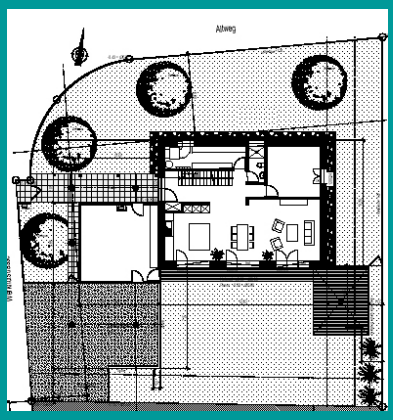
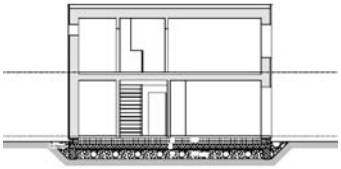


Dintikon, Switzerland

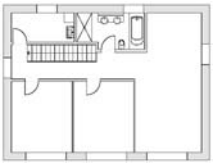
International Energy Agency

IEA – SCH Task 28 / ECBCS Annex 38:

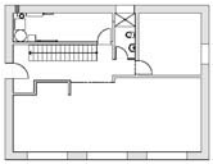
Sustainable Solar Housing



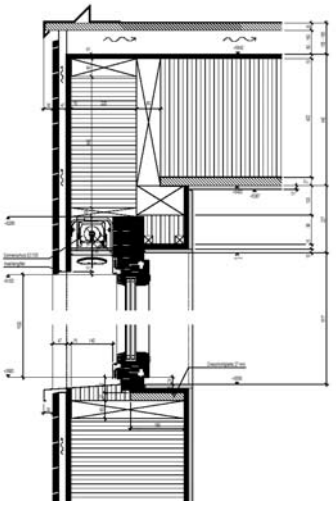
Cross section



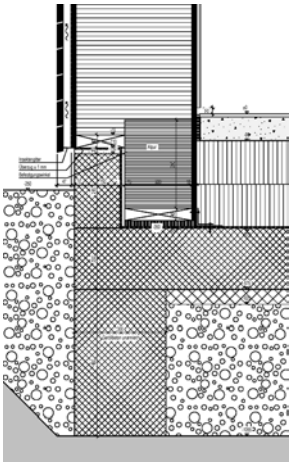
First floor



Ground floor



Detail roof



Detail floor

The project

This first Minergie-P[1] certified house of Switzerland was built by the architect Werner Setz in 2003. It is a privately built single family house.

The building is located in a rural area in Dintikon, (CH). It is situated on a north-west street corner with a neighbour to the east. The main orientation of the building benefits from the spacious and open agricultural field towards south. The single family house is very compact. Two unheated outbuildings create a south oriented courtyard and offer storage space. This eliminates the need for a cellar.

The heated floor area SIA[2] is 220 m^2 (including exterior walls). All main rooms are oriented towards south. The ground floor contains a spacious living area with an open kitchen, a workroom/guestroom as well as a plant room. The first floor includes two bedrooms and an open space.

[1] Swiss equivalent to the "Passivhaus" standard

[2] Swiss Society of Engineers & Architects

Objectives

The builders requested an optimised annual energy balance, a smart combination of passive and active solar energy use, modern and ecological construction as well as a conservation -conscious design of the site.

Building construction

The walls, ceiling and flat roof are in wooden frame lightweight construction. The whole envelope is free of thermal bridges.

Roof

Gypsum board, wooden strapping, wind barrier, wooden beams, mineral wool insulation, wood chip panel, sloped air gap, flat roofing

Ceiling

Gypsum board, wooden strapping, wooden beams with cavity insulation between, acoustic insulation, cement grout, finish flooring

Wall

Wooden lightweight construction, back-vented untreated douglas fir exterior skin.

Windows

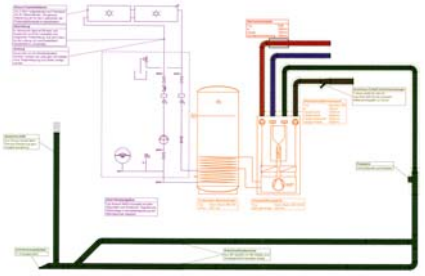
wooden-metal frames, triple glazing

Floor

Reinforced concrete, insulation, cement grout, paving tiles

U-Values	*[W/m2K]*
Walls	0.113
Roof	0.108
Floor	0.083
Windows	0.74
(g-value:	52%)

Photovoltaics installation on the roof



Technical system

Plant room: Expansion tank of the solar collectors, boiler, compact ventilation unit with integrated mini-heatpump and controller for the solar system.

Technical systems

Ground ventilation preheating

2 BP-pipes, 200mm diameter, 40m length

Mechanical ventilation

The supply air from the ground pipe is further tempered by heat recovered from the exhaust air via a counterflow heat exchanger.

Heating

Heat is distributed by the fresh air supply, heated with a compact counter flow heat exchanger unit supplied by the exhaust air heat pump. There is an electric powered radiator in the bathroom.

Solar thermal system

4.5 m^2 flat plate collectors, 320 l storage tank, 60% coverage, heat pump and electric resistance backup.

Photovoltaics

49.5 m^2 grid connected, 100% coverage of annual electricity and domestic hot water demand.

Controls

Sensor-controlled sun shading system.

Energy performance

Space and ventilation heating 12.5 kWh/m²a
Energy source:
Electricity
- calculated -

Domestic hot water 13.6 kWh/m²a
Energy source:
Solar thermal system 60%, electricity 40%
- calculated -

Electricity for technical systems 17.0 kWh/m²a
Energy source:
Photovoltaics
- calculated -

Pressurization test 0.35 h^{-1}
- monitored -

Maximal heat capacity 9.67 W/m^2
- calculated -

View from the terrace towards south

Living room

South-west façade

Innovative products

Building envelope
Window: Passivhaus-windows DW-Plus, Wiegand, http://www.wiegand-info.de
Door: Passivhaus-door DW-Plus, Wiegand, http://www.wiegand-info.de

Ventilation and cooling
Combi unit: Aerex BW 225/2, Drexel-Weiss, http://www.drexel-weiss.at

Controls
Shade and wind control: Hager Tebis TS, Hager, http://www.hager-tehalit.ch

Space heating and DHW
Heat pump: combi unit: Aerex BW 225/2, Drexel-Weiss, http://www.drexel-weiss.at
Solar collectors: Rüesch, Typ Terza, Rüesch, http://www.rueschsolar.ch

Electricity
Solar PV: Typ Shell Solar SM 110-24, Rüesch, http://www.rueschsolar.ch

Project team

Architect / site engineer
Architekturbüro Setz, Rupperswil
www.setz-haus.ch

Interior designer
Merz + Isler AG, Rombach

HLKK- engineer and blower-door-test
Otmar Spescha, Schwyz

Building physics
Ragonesi Strobel und Partner AG, Luzern

PV, solar thermal system planner
Ingenieurbüro Hauri, Schwyz
Rüesch Solartechnik AG, Dottikon

Contact person

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Literature and links

www.setz-haus.ch