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Aldes ME Flash

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Technical Information

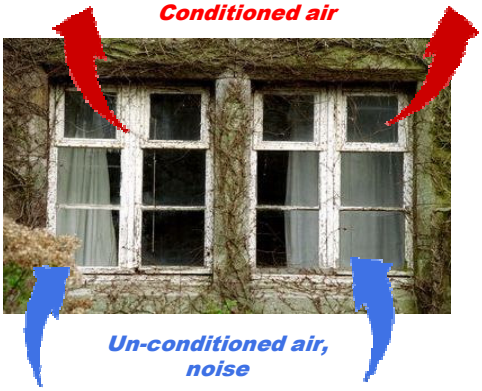
How to design an extract ventilation system?

What is ventilation?

Ventilation of any premises can be defined as "*the process to replace the stale / polluted air with fresh / clean air in order to* ***improve Indoor Air Quality (IAQ) and comfort*** *for the people using that premises*".

Why to ventilate?

Most of us ***spend around 90% of our time inside buildings*** (e.g. homes, offices, schools, gyms, shopping malls, restaurants etc.) therefore, the quality of air that we inhale plays a vital role on our health, efficiency and mood .



Old Building Designs:

→ *No proper insulation*
→ *Not enough air tightness*
→ *High level of energy consumption (for cooling as well as heating)*

Modern Building Designs:

→ *Adequate insulation*
→ *Good air tightness*
→ *Reduced energy consumption in general (as compared to past designs)*
→ ***Need for arrangements to remove different pollutions from buildings.***

The first step in the sustainability pace is to work on the **envelope of the building to ensure an efficient** building **insulation, air tightness and shade.** This will lead to great **energy savings by reducing the cooling/heating load** (low heat transfer and low air leakage), but it will also increase the need for an efficient ventilation system bringing outdoor air to **cure and improve the IAQ.** Indeed, all pollutants trapped inside buildings will have to be removed effectively for better IAQ.

Different types of pollutants inside buildings:

1 - Smells


Cooking…


Pets…

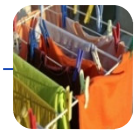

Toilets…


Chemicals…

Why to ventilate? - - - cntd

2 - Humidity

40g/h	➔ Breathing of some one relaxing
300g/h	➔ 5kg of clothes drying
350g/h	➔ Pan full of boiling water
400g/h	➔ Breathing of some one exercising
2000g/h	➔ Hot shower


3 – VOC
Volatile Organic Compounds

Products coming from indoor covers, furnishing, cleaning products, pesticides etc

4 - Allergens


Pets


Mattress


Carpets


Moulds

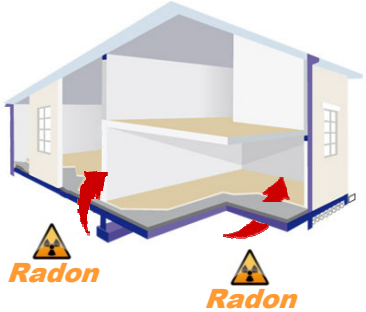
5 - Smokes


Cooking, smoking, …

6 – CO2


Occupants

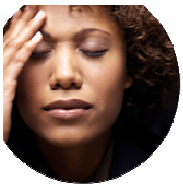
7 – Radon



Why to ventilate? - - - cntd

➞ ***Consequences of prolong exposure to pollutants inside building***

Discomfort & health problems

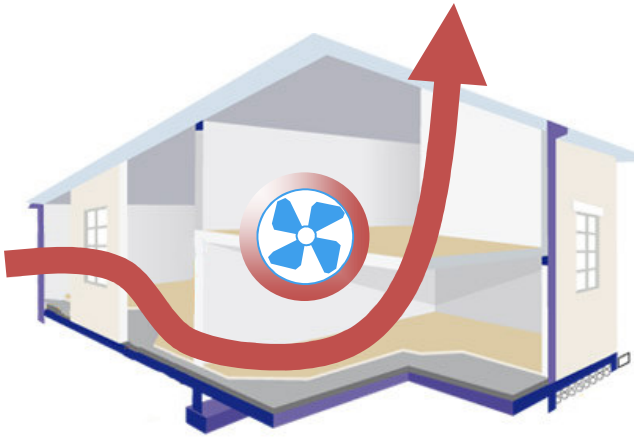


Hygiene

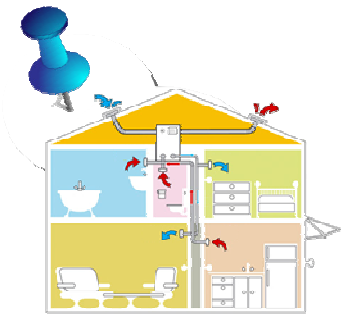
Building deterioration

➞ ***Solution for removing pollutants to improve IAQ & comfort***

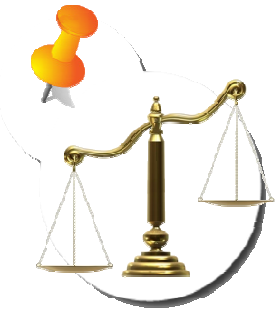
Continuous Mechanical Extract Ventilation (CMEV)



Permanent ventilation



Ventilation of the whole house / building

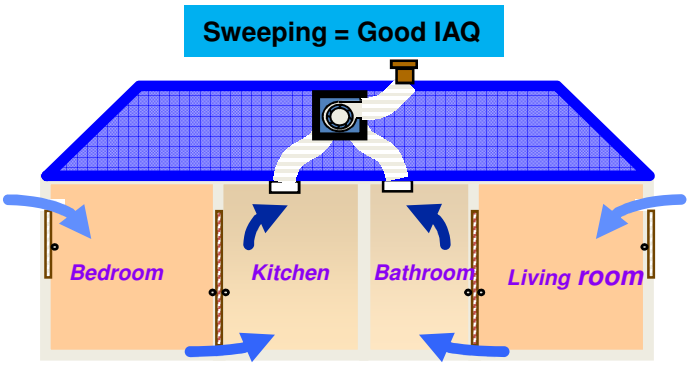


Control the balance between IAQ and energy consumption

Continuous Mechanical Extract Ventilation (CMEV)

In order to effectively remove all pollutants (VOCs, CO2, smells, allergens etc.) that are trapped inside building, a **Continuous Mechanical Extract Ventilation system** is the best solution **to guarantee proper IAQ & comfort.**

Absence of an adequate CMEV system with "correct" air flow rates will generate more and more **health issues** in particular for the most fragile (children, seniors). Some disorders from **building-related illnesses to sick building syndromes lead also to increased employee sick** days and **reduced work efficiency and productivity.**



The passage of air : From least polluted rooms towards most polluted rooms

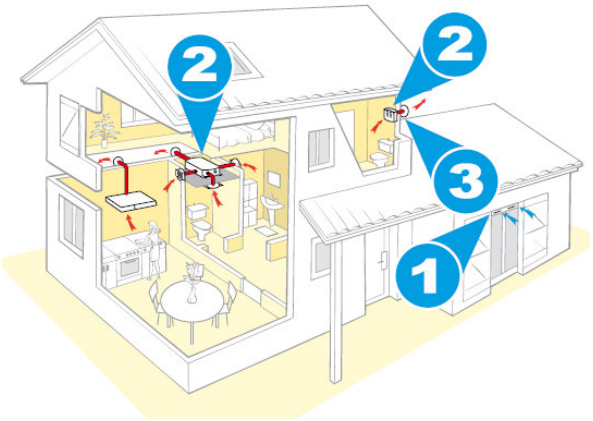
Types of CMEV

1- Self Balanced CMEV → Constant airflow
→ A controlled « constant airflow » goes through the whole house (individual family or multi-family) independent of the occupancy.

2- Humidity Control CMEV → Modulated airflow as per need
→ A controlled « variable airflow » goes through the whole house (individual family or multi-family) depending on the humidity content that changes with occupancy.

Split Self-balanced CMEV

- ***Electronic air flow rate control***
- *Split system for an **easier installation** (simpler ductwork)*
- *Constant airflow rate*



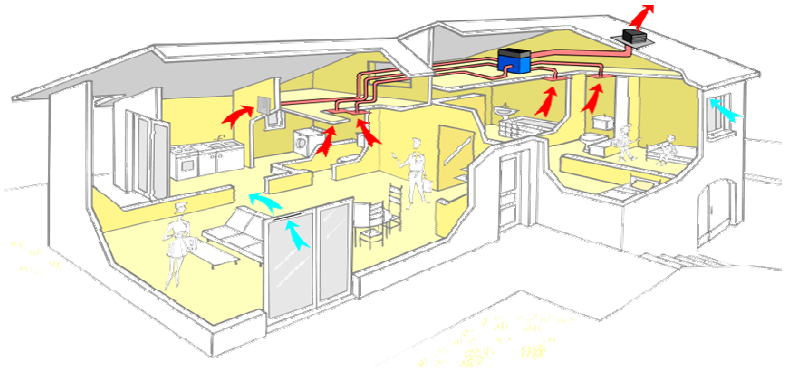
1 – *Inlets in principal room*

2 – *Two types of fans (constant airflow), single or multiple connections for single or multiple technical rooms*

3 – *Outside grilles for exhaust*

Centralized Self-balanced CMEV

- Centralized system for an **easier installation** for new building → only 1 fan
- **Air flow control** with self-balanced products on each connection of casing
- *Constant airflow rate*



1 *– Inlets in principal room*

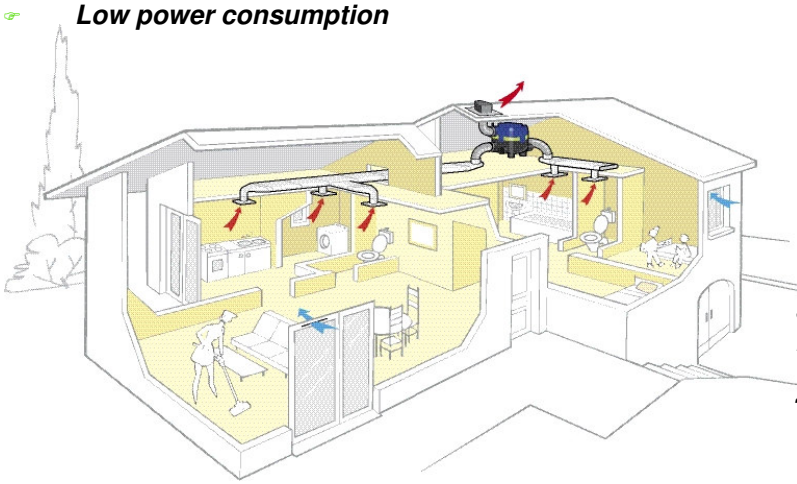
2 *– Outlets in technical rooms*

3 *– One type of fan (constant airflow) with multi connections*

4 *– Outside grilles for exhaust*

Centralized Humidity-controlled CMEV

- ***Air flow control*** *with humidity controlled systems (inlet and outlet)*
- *Airflow as per the need i.e. reduced when unoccupied / increased when occupied*
- ***Low power consumption***



1 *– Inlet with RH detection and valve changing airflow rate*

2 *– Outlet with RH detection and valve changing airflow rate*

3 *– One type of fans (variable airflow) with multi-connections*

4 *– Outside grilles for exhaust*

Self-balanced CMEV Vs Humidity-controlled CMEV

	Split Self-balanced CMEV	*Centralized Self-balanced CMEV*	*Centralized Humidity-cont CMEV*
IAQ	Whole room	Whole room	Whole room
Comfort	*	*	**
Airflow	Constant	Constant	Modulated
Energy consumption	*	*	***

Design criteria for an adequate CMEV system

Normal habits in the GCC about extract airflow → High airflows

- Toilets: 25-90cfm (50 to 150m^3/h)
- Kitchen: 120-150cfm (200 to 250m^3/h)

Consequence:

- ✓ Good in terms of IAQ
- ➢ Bad in terms of energy consumption

→ To **limit energy consumption** (without compromising IAQ), minimum airflow rates as defined in various international standards should be used.

Example 1: **ASHRAE 62.2 Std** for **single-family houses** and **multi-family structures** of no more than 3 stories (e.g. villas)

TABLE 5.2

Continuous Local Ventilation Exhaust Airflow rates

Application	Airflow	Notes
Kitchen	5 ach	Based on kitchen volume
Bathroom	20 cfm (34m3/h)	

Example 2: ***ASHRAE 62.1 Std*** *for* ***all spaces except those covered by ASHRAE 62.2 Std***

TABLE 6-4 Minimum Exhaust Rates

Occupancy Category	Exhaust Rate, cfm/unit	Exhaust Rate, cfm/ft^2	Notes
Residential kitchens	50/100		G
Toilets private	25/50		E
Toilets public	50/70		D

D Rate is per water closet and/or urinal. Provide the higher rate where periods of heavy use are expected to occur, e.g., toilets in theatres, schools, and sports facilities. The lower rate may be used otherwise.
E Rate is for a toilet room intended to be occupied by one person at a time. For continuous system operation during normal hours of use, the lower rate may be used. Otherwise use the higher rate.
F See other applicable standards for exhaust rate.
G For continuous system operation, the lower rate may be used. Otherwise use the higher rate.

Note:
- *25 cfm = 45 m3/h*
- *50 cfm = 85 m3/h*
- *70 cfm = 120 m3/h*
- *100 cfm = 170 m3/h*

Aldes ME offers several products suitable for Self-balanced and Humidity-controlled CMEV systems.

For further information or enquiry, please contact us!
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