

# General Information about Indoor Air Quality

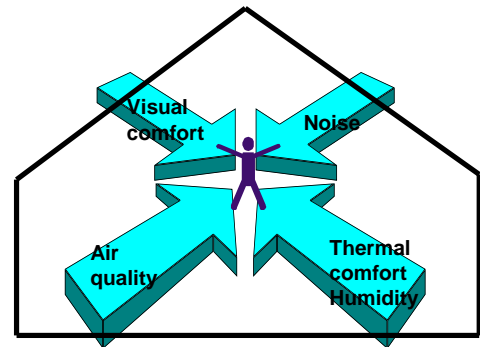
People spend most of their life indoors, especially at home: on average nearly 16 hours per day during the week and 17 hours per day during the weekend.

In more than 40% of the enclosed spaces people suffer health, comfort and safety related complaints and illnesses.

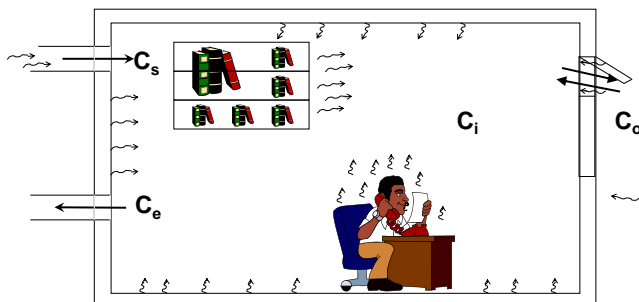
## Indoor Environment

In the indoor environment there are four basic environmental factors that directly influence the perception of that indoor environment through the senses, but also have an effect on the physical and mental state (comfort and health) of occupants:

- Thermal comfort or indoor climate: comprising of parameters such as moisture, air velocity, and temperature.
- Visual or lighting quality: determined by view, illuminance, luminance ratios, reflection and more parameters.
- Acoustical quality: influenced by among others noise from outside, indoors and vibrations.
- Indoor air quality: a complex phenomenon comprising of odour, indoor air pollution, fresh air supply etc.



## Indoor Air Quality



$$VdC/dt = \text{mass change in time} \\ = \text{supply} + \text{production (emission)} - \text{exhaust} - \text{removal}$$

The exposure of a person to pollutants present in a space can be defined as the concentration of the pollutants over time and depends on the production of the pollutants in the space, the ventilation rate of the space, the concentration of the pollutants in the ventilation air and several indoor climate parameters.

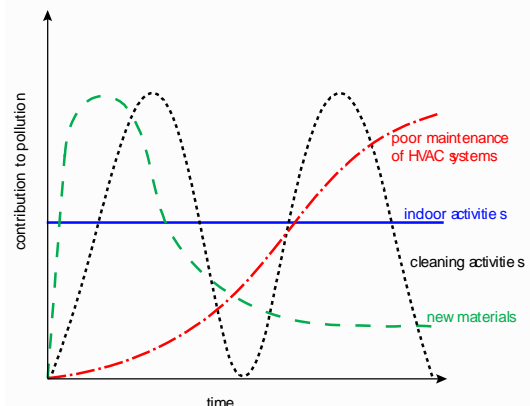
The pollution sources, from which substances are emitted or transported to the indoor air, are:

- Outdoor sources: traffic, industry
- Occupant related activities and products: cooking, tobacco smoke, equipment, consumer products (cleaning, hygienic, personal care products), open flames (candles, gas stoves, wood heaters)
- Building materials and furnishings: insulation, plywood, paint, furniture (particle board), floor/wall covering, etc.
- Ventilation systems.

## Contribution Over Time

A product can emit substances (particles and/or gases) to the indoor air that:

- Originate from the product itself (primary emission): such as new materials and freshly paint surfaces.
- Arise during the in use phase of the product itself (secondary emission) resulting from the interaction of products (or primary emission compounds) with environmental factors such as ozone, water external substances, and microbial growth in or on the surface of the product.
- Are caused by HVAC-systems: for example oil residuals or dirty filters.





# Healthy Air Project

## Scope

The need for the indoor environment to be addressed at the EU level is recognized, shown by the Environment and Health Actions Plan, the WHO ministerial declaration, but also the Strategic research agenda of the European Construction Technology platform. In the European community, the indoor environment is considered among the important determinants of an individual's health.

Outdoor and indoor air pollution largely influence the indoor air quality. The indoor air comprises of a complex mixture of compounds originating from different sources.

What can we do to reduce these pollution sources and/or reduce the exposure of occupants to pollution sources such as construction products, furnishing products and other indoor pollution sources in terms of education, source control, etc. is the main question to be answered.

The general objective is:

To define, initiate and develop activities that improve indoor air quality and reduce exposure to indoor air pollution sources, in particular of construction products.

## Strategies for Healthy Air

In order to reduce exposure to emissions of construction products (including also HVAC components), several types of measures can be taken in principle:

- Measures to reduce the primary emissions of construction products: by the products producers themselves and by the architect/end-user through selection of products
- Measures to reduce secondary emissions of construction products: by certain control strategies indoors such as ventilation, but also by selecting the right product for the location (environmental conditions) and activities it is meant to be exposed to.
- Measures to prevent the emissions of construction products to reach the occupant: by the occupant themselves through ventilation options, use of certain selected cleaning methods and/or.....

From this overview it is clear that to be able to reduce emissions from products indoors it is important to know what type of emissions and amounts emitted. Furthermore, it is important to know how the product will behave (emit) in the in-use situation when exposed to different environmental conditions and indoor activities such as smoking or cleaning.

## Actions

Actions are taken at different levels:

- European level (CE marking, CEN TC 351) and national regulations (e.g.: AgBB)
- National Environmental and Health Action Plans (NEHAPs)
- Voluntary labelling schemes in the EU
- Building design