BUILD IT TIGHT AND VENTILATE RIGHT:

HIGH PERFORMANCE, MECHANICAL VENTILATION, WITH HEAT RECOVERY

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Brink Team Manager

M.S., CPHT, LEED Green Associate

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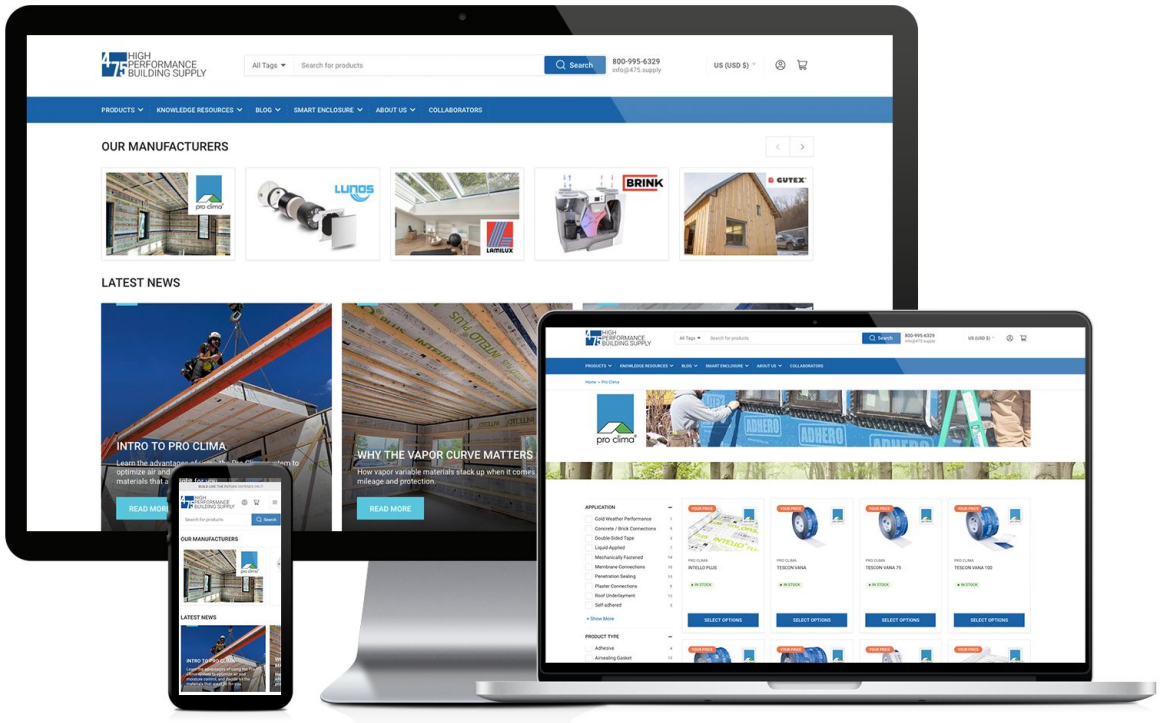
- E-commerce
- Building High Performance
- Knowledge resources
- Supplying materials



HEAT RECOVERY VENTILATION

LUNOS e²
energy-efficient

DECENTRALIZED - Through-wall, ductless HRV

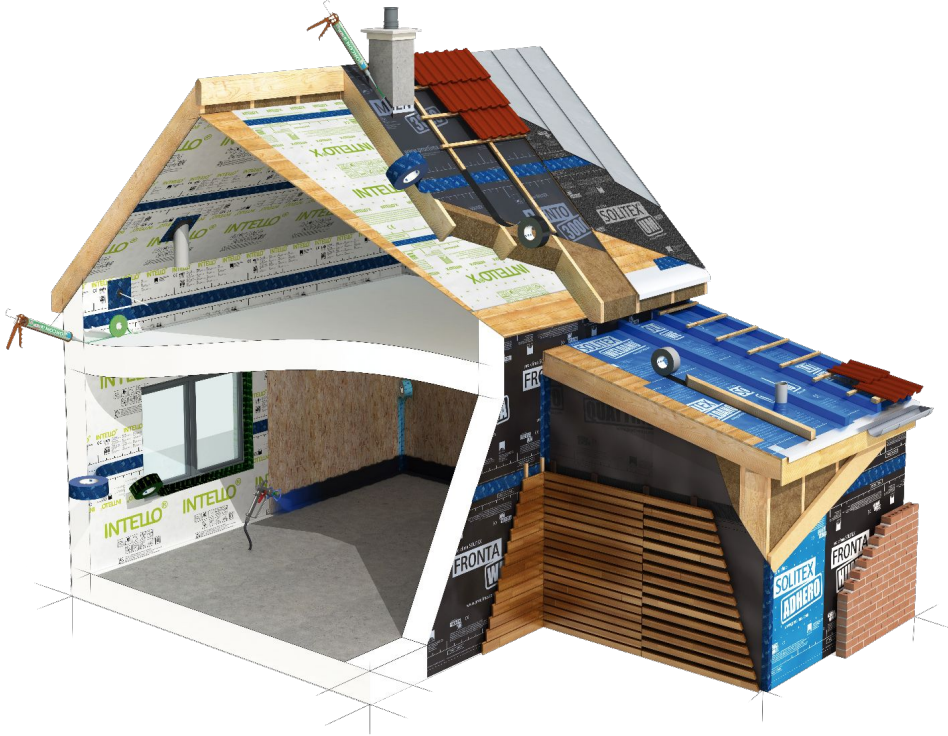
BRINK

CENTRALIZED - Ducted HRV or ERV


Air for life
#BreatheExcellence

AIR CONTROL

Encapsulate insulation inside and out … and on all 6 sides



AIRTIGHTNESS QUALITY CONTROL

AIRSEALING & VAPOR CONTROL

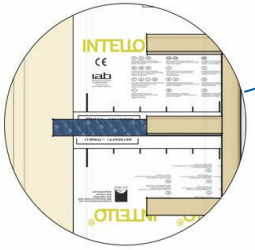
pro clima®

INTELLO PLUS

AIRTIGHT, SMART VAPOR RETARDER

VISCONN

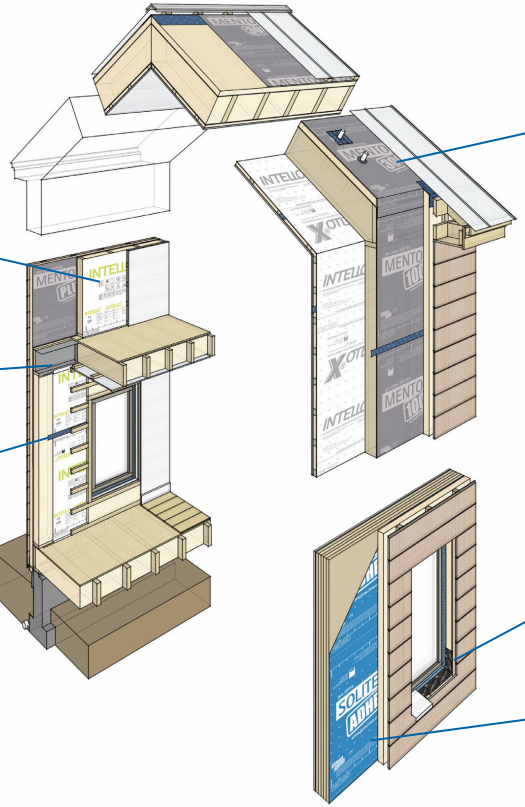
LIQUID-APPLIED

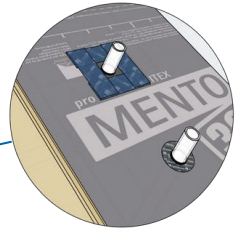


TESCON VANA

INTERIOR / EXTERIOR

ALL-AROUND TAPE CONNECTIONS





SOLITEX WRBs

ROBUST, AIRTIGHT, VAPOR-OPEN

TESCON PROFIL / EXTOSEAL ENCORS

WATER AND AIR PROTECTION FOR HIGH PERFORMANCE WINDOW PREP

ADHERO

SELF-ADHERED, DURABLE WRB

WOOD FIBER INSULATION BOARDS/WRB

GUTEX®

HIGH PERFORMANCE BUILDING COMPONENTS

AIR & VAPOR CONTROL

INSULATION

ROOF DAYLIGHTING

QUALITY CONTROL

HEAT RECOVERY VENTILATION

DO YOU FILTER YOUR WATER?

Greater than half of all Americans filter their drinking water at home

- NSF Consumer Study

WHAT ABOUT THE AIR YOU BREATHE?

The Conversation

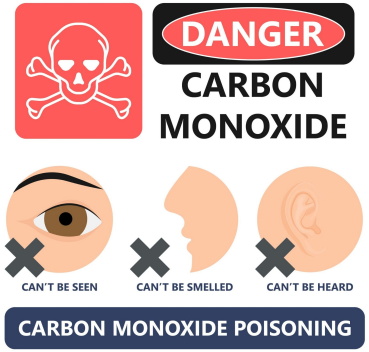
WHAT ABOUT THE AIR YOU BREATHE?

Dedicated, 24-hour, filtered fresh air

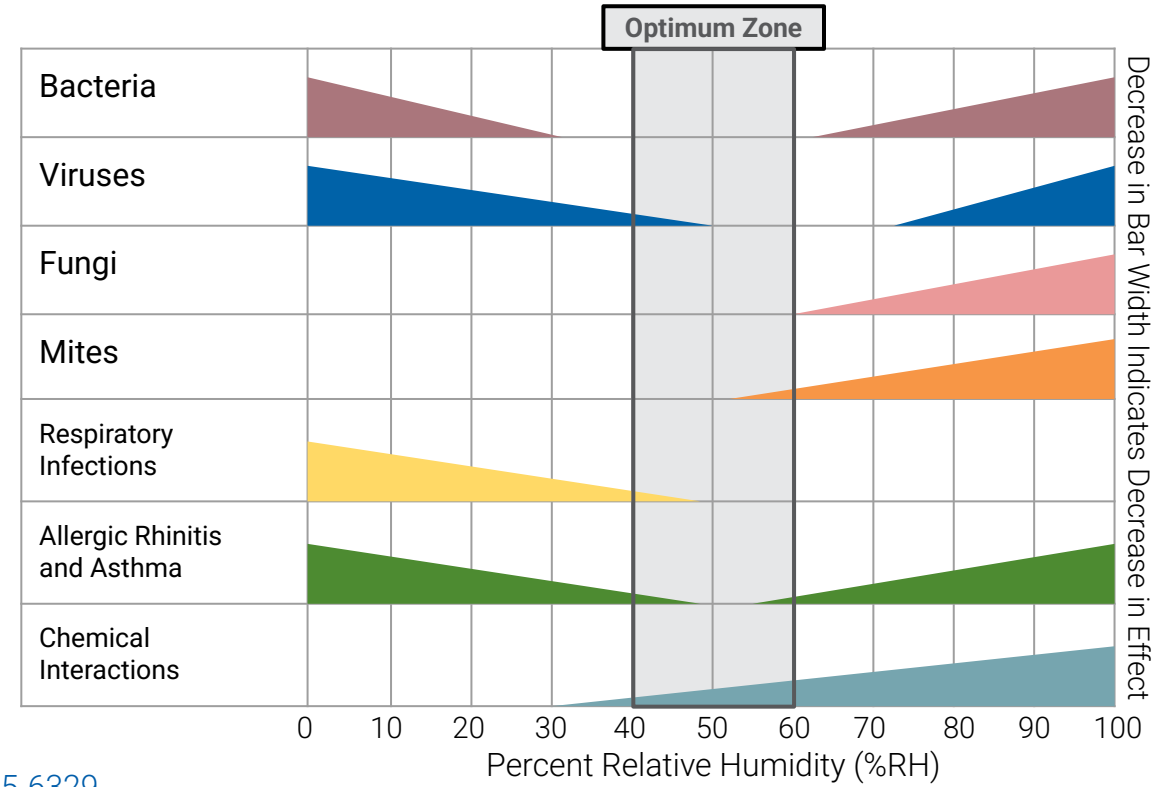
475.supply | 800-995-6329

HEALTH & WELL-BEING

Pollutants in Indoor Air	
Harmful Gas	**Effect**
N_2O, NO, NO_2	High Concentration: Damage pulmonary tissue
Formaldehyde	High concentration: impairment of eyes and upper respiratory tract
CO	Odorless, extremely toxic
CO_2	High concentration: drowsiness, headaches, poor mental performance
O_3	Highly toxic, irritation of mucous membranes and upper respiratory tract.
Radon	Long-term exposure risks of lung cancer
H_2O (%RH)	Too high or too low: creates environment for viruses, respiratory infection and more…



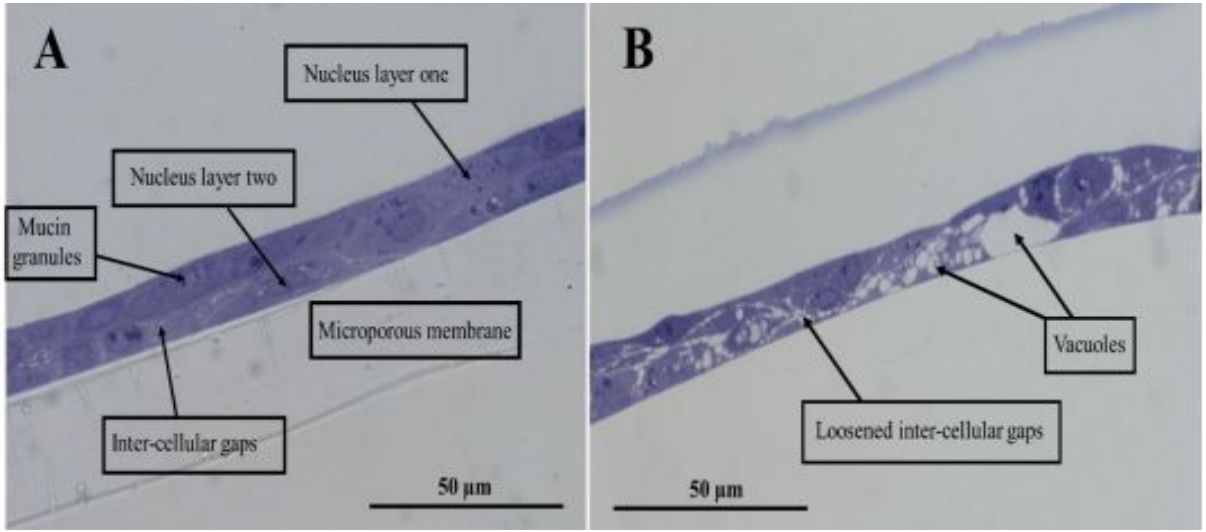
HEALTH & WELL-BEING



Credit: Energy Vanguard

HEALTH & WELL-BEING

Control Indoor Air Humidity



RH 50%	RH 20%

Credit: Stephanie Taylor, MD M. Arch

HEALTH & WELL-BEING

Control Indoor Air Humidity

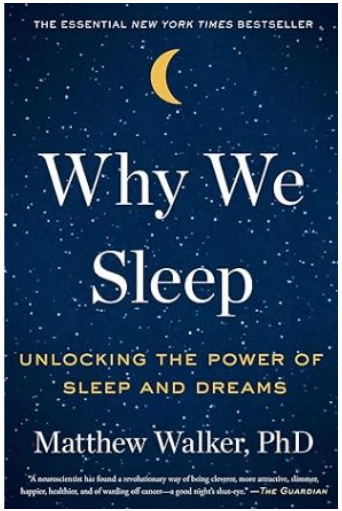
HEALTH & WELL-BEING

Studies Show:

- Improved air quality can lead to enhanced cognitive function, productivity, and reduced absenteeism in schools and workplaces.
- Improving ventilation rates in office environments could improve workers' cognitive function.

HEALTH & WELL-BEING

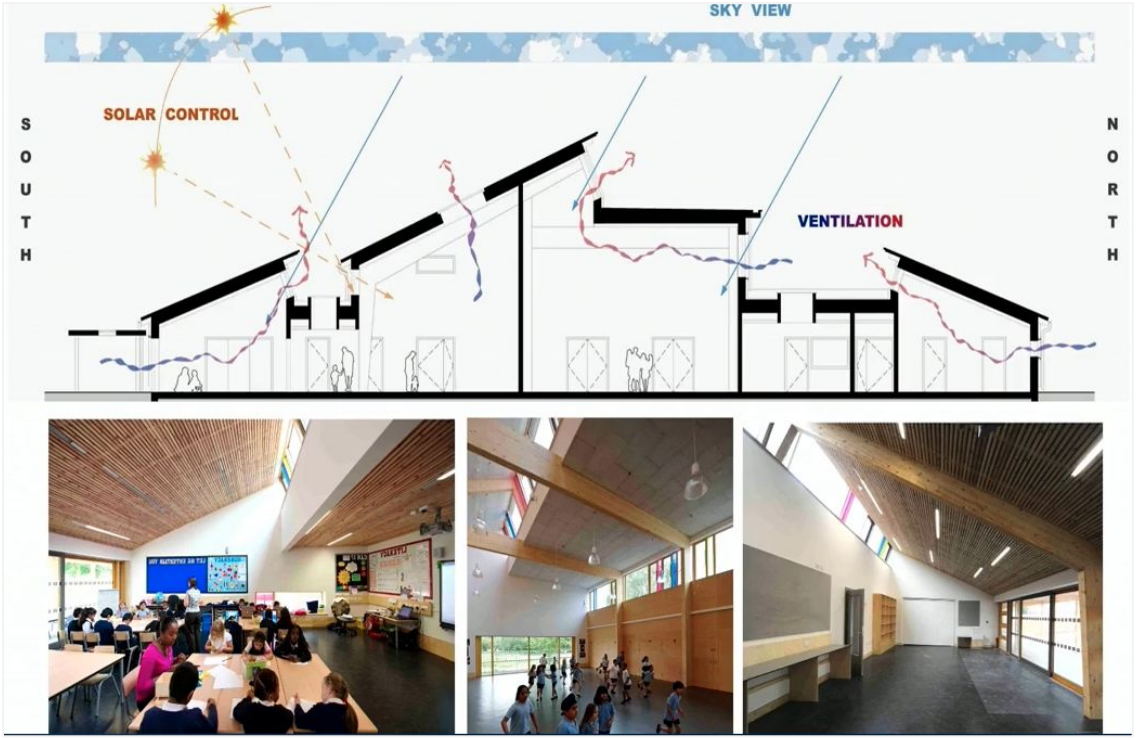
Indoor Air Quality = Better Sleep and Overall Well-Being



COMFORT

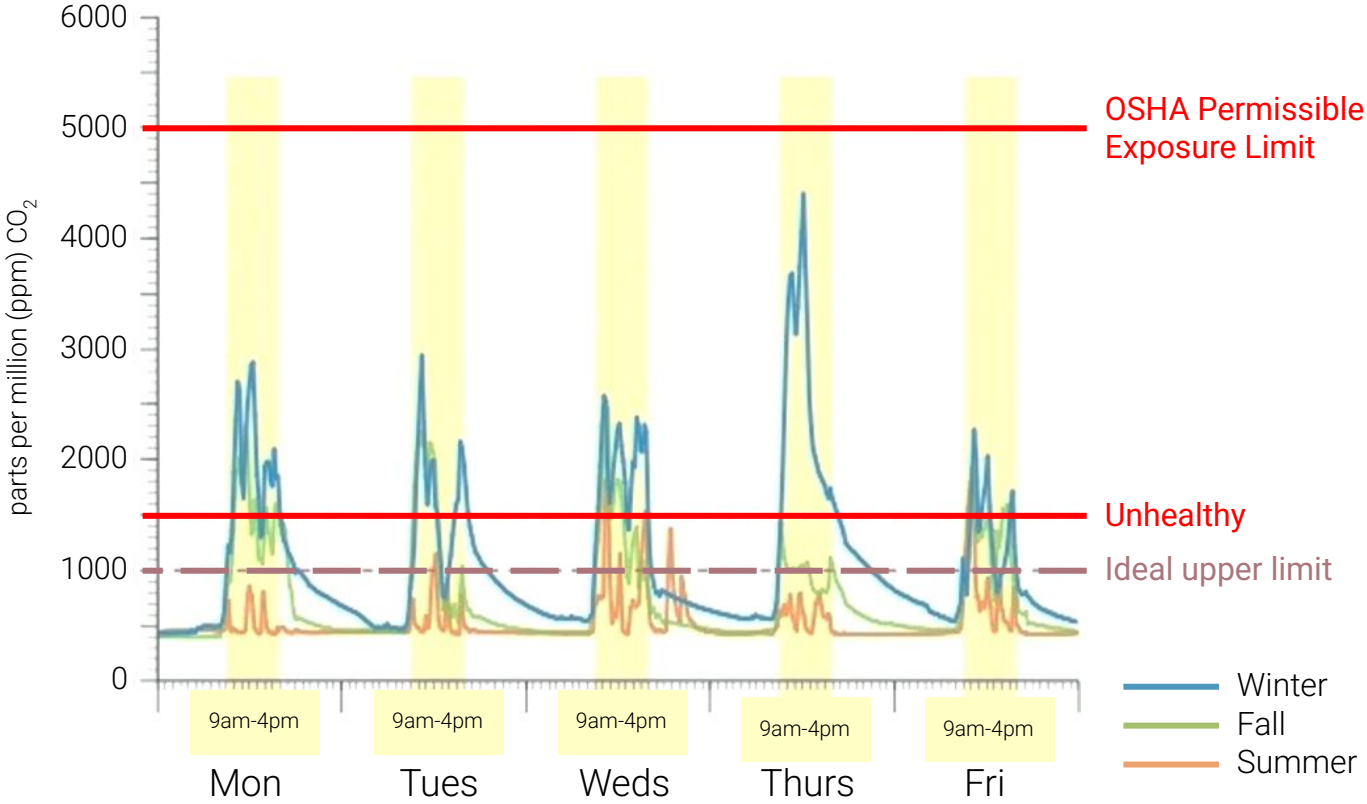
You could just open a window!

PASSIVE VENTILATION?



Jonathan Hines
Managing Director,
Architype

PASSIVE VENTILATION?



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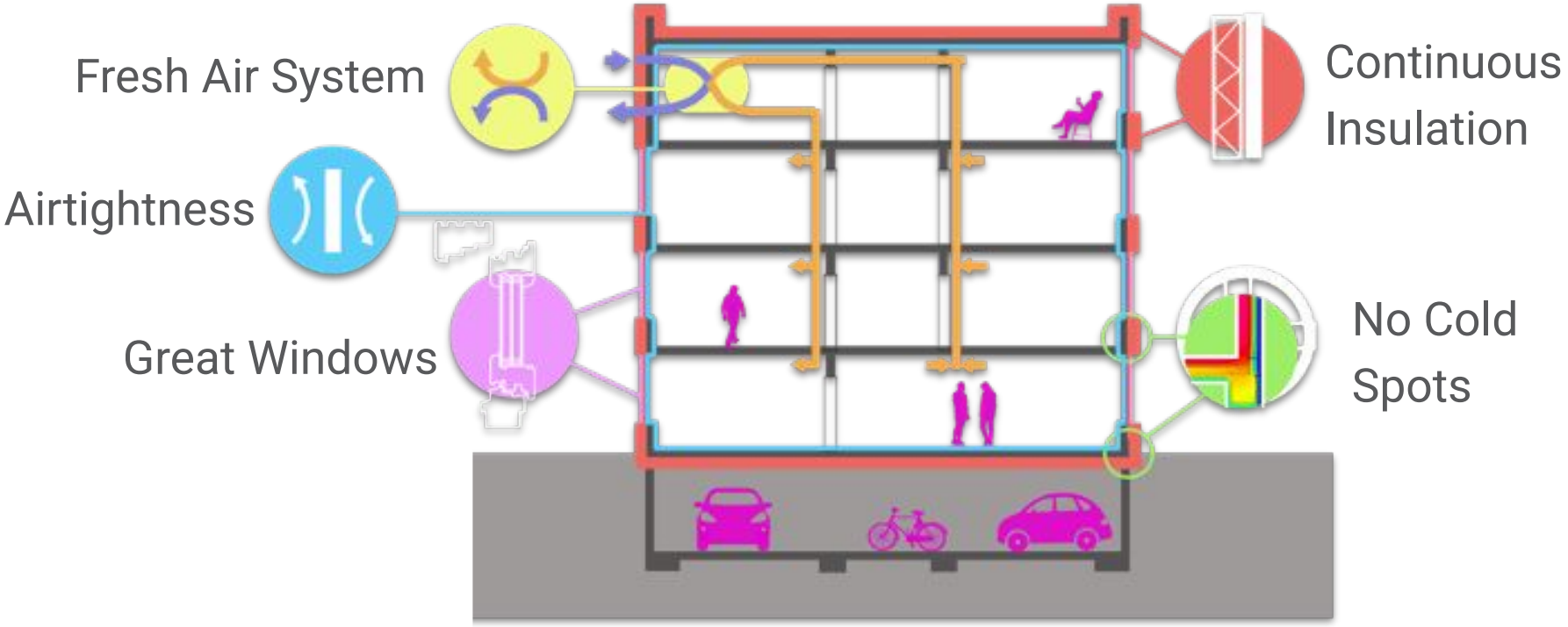
HOW DO WE DO IT?

Building as integrated systems



ASSEMBLY CONTROL LAYERS

In order of importance:

1. WATER CONTROL
2. AIR CONTROL
3. VAPOR CONTROL
4. THERMAL CONTROL

ASSEMBLY CONTROL LAYERS

In order of importance:

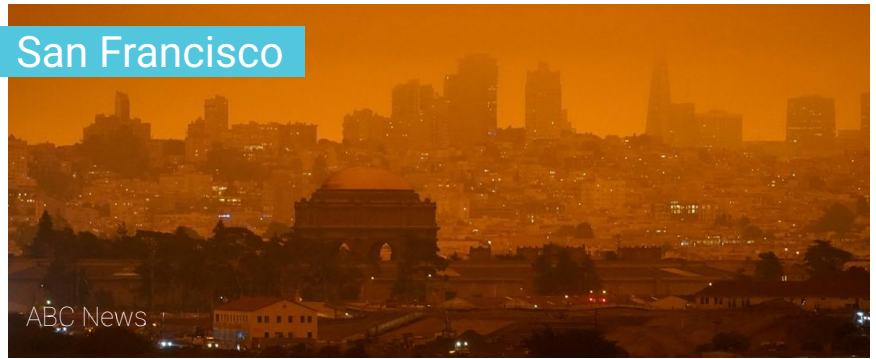
1. WATER CONTROL → Shed it.
2. AIR CONTROL → Delivers energy and health.
3. VAPOR CONTROL → Allow it to dry.
4. THERMAL CONTROL → Right size.

ASSEMBLY CONTROL LAYERS

1. WATER CONTROL: Shed it. Or it will destroy the building.

ASSEMBLY CONTROL LAYERS

2. AIR CONTROL: Delivers energy efficiency and healthy air.



ASSEMBLY CONTROL LAYERS

3. VAPOR CONTROL: Allow it to dry. Avoid mold and rot.

ASSEMBLY CONTROL LAYERS

3. VAPOR CONTROL: Allow it to dry. Avoid mold and rot.

ASSEMBLY CONTROL LAYERS

4. THERMAL CONTROL: Right size. Avoid thermal bridges.

SEQUENCE FOR CONTINUITY

Interior Walls

AIR CONTROL = ENERGY DRIVER

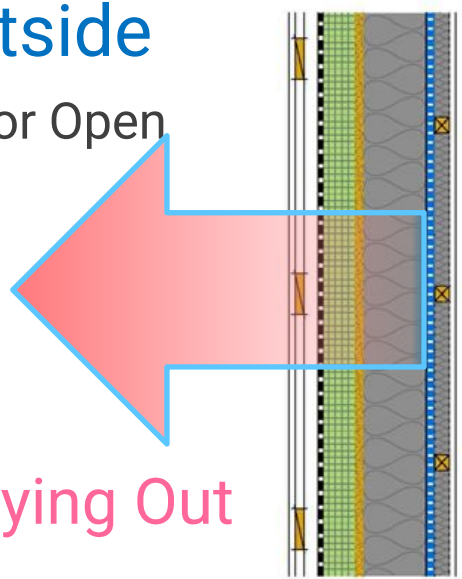
- "Infiltration **drives heating**."
- "In some segments … infiltration contributes **nearly double all other envelope heat transfer component loads combined**"
- "Reduction in air infiltration [provides] co-benefits of reduced moisture infiltration and improved indoor air quality **if coupled with mechanical ventilation.**"

VAPOR CONTROL

WINTER: Vapor Drive is Outward

Outside

Vapor Open



Inside

Vapor Retarding
(or variable)
How variable?

Drying Out

Minimize Potential
Wetting from Inside

VAPOR CONTROL

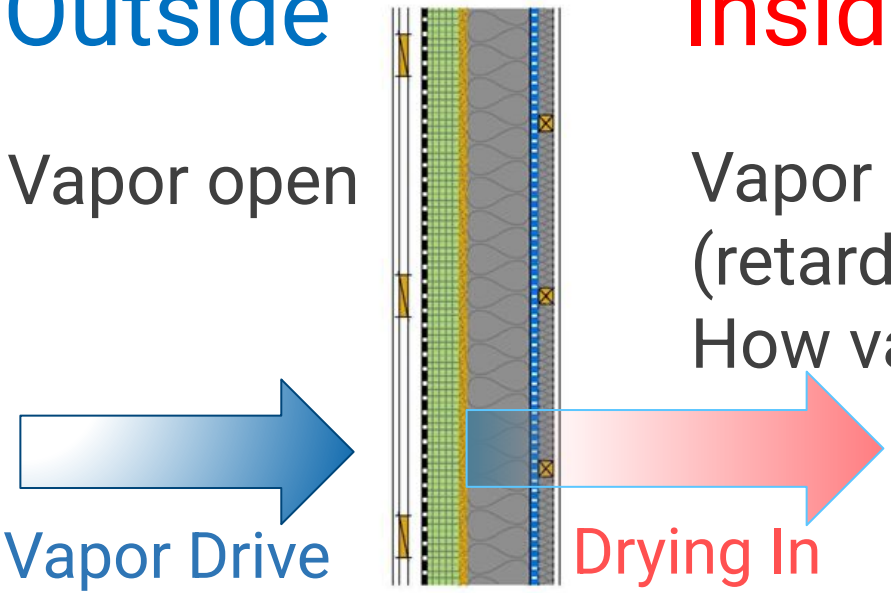
SUMMER: Vapor Drive is Inward

Outside

Inside

Vapor open

Vapor Open
(retarding/variable)
How variable?



Vapor Drive

Drying In

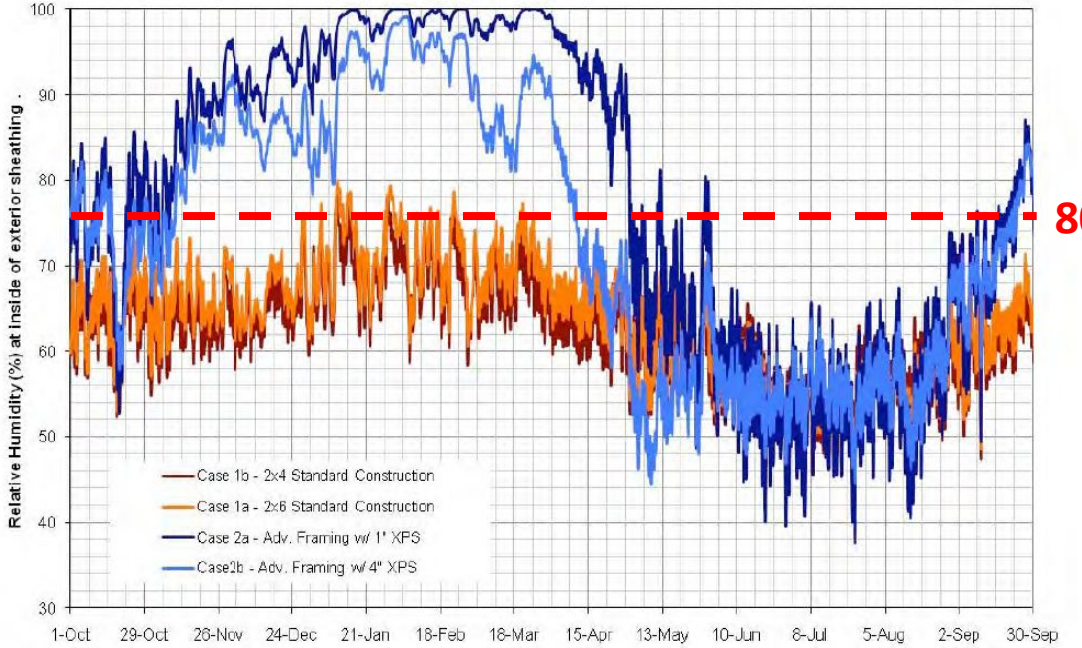
VAPOR CONTROL

Why are we installing **VAPOR TRAPS**?

Credit: Synergy Companies Construction LLC

VAPOR CONTROL

Foam Can Cause Moisture Concerns



Minneapolis MN 30% winter indoor RH

Figure 9 : Winter time sheathing relative humidity for Case 1 and Case 2
Credit: Building Science Corp.
Building America Special Research Project: High R Walls Case Study Analysis

TYPES OF SYSTEMS

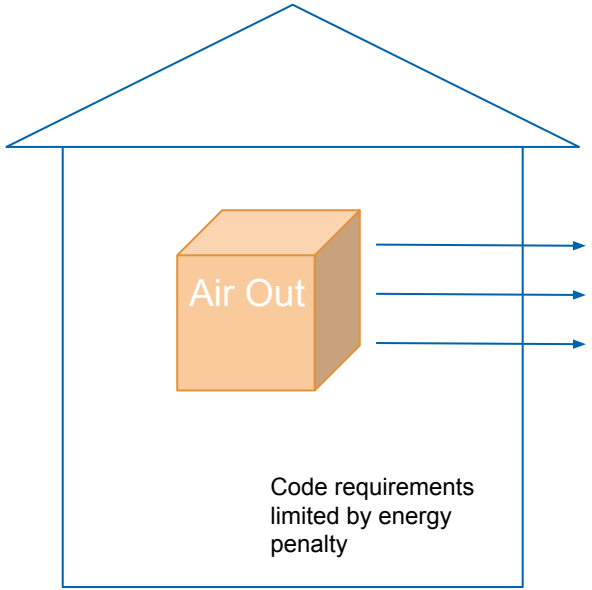
Exhaust only

Uncontrolled untempered air

- Air needs reheating!
- It's also dirty! (infiltration)

At 0.33 ACH50:
Every 3 hours need to reheat ALL the air in the building.

Home air purifiers



TYPES OF SYSTEMS

Balanced ventilation

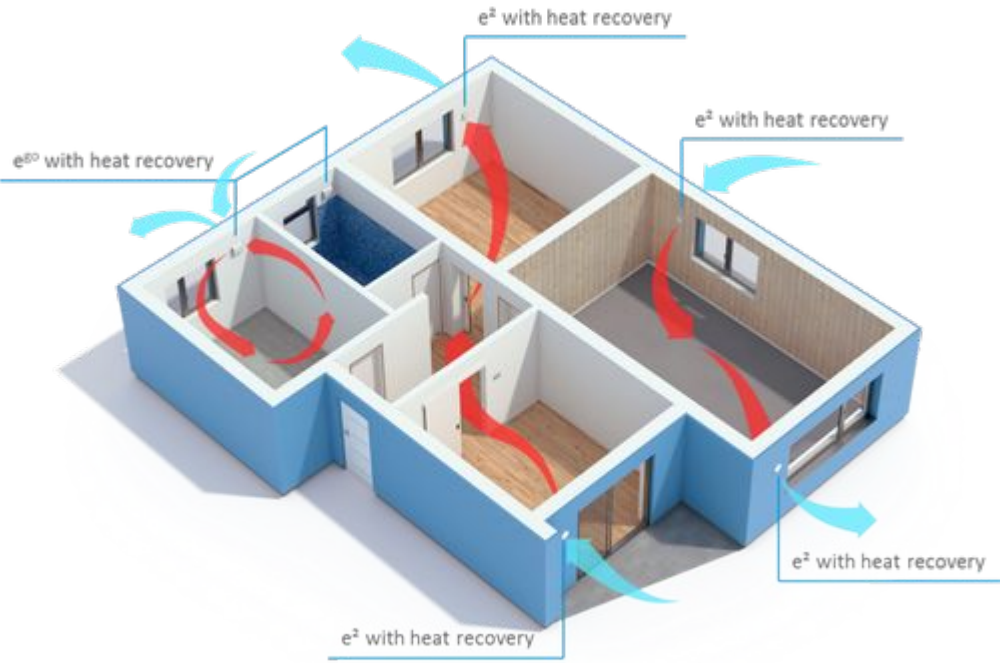
Control:

- Route (freshest air possible)
- Quality (source & filtration)
- Comfort (no drafts)
- Intentional delivery (where to)
- Energy savings

Code requirements limited by energy penalty

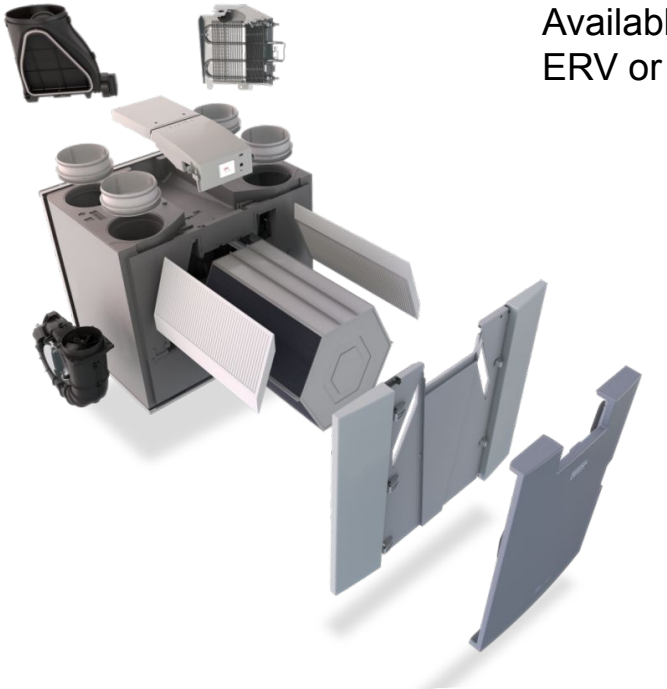
TYPES OF SYSTEMS

DECENTRALIZED



CENTRALIZED

CENTRALIZED



Available as an
ERV or HRV

COMFORT CRITERIA

Efficient systems provide a comfortable supply air

COMFORT CRITERIA

Efficient systems provide a comfortable supply air

Below 60 Fahrenheit = Draft

COMFORT CRITERIA

Efficient systems provide a comfortable supply air

$$T_{outdoor} + [(T_{indoor} — T_{outdoor}) * Efficiency\%] = Supply\ Air\ Temp$$

COMFORT CRITERIA

Efficient systems provide a comfortable supply air

$T_{outdoor}$ + [(T_{indoor} — $T_{outdoor}$) * Efficiency%] = Supply Air Temp

15°F + [(72°F — 15°F) * 91%] = 67°F

COMFORT CRITERIA

Efficient systems provide a comfortable supply air

$T_{outdoor}$ + [(T_{indoor} — $T_{outdoor}$) * Efficiency%] = Supply Air Temp

15°F + [(72°F — 15°F) * 91%] = 67°F

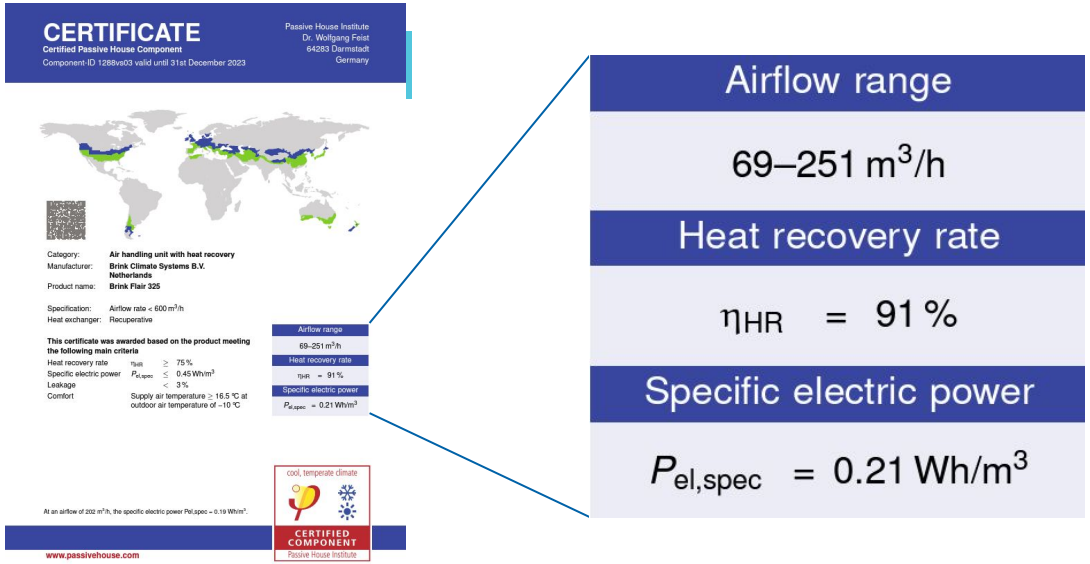
15°F + [(72°F — 15°F) * 65%] = 52°F

COMFORT CRITERIA

Efficient systems provide a comfortable supply air

- Temperature
- Air quality
- Noise

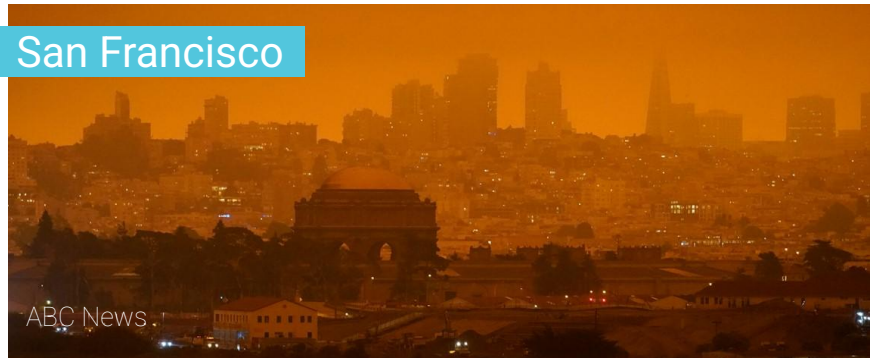
THIRD PARTY TESTED



Criteria	PHI
High Quality Air	Yes
High Heat Exchanger Eff	75%
Low Power Consumption	Yes
Minimal Air Leakage	Yes
Minimal Case Heat Losses	1
Comfortable Supply Temp	Yes
Low Noise Production	Yes
Effective Frost Protection	Yes

FILTRATION

Air control delivers energy efficiency and healthy air.



FILTERS

MERV Rating	Air filter will trap particles sized .3 to 1.0 microns	Air filter will trap particles sized 1.0 to 3.0 microns	Air filter will trap particles sized 3.0 to 10 microns	Filter Type & Particles Removed
MERV 1	<20%	<20%	<20%	Fiberglass and Aluminum Mesh pollen, dust mites, spray paint, carpet fibers, pet dander
MERV 2	<20%	<20%	<20%	
MERV 3	<20%	<20%	<20%	
MERV 4	<20%	<20%	<20%	
MERV 5	<20%	<20%	20% - 34%	Disposable Filters mold spores, kitchen aerosols, hair spray, furniture polish, household cleaning sprays
MERV 6	<20%	<20%	35% - 49%	
MERV 7	<20%	<20%	50% - 69%	
MERV 8	<20%	<20%	70% - 85%	
MERV 9	<20%	>50%	85% or better	Home Box Filters lead dust, flour, auto fumes, welding fumes
MERV 10	<20%	50% - 64%	85% or better	
MERV 11	<20%	65% - 79%	85% or better	
MERV 12	<20%	80% - 90%	90% or better	Commercial Filters bacteria, wildfire smoke, respiratory droplets
MERV 13	>75%	90% or better	90% or better	
MERV 14	75% - 84%	90% or better	90% or better	
MERV 15	85% - 94%	95% or better	90% or better	
MERV 16	95% or better	95% or better	90% or better	
MERV 17	99.97%	99% or better	99% or better	HEPA and ULPA viruses, carbon dust
MERV 18	99.997%	99% or better	99% or better	
MERV 19	99.9997%	99% or better	99% or better	
MERV 20	99.99997%	99% or better	99% or better	

FILTRATION

Installed in 475.Supply Office

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MERV 19	99.9997%	99% or better	99% or better	
MERV 20	99.99997%	99% or better	99% or better	

F7 / ePM1 50% / MERV 13
Remove outdoor pollutants at supply

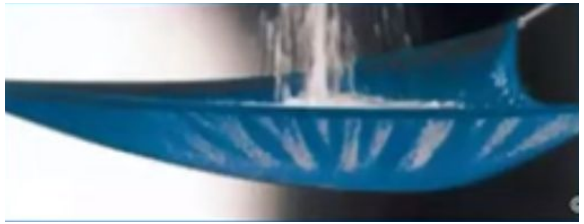
G4/ iso course 60% / MERV 7-8
Remove grease at return to protect core

59 days of NYC air + 3 days of wildfire smoke in June 2023

HRV or ERV?

What is the difference between an ERV and HRV?

- **HRV** = **H**eat **R**ecovery only.
  Uses a airtight, vapor-closed material
- **ERV** = **E**nergy or **E**nthalpy **R**ecovery.
  Uses an airtight, vapor-open material.

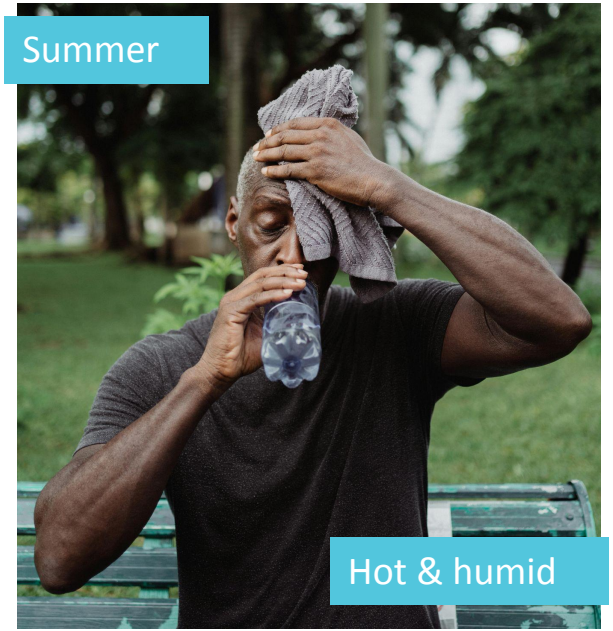


No transfer of liquid water

Transfer of water vapor

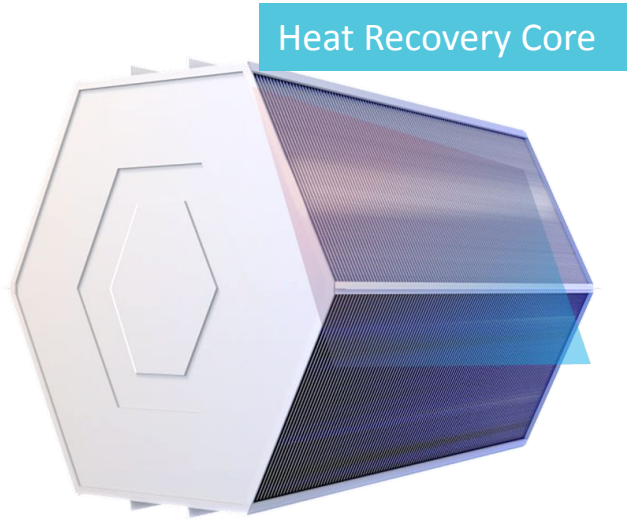
HRV or ERV?

When should I use an ERV or HRV?



HOW HEAT RECOVERY WORKS

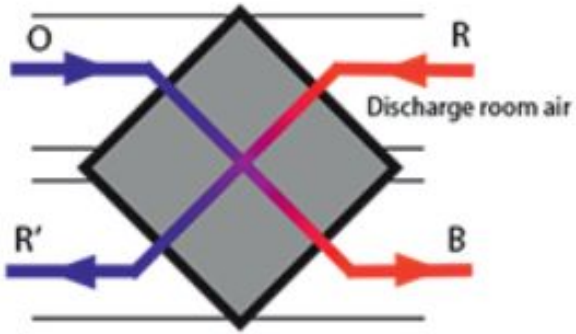
Types of Cores



HOW HEAT RECOVERY WORKS

Types of Cores

Cross flow heat exchanger



40-65% Efficient

Heat Recovery Core

HOW HEAT RECOVERY WORKS

Types of Cores

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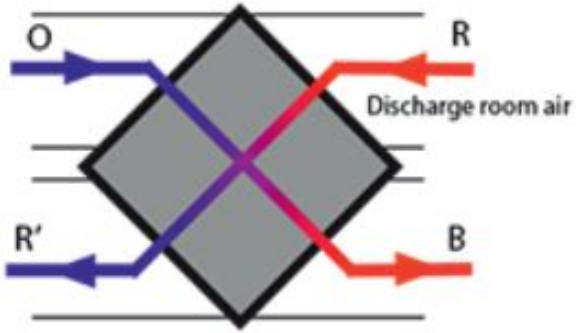
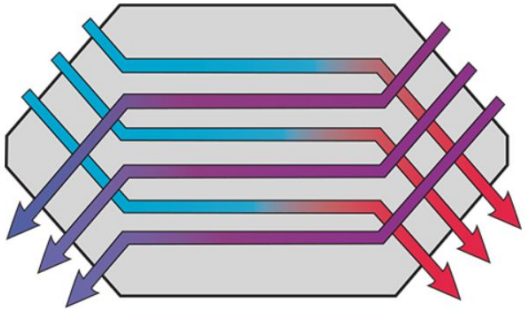


40-65% Efficient

Counter flow heat exchanger

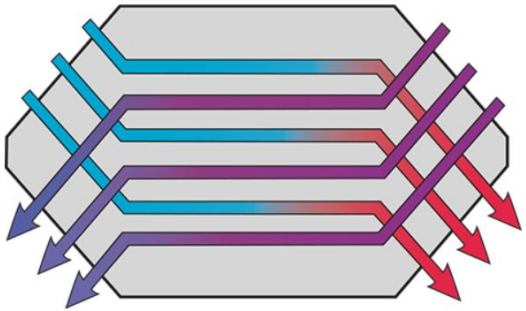


75-92% Efficient

Heat Recovery Core

COUNTER FLOW HEAT EXCHANGER

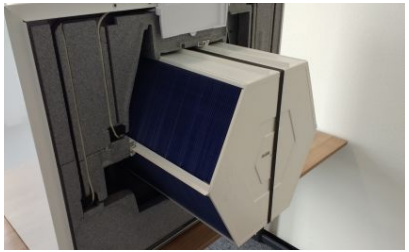
Counter flow heat exchanger



75-92% Efficient

Heat/Energy Recovery Core

Low resistance

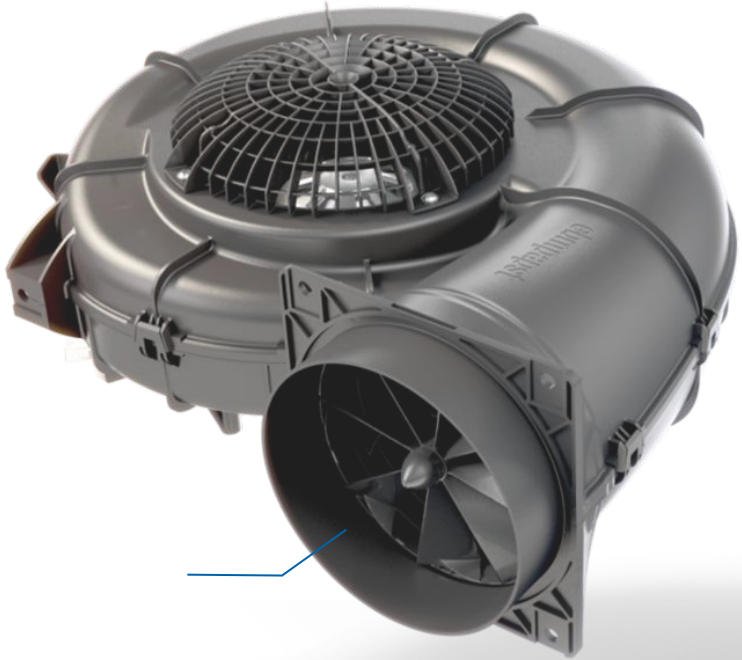


Guiding sleeves for airtightness

PERFECT BALANCING FURTHERS EFFICIENCY

Vane-Anemometer - Latest Technology!

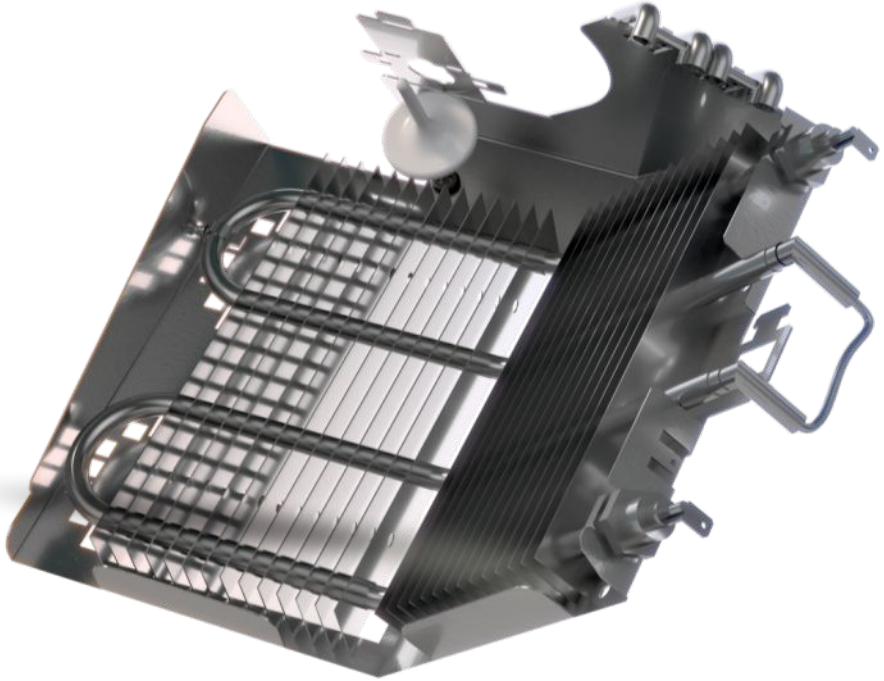
Ultra precise and fast flow-measurement



Constant Flow

Flow rates guaranteed with changes in air density or pressure in the system (despite dirty filters!).

INTELLIGENT PREHEATER ALWAYS INCLUDED



New aerodynamic design

- Larger surface (cooling ribs)
- Double safety switch max temp
- Guiding vanes for equal air-flow over heat exchanger
- Ramps up as needed

58/31

FULL KITTED SYSTEM REDUCES INSTALLER ERRORS

Airtight ducts with low resistance.

3" SEMI-RIGID DUCTS

BRINK PURE HEPA POST FILTER ADD-ON

GEOTHERMAL PRE CONDITIONING ADD-ON

AIRTIGHT ROFLEX GASKET (BOX OF 2 WITH TAPE)

2- AND 3- PORT DIFFUSER BOXES

5-, 10-, AND 15-PORT MANIFOLDS

EASY TO ASSEMBLE INSULATED DUCTS

EXTERIOR WALL GRILLS

KITCHEN DIFFUSER WITH FILTER

DUCT LABELS

HIGH EFFICIENCY AND ROBUST BRINK FLAIR UNITS (4 SIZES AVAILABLE NAMED ACCORDING TO M3/HR FLOW RATES: 225, 325, 400, 600)

O-RINGS FOR 3" SEMI-RIGID DUCT

ELEGANT AND ADJUSTABLE DESIGN DIFFUSERS

WATERLESS P-TRAP (HRV ONLY)

ADVANCED CONTROLS AVAILABLE: CO2 OR RH BASED DEMAND CONTROLLED VENTILATION, DATA TRENDING, AND APP CONNECTIVITY

DISTRIBUTION SYSTEM MATTERS

Home run system

Full system reduces install errors and duct leakage.

Airtight ducts with low resistance.

BRINK FLAIR UNIT

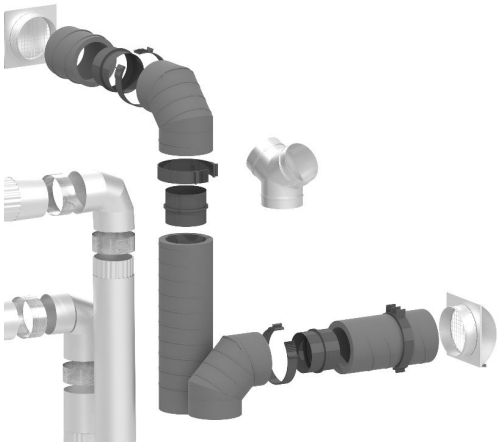
SUPPLY AND EXHAUST MANIFOLDS

DISTRIBUTION

3” SEMI-RIGID

OR 3” FLEX DUCT

INSULATED DUCT

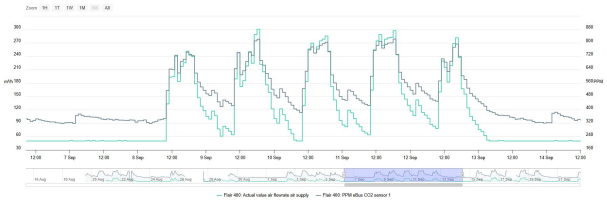


INSULATED DUCTING for FRESH AIR INTAKE and EXHAUST to environment

OPTIONAL ACCESSORIES / CONTROL

Modbus compatible

Demand controlled ventilation capable



Time of day / day of week scheduling

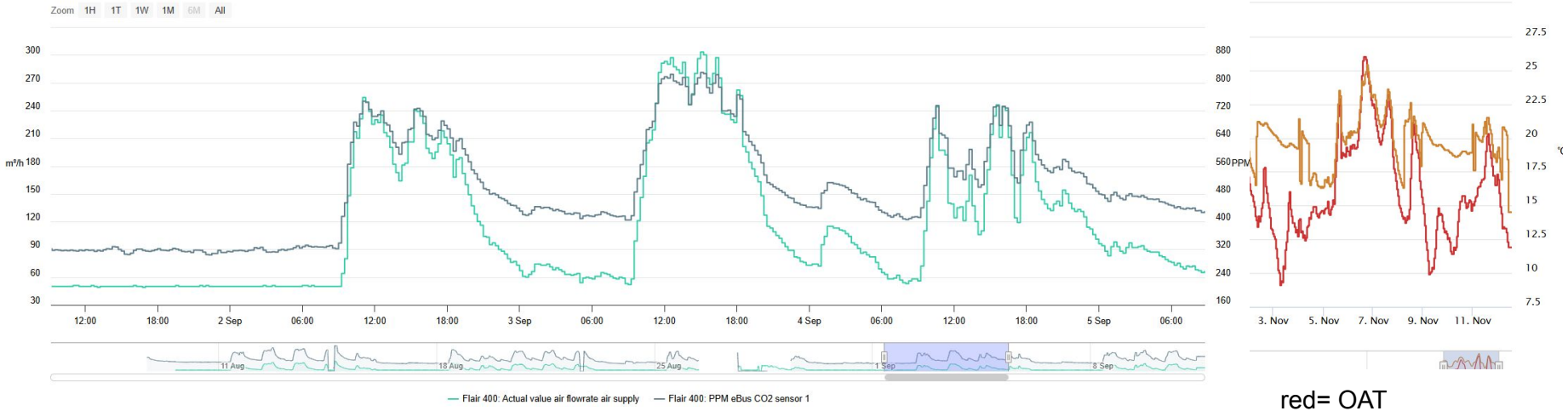
Onboard PCB allows connection to controls

App control

CO2 SENSOR AND RH SENSOR

BOOST SWITCHES, TOUCH CONTROL, PLUS MODULE

OPTIONAL ACCESSORIES / CONTROL



red= OAT
orange = SAT

BRINK HOME

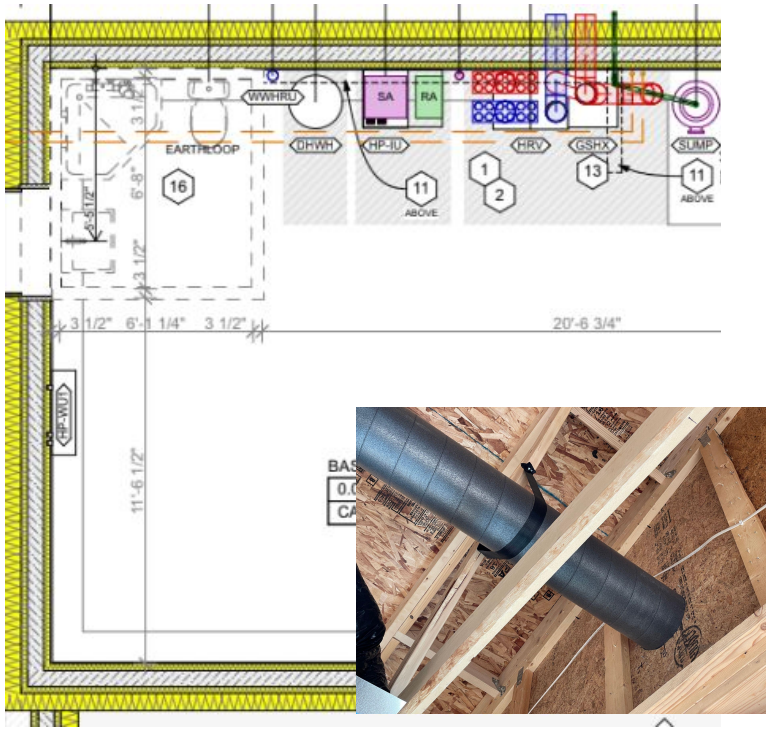
ERV IN DD

*"It's a difficult position for an architect to be in to constantly be **defending the mechanical room**. I've certainly failed doing it and lived to regret that."*
- Barry Price

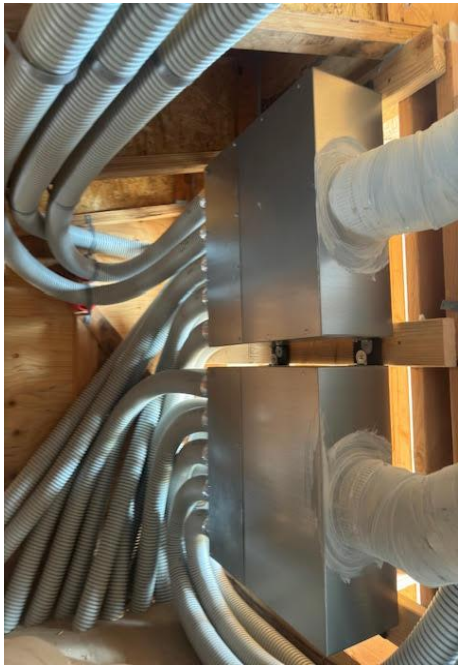
- **Design development** - Coordinate HVAC equipment, access to outdoor air, duct runs, diffuser locations.
- **Proactive** instead of reactive process.

ERV IN DD

- Locate the mechanical room close to exterior wall.
- Intake and exhaust ducts should be:
  - Insulated
  - Airtight
  - Vapor-closed
  - Sealed to air barrier with gaskets
- Long cold air ducts can reduce heat efficiency by 5-15%



ERV IN DD



Available in left or right hand orientations, consider where manifolds will be located when ordering.

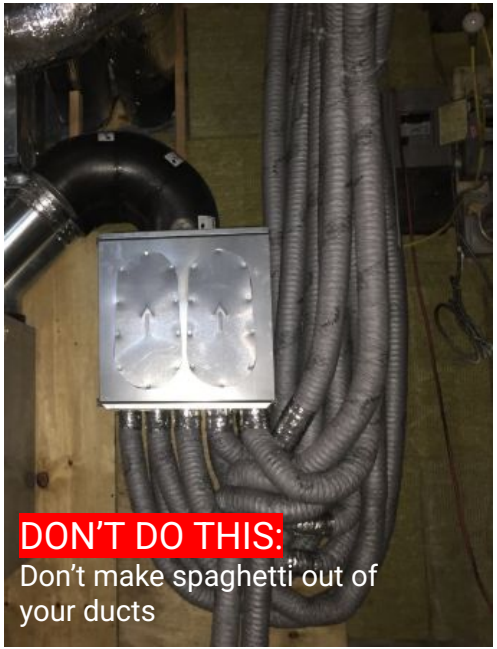
CHANGE YOUR FILTERS

- Well-designed ventilation systems have very little maintenance
- Accessible filters and diffusers make routine maintenance simple

“Change your filters, change your filters, change your filters” - Cramer Silkworth, Baukraft Engineering

CONSIDERATIONS

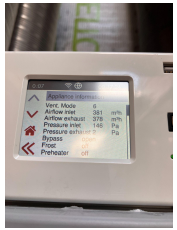
Can have good ingredients, but must also have a good “chef” or installer.

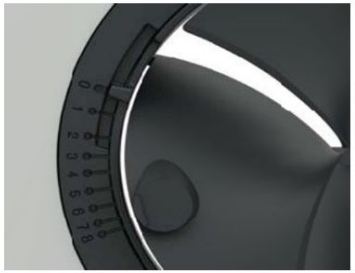


COMMISSIONING

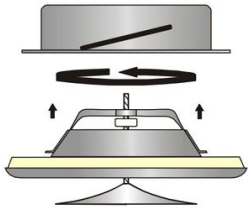
What Commissioning Ensures:

- Each room has required air exchange
- Neutral pressure: balanced
- Short runs should be made to be a minimum of 10’
- May need additional ducts for longer runs.





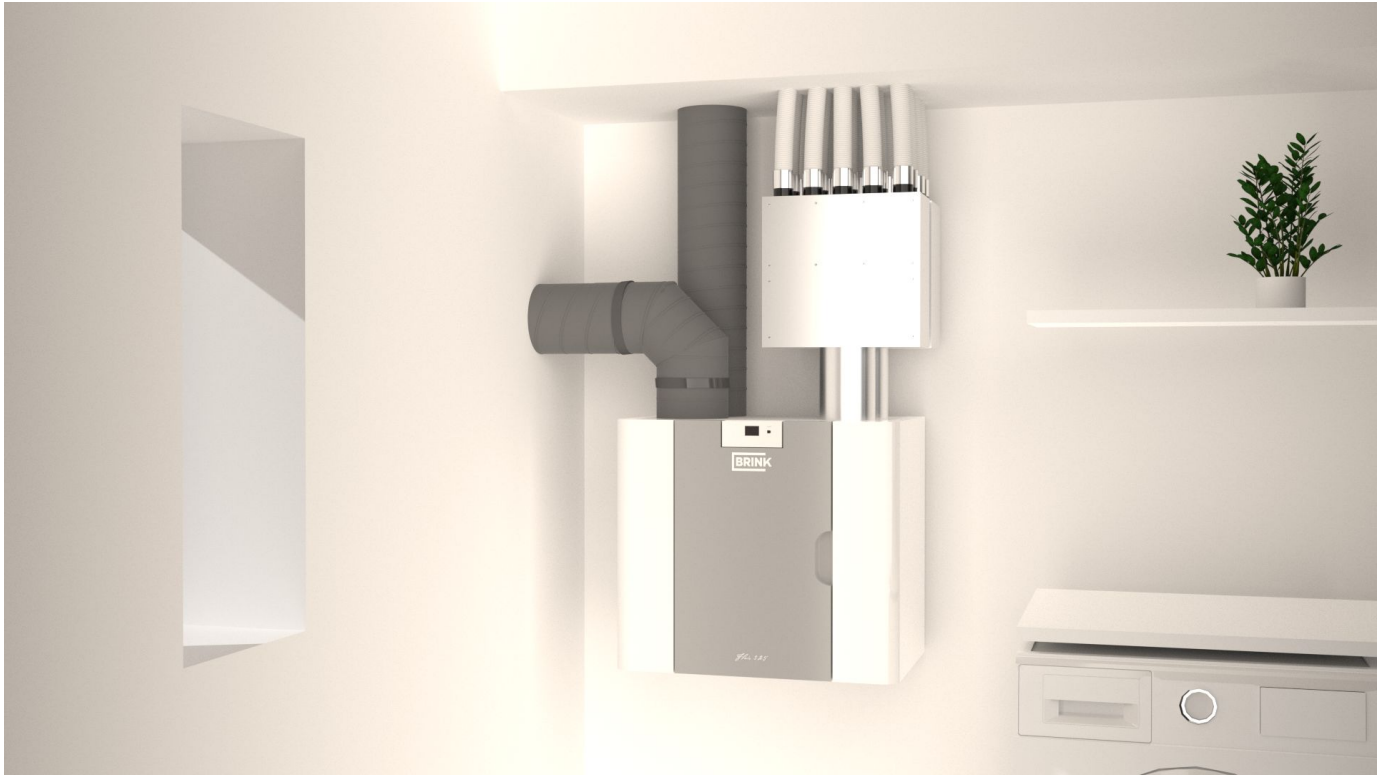
9-step air flow balancing valve



SUMMARY

- Distributed
- Balanced
- Continuous
- Energy recovery (with certifications)
- Robust = longevity
- Quiet
- Filtered (IAQ /IEQ)
- Reduce risk of condensation and mold

QUESTIONS?



THANK YOU!

Brink Team

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