

Zehnder inside: A perfect indoor climate for all requirements



**Zehnder systems for
radiant heating
and cooling**

Zehnder designer radiators

**Zehnder Clean
Air Solutions**

**Zehnder Systems for
comfortable indoor ventilation**



Zehnder Design-Heizkörper
Zehnder Comfosystems

Tere

always
around you **zehnder**

Zehnder ventilation seminar

Tallinn, October 5th 2010

Who we are



Anneli Saal, Zehnder Estonia

Meelis Saal, Zehnder Estonia

Klaus Niederer, Zehnder

Engineer for Ventilation, Heating, Air Conditioning

Technical Sales Support Export

Agenda

The mission statement

Our history and the history of the ventilation technology

Why ventilation?

Advantages of HRV

Energy savings

Systems comparison

Coffee break

The four product groups

Our products

Renovation concepts

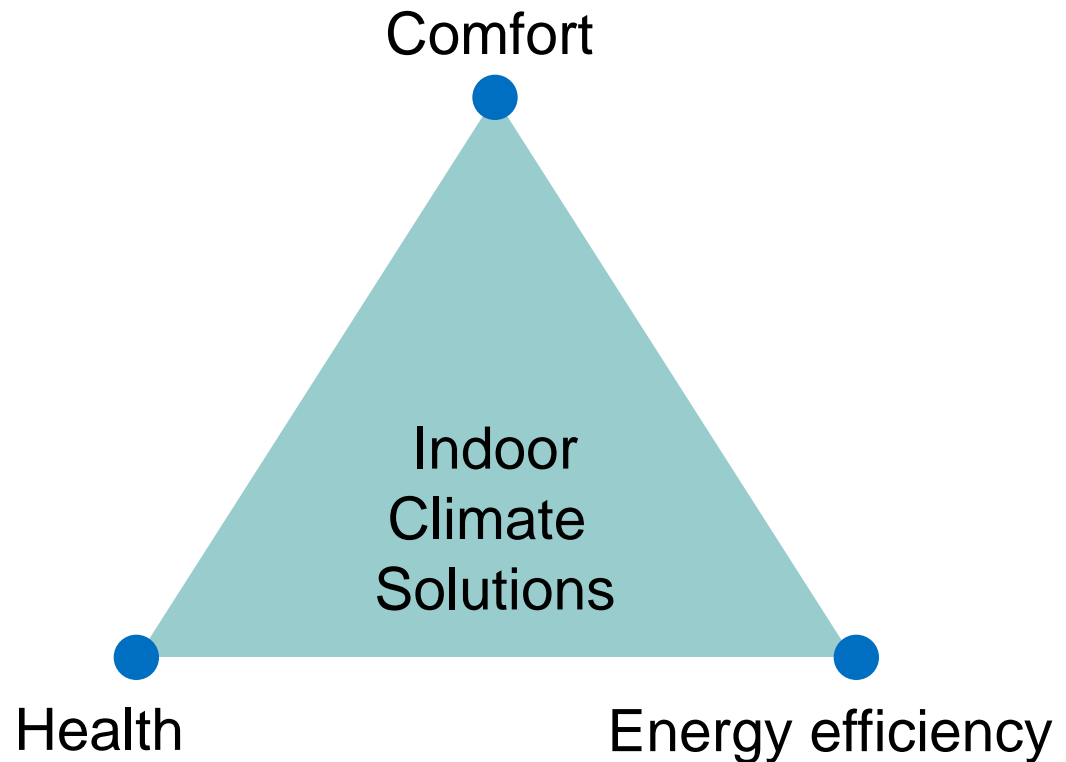
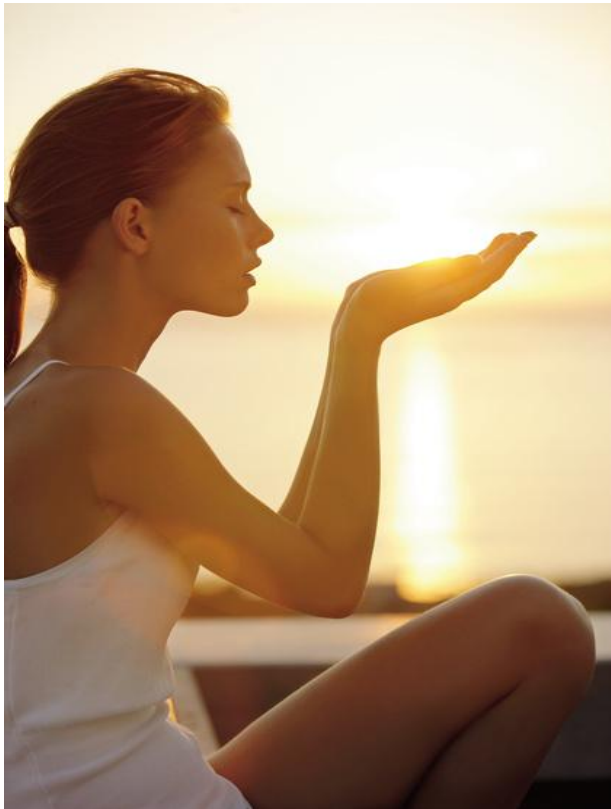
“Life” samples

Questions and answers

Our mission


always
around you **zehnder**

We want to be the most attractive provider of energy-efficient, healthy and comfortable indoor climate solutions.



The three elements of the triangle

Comfort

- Increasing demand for comfort and a comfortable indoor climate
- Customers require simplicity and style
-  We spend 70% of our time within 4 walls

The three elements of the triangle

Health

- Increasing sensitivity with respect to a healthy indoor climate
(humidity, mould, fine dust, pollen, noise)
- Increasing proportion of elderly people with even higher demands for a healthy indoor climate
- Growing awareness regarding a healthy indoor climate for children

The three elements of the triangle

Energy efficiency

- Ecological awareness
- Limitation of oil and gas
- Governmental regulations in
 - Europe with the Energy Performance of Buildings Directive (EPBD)
 - Other important markets such as US and CN

Indoor climate

always
around you **zehnder**



Functionality

Design

Efficiency



The Zehnder is family owned since 1895

always
around you **zehnder**



1895 Manufacturing of motor cycles

1930 First radiators made of steel

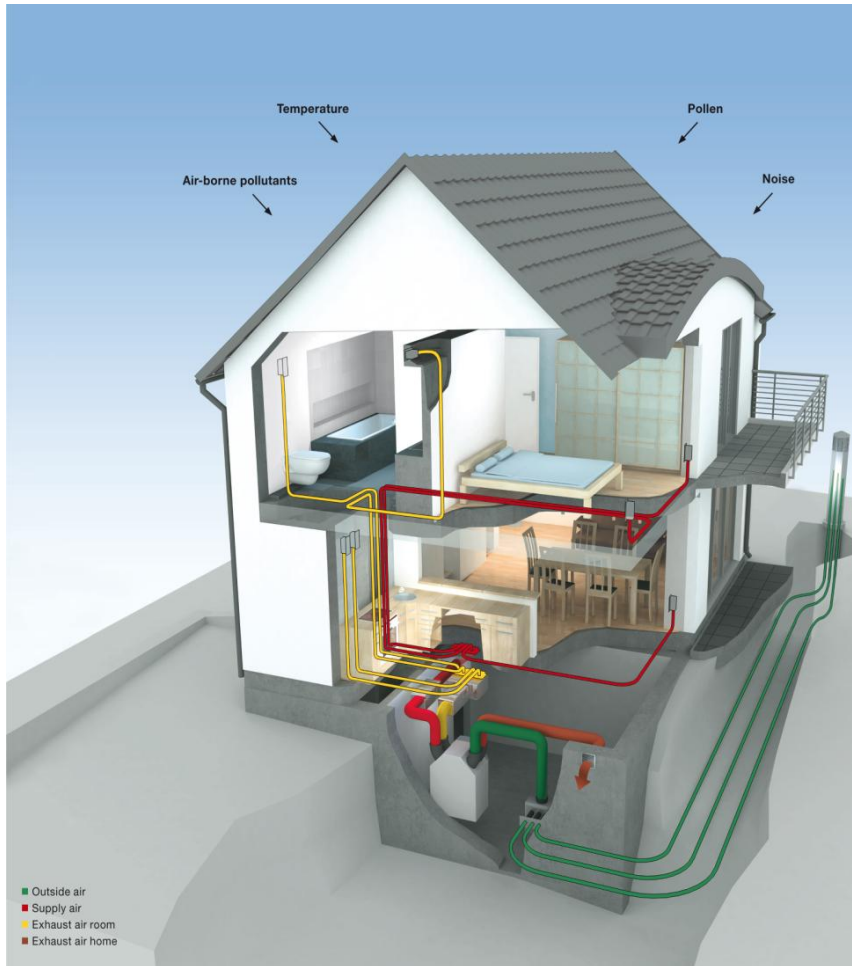
1958 Start of production of
Ceiling Panels

1980 Invention and production of
the first towel radiator

2000 Entry in residential ventilation
with heat recovery

The Zehnder ventilation history

always
around you **zehnder**



1993 New concept of ventilation in Minergie houses in Switzerland
Invention of a cleanable air distribution system

2000 Acquisition of J.E. StorkAir (NL)

2007 New air distribution system OnFloor

Currently
Zehnder is the market leader in residential ventilation

comfosystems **zehnder**

J.E. StorkAir

 **PAUL**
WÄRMERÜCKGEWINNUNG

 **GREENWOOD**
AIR MANAGEMENT

Zehnder Comfosystems

always
around you

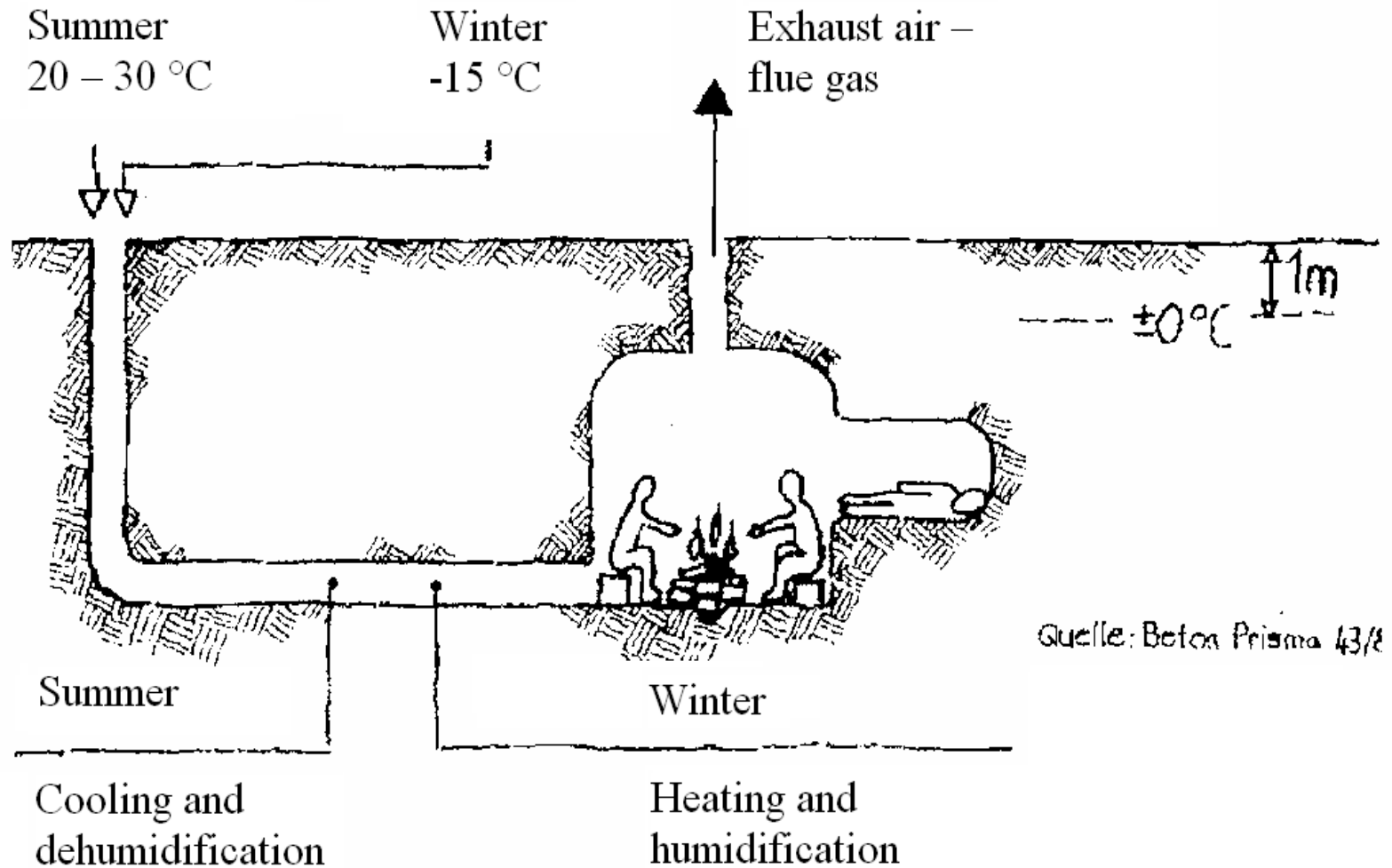
zehnder



The history of ventilation

always
around you

zehnder



Why ventilation?

We (human beings) can last

3 weeks without **food**

3 days without **water**

3 minutes without **air**

We breathe more than **500.000.000** times in our life

We spend about **70%** of our life inside of 4 walls

Is any **food** more important than **air**?

Where is having **healthy air** more important than **inside**?

The tasks of a ventilation system

always
around you **zehnder**



- Guarantee of a healthy air quality
- Limitation of the air humidity
- Minimising of the ventilation losses

The advantages of a ventilation system with heat recovery



Sound removal of pollutants as odors, smoke, housing poisons etc.

Avoidance of humidity problems and protection of the building structure

Protection of the inhabitants with regard to mould

Filtration of the outside air as protection against pollen (allergies)

Recovery of the ventilation heat resultant in energy savings

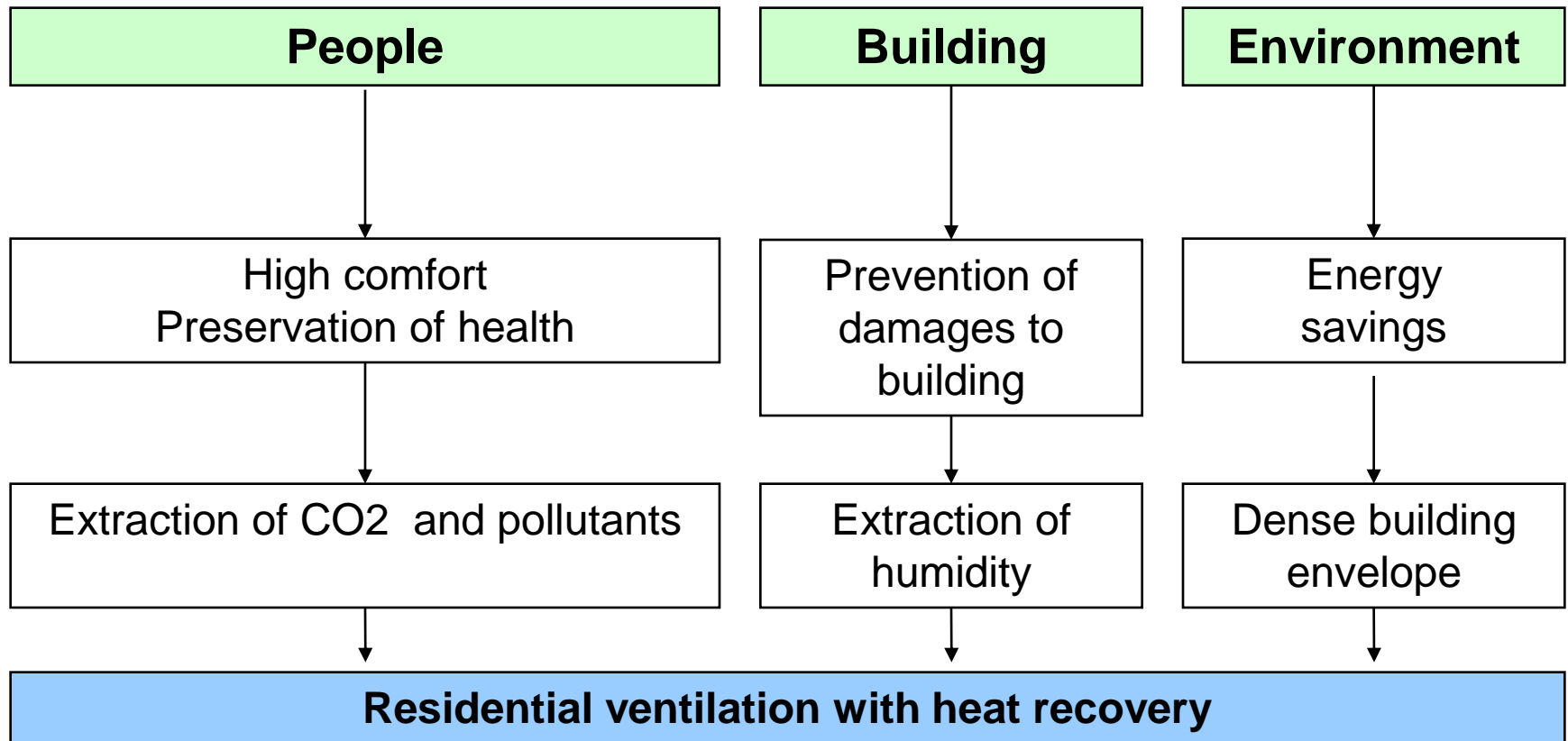
No draughts in comparison to the window ventilation or supply valves

Safety whilst inhabitants are absent

Reduction of the street noise disturbance

Why ventilation

always
around you **zehnder**



Humidity in buildings

always
around you

zehnder



My personal experience

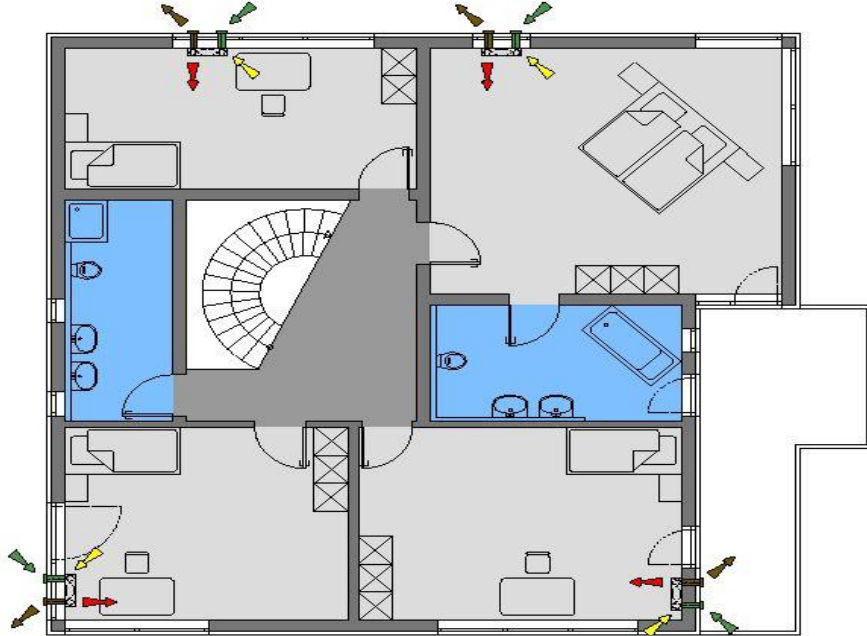
always
around you

zehnder



My personal experience

always
around you **zehnder**



Legal requirements (EnEV 6)

Impermeability, minimum change in air ventilation

(1) Buildings have to be constructed /designed that the area transferring the heat, including all joints, is made **permanently airtight** to a standard that meets industry requirements.

(2) Buildings have to be constructed / designed that the **minimum change in air ventilation** necessary for health and heating purposes **is guaranteed**.



Legal opinion DIN E 1946 -6

always
around you **zehnder**

Planners and builders who build a new residence or renovate an existing one **without using a controlled ventilation system** are exposing themselves to the **risk of liability**. Although it cannot yet be stated with any degree of certainty that having a ventilation system is a mandatory requirement, the alternative of relying on the residents to provide the air convection described above by **opening windows** is **extremely risky** from a **legal point of view**.



**Bundesverband für
Wohnungslüftung e.V.**

Tel. 06204 - 708 66 37

FAX 06204 - 708 66 38

e-mail :

info@wohnungslueftung-ev.de

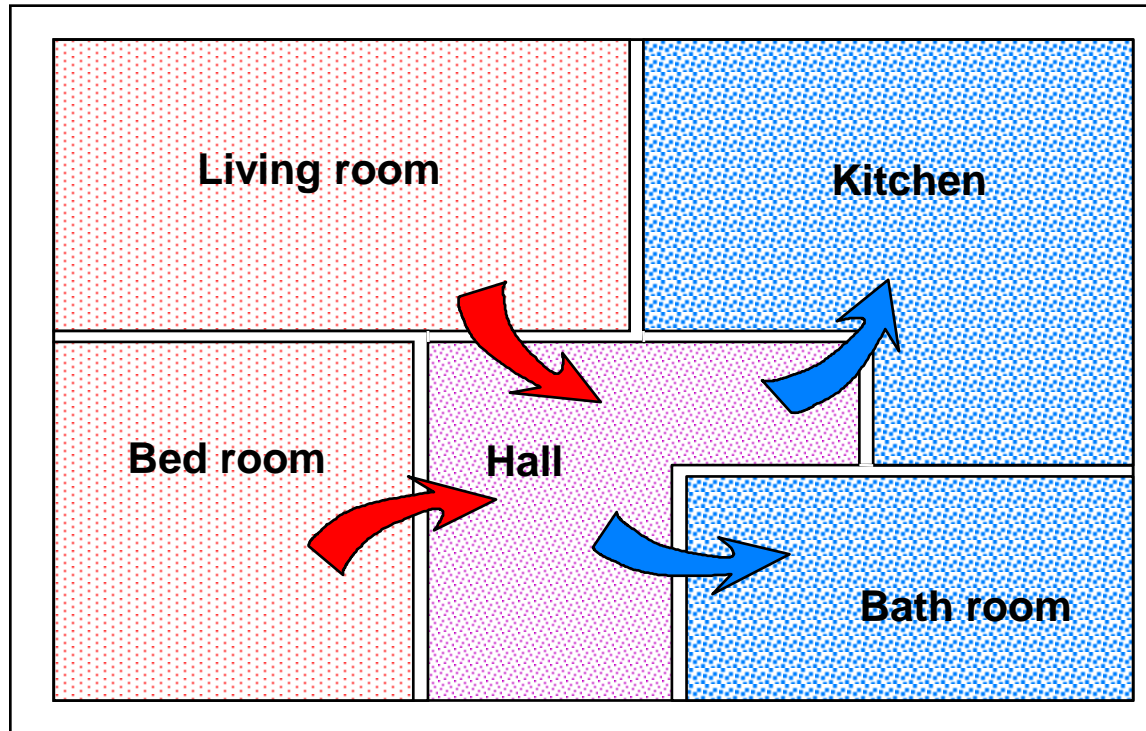
Internet :

www.wohnungslueftung-ev.de

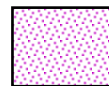
Various air sectors

always
around you

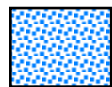
zehnder



Supply air



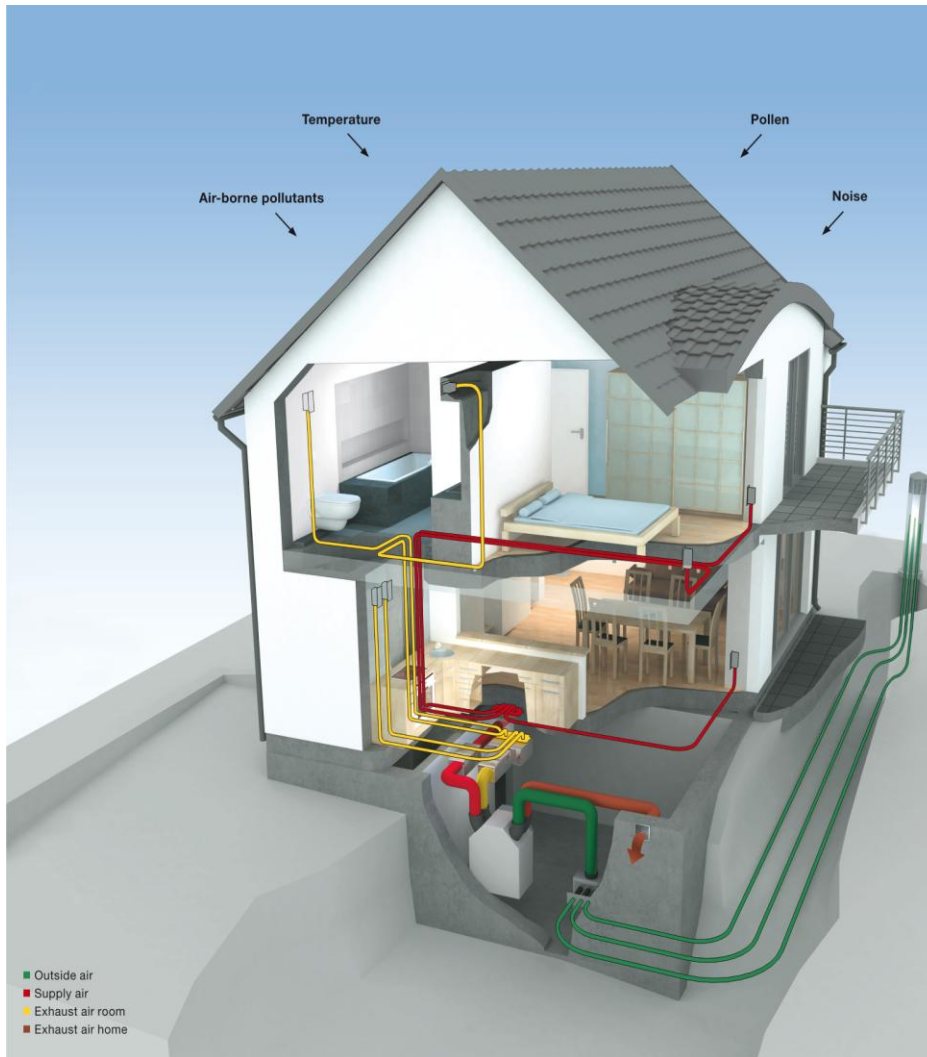
Overflow area



Exhaust air

System components

always
around you **zehnder**



Ventilation device

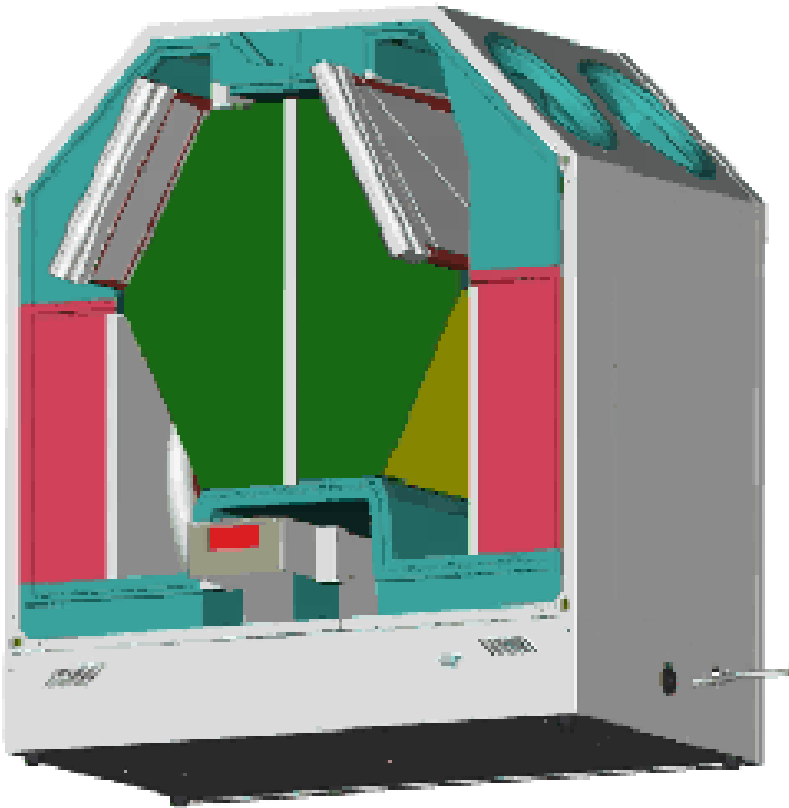
Air distribution system

Air intakes and outlets

Geothermal heat exchangers

Zehnder ventilation devices components

always
around you **zehnder**



DC motors

Lowest energy consumption

Heat recovery unit

High heat recovery > 90%

Filters

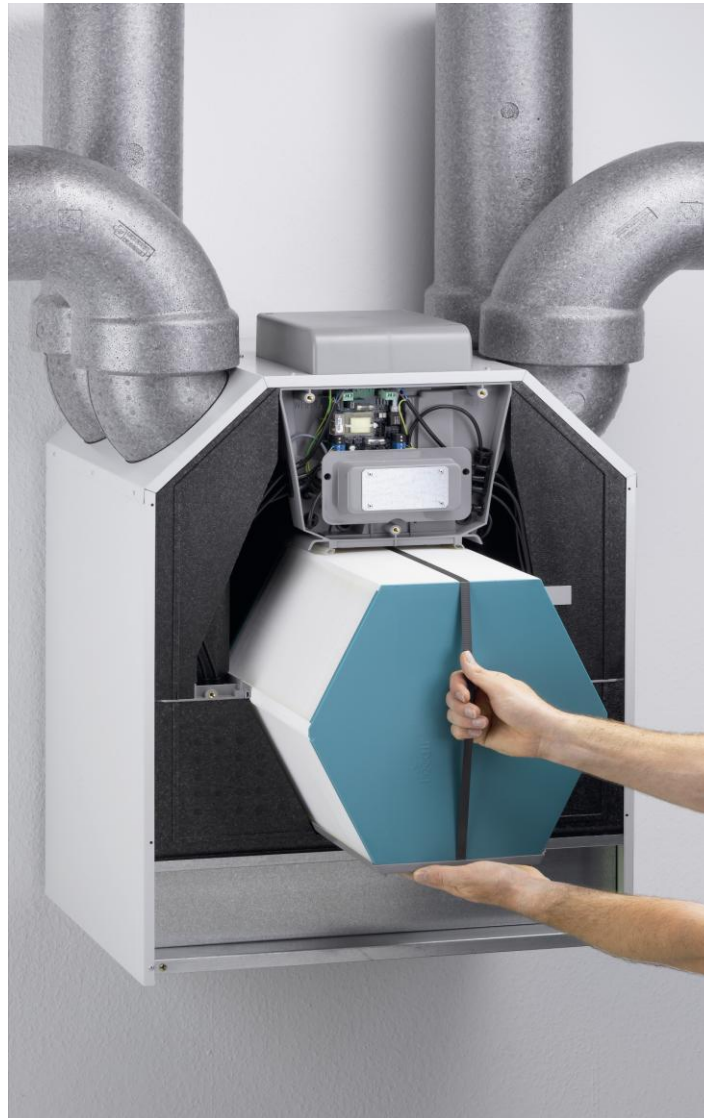
G3, G4, F8, pollen filter

Control unit /display

Zehnder heat exchanger

always
around you

zehnder



Passivhaus certificate ComfoAir 350

always
around you

zehnder

Zertifikat
gültig bis 31.12.2009

**Passivhaus
geeignete
Komponente:** **Wärmerückgewinnungsgerät**
Hersteller: J.E. Stork Ventilatoren B.V.
Produktname: **Zehnder ComfoAir 350**
(Zehnder Comfo D 350, G90-380, WHR 930)

**Passivhaus
Institut**
Dr. Wolfgang Feist
Rheinstraße 44/46
D-64283 Darmstadt



Folgende Kriterien wurden für die Zuerkennung des Zertifikates geprüft:

- Passivhaus-Behaglichkeitskriterium:**
Eine minimale Zulufttemperatur von 16,5°C wird bei -10 °C Außenlufttemperatur erreicht.
Begründung: In Passivhäusern sind keine Heizflächen an Außenbauteilen erforderlich. Um unbehaglichen Kaltluftzufall zu vermeiden, muß die Zulufttemperatur nach unten hin begrenzt werden.
- Effizienz-Kriterium (Wärme):**
Der effektive trockene Wärmebereitstellungsgrad muß mit balancierten Massenströmen bei Außentemperaturen zwischen -15 und 10°C und trockener Abluft (21°C) höher als $\eta_{WRG,terr} \geq 75\%$ sein (hier: 84 %).
- Effizienz-Kriterium (Strom):**
Die gesamte spezifische elektrische Leistungsaufnahme des Gerätes darf in den für Passivhäuser vorgesehenen Betriebszuständen (bei Betriebs-Massenstrom) **0,45 W/(m³/h)** geförderter Zuluftvolumenstrom nicht überschreiten (hier 0,29 W/(m³/h), Randbed. siehe Anlage).
- Dichtheit und Wärmedämmung:**
Der interne und der externe Leckluftstrom des Gerätes dürfen jeweils 3% des Nenn-Abluftstromes nicht übersteigen. (Anforderungen und Nachweise sind der Anlage zu diesem Zertifikat zu entnehmen.)
- Abgleich und Regelbarkeit:** (Anforderungen und Nachweise sind der Anlage zu diesem Zertifikat zu entnehmen.)
- Schallschutz:** Das Zertifikat gilt nur mit der Einschränkung für die Aufstellung im Haustechnikraum
Schalldruckpegel im Aufstellraum von 35 dB(A) bei äquivalenten Raumabsorptionsflächen von 4 m² wurde überschritten. Schalldruckpegel in Wohnräumen unter 25 dB(A), in Funktionsräumen unter 30 dB(A), werden durch den Einsatz von Schalldämmern erreicht (Erläuterungen und Nachweise sind der Anlage zu diesem Zertifikat zu entnehmen.)
- Raumlufthygiene:**
Bei Einbau und Betrieb des Gerätes und der übrigen Anlagenkomponenten gem. den vom Hersteller beigefügten Unterlagen sorgt das Gerät für hygienisch einwandfreie Qualität der Zuluft. (Erläuterungen und Nachweise sind der Anlage zu diesem Zertifikat zu entnehmen.)
- Frostschutzschaltung:** (Anforderungen und Nachweise sind der Anlage zu diesem Zertifikat zu entnehmen.)

Das Zertifikat ist wie folgt zu verwenden:

**PASSIV
HAUS
geeignete
KOMPONENTE**
Dr. Wolfgang Feist



Wärmerückgewinnung:
Wärmebereitstellungsgrad
(effektiv): 84 %
Elektroeffizienz: 0,29 Wh/m³

Passivhaus certificate criterias

1. Control criteria

At an outside temperature of $-10\text{ }^{\circ}\text{C}$ the supply temperature has to be $+16.5\text{ }^{\circ}\text{C}$ as a minimum

2. Efficiency criteria (heat)

The effective heat recovery figure in between $-10\text{ }^{\circ}\text{C}$ to $+15\text{ }^{\circ}\text{C}$ and dry exhaust air of $+21\text{ }^{\circ}\text{C}$ has to be as minimum 75 %

Zehnder ComfoAir 350: 84%

3. Efficiency criteria (electricity)

Maximum 0.45 Watts per m^3 and hour

Zehnder ComfoAir 350: $0.29\text{ W /m}^3\text{ /h}$

4. Tightness and Insulation

Maximum internal and external leakage 3 %

Zehnder ComfoAir: $< 1\%$

Passivhaus certificate criterias

5. Control criteria

The ventilation device has to be controlled

6. Sound level criteria

Maximum allowable sound absorption in minor rooms 35 dB (A)

Maximum allowable sound absorption in living rooms 25 dB (A)

7. Hygiene criteria

The ventilation device has to guarantee perfect hygiene supply air

8. Frost protection criteria

The ventilation device has to be protected against icing

ComfoAir 350 electrical consumption

Air volume: 200 m³ /h

External pressure: 225 Pa

Electrical consumption of the unit:

0.29 W /m³ /h x 200 m³ /h = 58 W

58 W x 24 h /d x 365 d= 508 kWh per year

Yearly electrical consumption in EEK:

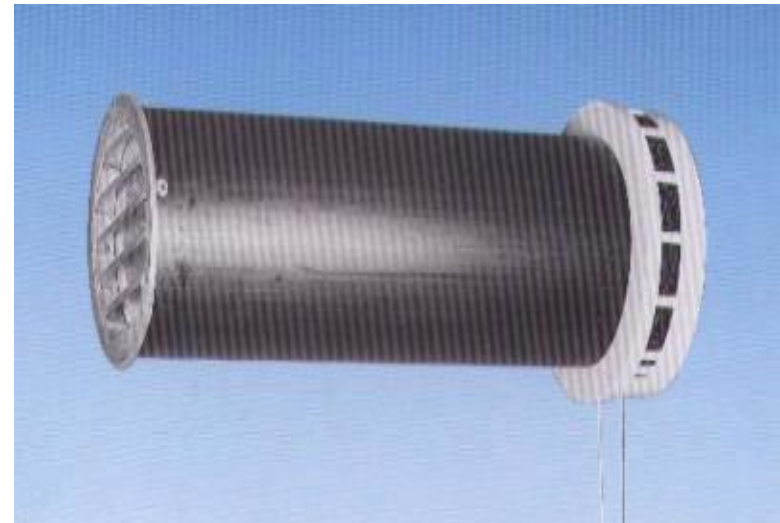
508 kWh x 1 EEK /kWh= 508 EEK

80 EUR

Energy comparison HRV and supply valves

always
around you

zehnder



Comparison HRV and supply valves

Energy savings in total per year: 7496 kWh

Yearly net savings:

Ventilation energy savings:	7496 kWh	7496 EEK
		479 EUR

- Electrical consumption HRV	1670 kWh	1670 EEK
		107 EUR

Total	5826 kWh	5826 EEK
		372 EUR

The differences of the two ventilation systems

always
around you



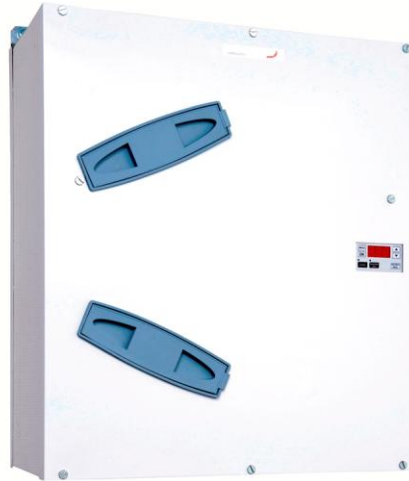
Topic	Supply valves	HRV
Removal of pollutants	NO	YES
Avoidance of humidity problems	NO	YES
Protection of the building structure	NO	YES
Filtration of the outside air	OPTION	YES
Recovery of ventilation heat	NO	YES
Draughts	YES	NO
Safety whilst being absent	Partly	YES
Reduction of the street noise	NO	YES

Zehnder ventilation devices 100 – 150 m³ /h

always
around you **zehnder**



ComfoAir 100
Decentralised



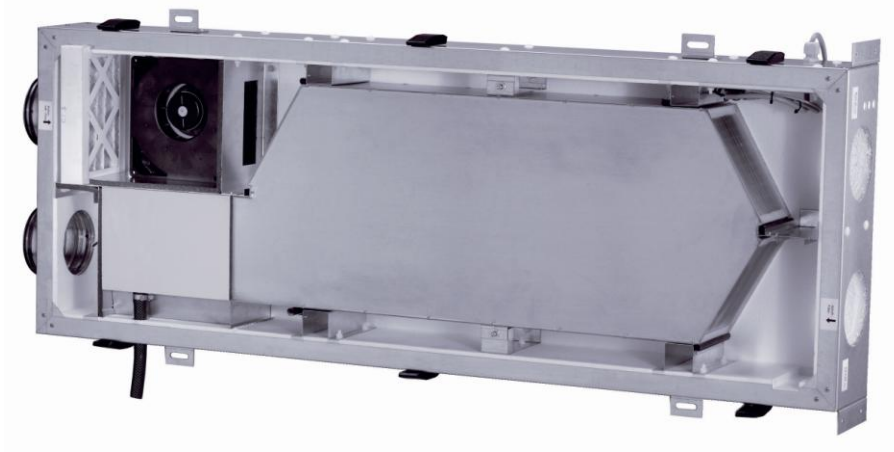
ComfoAir 140
Centralised



ComfoAir 150
Centralised

Zehnder ventilation devices 150 – 200 m³ /h

always
around you **zehnder**



ComfoAir 150 flat

Centralised



ComfoAir 200

Centralised

Zehnder ventilation devices 350 – 550 m³ /h

always
around you

zehnder



ComfoAir 350

Centralised



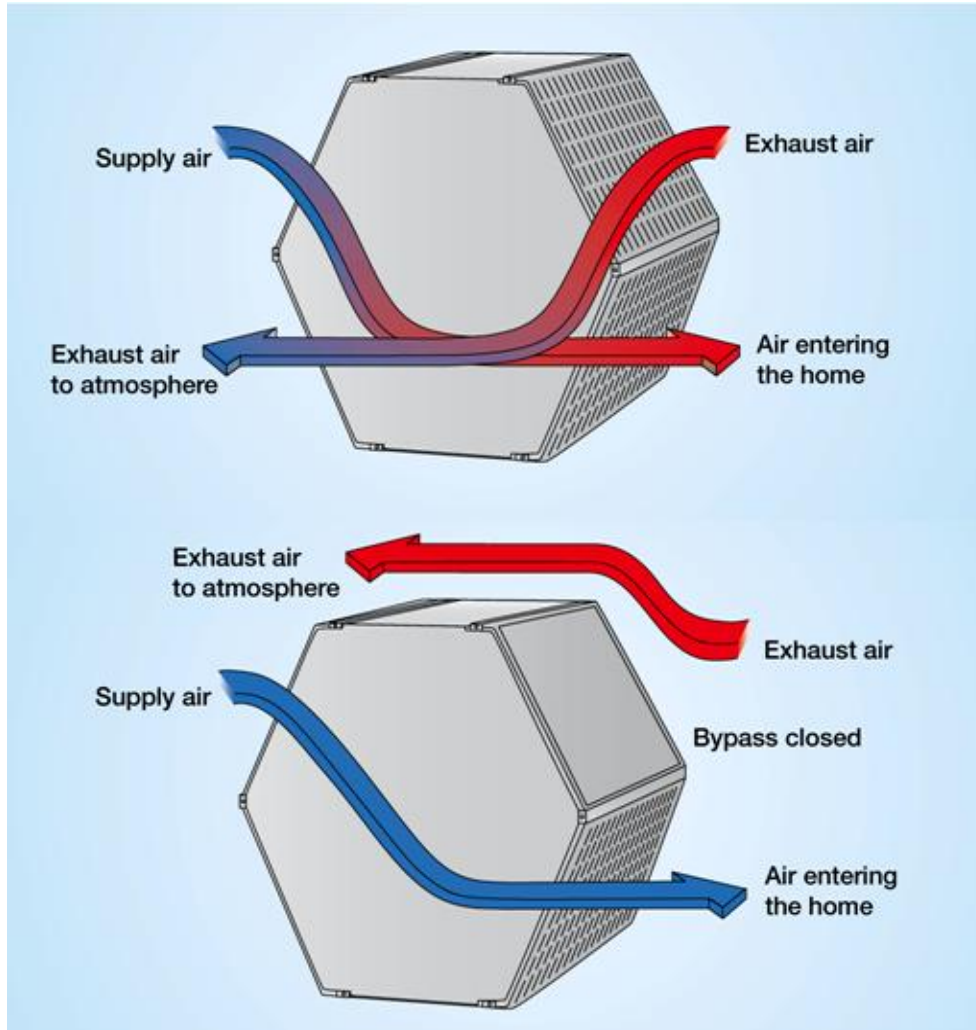
ComfoAir 550

Centralised

Heat exchanger and summer /winter bypass

always
around you

zehnder



Heat exchangers

Cross current flow

Summer /winter bypass

Automatically controlled

Temperature freely adjustable

Enthalpy heat exchanger

always
around you **zehnder**

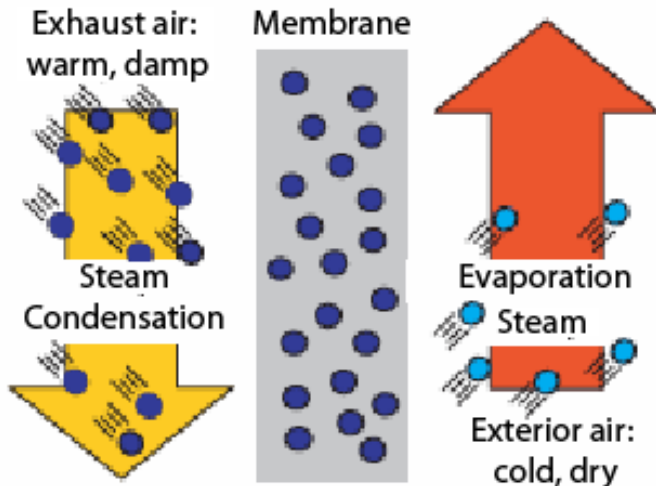


Hygienic humidity recovery
without transfer of smells and microbes

Retrofittable

Recovery figures

Sensible:	86%
Latent:	63 %
Total:	127 %



Cooling unit Artic 350 /550

always
around you **zehnder**



Increase of the comfort level

All in one

Evaporator, compressor, condenser,
expansion valve

Controls

Via ventilation device

Cooling output

2.2 kW

Zehnder comfobox 5

always
around you **zehnder**



All in one energy centre

Heating, cooling, ventilation and warm water

Heat pump sizes

5, 6, 8, 10, 13 kW

Ground source

Geothermal probe, collector or basket

Zehnder comfobox 5

always
around you **zehnder**



Advantages

All in one whole house energy centre
Effective usage of renewable energy sources

Minimum space requirements

Free cooling and pre-heating with renewable energy

Enthalpy exchanger usable

High reliability

Simple planning and installation of the entire system

Settings and commissioning can be done easily

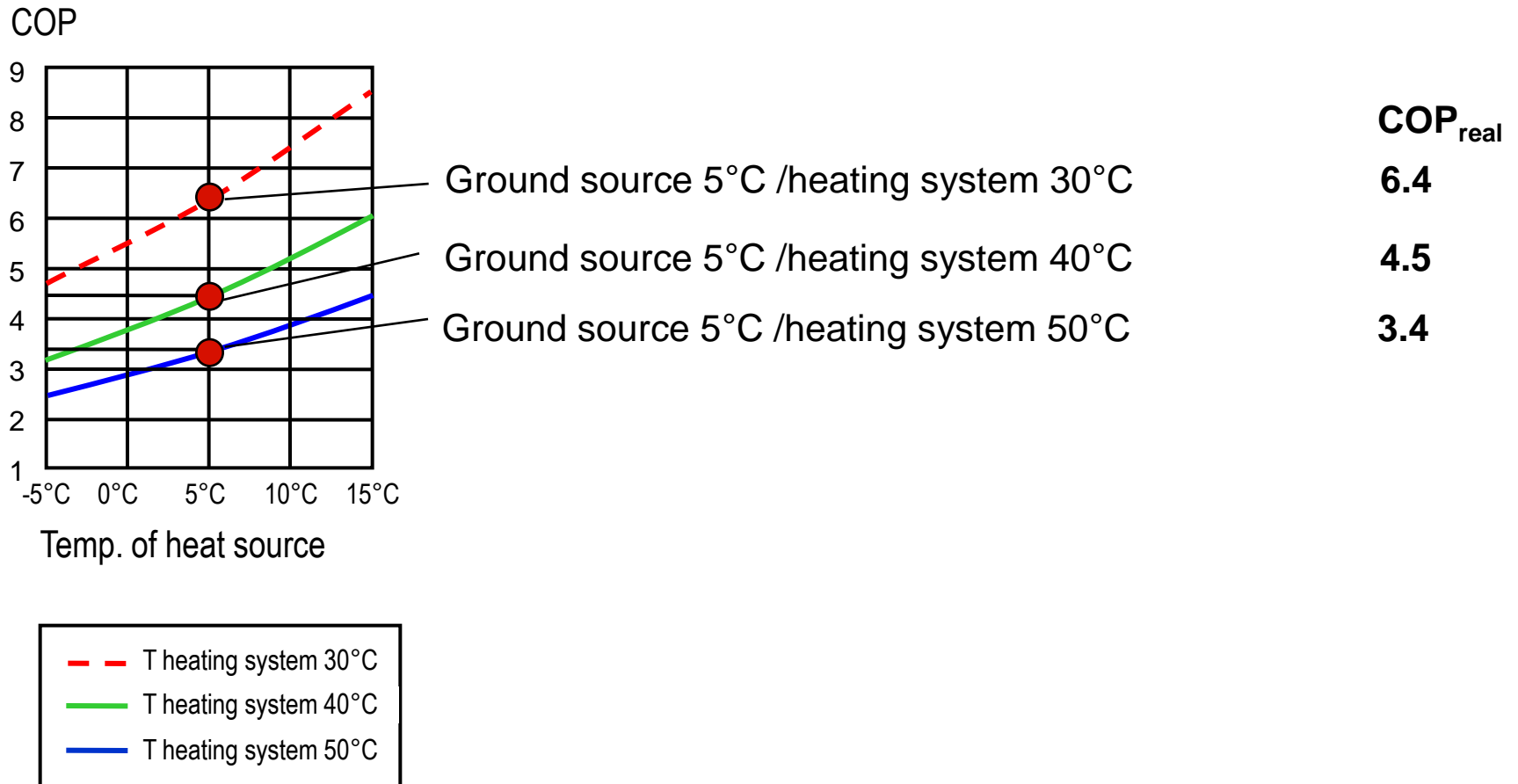
Zehnder comfobox 5

always
around you **zehnder**



Zehnder comfobox 5 COP values

always
around you



Zehnder comfobox 5 components

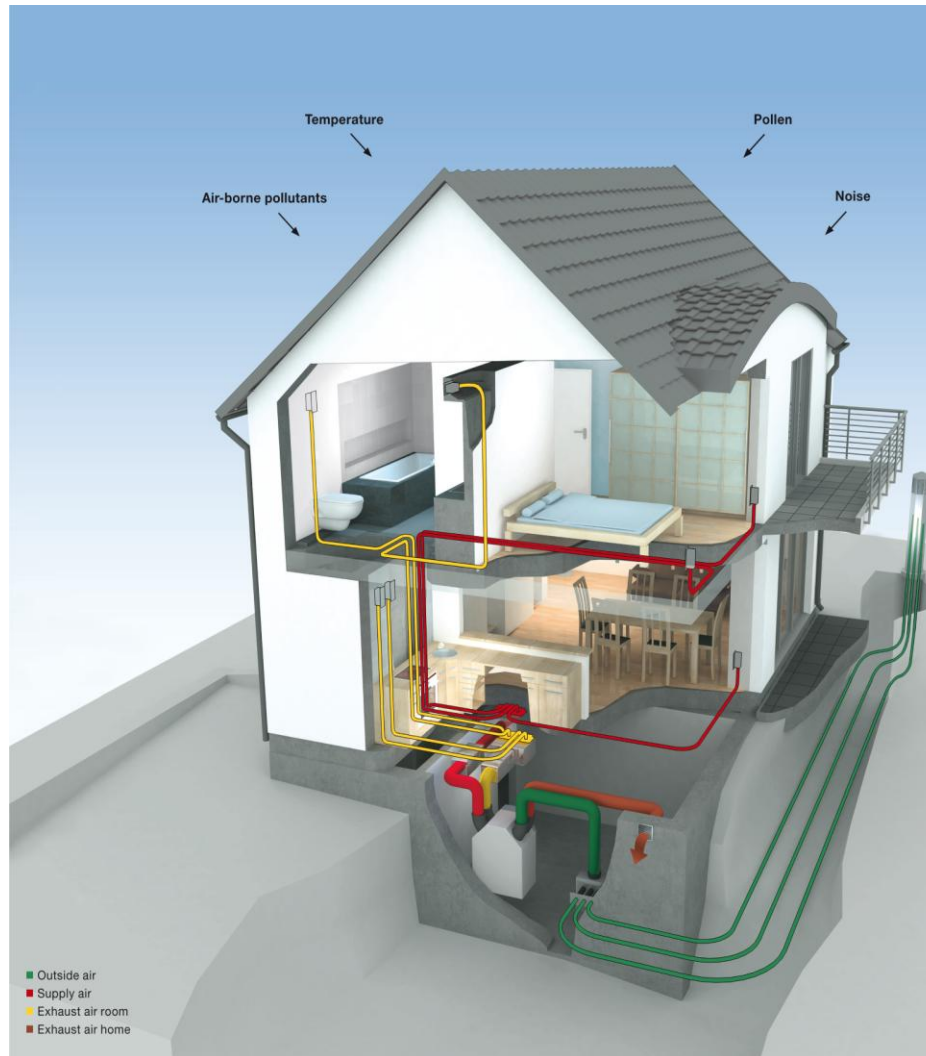
always
around you **zehnder**



Zehnder air distribution systems

always
around you

zehnder

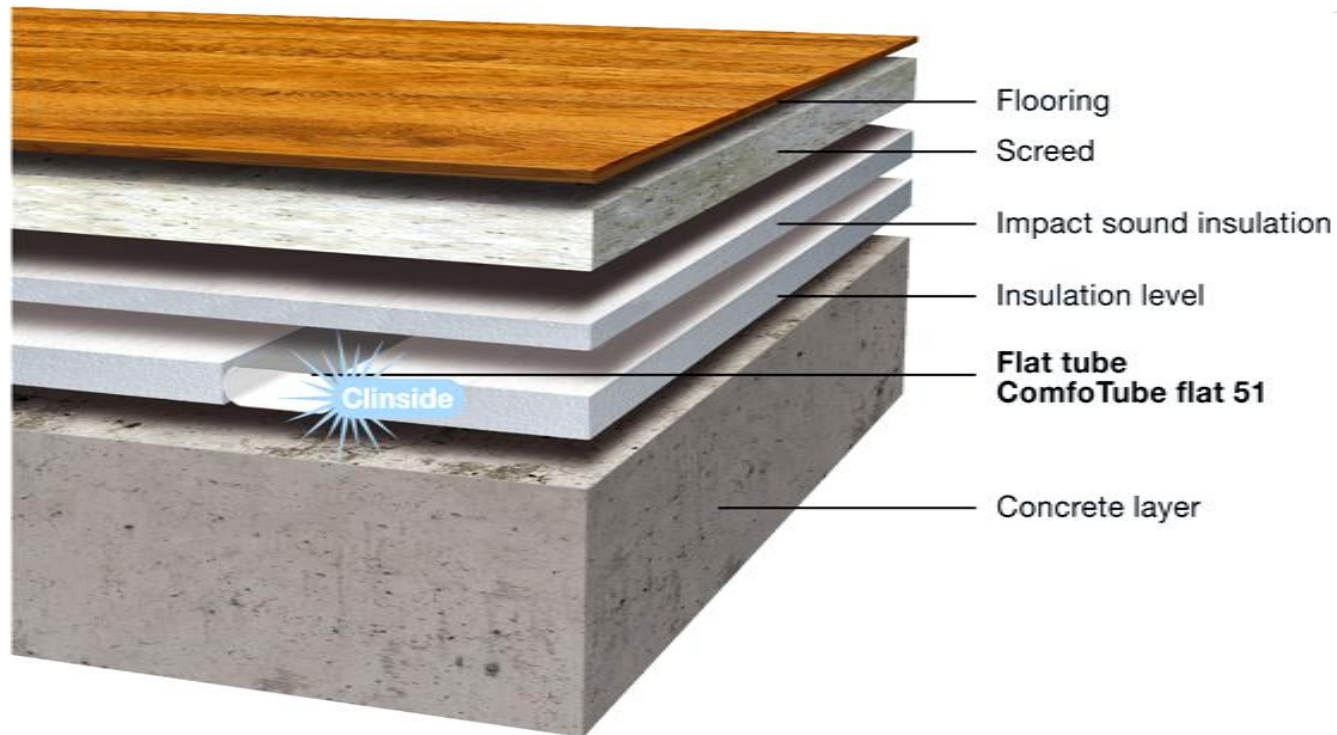


Zehnder air distribution systems OnFloor

always
around you

zehnder

Air distribution system Zehnder OnFloor

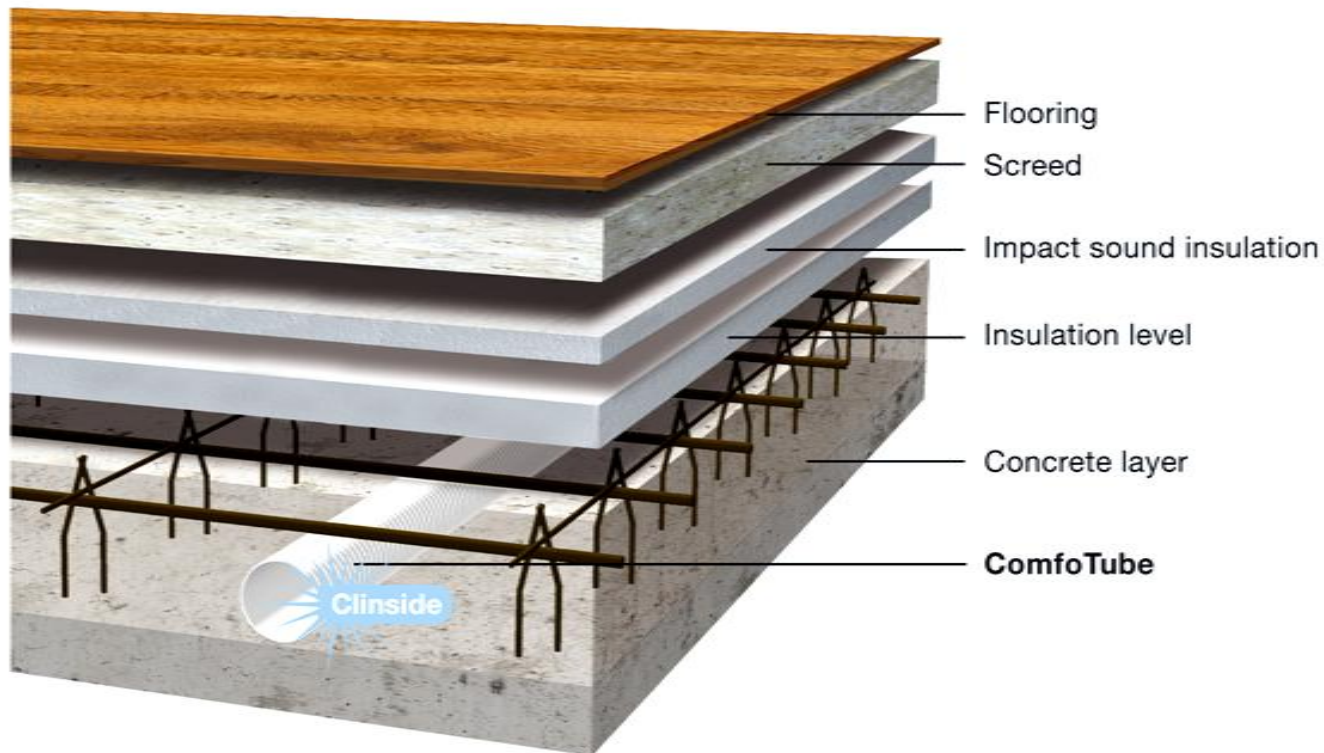


Zehnder air distribution system InFloor

always
around you

zehnder

Air distribution system Zehnder InFloor



Zehnder air distribution systems



Advantages

Cleanable

Low pressure losses

Few components

Easy to calculate and design

Simple installation

High flexibility during installation

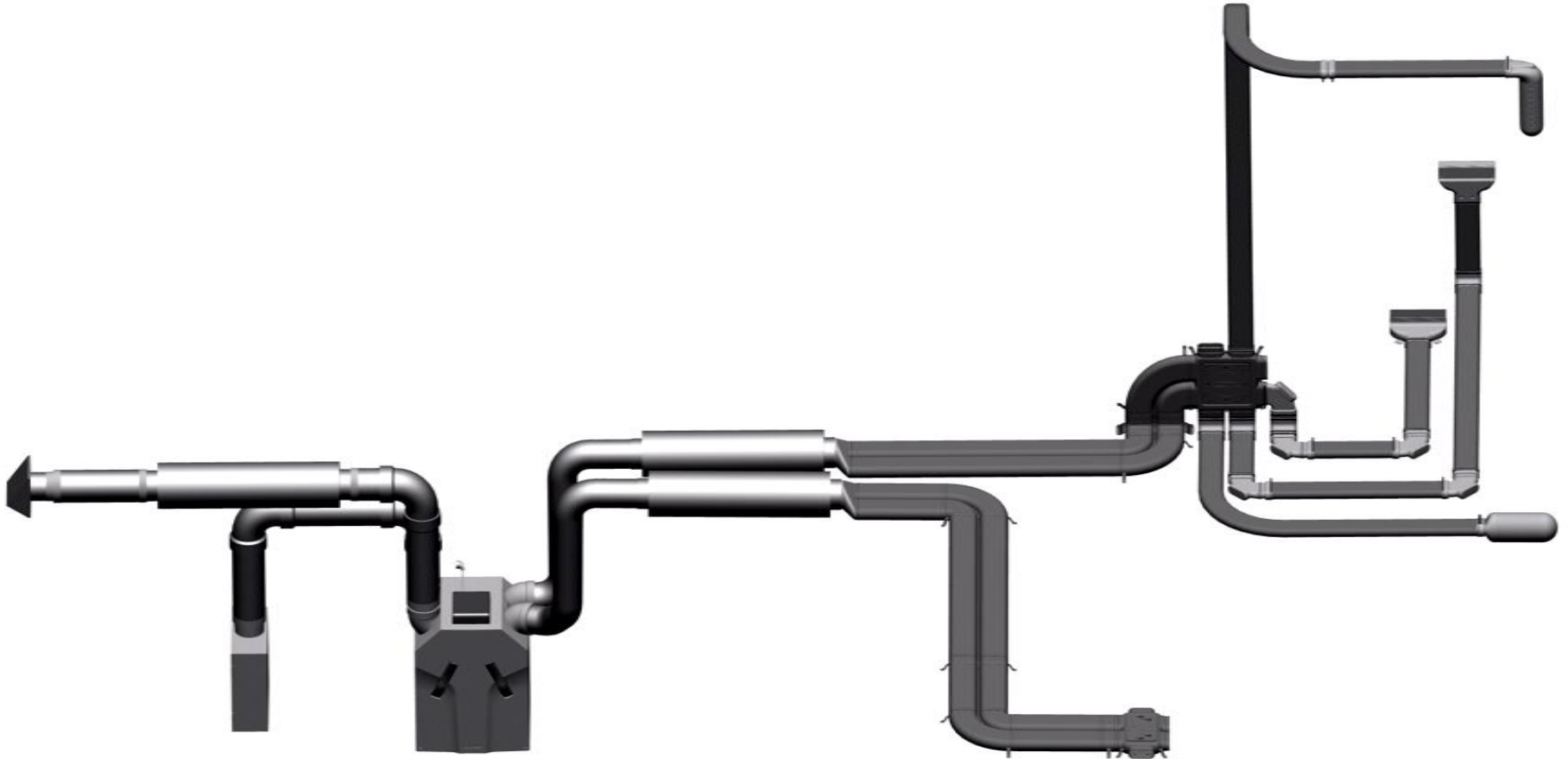
Damping of the noise level

Settings and commissioning can be done easily

Zehnder OnFloor air distribution system

always
around you

zehnder



Comfotube flat 51



- Oval and flexible pipe (51 x 138 mm)
- High quality food-grade plastic (HDPE)
- Centrally adjustable air volumes
- Low loss of pressure
- Easy to clean
- For installation in the dampening layer
- Low weight
- Corrosion-proof



Zehnder OnFloor components

always
around you **zehnder**



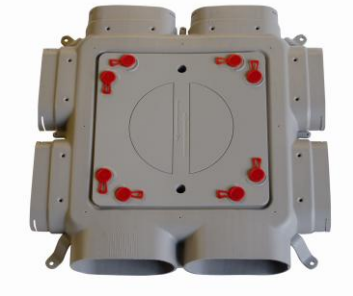
Flat 51 straight connector



Flat 51 rectangular housing



Flat 51 comfoset



Flat 51 /4 manifold
Flat 51 /6 manifold



Flat 51 circular housing

Zehnder InFloor pipe

always
around you

zehnder

Comfotube 75 /90

Circular and flexible pipe
High quality food-grade plastic (HDPE)
Centrally adjustable air volumes
Low loss of pressure
Easy to clean
High leak-proofness
Low weight
Corrosion-proof



Zehnder InFloor components

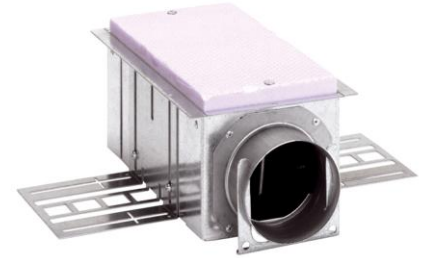
always
around you **zehnder**



ComfoTube straight connector



Manifold boxes



ComfoTube housing CLD



Manifolds



ComfoTube housing TVA



ComfoDuct

Zehnder designer grilles

always
around you

zehnder



**product
design
award**

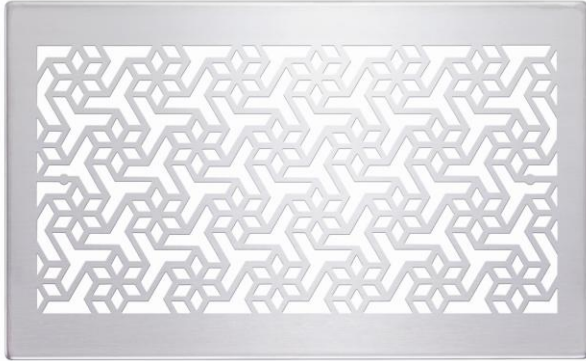
2009



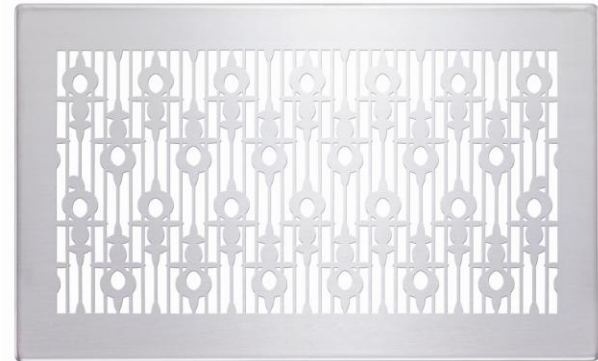
Zehnder designer grilles

always
around you

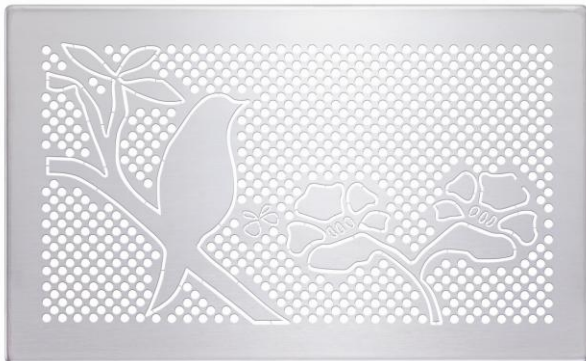
zehnder



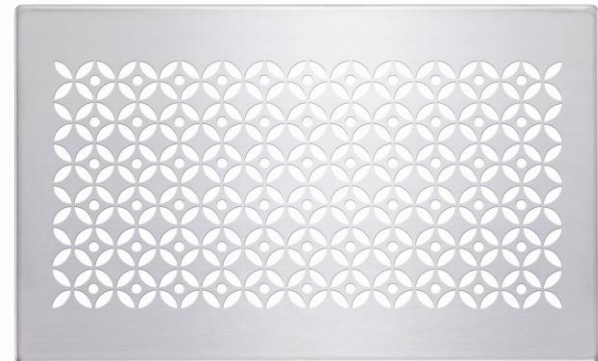
Engelberg



Luzern



Abacus

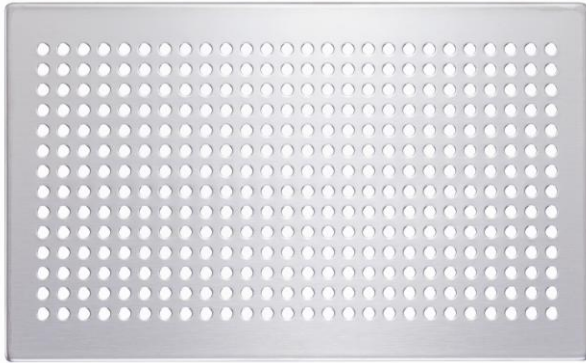


Vienna

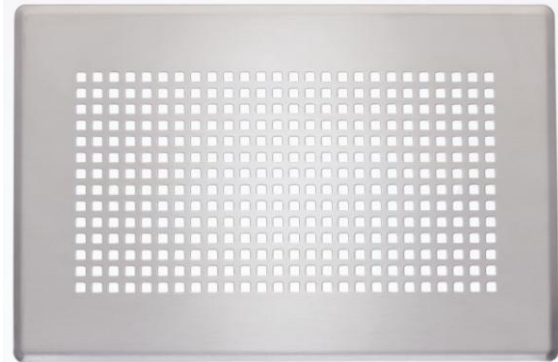
Zehnder designer grilles

always
around you

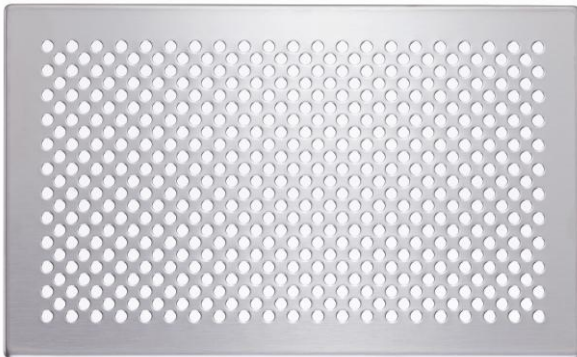
zehnder



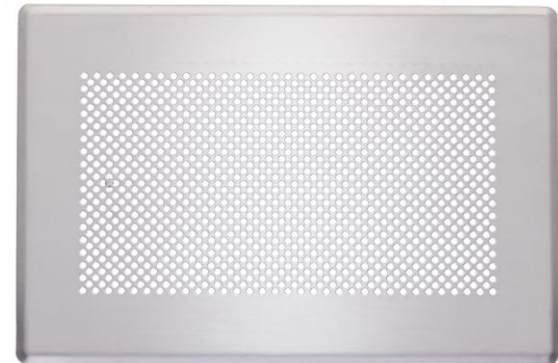
Roma



Torino



Pisa

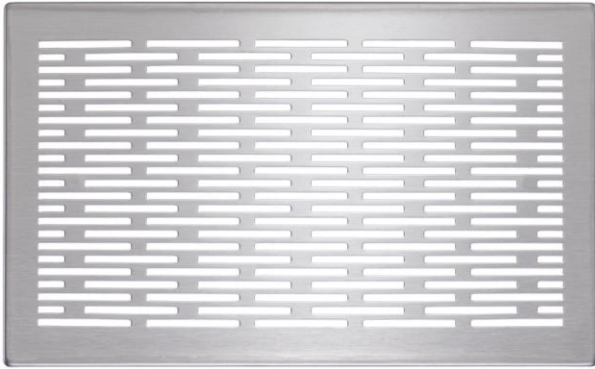


Venezia

Zehnder designer grilles

always
around you

zehnder



Genua



Torino



Venezia

Zehnder valves /vents

always
around you

zehnder



Supply valve STH



Extract valve STB



Supply valve KE



Extract valve STC

Zehnder renovation example

always
around you

zehnder



Zehnder renovation example

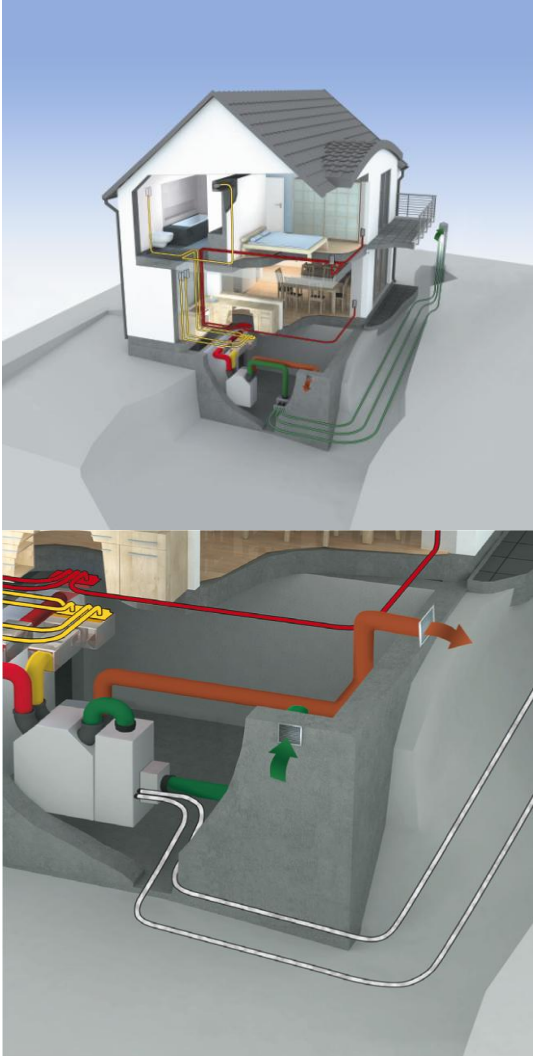
always
around you

zehnder



Zehnder geothermal heat exchangers

always
around you **zehnder**



Advantages

Comfort

Continuous supply of fresh air

Provision of pre heated fresh supply air in winter
and pre cooled fresh supply air in summer

Health

Improved air quality by removing stale and moist
air (containing allergens and dust mites)

Filtering supply air

Energy efficiency

Usage of free ambient heat /cool with
minimal consumption of electricity

Zehnder earth-brine heat exchanger

always
around you

zehnder



ComfoFond-L 300

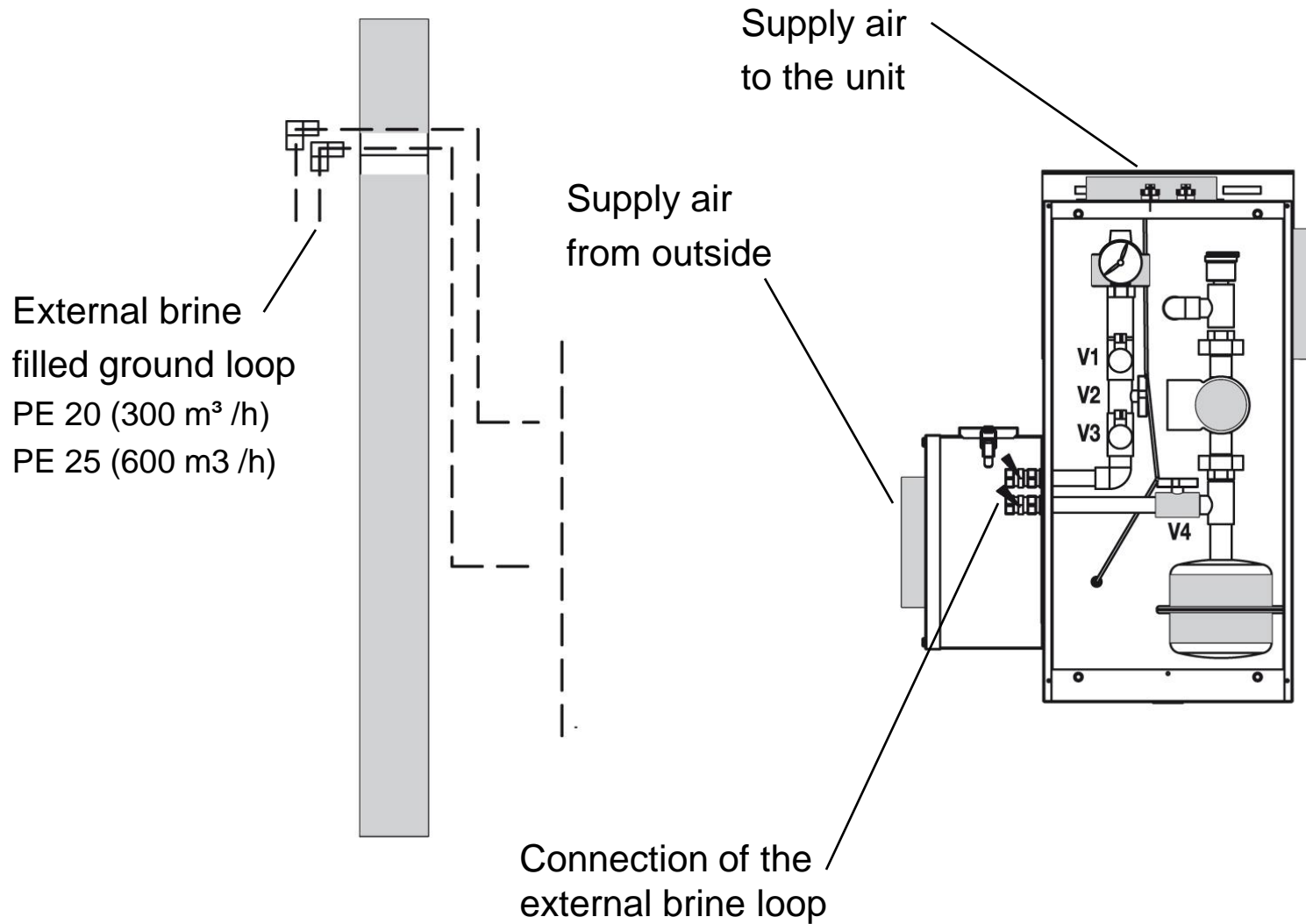


ComfoFond-L 600

Zehnder earth-brine heat exchanger

always
around you

zehnder



Zehnder earth-air heat exchanger

always
around you

zehnder



Inlet tower
250 /500



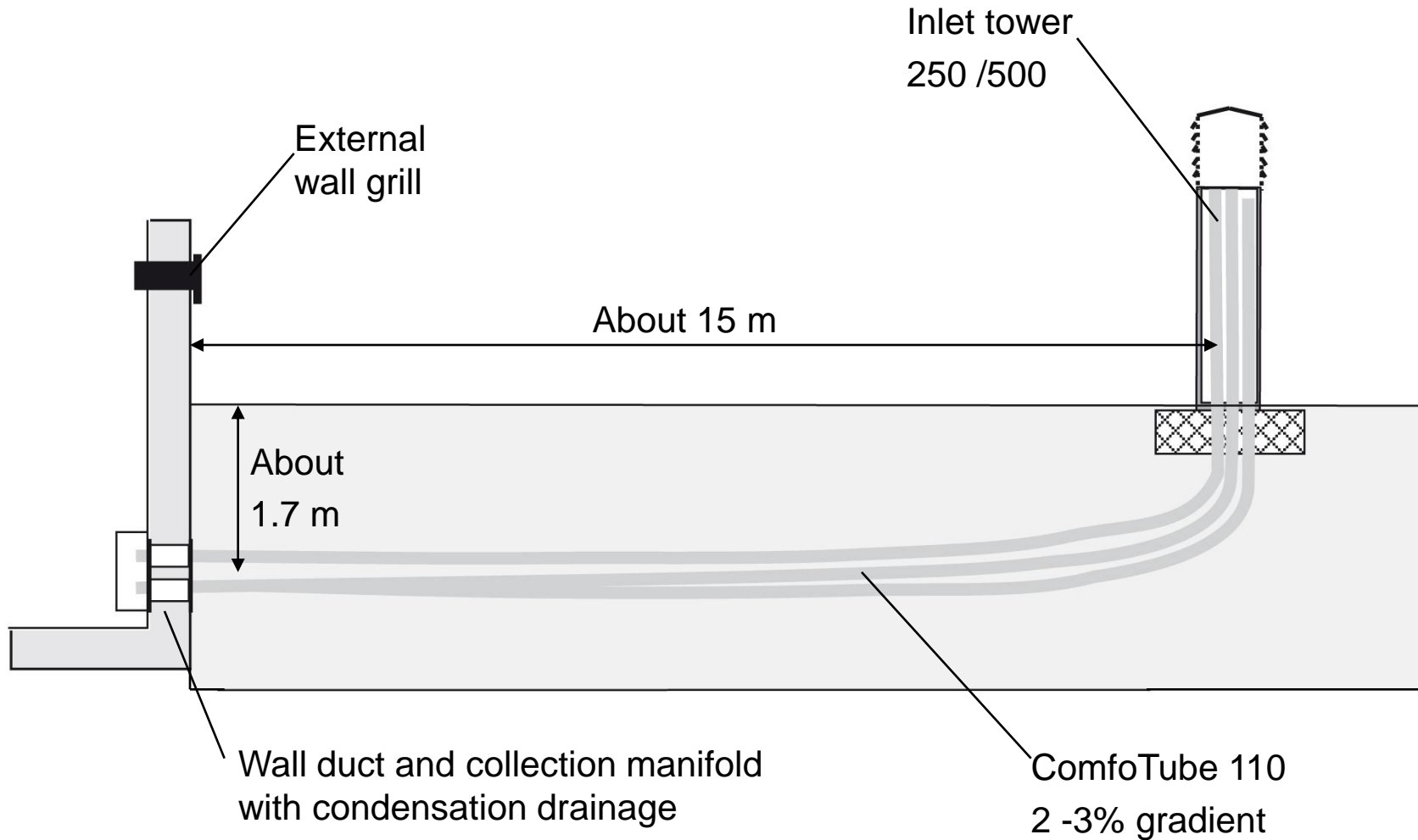
Air geothermal heat exchanger
CF 250 /500



Zehnder earth-air heat exchanger

always
around you

zehnder



Zehnder project examples

always
around you

zehnder



Zehnder project examples

always
around you

zehnder



Zehnder project examples OnFloor

always
around you



Zehnder project examples OnFloor

always
around you

zehnder



Zehnder project examples OnFloor

always
around you

zehnder



Zehnder project examples OnFloor

always
around you

zehnder



Zehnder project examples InFloor

always
around you

zehnder



Zehnder project examples InFloor

always
around you

zehnder



Zehnder project examples InFloor

always
around you



Zehnder project examples InFloor

always
around you

zehnder



Zehnder project example

always
around you

zehnder



Zehnder commissioning

always
around you **zehnder**



Zehnder services and support

always
around you **zehnder**



Zehnder provides

- Consultation and training
- Design assistance and support
- Supply
- Onsite support for installers
- Commissioning support
- Post installation support

Questions?

always
around you

zehnder

?

?

?

?

?

?

?

?

?

**Many thanks for
your attention**

