GCP EUROPE

The voice of €fficient building engineering services

# The role of HVAC - Heating, Ventilation & Air Conditioning to mitigate COVID-19

*Nathan Wood: Chair of Indoor Environmental Quality task force, GCP Europe*

GCP EUROPE

The voice of €fficient building engineering services

# Ventilation & Air conditioning systems

## are a major part of the solution to mitigate the risk of COVID-19 in indoor environments

## In addition to HANDS – FACE - SPACE

GCP EUROPE

The voice of €fficient building engineering services

# HVAC GUIDANCE

- World Health Organisation – **WHO**
- Federation of European Heating Ventilation and Air Conditioning Associations - **REHVA**
- European Centre for Disease Prevention and Control -**ECDC**
- Chartered Institution of Building Services Engineers – **CIBSE**
- Building Engineering Services Association – **BESA**

GCP EUROPE

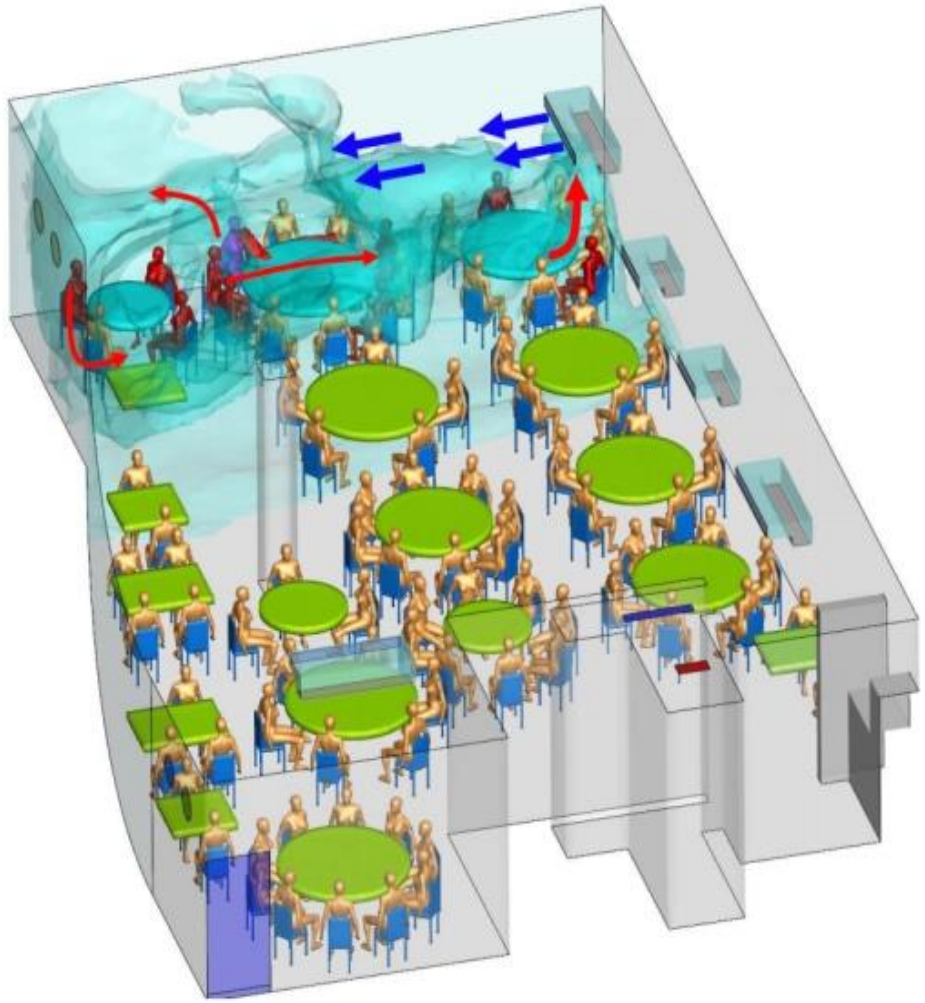
The voice of €fficient building engineering services

# HVAC Design

- Ventilation strategy changes
- Air distribution – Perspex barriers
- Source location – supply and extract locations
- Distribution of aerosol
- Temperature & relative humidity (40-60%RH)
- Filtration & Clean air technology (HEPA – UV-C)
- Maintenance & hygiene

GCP EUROPE

The voice of €fficient building engineering services



# Guangzhou, Chinese restaurant Covid outbreak

Recirculation air conditioning unit

location and direction of air flow

limited space & overcrowded

Faulty secondary ventilation

Poor maintenance

No Natural Ventilation / windows

Air velocity was high (compared to EU)

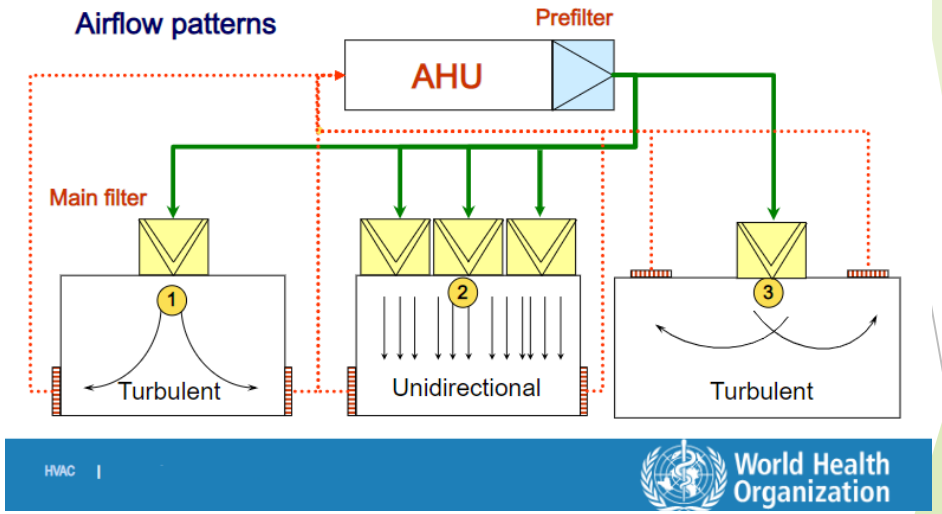
- High temperature differentials

GCP EUROPE

The voice of €fficient building engineering services

# Importance of correct airflow






Offices designed to be open plan are now segregated and partitioned with screens and barriers – yet the ventilation strategy remains unchanged.

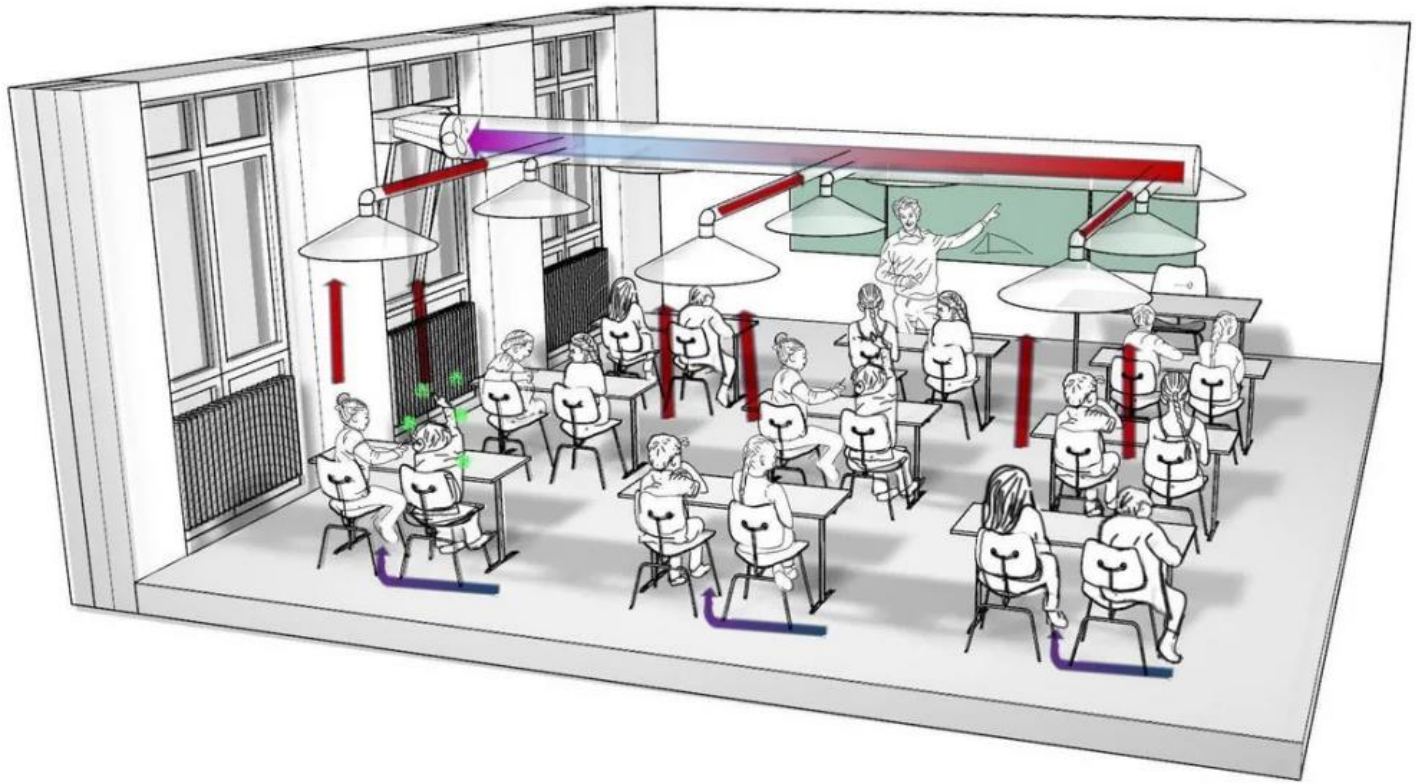
This needs to be carefully investigated / improved, taking into account the type of existing system and the air flow strategy

Turbulent – Unidirectional - Displacement - Natural

GCP EUROPE

The voice of €fficient building engineering services

School Design / Concepts:



GCP EUROPE

The voice of €fficient building engineering services

Reality:

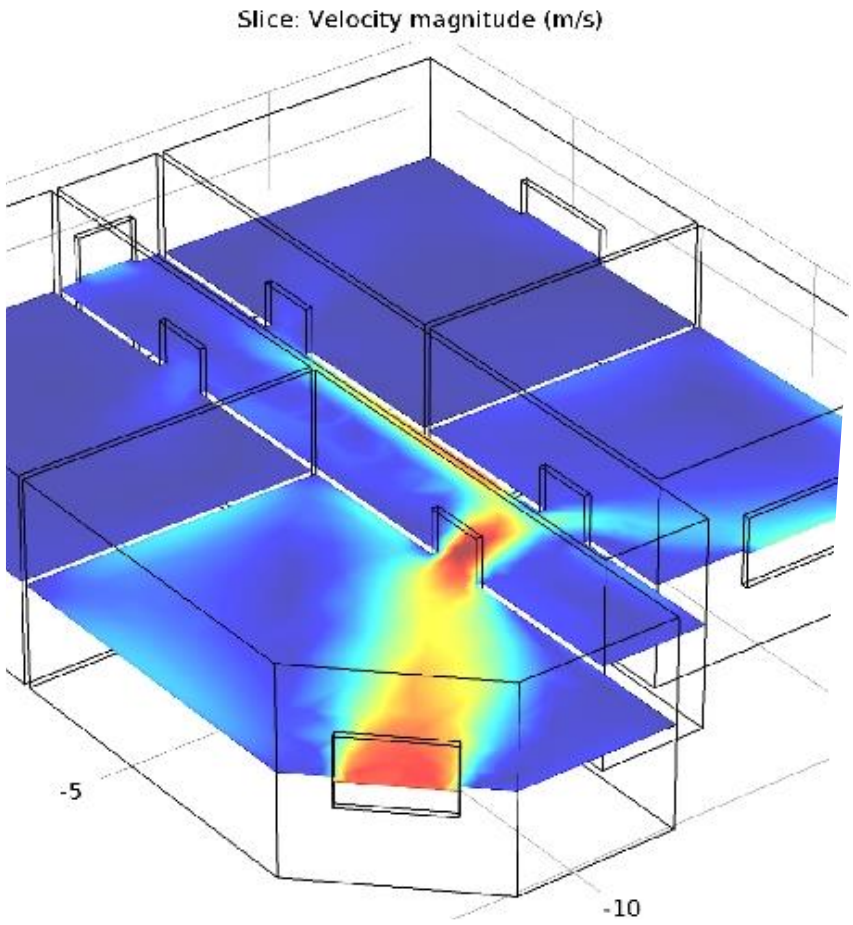


- Virus not necessarily buoyant
- Flow rate is insufficient
- Exhaust air only
- No supply / outside air
- Small differential pressure – wind pressure effects performance
- Limited life expectancy
- Fire resistance questionable
- Effect on the lighting unknown

GCP EUROPE

The voice of €fficient building engineering services

# Natural ventilation limitations

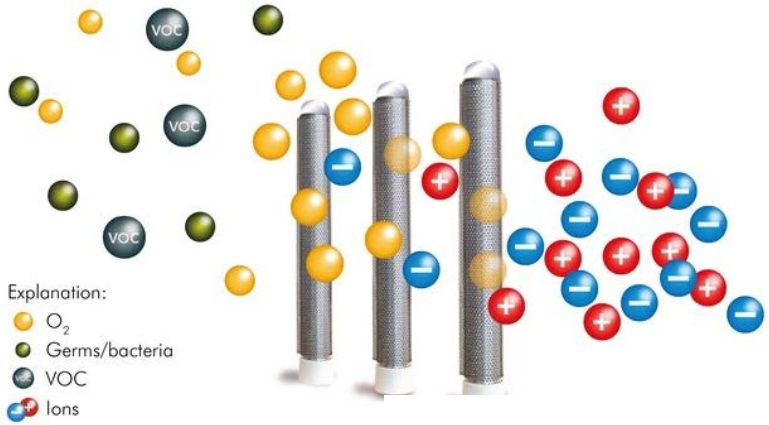



- Un-controlled ventilation rate via windows
- Adverse effect on existing systems
- No thermal control / energy efficiency / Heat recovery
- Cross ventilation to other areas
- **“Fresh air” Outside air** isn’t guaranteed
- Secondary pollutants maybe created
- Natural ventilation may have a detrimental effect on the IEQ

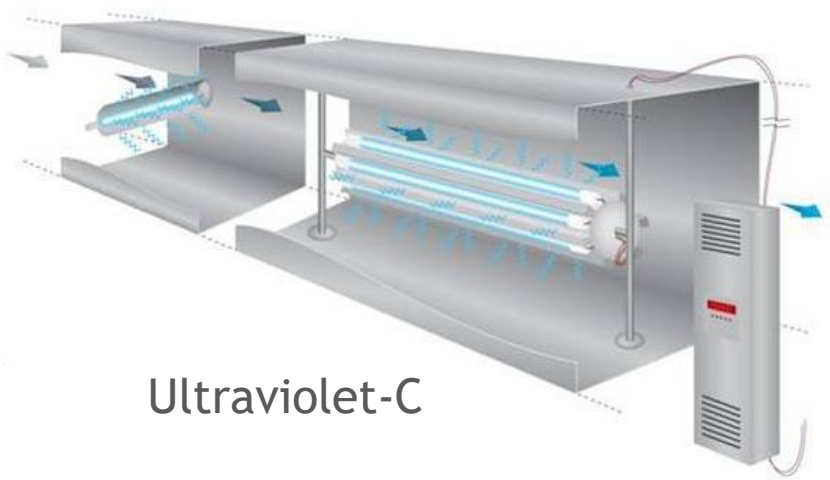
GCP EUROPE

The voice of €fficient building engineering services

# Additional solutions




Bi-Polar Ionisation



Ultraviolet-C



HEPA Filters

GCP EUROPE

The voice of €fficient building engineering services

# In Room Air Purifiers – Clean Air Technology




- Under regulated sector
- Sales information
- Understand the limitations
- Correct application
- Cost (purchase / operate / service)
- Test data accuracy
- Use dependant on pollutant
- Should be seen as a supplementary system

GCP EUROPE
The voice of €fficient building engineering services

# Professional guidance for HVAC

- Reconfigure risk assessments for the safe use of HVAC systems
- Increase supply and exhaust ventilation rates (based on L/s per person not necessarily ACPH)
- Demand controls setpoints changed to ensure higher ventilation rates - Co2 levels set 800ppm
- Start systems earlier and run on for longer periods.
- Clean air purifiers – whilst may remove particles, gasses and potential virus aerosols they have little effect on Co2.
- Where increased ventilation is not possible - Limit the max room occupancy
- Option for home / work office patterns to reduce staff numbers in buildings at any one time.

GCP EUROPE
The voice of €fficient building engineering services

# Professional guidance for HVAC

- Buildings without mechanical ventilation to use window airing – even if this causes thermal discomfort
- Humidification maintained between 40-60%
- Heat recovery systems to be checked for any leakage or cross contamination (rotary wheels) – if contamination is identified the system additional filters must be installed – recommend check manufacturers information
- Toilet facilities should operate ventilation systems at least 1 hour start systems earlier and run on for 2 hours longer periods.
- Toilet facilities recommended to keep toilet lids closed when flushing
- Ensure good maintenance of systems continue – wear additional / higher grade RPE – Dirty filters to be safely bagged and disposed of safely – due to potential Viral contamination.

GCP EUROPE

The voice of €fficient building engineering services

# Huge opportunity in this sector. But…

Keep it simple

Comply with the guidance

Comply with regulations

Research new technologies

GCP EUROPE

The voice of €fficient building engineering services

# Thank you.

Nathan Wood