PASSIVE HOUSE

Commercial
Reference Projects

Swegon

PASSIVE HOUSE OVERVIEW & REFERENCE PROJECTS

WHAT IS PASSIVE HOUSE?

Passive House is a rigorous, voluntary standard for energy efficiency in a building, which reduces the building's ecological footprint. It results in ultra-low energy buildings that require little energy for space heating or cooling. Passive House projects are both residential and commercial. Passive House is gaining popularity in North America as a compliance path for high performance commercial buildings especially Zero Energy Ready projects. Passive House offers certification programs for buildings, contractors and design professionals and products such building envelope components and energy recovery ventilation units.

For more information on Passive House please visit:

www.passivehouse.com
www.PHIUS.org

HOSPITALITY & RETAIL

Hospitality is an excellent fit for Passive House. Owners benefit from lower operating costs, while guests enjoy greater comfort. Challenges include humidity management in both summer and winter due to the high performance building envelope.

Swegon solutions include the smart application of sensible or total energy recovery, demand control ventilation and integration of supplemental mechanical cooling such as chilled beams or VRF.

Passive House retail is gaining popularity where businesses want to show their commitment to sustainable design, and reduce operating costs. Challenges include air conditioning loads from high internal heat gain.

Swegon solutions include the smart application of sensible or total energy recovery, demand control ventilation and integration of supplemental mechanical cooling such as chilled beams or VRF.

Red Deer Subaru
Red Deer, AB

Explorer Hotel
Obersdorf

Teamhaus
Feuerwehrweg

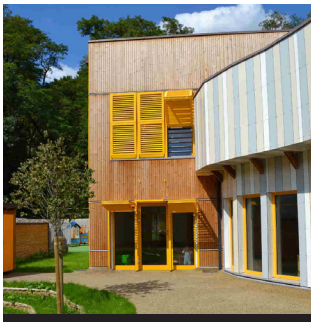
K-12 SCHOOL

Passive House and schools are well established in Europe where the high energy performance is aligned with the goals of the school board. Challenges include the high ventilation air load.

Swegon solutions include total energy recovery, boost economizer mode, integrated supplemental mechanical cooling such as VRF.

Oakmeadow
Wolverhampton

Kindergarten
Saint Brieuc



Kindergarten
Nogent sur Marne

K-12
Ancenis

Richmond Primary
Leeds

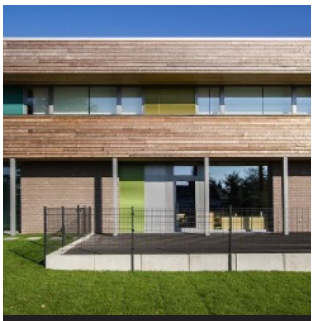
Kindergarten
Skövde

Bushbury Hill
Wolverhampton

Pre-K, NYCSCA
Queens

K-12
Collecchio

K-12
Kaltenkirchen



GBS Gilko
Merelbeke

K-12
Wiesbaden

MULTIFAMILY RESIDENTIAL

Multifamily Residential projects range from private high-end condos to public high density urban housing. Owners and occupants alike benefit from high comfort levels and low utility bills resulting from Passive House construction techniques. The challenges of these projects include indoor humidity management and comfort control.

Swegon solutions include the smart application of sensible or total energy recovery, demand control ventilation, boost control and integration of supplemental mechanical cooling such as VRF.

Carlington HUB
Ottawa, ON

Apartment
Munich

211 E 29th St.
New York, NY

Blossom Park Phase 2
Woodstock, ON

Radius
Whistler, BC

Apartment
Hamburg

Ask Wellness
Merritt, BC

Hamnhuset
Gothenburg

Kings, Daughters and Sons
Ottawa, ON

Hanac Corona
New York, NY

Apartment
Heilbronn-Neckargartach

Apartment
Schweich

OFFICE

Passive House Office projects are well established in Europe and gaining popularity in North America. Challenges for these projects include air conditioning loads from high internal heat gain.

Swegon solutions include the smart application of sensible or total energy recovery, boost economizer mode, demand control ventilation and integration of supplemental mechanical cooling such as VRF.

ATX Factor
Austin, TX

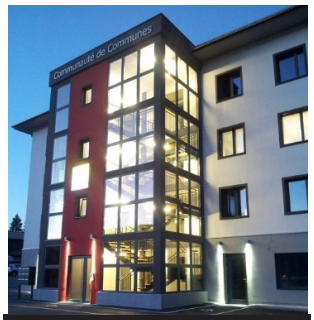
PHFA
Harrisburg, PA

Training Center
Clermont Ferrand

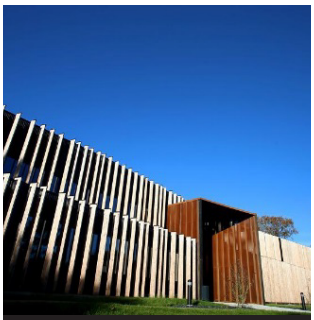
Offices
Clermont Ferrand

ECC
Berlin

Notre Logis
Halluin



Offices
Le Chatelard



Energy Dept.
Vannes

Start-Up Incubator
Gaziantep

Office
Saint-Etienne-du-Rouvray

Enterprise Center
Norwich

Charter Telecom
Victoria, BC

INSTITUTIONAL & PUBLIC BUILDINGS

Passive House institutional and public projects include university residences and labs, firehalls, police stations and community centers. Challenges vary greatly based on specific building use.

Swegon solutions include total energy recovery, boost economizer mode, integrated supplemental mechanical cooling such as VRF.

Salzmannschule
Walktershausen

Halifax Hospice
Halifax, NS

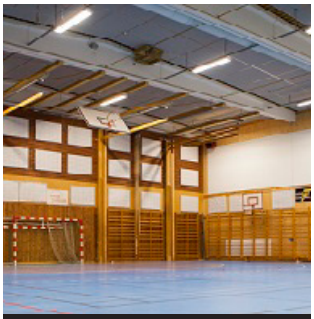
Burgas Art Gallery
Burgas

King's Hawford
Worcester

Bushbury Hill
Worcester

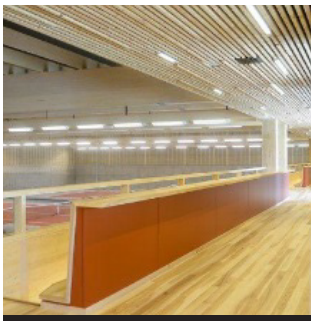
UNBC Wood Lab
British Columbia

Williams College Dormitory
Willilamstown, MA



Hälsohusets
Knivsta

Mehrzweckhalle
Nordhastet



Södra Arena
Växjö

Clayton Community Center
Surrey, BC

Humber College NX
Toronto, ON

EXCEPTIONAL ENERGY EFFICIENCY AND COMFORT WITH PASSIVE HOUSE

Passive house projects are both residential and commercial. The goal is ultra-low energy use while maintaining exceptional occupant comfort. This is accomplished by a high performance building envelope (fenestration, insulation and low leakage rates). In many cases the building can be heated and cooled by just conditioning the ventilation air.

The Energy Recovery Ventilator (ERV) system is the heart of most Passive House HVAC systems. Passive House Institute offers certification programs for most critical components including residential and commercial ERV units. The Swegon GOLD RX unit was the first commercial unit to be certified by Passive House Institute.

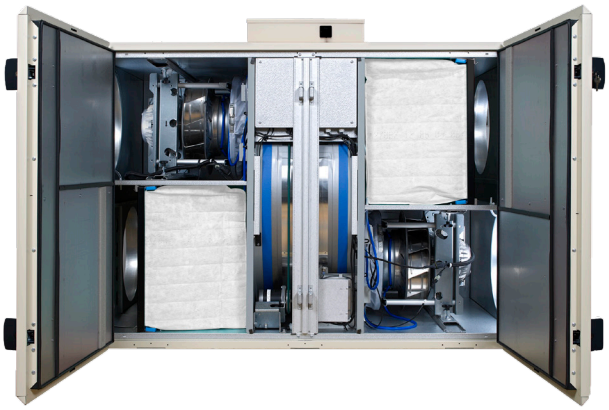
The PHI ERV certification program covers power consumption, cross contamination, energy recovery, air leakage, sound level and airflow control.

SURPASS COMFORT AND ENERGY EFFICIENCY EXPECTATIONS WITH GOLD RX NA

The Swegon GOLD is designed for low leakage, excellent thermal performance and low sound levels. Energy recovery is accomplished with Swegon's own heat or energy recovery wheel which is also permissible under the PHI certification. Swegon surpasses the 75% efficiency Passive House Institute minimum requirement with wheel efficiencies reaching 86%. Minimizing internal leakage (cross contamination) through the wheel is critical for Passive House with a maximum level of 3%. The Swegon GOLD unit is certified 0.45% internal leakage, thanks to unique control algorithms.

Minimizing unit energy consumption is critical to achieve Passive House goals. GOLD RX units are PHI-certified to achieve the electrical power target of < 0.77 W/CFM. This is achieved with direct-drive ECM motors and unique control algorithms.

Swegon GOLD units include integral controls with air flow monitors to optimize airflow and energy recovery and to meet PHI requirements for automated airflow balancing. IQLogic controls can integrate with BACnet, Lonmark, N2, Modbus and are BTL certified.



UNPARALLELED ENERGY EFFICIENCY LEVELS WITH RX

GOLD RX units are designed to perform efficiently and quietly, making them desirable for projects that need to consider space and energy. The GOLD RX is the first air handling unit for commercial buildings to be certified as a Passive House component.

GOLD RX	Dimensions			Airflow Range for PHI Certified Operation		Max. PD (in.wc.)*	Electrical Power Consumption (w/cfm)**	Heat Recovery Temperature Efficiency %†
Size	Length (in)	Width (in)	Height (in)	Minimum CFM	Maximum CFM			
05	60	30	40	318	589	0.888	<0.77	85
07	64	40	47	318	1071	1.063	<0.77	86
08	64	40	47	635	1047	1.04	<0.77	84
11	75	55	55	635	1450	1.128	<0.77	85
12	75	55	55	1059	1530	1.128	<0.77	84
14	82	55	62	1059	2522	1.168	<0.77	84
20	82	55	62	1483	2354	1.236	<0.77	84
25	87	63	70	1483	3237	1.316	<0.77	84
30	87	63	70	2118	2254	1.236	<0.77	84
35	96	78	82	2118	4414	1.393	<0.77	85
50	105	91	93	3178	5297	1.441	<0.77	85

* Max Pressure Drop: The maximum pressure drop takes into account the external duct pressure drop, filter pressure drop, and the pressure drop of any Gold coils or accessories.

** Electric Power Consumption: Required value must not exceed 0.77 w/cfm and covers the total power consumption of the unit.

† Heat Recovery Temperature Efficiency: Required value is at least 75%

Certificate

Certified Passive House Component
For cool, temperate climates

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
GERMANY

Category: **Heat recovery unit**
Manufacturer: **Swegon AB**
53523 Kvänum, Sweden
Product name: **GOLD RX Series**

This certificate was awarded based on the following criteria:

Thermal comfort	$\Theta_{supply\ air} \geq 62°F$ (16.5°C) at $\theta_{outdoor\ air} = 14°F$ (-10°C)
Effective heat recovery rate	$\eta_{HR,eff} \geq 75\%$
Electric power consumption	$P_{el} \leq 0.77$ W/cfm (≤ 0.45 Wh/m³)
Performance number	≥ 10
Airtightness	Interior[1) 2)] and exterior air leakage rates less than 3% of nominal air flow rate
Balancing and adjustability	Air flow balancing possible: required Automated air flow balancing: required
Sound insulation	It is assumed that large ventilation units are installed in a separate building services room. Sound levels documented in the appendix of this certificate
Indoor air quality	Outdoor air filter F7 (MERV 13) Extract air filter F5 (MERV 10)
Frostprotection	Not required at $T_{OA} \geq 5°F$ (-15°C)

1) Carry-over from extract air to supply air side
2) Due to heat exchanger condition the risk of carry-over from extract air to supply air side exists. In order to avoid carry over into the supply air side, pressure conditions in the device must be set as given by the manufacturer.

Further information can be found in the appendix of this certificate.

Certified for air flow rates of (total series)

317 – 5297 cfm
540 – 9000 m³/h

Requirements non residential buildings (Therewith device also applicable for residential buildings)

$\eta_{HR,eff} \geq 84\%$

Electric power consumption
0.77 W/cfm
0.45 Wh/m³

CERTIFIED COMPONENT
Passive House Institute

www.passivehouse.com