
HONEYWELL
HEALTHY
BUILDINGS
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HB SALES AMBASSADOR (UK)
TREND CONTROL SYSTEMS LIMITED
Honeywell


WHAT IS A
HEALTHY BUILDING?
A HEALTHY BUILDING ENVIRONMENT HELPS PEOPLE AND BUSINESSES GET BACK TO WORK, REASSURES OCCUPANTS A SPACE IS SAFER AND COMPLIES WITH NEW POLICIES
Honeywell

WE UNDERSTAND YOUR CONCERNS...

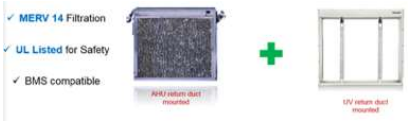
- “Is the environment clean, safe, and ready for business?”
- “Are your employees comfortable coming back into the building?”
- “Are occupants complying to your safety policies and are your buildings operating within the latest health guidelines?”
- “How quickly can we implement change and how flexible are these solutions?”

HEALTHY BUILDINGS INITIATIVE

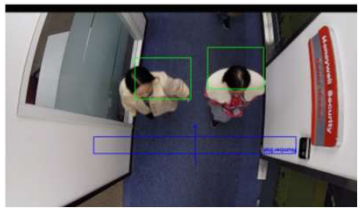
ENCOUNTER THE NEW NORMAL

TREND

1. **IMPROVED AIR QUALITY**
   Sensors, EAC, UV Light, VAV, Venturi valve



2. **SAFETY/SECURITY**
   Thermal Temp Screening, Touchless Access Control



KPI Dashboards

Help Building Owners Minimize Potential Risks Of Contamination And Ensure Business Continuity

OUR GOAL: SAFELY BRING PEOPLE BACK INTO YOUR BUILDINGS QUICKLY

HOSPITALS

AIRPORTS

OFFICE BUILDINGS

SCHOOLS

LARGE VENUES

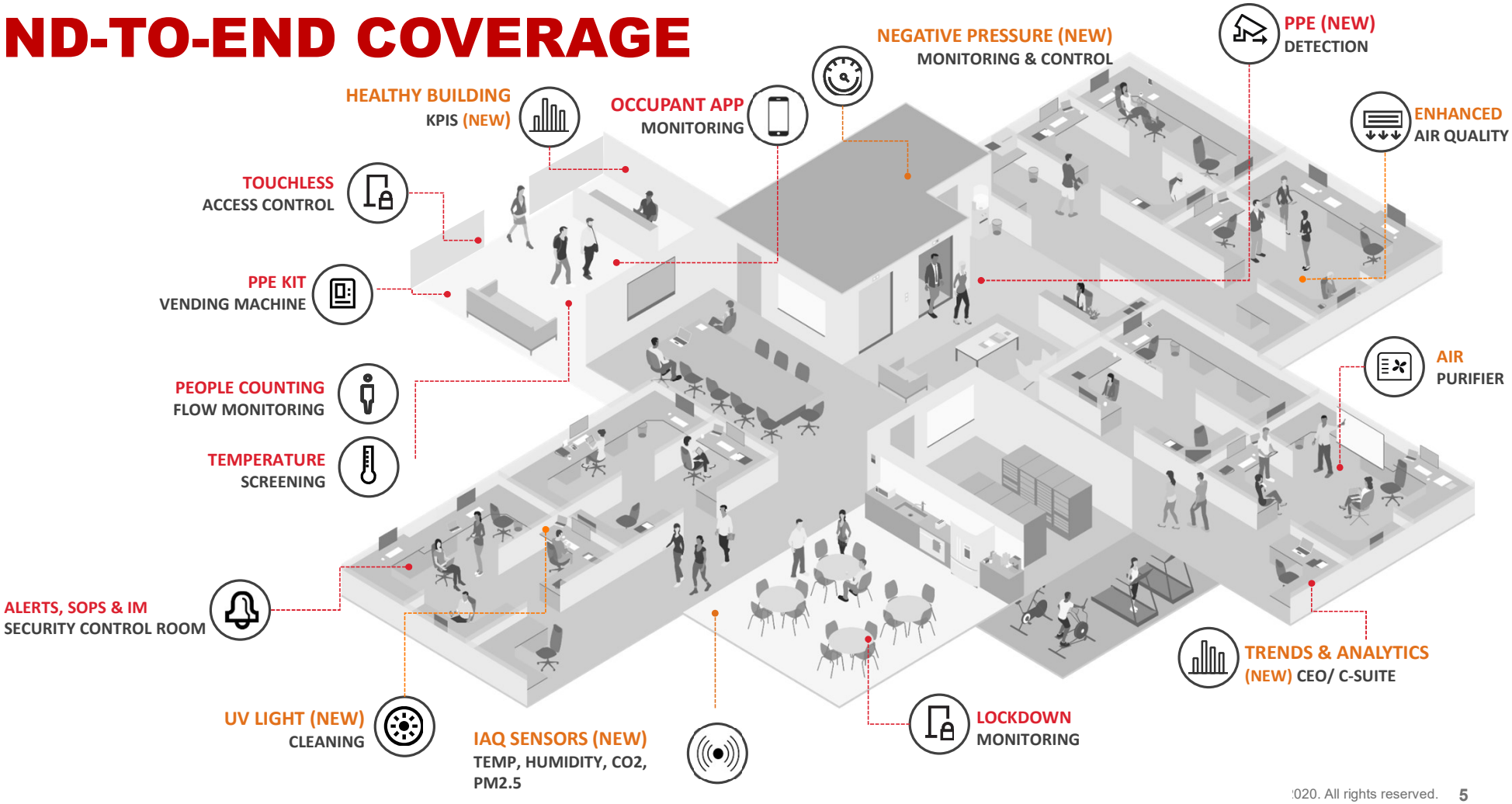
HOSPITALITY

FACTORIES

UNIVERSITIES

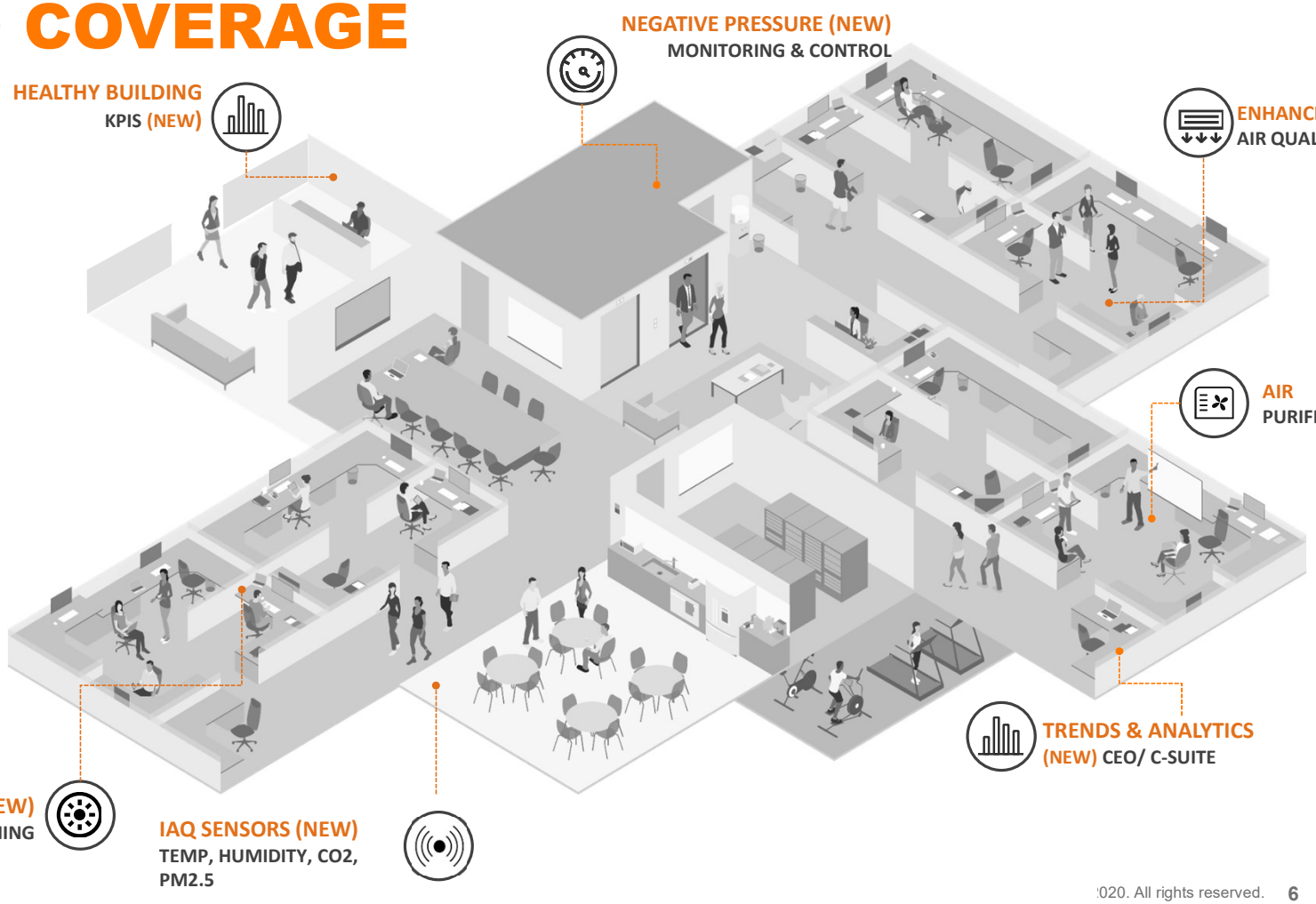
Make it safer. Know it's safer. Keep it safer.

PROVEN TECHNOLOGIES
END-TO-END COVERAGE



PROVEN TECHNOLOGIES

END-TO-END COVERAGE



REHVA COVID-19 GUIDANCE DOCUMENT

- Secure **ventilation** of spaces with **outdoor air**
- Switch ventilation to nominal speed at least 2 hours before the building usage time and switch to lower speed 2 hours after the building usage time
- At nights and weekends, **do not switch ventilation off**, but keep systems running at lower speed
- Ensure regular airing with windows (even in mechanically ventilated buildings)
- Keep **toilet ventilation 24/7** in operation
- Do not change heating, cooling and possible humidification setpoints

Reference: REHVA Guidance doc April 3rd 2020

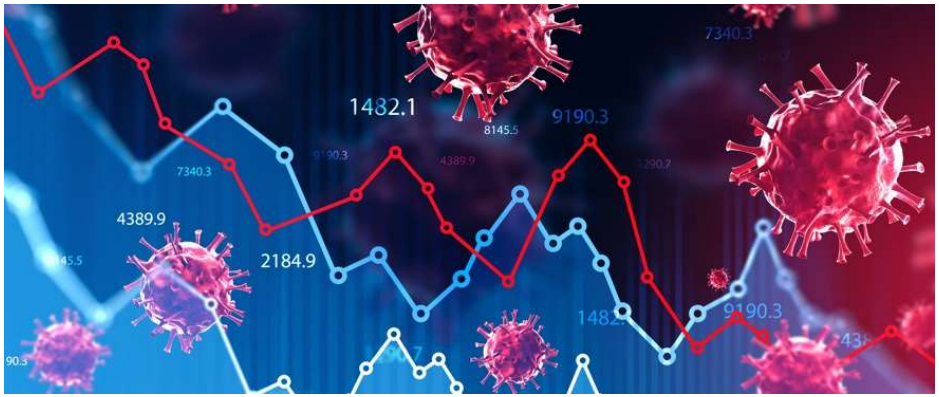
REHVA
Federation of European Heating, Ventilation and Air Conditioning Associations

ASHRAE

NON-HEALTHCARE BUILDINGS SHOULD HAVE A PLAN FOR AN EMERGENCY RESPONSE. THE FOLLOWING MODIFICATIONS TO BUILDING HVAC SYSTEM OPERATION SHOULD BE CONSIDERED:

- Increase **outdoor air ventilation** (disable demand-controlled ventilation and open outdoor air dampers to **100%** as indoor and outdoor conditions permit)
- Improve central air and other HVAC **filtration to MERV-13** (ASHRAE 2017b) or the highest level achievable
- Keep systems **running longer hours** (24/7 if possible)
- **Add portable room air cleaners** with HEPA or high-MERV filters with due consideration to the clean air delivery rate
- Add duct or air-handling-unit-mounted, upper room, and/or portable **UVGI devices** in connection to in-room fans in high-density spaces such as waiting rooms
- Maintain **temperature and humidity** as applicable to the infectious aerosol of concern
- **Bypass energy recovery ventilation** systems that leak potentially contaminated exhaust air back into the outdoor air supply

CIBSE



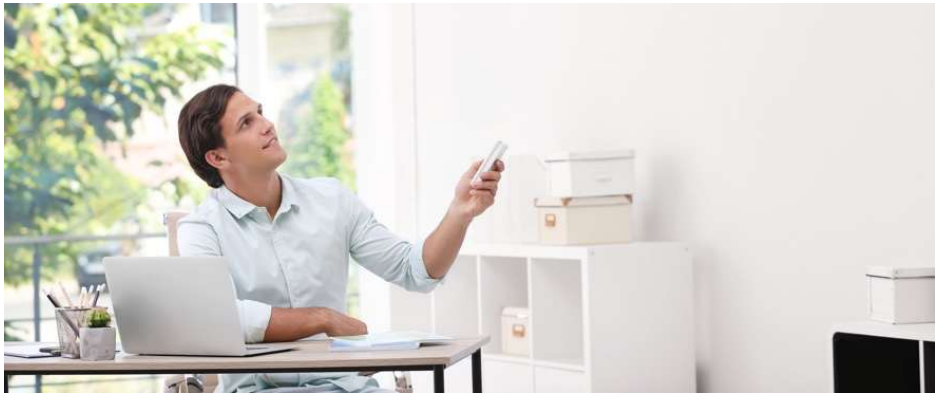
1 - Covid risks

Evidence is beginning to emerge that SARS-CoV2, the virus which causes Covid-19, can spread by very small particles – called aerosols – which are released by an infected person when they cough, sneeze, talk and breathe, as well as the larger droplets that are released. **Larger droplets will fall by gravity and influences the 2m social distancing measures to reduce spread. However, these fine aerosols can remain airborne for several hours.**

"To help you decide which actions to take, you need to carry out an appropriate COVID-19 risk assessment, just as you would for other health and safety related hazards. This risk assessment must be done in consultation with unions or workers."

Undertaking that risk assessment may require advice from competent persons, such as professionally registered engineers who are Chartered or Incorporated engineers registered with the Engineering Council.

Reference: CIBSE COVID-19 Ventilation Guidance v3 July 15th 2020



2 - Reduce risks - Understand your ventilation system

To reduce the risks of airborne transmission of SARS-CoV2 the general advice is to **increase the air supply and exhaust ventilation, supplying as much outside air as is reasonably possible**.

The underlying principle is to dilute and remove airborne pathogens as much as possible, exhausting them to the outside air and reducing the chance that they can become deposited on surfaces or inhaled by room users.
Recirculation/transfer of air from one room to another should be avoided unless this is the only way of providing adequately high ventilation to all occupied rooms.

https://www.cibse.org/coronavirus-covid-19/emerging-from-lockdown


INDOOR
AIR QUALITY
TREND

INDOOR
AIR QUALITY




WHAT YOU CAN FEEL AND MEASURE	WHAT YOU CAN MEASURE BUT CANNOT FEEL	WHAT YOU CAN'T MEASURE AND CAN'T FEEL IMMEDIATELY
hot/cold → Temperature sensor → heating or cooling solutions	CO2 → CO2 sensors→ adding fresh air	Viruses →
wet/dry → Humidity sensor → Humidifiers / de-humidifiers solutions	VOC and particles → Sensors → additional filtering and fresh air	Disinfectant solutions →

THERE ARE SOLUTIONS!

TEMPERATURE AND HUMIDITY

Controlling **RH reduces transmission of certain airborne infectious organisms**, including some strains of influenza (Taylor and Tasi 2018)

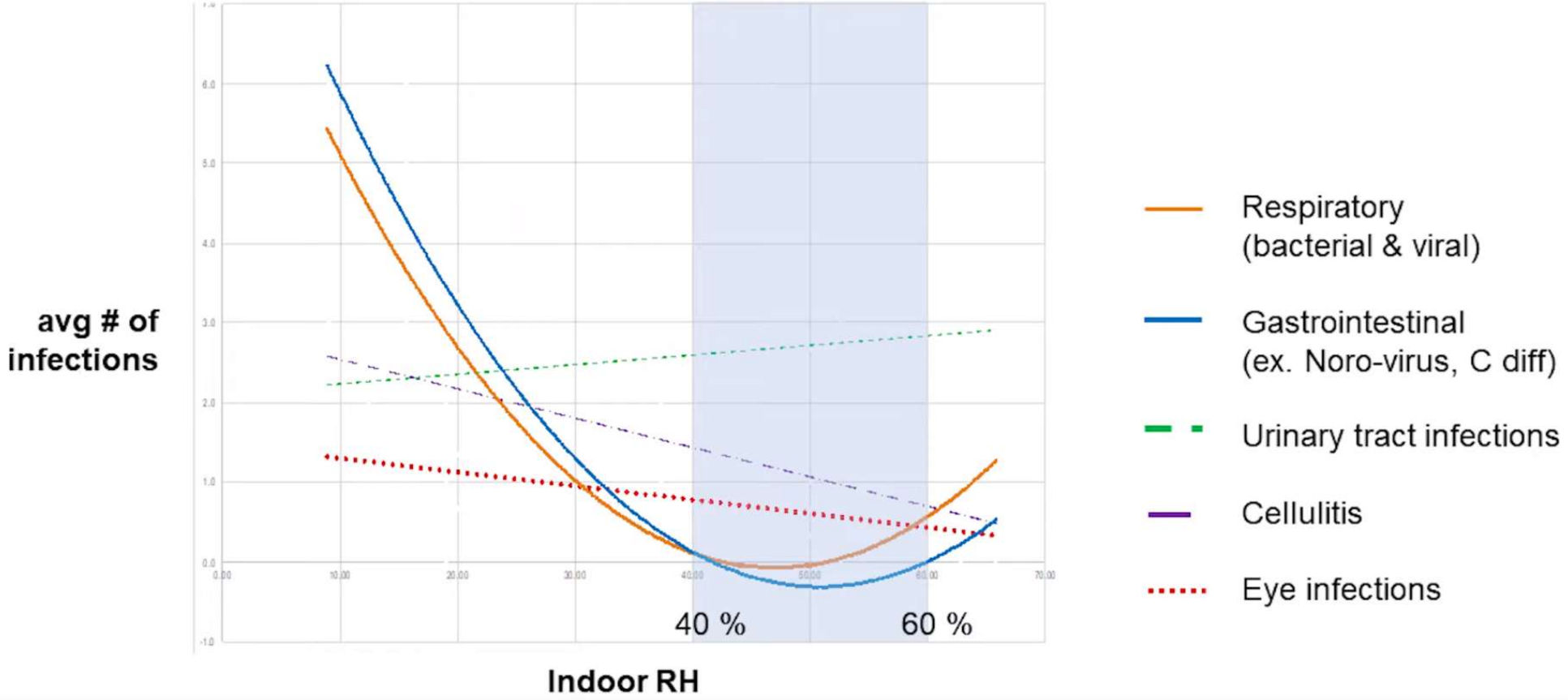
Mousavi et al. (2019) report that the scientific literature generally reflects the most **unfavorable survival** for **microorganisms** when the RH is between **40%** and **60%**

"I think this is one of the most effective precautions we can take in homes, schools and hospitals"

Harvard Medical School lecturer, Pediatric Oncologist and molecular biologist Dr. Stephanie Taylor

https://youtu.be/4jCji-mIKVQ

RESPIRATORY & GI INFECTION RATES WERE LOWEST WHEN INDOOR RH = 40-60%

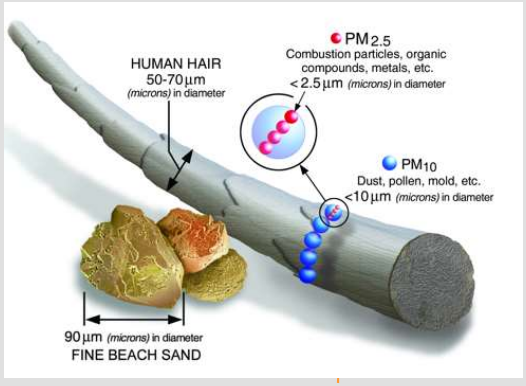


Credit: Dr. Stephanie Taylor

TREND

COMMON POLLUTANTS

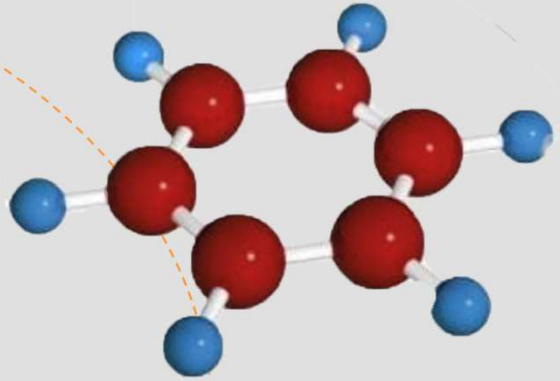
PM 2.5



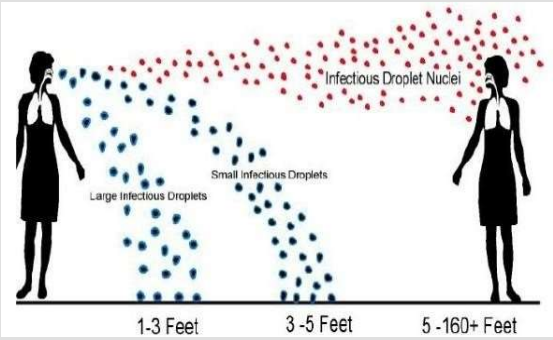
Haze

VOC

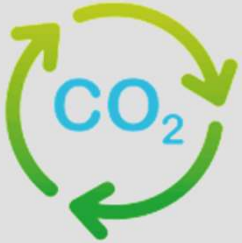
TVOC refers to the total concentration of multiple airborne VOCs (volatile organic compounds) present simultaneously in the air.



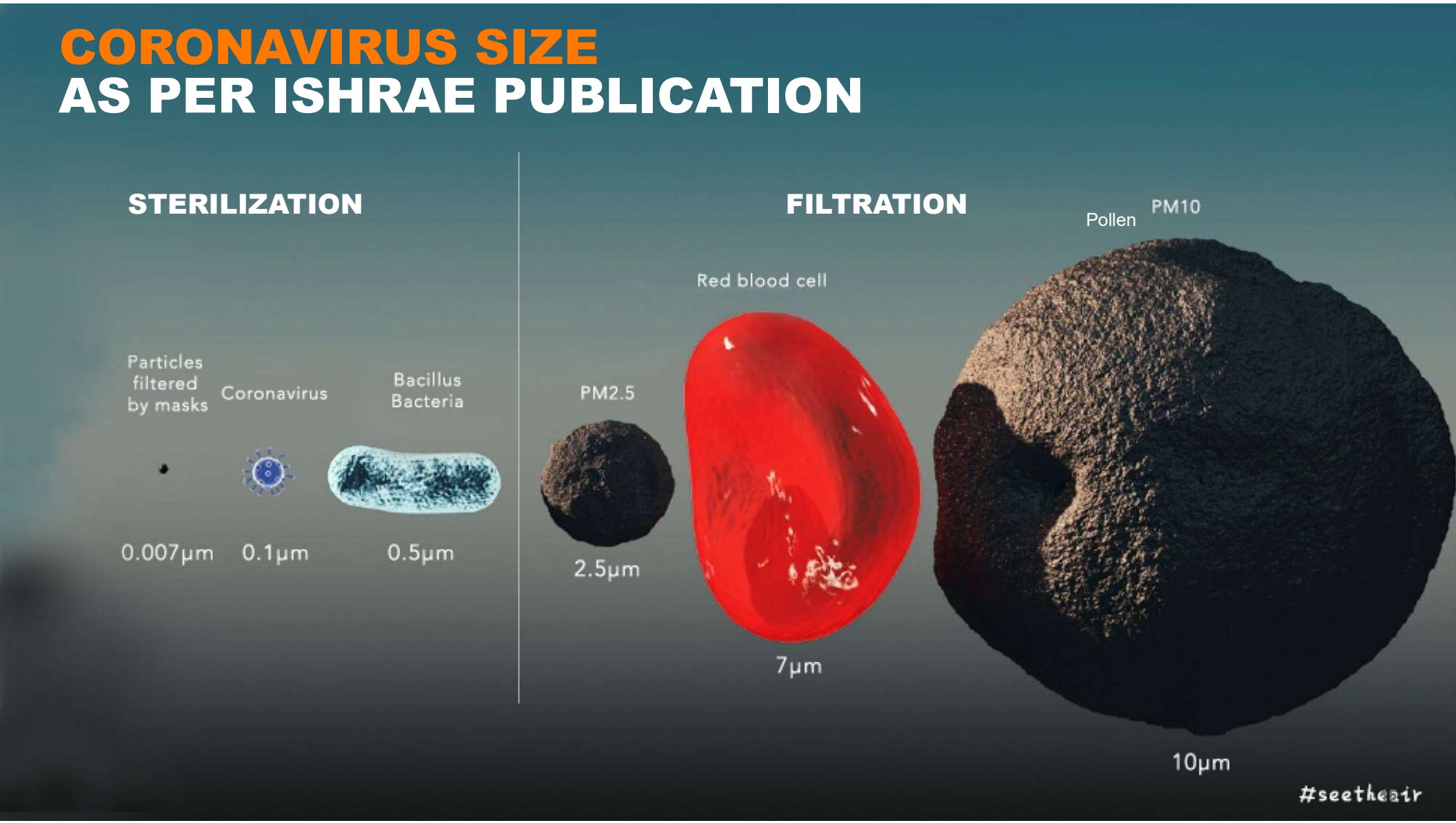
Bio Contaminants



Toxic Chemical & Pollutants



CORONAVIRUS SIZE
AS PER ISHRAE PUBLICATION



KEY TAKEAWAYS FROM ISHRAE GUIDELINE

As per ISHRAE* and ASHRAE – Size of Coronavirus is found to be **0.1microns**

FRESH AIR SUPPLY

ISHRAE suggests building owners to **increase the Fresh air intake** as much as possible. Consider introducing DOAS (Dedicated Outdoor Air Systems)

MERV

ISHRAE recommends facility owners to **upgrade** the filtration on AHU's to **MERV 13 or above (MERV) Minimum Efficiency Reporting Value**

UV

ISHRAE also recommends **UVGI Lights to disinfect the coils**

The combination **MERV 13 Filtration and UVGI system** on AHU's will help counter harmful biological contaminants and Particulate Matter

* ISHRAE Covid 19 guidance doc for a/c and ventilation April 2020

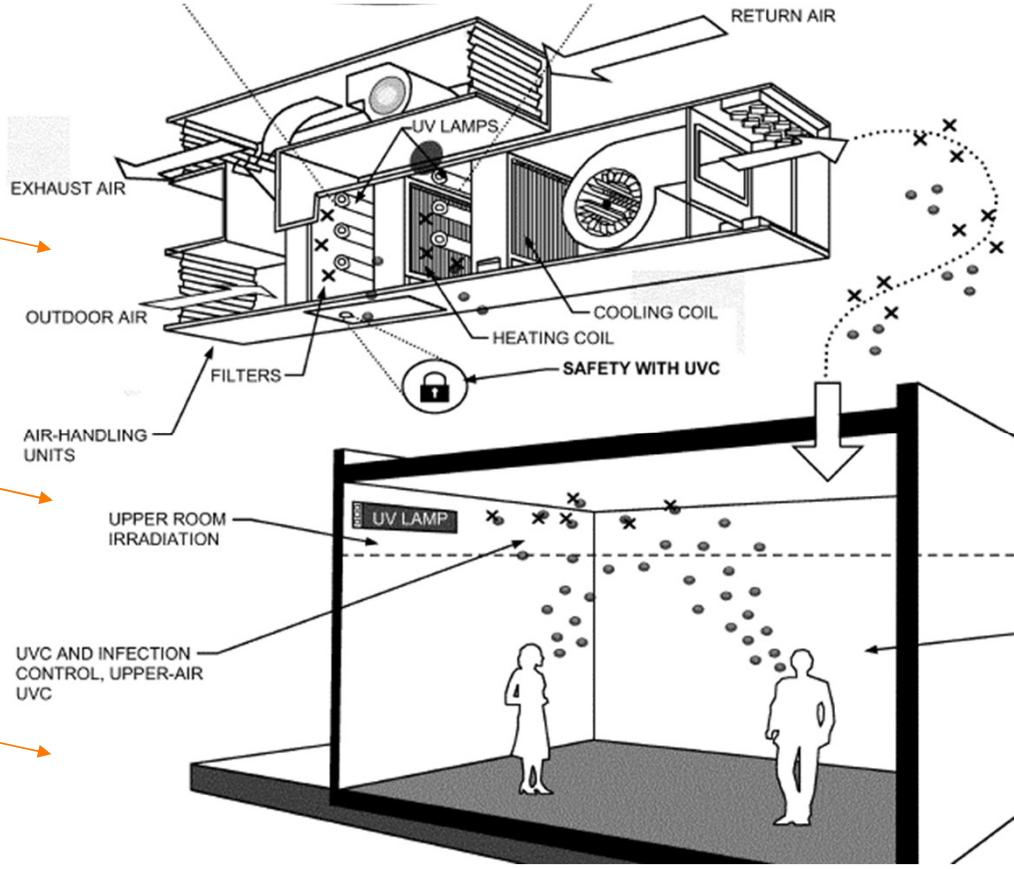
AIR COMPOSITION

Existing Sensor Solutions

Temperature

Humidity

CO^2



Additional Sensors

PM2.5

TVOC

All In One
(T, H, CO^2 , PM,2.5, TVOC)

AIR COMPOSITION DATA (example)

2.2.2 Indoor Air Quality Performance Targets

RESET™ Air is a performance-based building standard. In order for a project to achieve RESET™ Air Certification for Commercial Interiors, indoor air quality parameters, as tracked through continuous monitoring and calculated into a daily average according to hours of occupancy, must be maintained within the limits listed below.

Targets are based on industry best-practices and international standards.* Acceptable targets are requisite; all projects must meet the limits as listed.

High Performance targets are listed as a reference for projects striving for more rigorous IAQ goals and/or for projects located in regions where ambient outdoor air quality levels typically stay within recommended health limits.

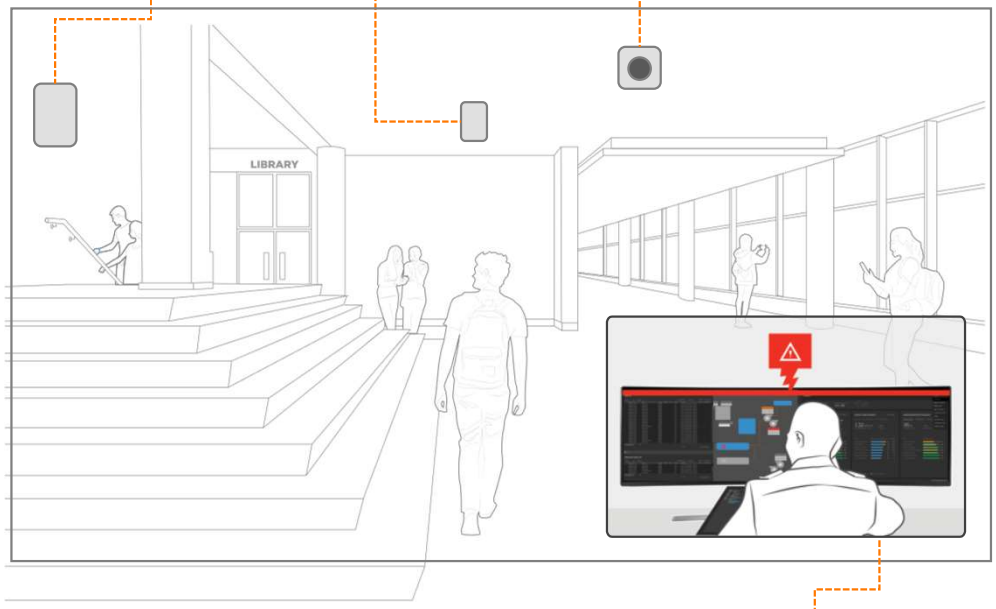
PM2.5 Particulate Matter	TVOC Total Volatile Organic Compounds	CO_2 Carbon Dioxide	Temp Temperature	RH Relative Humidity	CO Carbon Monoxide
Acceptable < 35 µg/m³	Acceptable < 500 µg/m³	Acceptable < 1000 ppm	Monitored	Monitored	Acceptable < 9 ppm
High Performance < 12 µg/m³	High Performance < 400 µg/m³	High Performance < 600 ppm	*Although there are no requirements for temperature and humidity under RESET™ Air, both must be monitored given their impact on sensor readings for PM2.5 and TVOC.*		*CO monitors are only required in spaces with combustion.*

IMPROVED AIR QUALITY

Humidity / CO^2 Sensor

Temperature Sensor

Occupancy Sensor



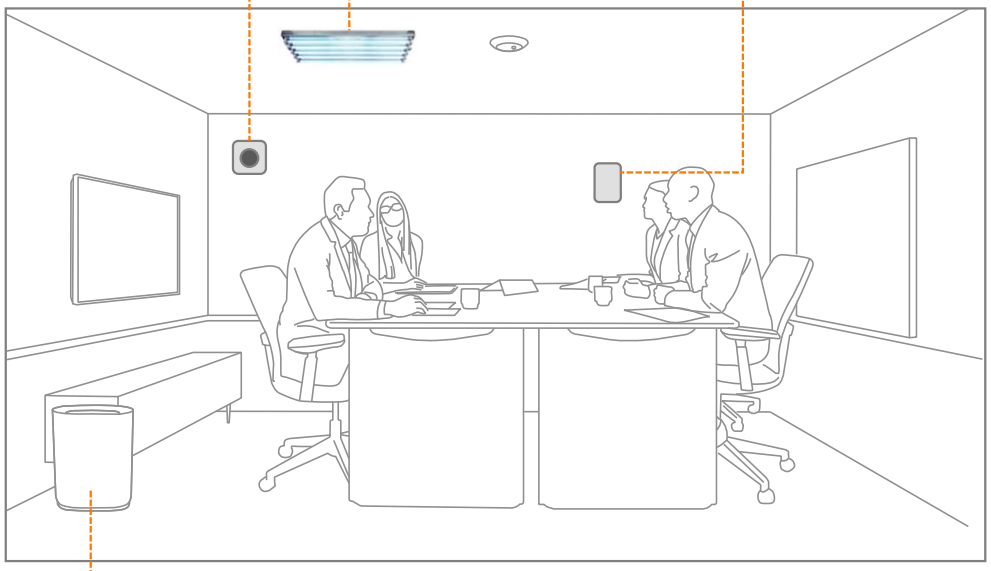
Ideal indoor air quality to minimize spread of virus by a perfect humidity & temperature balance through additional sensing and automated control as per ASHRAE guidelines

- Autonomous Building automation & control
- Alerts, SOPs, IM

Occupancy Sensor

UV Light

All In One (T, H, CO^2, PM,2.5, TVOC) Sensor



Air Purifier

Enhanced Air Quality in small spaces with UV light sanitization & Honeywell Air Purifier

PROVEN FILTRATION / SUPPRESSION TECHNIQUES

Efficiency

STANDARD

Primary Media Air Filter

Lies Between G-1 to G-4 grade filtration
Efficient Only up to PM 10 Micron particle size

Secondary Media Air Filter

Lies Between M-5 TO F-9 Filtration Grade
95% Efficient on PM5 Micron particle size

Electronic Air Filtration System

HEPA Filtration Grade

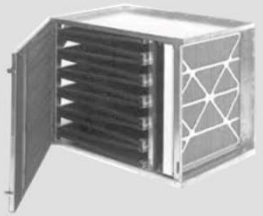
99.995% Efficient to .3Micron

Merv-14 filtration Grade 95-99% efficient to PM2.5%

Be aware: the more "standard" filter layers are added, the more energy will be needed to compensate for the loss of flow.

SPECIAL

HMZD Carbon Filters



Chemical/ Carbon filters – Odor & /SOx/NOx

Germicidal UVC Emitters

UV emitters are used only to kill virus & Bacteria /microbes

Electronic air filtration system does not restrict air flow. It has high air filtration efficiency and very low pressure drops.

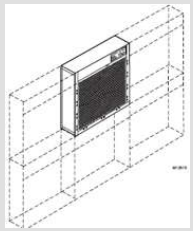
FILTRATION /
FILTRATION / STERILIZATION

Ceiling Mount Electronic Air Cleaner

- Removes airborne particles. 3 micron and larger from the air circulating through the room EAC with no ductwork required

Duct Mount (AHU) Electronic Air Cleaner

- Removes airborne particles. 3 micron and larger from the air circulating through the building ventilation equipment with minimal pressure drop



UV for Use With Electronic Air Cleaner

- Install adjacent to EAC – Air sterilization

Electronic Air Cleaner with Integrated UV

- Must attach to EAC – Provides Air sterilization

CRITICAL SPACES

Pressure Control

- Venturi Control Valves
- Zone Pressure Sensors
- Air Velocity Sensors

Outcomes:

- Indoor Air Quality Compliant
- Reduced Growth of Infections
- Healthier and Secure Environment

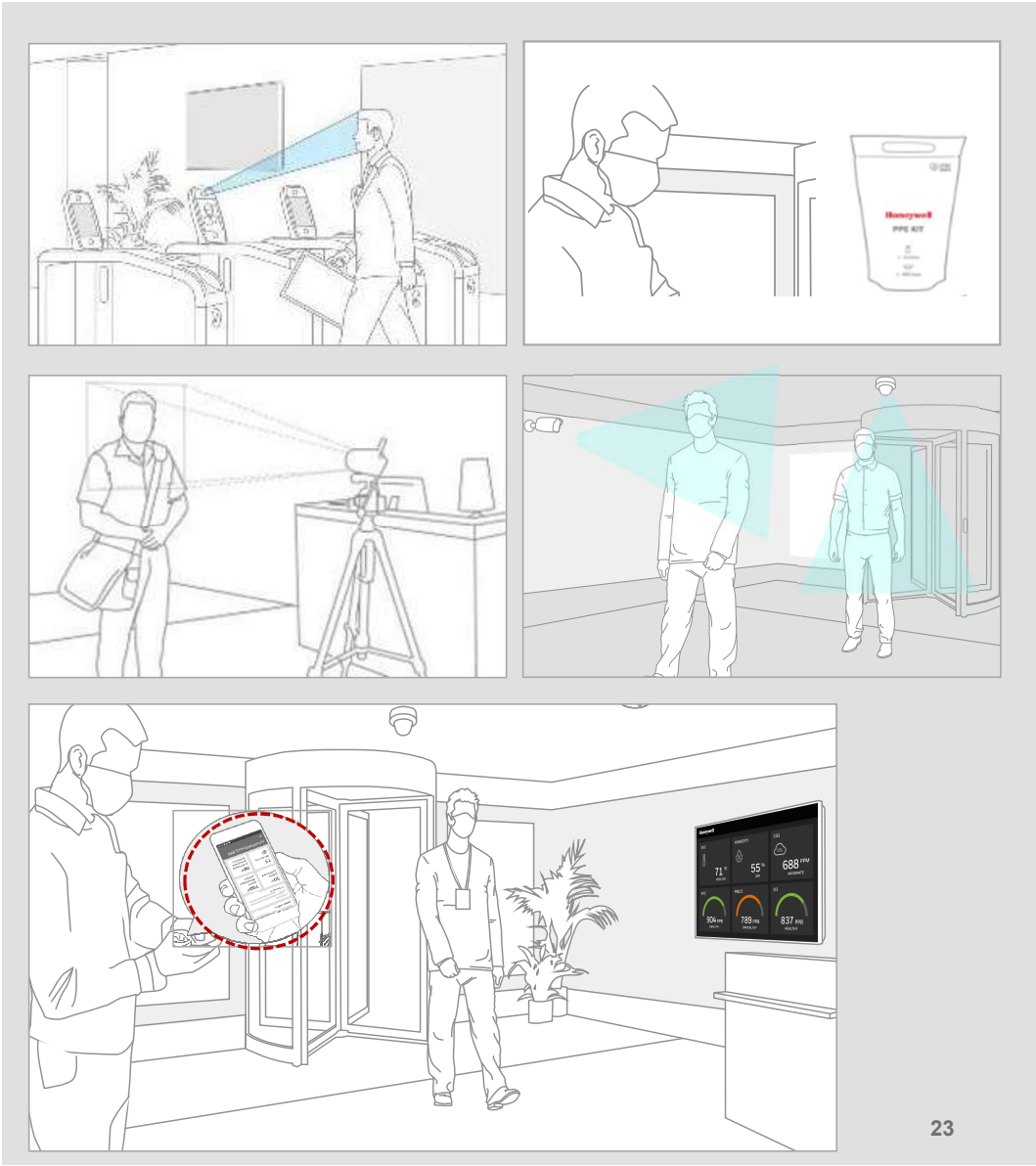
BUILDING
SAFETY & SECURITY

1. **People Temperature Screening and PPE**
   Minimizing the risk of exposure, from the start

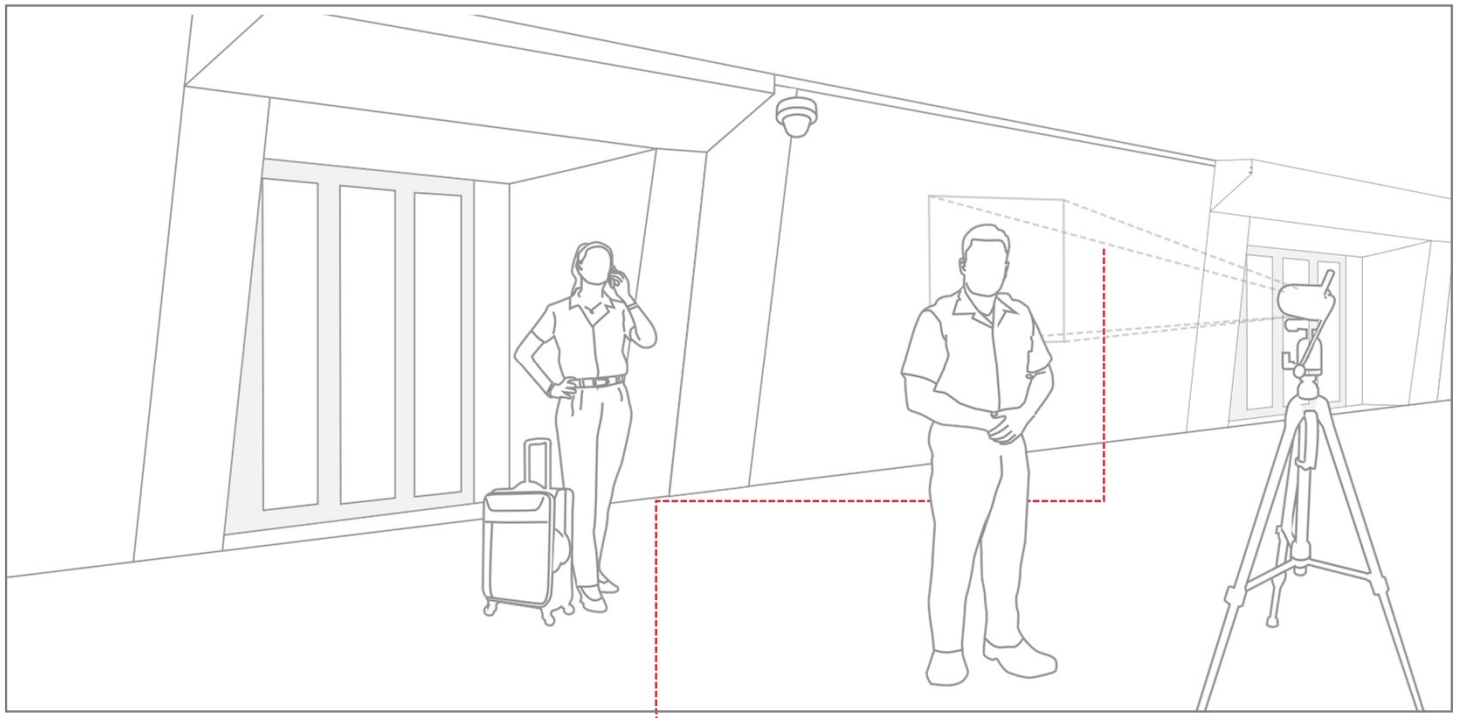
2. **Frictionless Access**
   From face recognition to touchless access controls

3. **People Counting and Secure Access**
   Monitoring spaces and optimizing flow to less crowded areas

4. **Occupant View – Healthy Dashboard**
   Reassure occupants and operators, with easy access to air quality data, people flow stats, and more



BUILDING
SAFETY & SECURITY

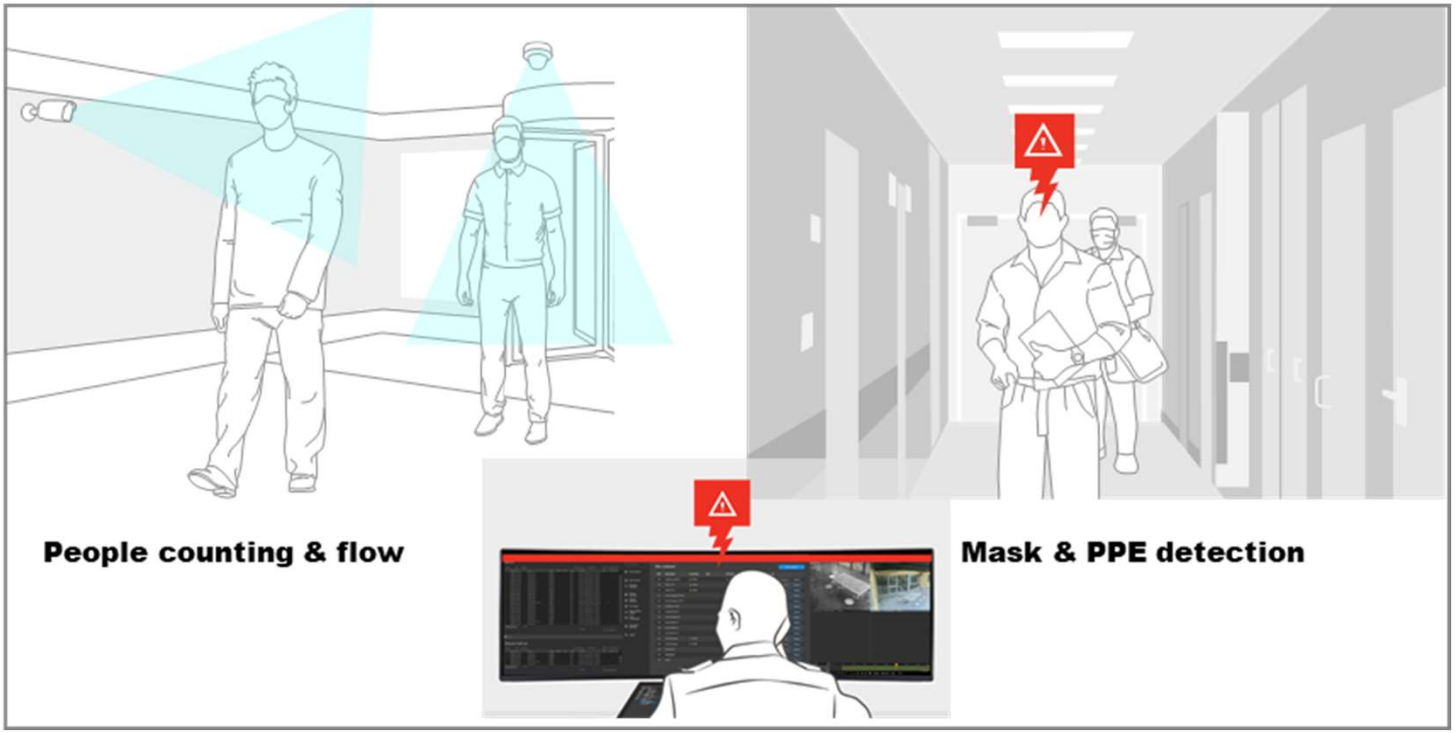


- Thermal imaging
- Secondary check with FDA approved thermometer
- Self assessment

Temperature screening technology at building entrances is available and already being implemented

BUILDING
SAFETY & SECURITY

MINIMIZE RISK : RESPOND & CONTROL



People Counting and flow is available and already being implemented

Mask and PPE Detection utilising facial imaging technology

Social Distancing and Track and Trace Detection utilising facial imaging technology

HEALTHY BUILDING
DASHBOARD

VARIABLES	COMMON PLACE	IMPORTANCE	GOOD	BETTER	BEST	NOTES
Temperature	High	Low	✓	✓	✓	
Humidity	High	High	✓	✓	✓	
$C0^2$	Moderate	High	✓	✓	✓	
Particles	Low			✓	✓	PM2.5
TVOC	Low				✓	Calculated
Air changes/Hour	High	High	✓	✓	✓	Calculated
% of Outside Air	High	High	✓	✓	✓	Calculated
Location of People	Low	High			✓	Lighting control motion sensors
People Count	Low	Moderate			✓	EU Access control has badge out

DASHBOARD ENABLES BMS SYSTEM EXPANSION

TREND

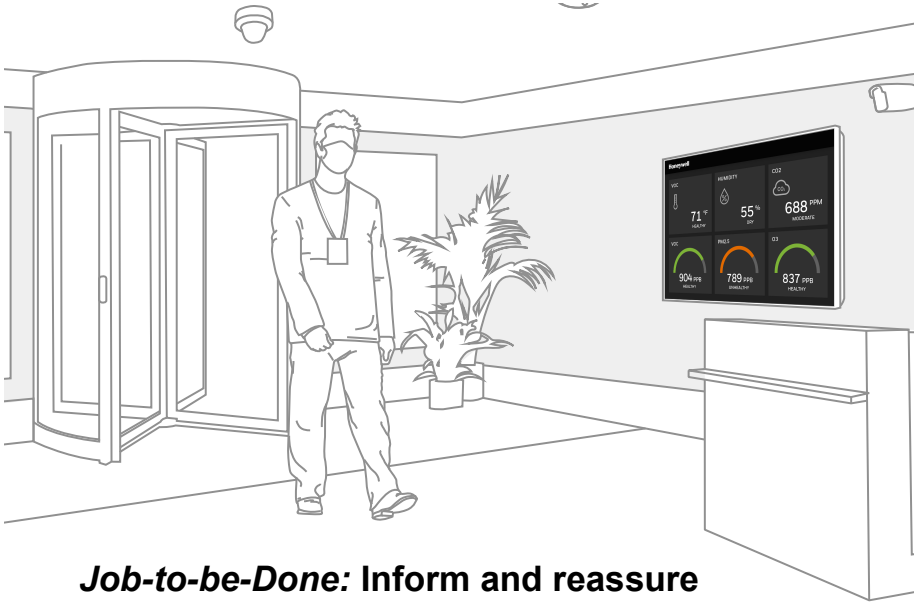
HEALTHY BUILDING DASHBOARD

FACILITY DASHBOARD
HONEYWELL

Job-to-be-Done: **Monitor & manage facilities for compliance**

"Are the building occupants and the building itself adhering to health and safety guidelines?"

HEALTHY BUILDING KPIS DASHBOARD
TREND IQVISION



Job-to-be-Done: **Inform and reassure occupants**

"Is the environment clean, safer and ready for business continuity?"

HEALTHY BUILDING DASHBOARD

- Server Based IQVISION
- Built on Common Supervisor Anywhere Platform N4
- Configurable to suit customer site
- Various widgets to support Indoor Air Quality data needs

Connected Building APIs

Common Supervisor Edge

Supervisors

Tools

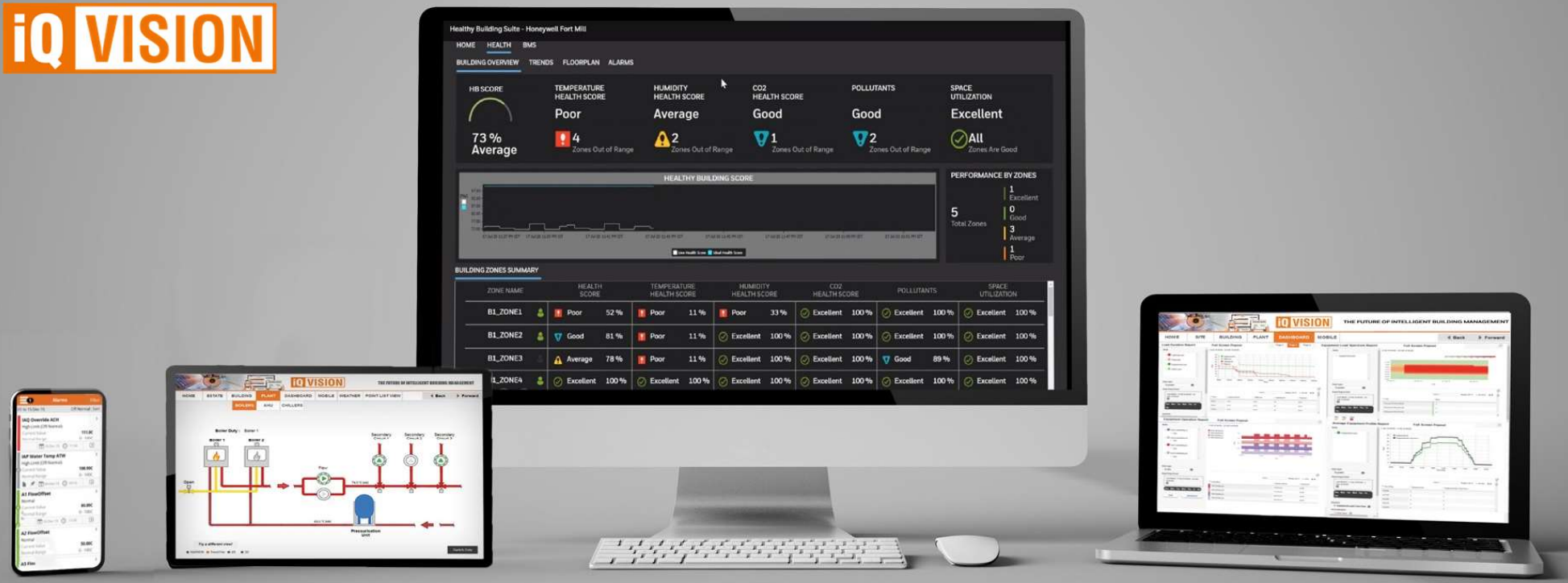
Controller

Controller

Controller

HEALTHY BUILDING
KPI DASHBOARD

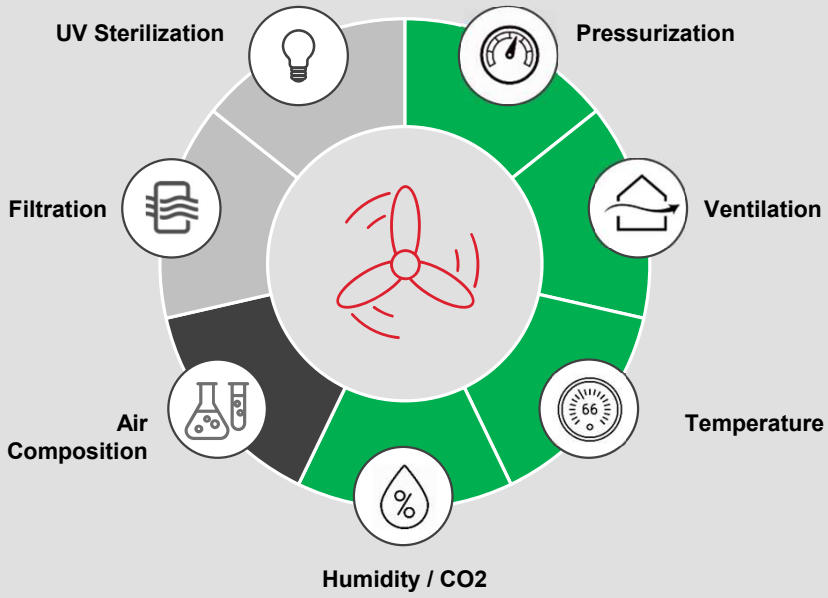
iQ VISION



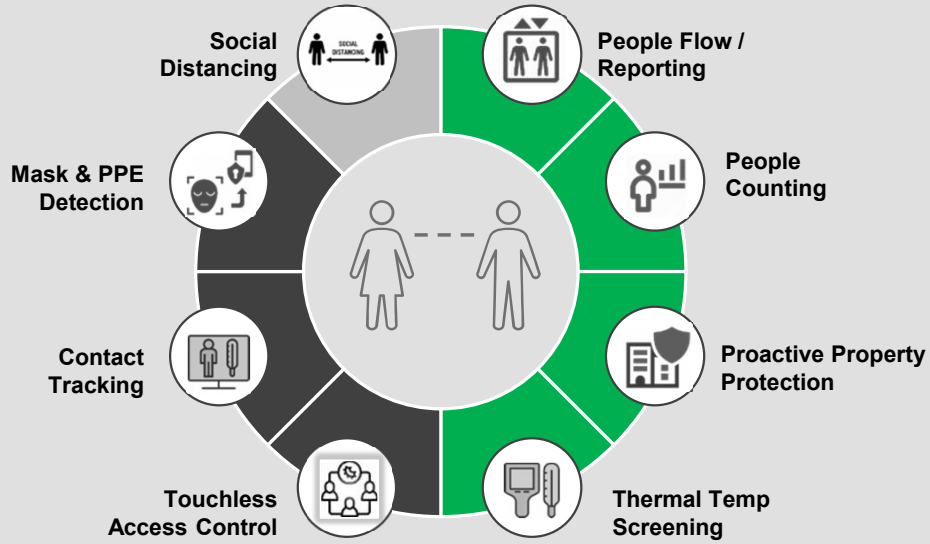
HEALTH STATUS OF INDIVIDUAL PROPERTY

HEALTHY BUILDING SOLUTIONS

1 Air Quality - Trend



2 Safety & Security – Honeywell



3 Healthy Building & Governance Dashboard


Honeywell
THE
FUTURE
IS
WHAT
WE
MAKE IT