]

Water Resistance* B7

Wind Load* C5

*Tested to CSA-A440 test sizes

[†]A3=0.5 L/s*m² (0.10cfm/ft²) vs. EuroLine test result of 0.010 L/s*m² (0.002 cfm/ft²)



Product ^{1,2}	U _f ³ W/m²K (BTU/h*ft²*°F)	Frame Height mm (inches)	Ψ (psi) W/mK (BTU/h*ft²*°F)	U _{COG} ⁴ W/m²K (BTU/h*ft²*°F)	Solar Factor (g) COG
Tilt & Turn window	0.77 (0.14)	115 (4 1/2)	0.033 (0.019)	0.63 (0.11)	0.55
Picture window	0.75 (0.13)	72 (2 13/16)	0.033 (0.019)	0.63 (0.11)	0.55
Door	0.78 (0.14)	142 (5 9/16)	0.033 (0.019)	0.63 (0.11)	0.55

¹ Glass: 4mm Cardinal LoE180 - 16mm argon - 4mm clear - 16mm argon - 4mm Cardinal LoE180
² With TriSeal Super Spacer
³ U_f tested according to EN 12412-2
⁴ Centre of Glass (COG) U value and Solar Factor according to EN 673 and EN 410



Credit: Bernhardt Contracting

NORTH PARK PASSIVE HOUSE

Designed by HCMA as project architects, this 6-unit condominium building is the first market condominium building in Canada to meet the stringent international Passive House standard of energy efficiency.

“Deep set windows and doors are a result of wall thickness and, simply through their inherent quality, will have a European feel, with detailing and shadow lines rather than more recent lightly built structures”, states project architect Adam Fawkes. “This project provides a benchmark for future developments by showing what can be achieved with high quality residences designed within their architectural, urban and environmental context”.

The buyers of the units – which sold out quickly – were attracted to the qualities of a Passive House: amazingly quiet; comfortable, even temperatures; and a constant supply of fresh air in each room. These features were available at an affordable price considering the low strata fees and operating costs of a certified Passive House.

The inside surface of the windows, both glass and frame, are warm enough to prevent drafts and avoid conden-

- Project Location:** Victoria, BC
- Type of Construction:** Multi-Family Condominium
- Architect:** HCMA Architecture + Design
- General Contractor:** Bernhardt Contracting Ltd.
- Scope of Project:** 27 windows, 5 doors

sation. Being able to sit beside a large window in winter without feeling a chill increases the useful living area, an important factor in a compact urban setting.

To maintain comfortable temperatures in the summer, the high performance windows are shaded from the summer sun, but exposed to the winter sun. Balcony overhangs on south-facing patios provide summer shade to those windows, while east and west facing windows are fitted with remotely controlled exterior blinds to provide shade when required.

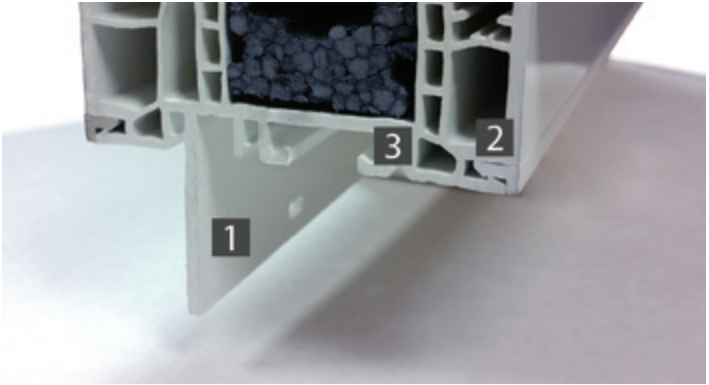
In addition to providing residences at market values, the North Park Passive House aligns with community objectives to reduce CO₂ emissions and provide human scale development appropriate for the neighbourhood.

Designed for North America

While the technology may be European, the new generation ThermoPlus system was designed specifically for the North American market.

EuroLine’s exclusive GENEО frame features:

- 1. Integral nailing fin
- 2. Accessory grooves
- 3. Support legs



The integral nailing fin is welded together with the rest of the frame, making it air and water tight, and much stronger than a snapped-in or glued-on fin could be. If windows are not installed flush with the exterior, and the nailing fin is not required, it can simply be cut off.

Grooves on the exterior and interior of the frame not only allow for easy snap-in installation of brickmoulds, drywall returns and other accessory profiles – they also aid in the connection of muller units, as cover caps can be snapped into the grooves, further strengthening the connection.

Support legs transfer the load of the unit onto the sill of the window opening through shimming, and are designed in such a way that strap anchors can be fastened without having to screw them into the frame. The flat surface facilitates proper application of rod and caulk.

Endless Possibilities

Choose from a large array of 4700-series ThermoPlus products – picture and tilt & turn windows; single and French patio or entry doors; swing only, tilt & turn and tilt & glide doors – combine them with a large variety of weather resistant acrylic finish foils of the highest quality – including brushed metal and metallic powdercoat looks, solid colours and life-like EuroWood™ finishes – as well as dozens of glass options, internal and external grids, etc., and the possibilities are virtually endless!

Superior Features

- GENEО Profiles: RAU-FIPRO fibreglass-reinforced core for high stability and torsion stiffness; co-extruded RAU-PVC outer layer for the best surface quality and weldable leak-free corners
- Designed for North America
- Fully reinforced, weldable corners
- Integral nailing fin
- Profile depth of 86mm
- 6-chamber design
- U_f of 0.77 W/m²K (0.14 BTU/h*ft²*°F) with optional thermal modules
- Triple Seal System – 2 compression gaskets, 1 centre seal
- ROTO NT multi-point locking hardware with self-healing Roto Sil Nano surface finish
- Meets Grade 20 Forced Entry Resistance requirements of NAFS 11 and Enhanced Security WK2 with standard hardware
- 66mm (2 5/8”) glazing rebate; min. 24mm (15/16”), max. 52mm (2 1/16”) total IGU thickness
- Up to STC = 47 (SSK 5) with standard IGU
- Large variety of colours, including EuroWood™ finishes
- **Ideal for Passive House**



Credit: Ankrom Moisan

ORCHARDS AT ORENCO (PHASE 1)

REACH Community Development, a Portland affordable housing development and property management company, has worked to provide families in Portland and throughout the Pacific Northwest with safe, attractive, affordable homes.

In June 2015, REACH completed the first phase of one of its most ambitious projects to date: Orchards at Orenco, a 150-unit multi-family residential affordable housing complex in suburban Portland that meets Passive House certification standards. At 3 stories, 57 units, and more than 57,750 ft² (5,365 m²) of space, Phase 1 of Orchards at Orenco is the largest multi-family Passive House building in North America.

A project that sets such a high bar for energy efficiency requires unique materials and a careful approach to design. Some of the most demanding specs were applied to the windows and exterior doors, which proved up to the task. A preliminary blower door test of Orchards at Orenco after the windows and doors were installed recorded 0.056 ACH50 – more than 10 times the efficiency required.

Project Location: Hillsboro, OR

Type of Construction: Multi-Family Residential

Architect: Ankrom Moisan Architects Inc.

General Contractor: Walsh Construction Co.

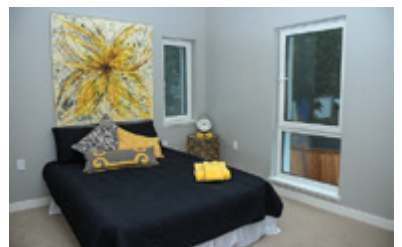
Scope of Project: 265 windows, 57 doors

“Normally”, says Marty Houston, quality director for Walsh Construction Co. in Portland, the project’s general contractor, “there is a gap in the rough opening between the window and the wall cavity. On the Orchards at Orenco project, those gaps had to be filled. We actually take rigid exterior insulation and bring it over and on top of the face of the window frame. These frames have a big section of material that you can have the insulation engage with. On lower-performing vinyl windows, you don’t have enough ‘meat’ on the frame to get that overlap”.

The Orchards at Orenco project passes the original and more stringent European standards for Passive Houses rather than the U.S. standards, which have been relaxed to allow for North America’s more extreme temperatures.



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