

# Ventilation, What works, What doesn't and Why.

FOR BCBECC SEPT. 22, '09

David A. Hill  
Eneady Products Ltd

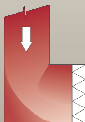
Presentation: with great help from Chelsea Gauvin

Lets deemphasize equipment

# TECA's latest course



## Basics of Air



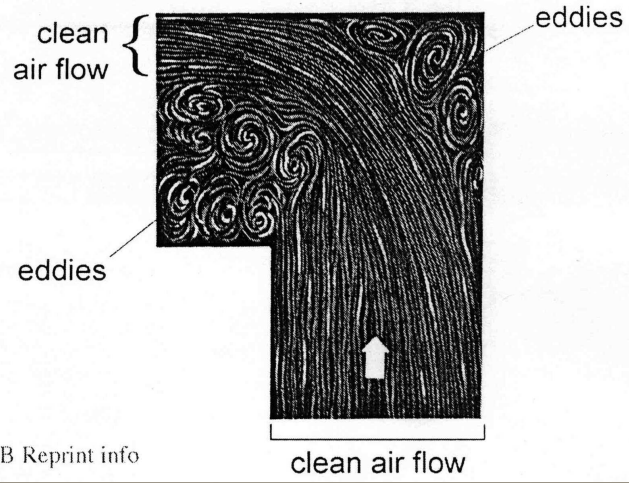
An Introduction to the Principles  
of Moving Air Quietly & Efficiently

1st Edition, October 2008



Graham Finch

Figure 13: FLOW THROUGH A MITRED FITTING



ADD T&B Reprint info

## 'Basics of Air' Model



## History

- Respiratory Canary
- Saskatchewan Conservation House
  - Rob Dumont, Harold Orr and Bob Besant
- Great building technology mentors here in Canada and in Europe in ventilation

Mark Gauvin and his team

## Our Swedish Ventilation Mentors



OVE SVENSON, me, Yorgen, Eiron Anderson

## Our French Mentor




## Pet Ventilation Gripes

- Exhaust-only is impossible in houses
- SI vs IP, On the street Mechanical is IP
- ACH, convenient index of uncontrolled air leakage and heat loss; It is Not a measure of ventilation
- Air circulation is not ventilation
- ????How tight is too tight????
- Complex system installed poorly
- O3 smells good but is not good for human lungs



# Air Circulation is not Ventilation

fresh air for feet

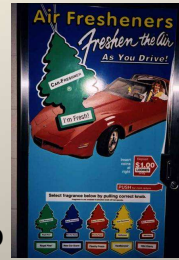


The perfect combination of lightweight, flexible, soft and breathable.  
Clarks Unstructured collection features our unique Air Circulation System – a climate control technology that keeps feet fresh and comfortable all day.

unstructured  
Clarks

Men's "Un-Kenneth" \$169.95

## Pet Gripes Con't



- Air Fresheners, UGH!!!!!!!!!!
- Filtration is good, complimentary to ventilation, can not (economically) eliminate ventilation
- CO2 is not a toxin, it is an easy to measure indicator of 'used' only.
- CO is lethal, don't mess with it
- Ventilation is an art not a precise science!
- BASIC QUESTION WE DON'T THINK TO ASK:  
What are we ventilating for?????

## CO2 in the Air



## Good engineering, (exact calc)

- Need to insert You Tube Video here

John Kenneth Galbraith

## Conventional wisdom formed by:

- The ease which the idea may be understood
- Degree to which it affects one personally
- The need for heating (or thermal comfort\*) is understood, the need of ventilation is not.
- ----- OBJECTIVE! -----
- To build a warm, dry (& healthy) house!!!

Eric Burnett says comfort includes ventilation!

# Good Books on Water

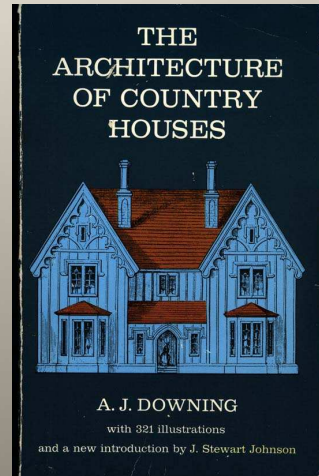


# The Architecture of Country Houses

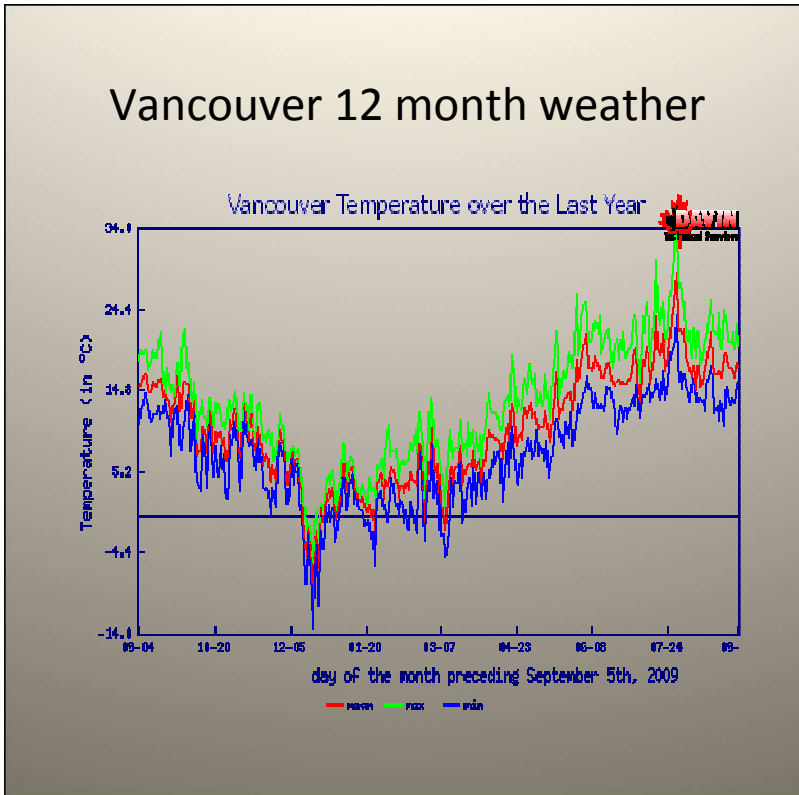
A.J. Downing, Arch.pub. 1869

There is no subject directly connected with domestic life on which there is so large amount of popular ignorance as ventilation.....

The want of attention arises from the fact that the poison of breathing bad air is a slow one..... and its affects are only felt little by little.



# Vancouver 12 month weather



Green Daily Max

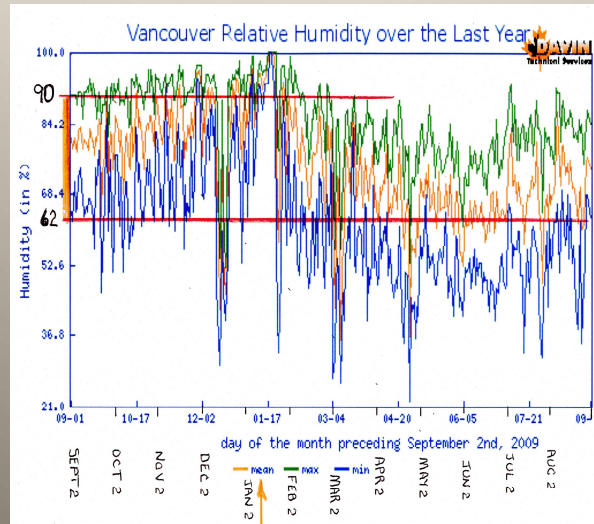
Orange Daily Mean

Blue Daily Min



# Vancouver 12 month RH

orange lines daily avg. ----- a dry year!  
Normally 74- 87%

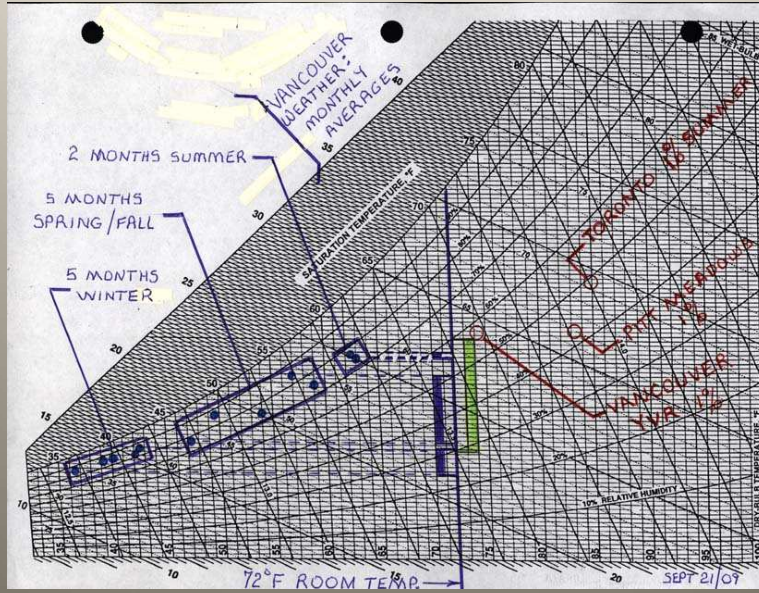


Green Daily Max

Orange Daily Mean

Blue Daily Min

# Vancouver Monthly Weather Data



## What is Ventilation?

- An exchange of indoor (used air) with cleaner (in most cases) outdoor air

# 1 cubic foot

the rate of ventilation is measured in cubic feet per minute



ncngngngf

## What are we ventilating for?

- People!
  - People activities!
  - As a bonus diluting the other inhalable garbage which we drag indoors from our chemical world
- 
- The goal, to repeat: How about?
  - Whats wrong with warm!, dry! and healthy!!

# Low emissions floor coverings

## Roll out the linoleum

Linoleum — the real stuff, not vinyl — is back in favour for its retro look, hard-wearing qualities, vivid colours and environmental friendliness

Susan Balcom



Successful flooring is a rare commodity. It must be durable, easy to clean, and have a long life. The floor is the most visible part of a room, and it sets the tone for the rest of the interior. For the past few years, vinyl has been the dominant force in the flooring market. But now, linoleum is making a comeback. The floor is the most visible part of a room, and it sets the tone for the rest of the interior. For the past few years, vinyl has been the dominant force in the flooring market. But now, linoleum is making a comeback.



The new look of linoleum: This attractive Massachusetts floor covering from Parle Industries has the lasting look of a living room rug.

Linoleum is made from natural materials, including linseed oil, pine resin, and wood flour. It is a natural, renewable resource that is easy to maintain and has a long life. The floor is the most visible part of a room, and it sets the tone for the rest of the interior. For the past few years, vinyl has been the dominant force in the flooring market. But now, linoleum is making a comeback.



Details show the texture and color of the linoleum pattern.

**Linoleum ingredients: Renewable resources and environmental benefits**

Linoleum is a natural, renewable resource that is easy to maintain and has a long life. The floor is the most visible part of a room, and it sets the tone for the rest of the interior. For the past few years, vinyl has been the dominant force in the flooring market. But now, linoleum is making a comeback.

<b>Lime Rock</b> Used in linoleum production.	<b>Wood Flour</b> Natural strength, excellent durability.	<b>Pine Resin</b> Natural strength, excellent durability.	<b>Flax Seeds</b> Used in linoleum production.

The new look of linoleum: This attractive Massachusetts floor covering from Parle Industries has the lasting look of a living room rug.



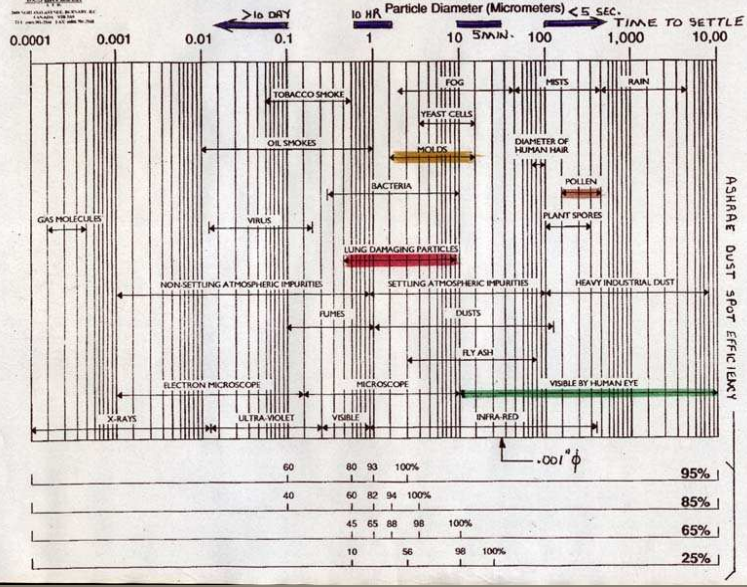
The new look of linoleum: This attractive Massachusetts floor covering from Parle Industries has the lasting look of a living room rug.

## What are we not ventilating for?

- Controlling temperature, except for summer free cooling in a cool evening
- Destratification (of temperature between levels)
- Rising damp
- Control of dust (from interior sources)



# Relative Size Chart of Common Air Contaminants



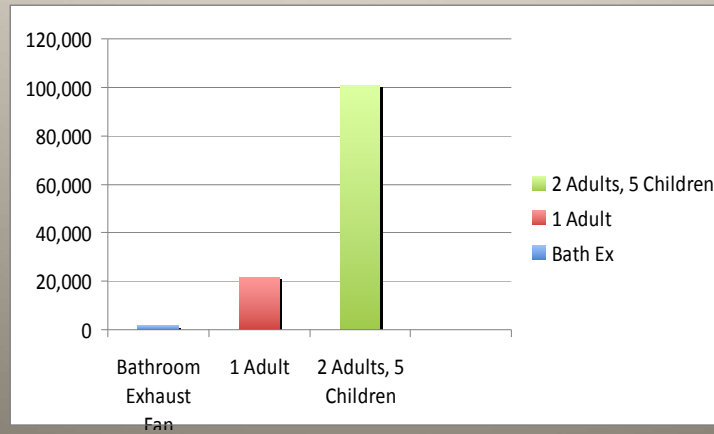
ASHRAE DUST SPOT EFFICIENCY (NEW) RATING

14  
13  
11  
7



# Ventilation volume comparison

people need 15 cfm



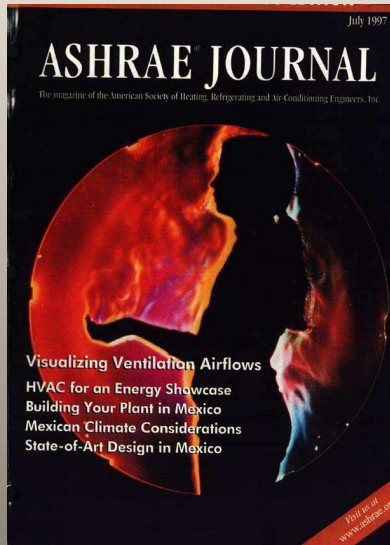
Bathfan 50 cfm x 30 minutes use/day = 1500 cubic feet/day

## Effective Ventilation requires

- Effective Exhaust
  - Effective Fresh Air
  - Effective Duct System
  - Effective Controls
- 
- **WHAT DOES ALL THIS MEAN?**

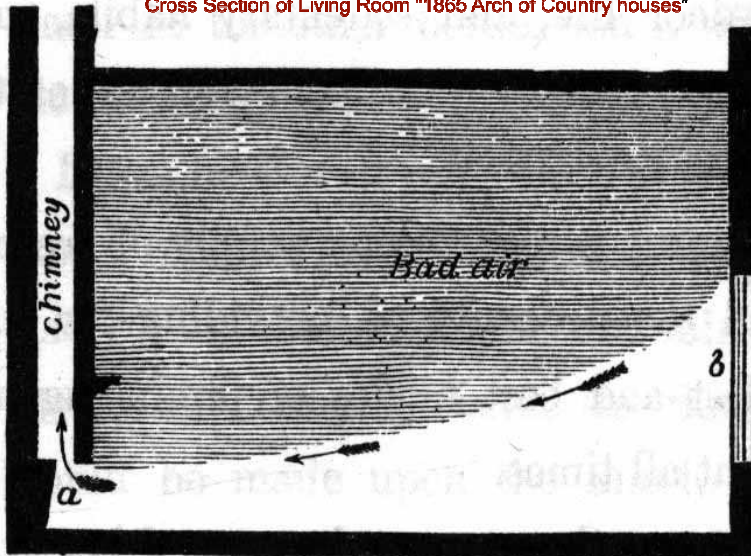
## Schlieren Photo

12 year old girl



German physicist Toepler @ 1864 to study super sonic air flow

Cross Section of Living Room "1865 Arch of Country houses"

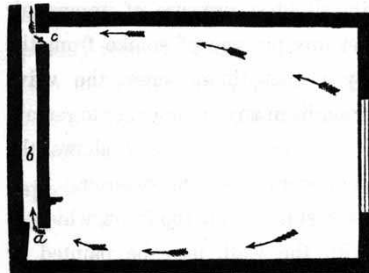


[Fig. 310. Room without ventilation.]

# High Level Exhaust (grille)

Dr. Arnot Chimney valve

of introducing a *chimney-valve*, or register, in the flue, near the ceiling. In the accom-



panying diagram of a room, *a* is the fireplace, *b* the flue, *c* the chimney-valve. Now the impure air, rising as it does to the upper part of the room, would have a tendency to pass off slowly

through any opening near the ceiling. But whenever there is a fire in the flue, as is usually the case in winter, when ventilation is most needed, a strong *upward* current is created in the

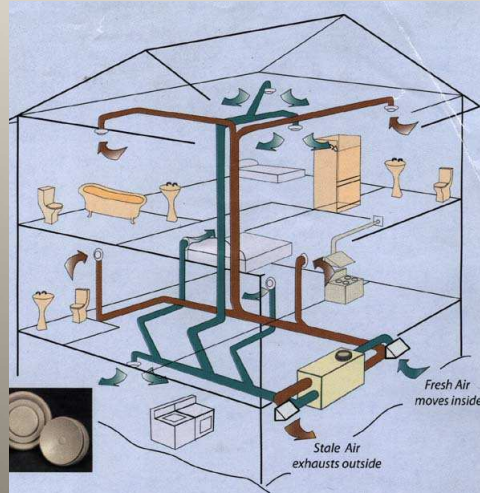
[Fig. 311.]

# 1930's School Ventilation

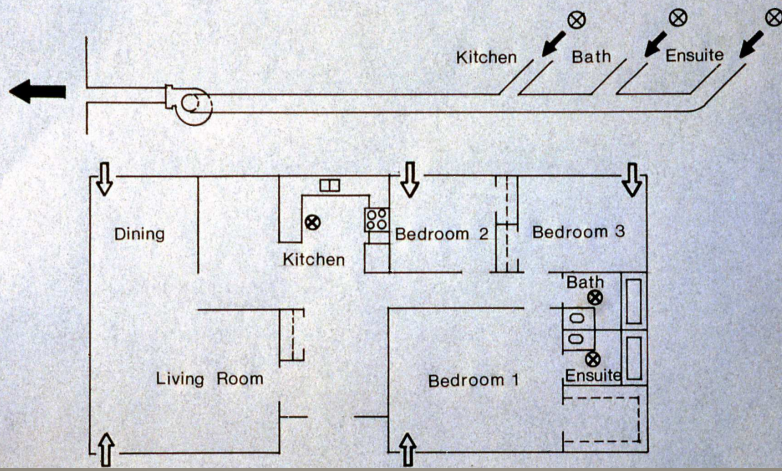
Passive stack exhaust e/w 'high' classroom window intake



# Independently ducted Fresh air (green) and Exhaust (brown) Ventilation system



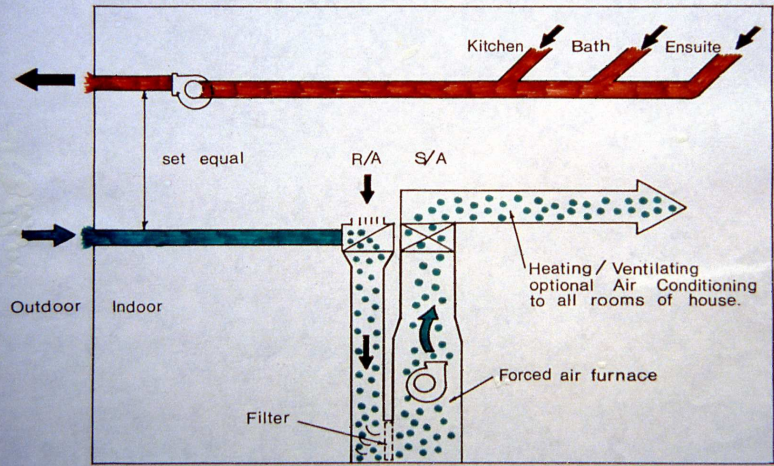
### Central Exhaust with Passive Inlets



CEV e/w Passive Inlet System is very effective in a) coastal climate, b) small unit & c) a non forced air heating system



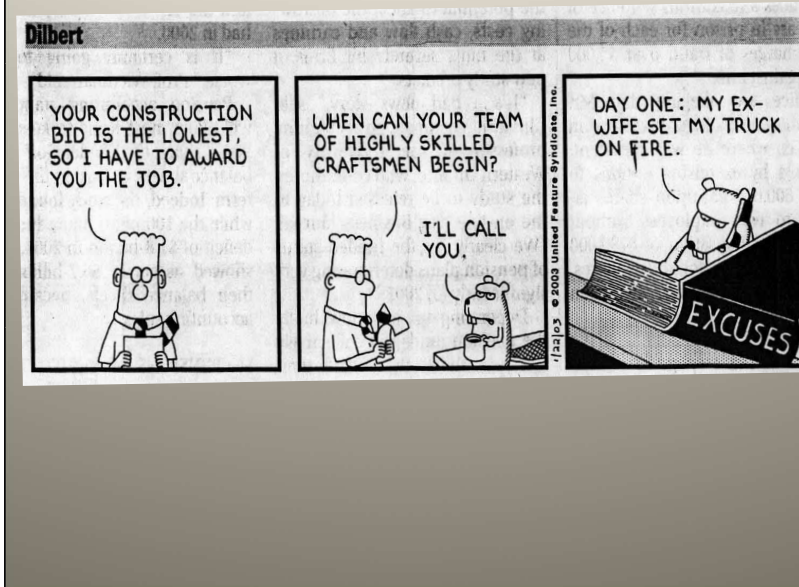
### Central Exhaust with outside air to R/A System



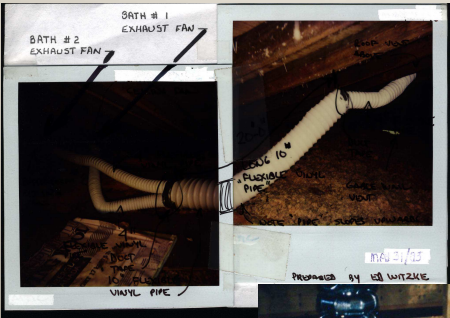
## Ventilation Screw-ups

- **Inappropriate application**, ie: pump out water from a crawlspace using ventilation
- **Stupid conceptual layout**, ie: exhausting from a low wall or floor grille
- **Mickey mouse equipment**, noisy/junk which won't take 24/7 operation
- **Lack of understanding (belief in ventilation) by installer** ie: why does this idiot want this stuff, it doesn't work anyway.
- **Inadequate budget for install**

# Lowest Price Contractor



# Air Duct Systems



Garbage material and Garbage workmanship

Good Material, potentially Good installation



# Ventilation Duct System Duct Blast Test

for both cfm and leakage



## Efficient Ventilation

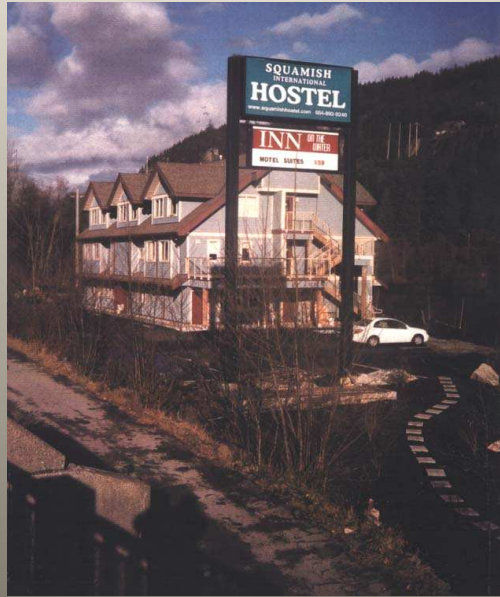
- A ventilation system without the sour notes!\*
- No sound
- No draft
- Invisible (to the eye) duct system
- No odour remains
- acceptable energy consumed
  - Electricity to move air &
  - Heat (or cool) to replace that lost.

\* system doesn't impact any of our senses

# Dansk Alpline @Sun Peaks



## Central Exhaust Ventilation





## Al Koehli & Eve



# Moisture in the Air Graph

