Dynamic
Air Quality Solutions

WELCOME

Webinar

August 12, 2020

11:00 am - 12:00 pm

Duke Wiser
President and Chief Technology Officer

DYNAMIC AIR QUALITY SOLUTIONS

PRODUCTS AND CAPABILITIES

Duke Wiser

Dynamic Air Quality Solutions

DYNAMIC AIR QUALITY SOLUTIONS

Since 1982, Dynamic has been manufacturing award-winning air cleaning systems that improve IAQ, save energy, and reduce maintenance around the world.

From anthrax clean-up, to the world's most valuable art collection, mission critical government facilities, and ASHRAE headquarters…

Dynamic can design the right system for the job.

aee® The Association of Energy Engineers

partner in ASHRAE Headquarters renewal

aashe The Association for the Advancement of Sustainability in Higher Education

IAQA

American Alliance of Museums

NAFA® National Air Filtration Association

ASHE™ Optimizing health care facilities

U.S. GREEN BUILDING COUNCIL USGBC

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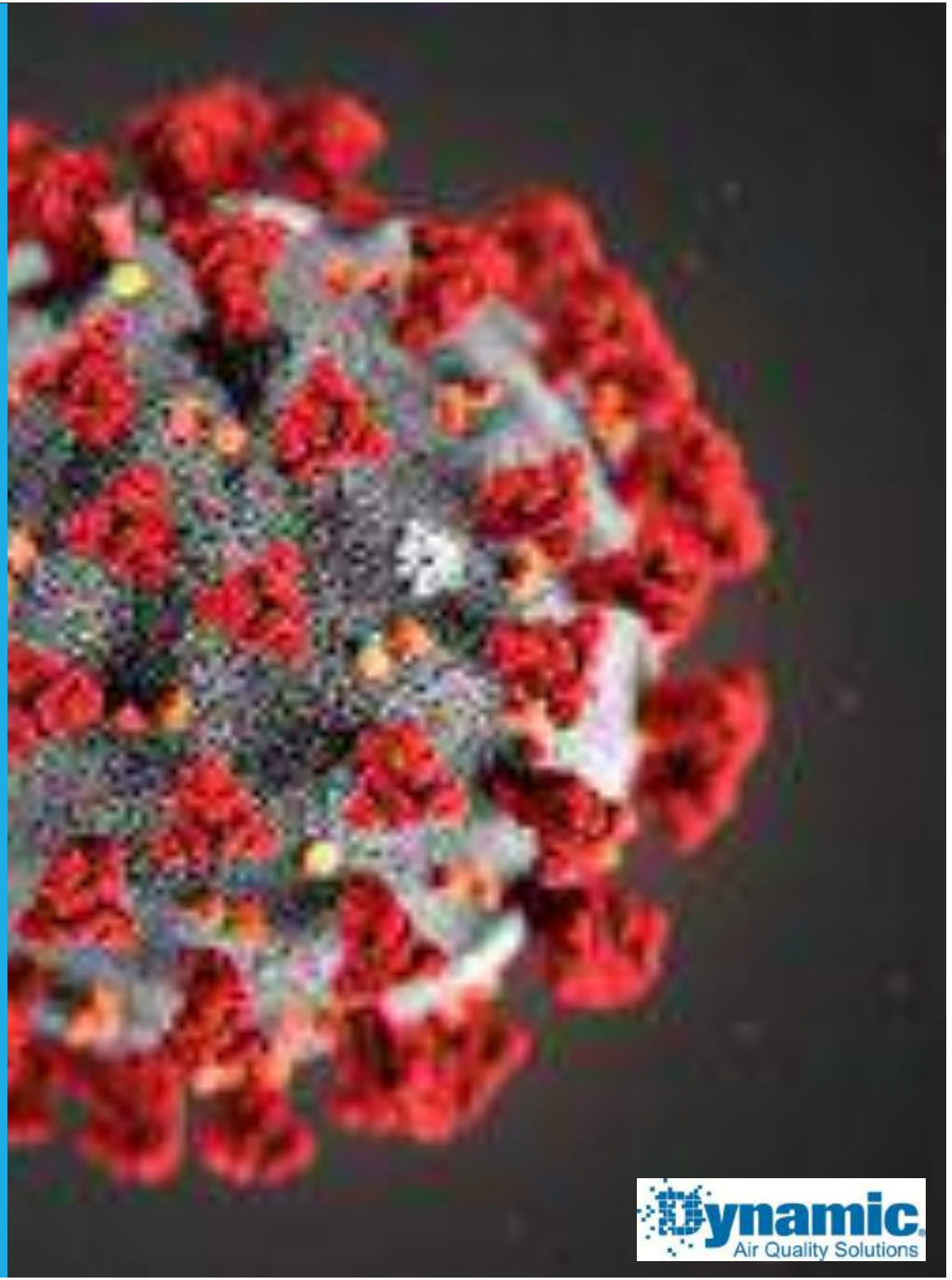
COVID-19 WHAT WE KNOW

SARS-CoV-2 is **dangerous because it spreads readily, and humans have no immunity to it.** That is what makes it unique and unprecedented: its interaction with people.

But in terms of its interaction with other things, just like all other viruses:

It can be caught on a filter; be inactivated by UVC and disinfectants; and will die by itself on a dry surface.



COVID-19 WHAT WE KNOW

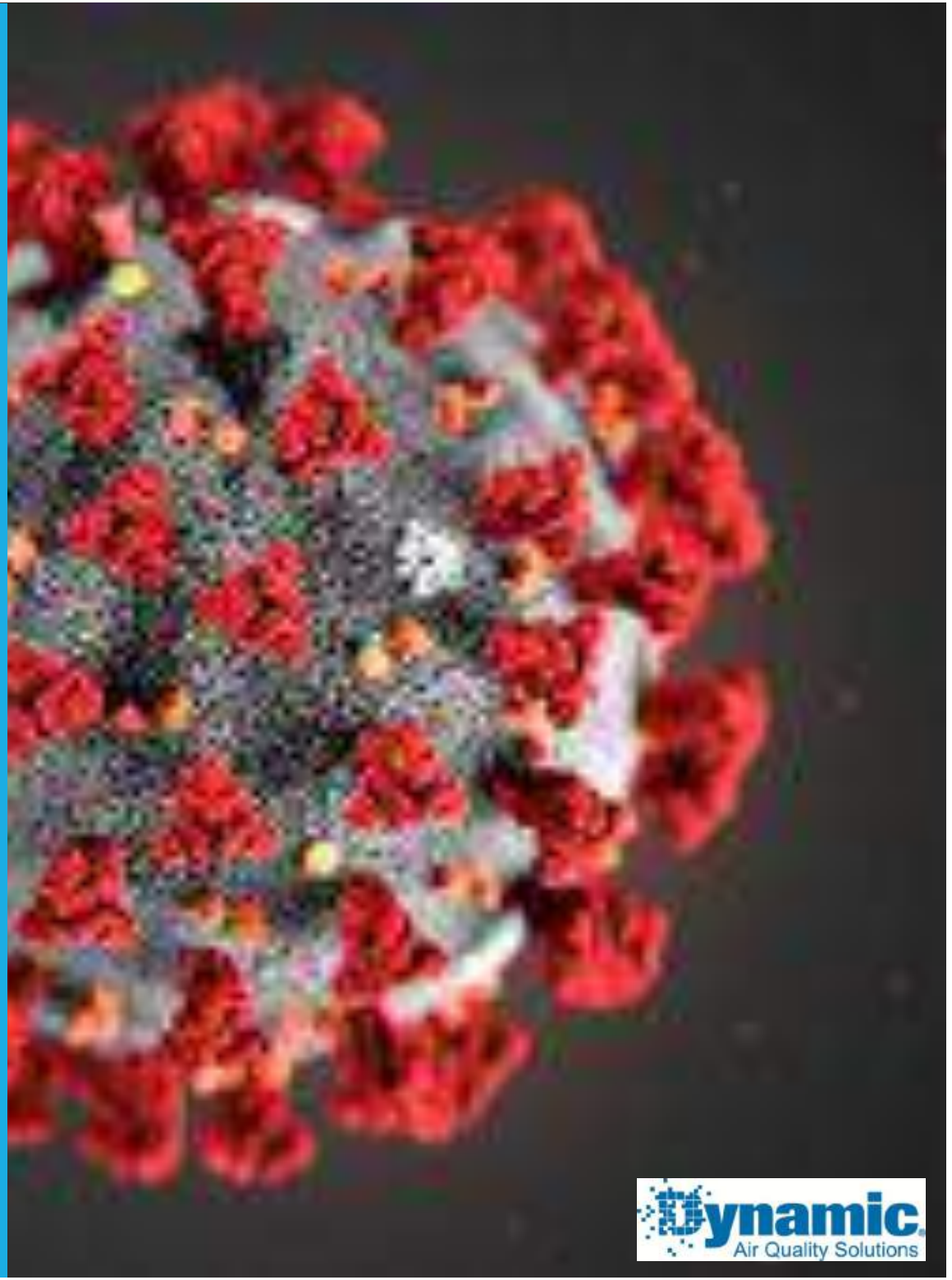
Airborne Transmission:

SARS-CoV-2 travels through the air in droplet nuclei (>5 micron) and aerosols (.5 to 5 micron) from sneezes, coughs, talking, breathing, etc. The virus itself is approximately 0.15 micron. But the majority of airborne aerosol is 1-3 micron.

The bigger the droplet nuclei, the less time it will remain in the air before settling on a surface. Only some nuclei will make it into the HVAC system before settling.

Droplet nuclei become smaller quickly as contained moisture evaporates.

SARS-CoV-2 can live on a surface



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COVID-19 WHAT WE KNOW

Airborne Transmission…

At the University of Florida, live virus was found in aerosols in a hospital 7-16 feet from patients.

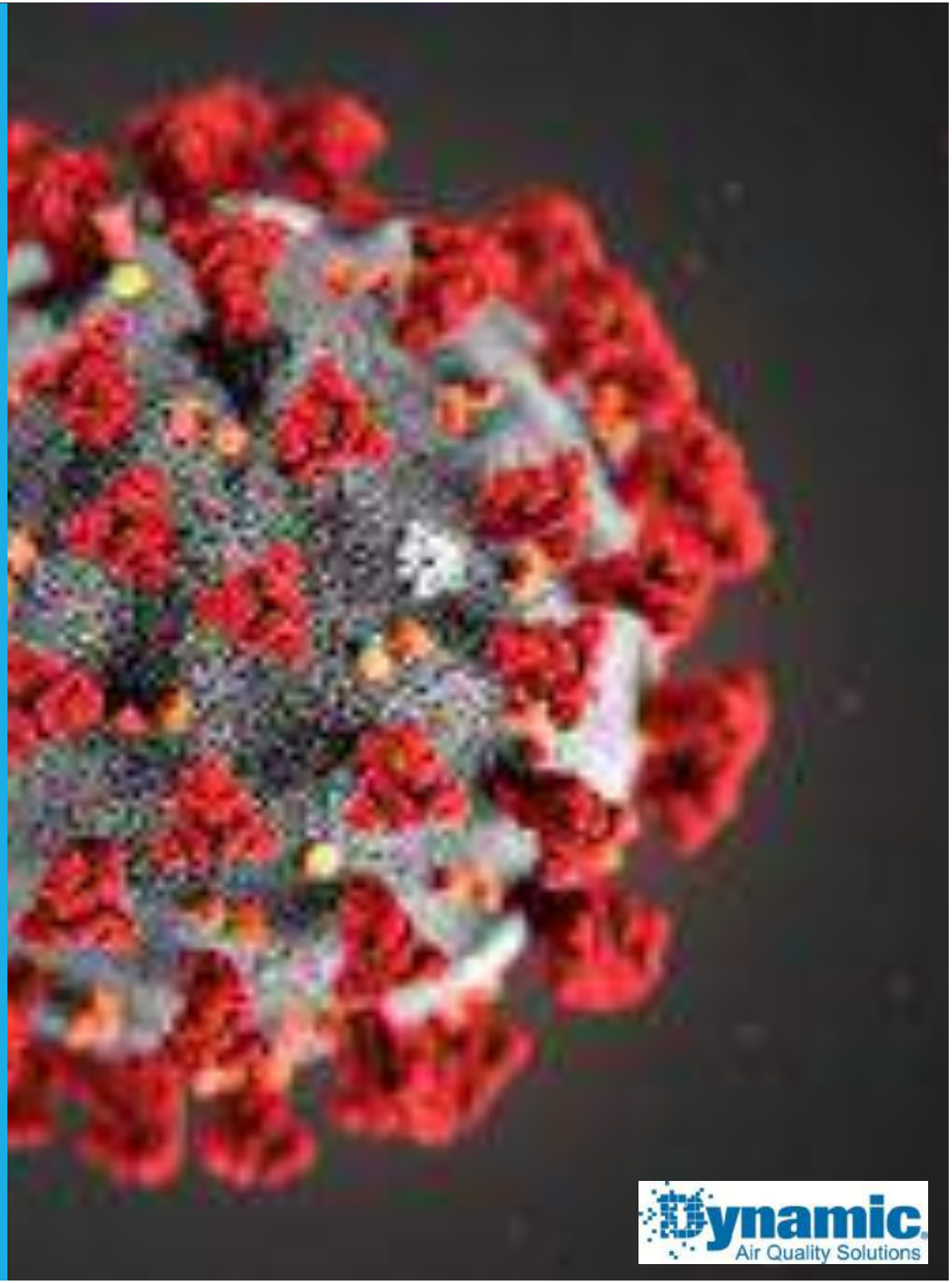
Out of 1,200 Super Spreader events, 97% occurred indoors.

In a Korean office building, 94 out of 216 people on the same floor contracted the virus while only 3 in the rest of the building did.

SARS-Co-V-2 RNA has been found on filters and supply dampers in an Oregon Hospital as well as under beds.

In Wuhan, they have found the virus in re-suspended particles from floors, surfaces, and clothing.

Beyond personal protection, handwashing, surface cleaning, and social distancing….



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ASHRAE POSITION DOCUMENT ON INFECTIOUS AEROSOLS, APRIL 2020

COVID-19 Statements

Airborne Transmission of SARS-CoV-2: Transmission of SARS-CoV-2 through the air is sufficiently likely that airborne transmission to the virus should be controlled. Changes to the building operations, including the operation of the HVAC systems, can reduce airborne exposures.

Operation of HVAC Systems to Reduce Transmission: Ventilation and ***filtration provided by the HVAC systems can reduce the airborne concentration of SARS-CoV-2 and thus the risk of transmission through the air.*** Unconditioned space can cause thermal stress to people that may be directly life-threatening and that may also lower resistance to infection. In general, disabling of the HVAC systems is not a recommended measure to reduce the transmission of the virus.

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ASHRAE POSITION DOCUMENT ON INFECTIOUS AEROSOLS, APRIL 2020, CONTINUED….

INFECTION AEROSOLS

Figure 1 (a) Comparative settling times by particle diameter for particles settling in still air (Baron n.d.) and (b) theoretical aerobiology of transmission of droplets and small airborne particles produced by an infected patient with an acute infection (courtesy Yuguo Li).

Asymptomatic people generate more smaller infectious aerosols.

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ASHRAE RECOMENDATI

- High-efficiency filtration (MERV 13 or better) in central systems
- Use of UVC Germicidal systems
- Localized supplemental air cleaning systems
- Proper ventilation rates—maximum outdoor air
- Optimized/directional airflow patterns
- Building/room pressurization
- Proper Humidity Levels

PASSIVE FILTRATION

Panels, Bags, and Cartridges Today

- Rated per ASHRAE 52.2 MERV
- Essentially a sieve
- Trade increased efficiency for increased pressure drop and energy
- 90% of the cost of filtration is energy
- Upstream, face loading
- Efficiency can increase as they load

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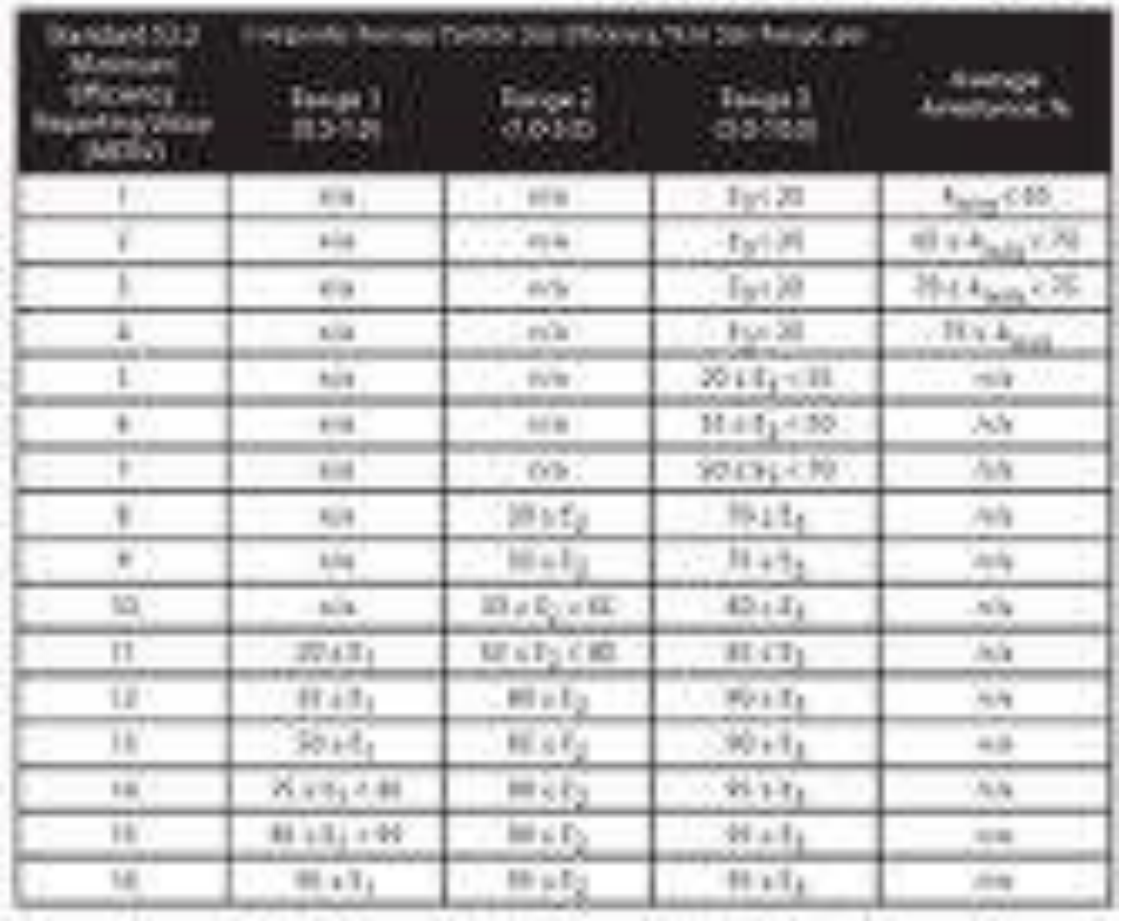
PASSIVE FILTER RATINGS

- Pursuant to ASHRAE 52.2
- Three Size Ranges (E1-3)
- Single Pass Efficiency
- Range of Allowable Ef

TABLE 3: MERV PARAMETERS



[Dynamic V8 in Operation]

E1 (%) Composite Minimum Avg. Efficiency 0.30 - 1.0 um	94
E2 (%) Composite Minimum Avg. Efficiency 1.0 - 3.0 um	99
E3 (%) Composite Minimum Avg. Efficiency 3.0 - 10.0 um	100
Minimum Efficiency Reporting Value (MERV)	MERV 15 @ 1968 CFM

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ENGINEERED
SOLUTION
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V8 AIR CLEANING SYSTEM

GREEN

- ASHRAE 52.2 MERV13 &14 Rating
- ASHRAE 52.2-NC MERV15+
- 92-99% reduction of Ultrafine Particles
- Zero Bypass Seal
- 45-65% TVOC removal
- Highest Dust Holding Capacity on market
- **Typical 3-5 year Maintenance Cycle**
- Saves energy and reduces maintenance

MAINTAIN IAQ | **REMOVE ODORS** | **52.2 COMPLIANT** | **NO OZONE**

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V-BANK & STERILE SWEEP

- Catch, Hold, Kill UVC Systems: coupling sparse glass media with hi-output 254nm UVC
- Up to 90% Bacteria kill after 5 minutes
- Often a Pre-filter for V8 or other High Efficiency Filtration
- Up to MERV 14 Performance in a Re-circ system
- 20-35% First Pass TVOC Removal
- Increased Dust Holding Capacity
- Easy to Use, Maintain, and Replace

MAINTAIN IAQ

STERILIZE PATHOGENS

REMOVE ODORS

NO OZONE

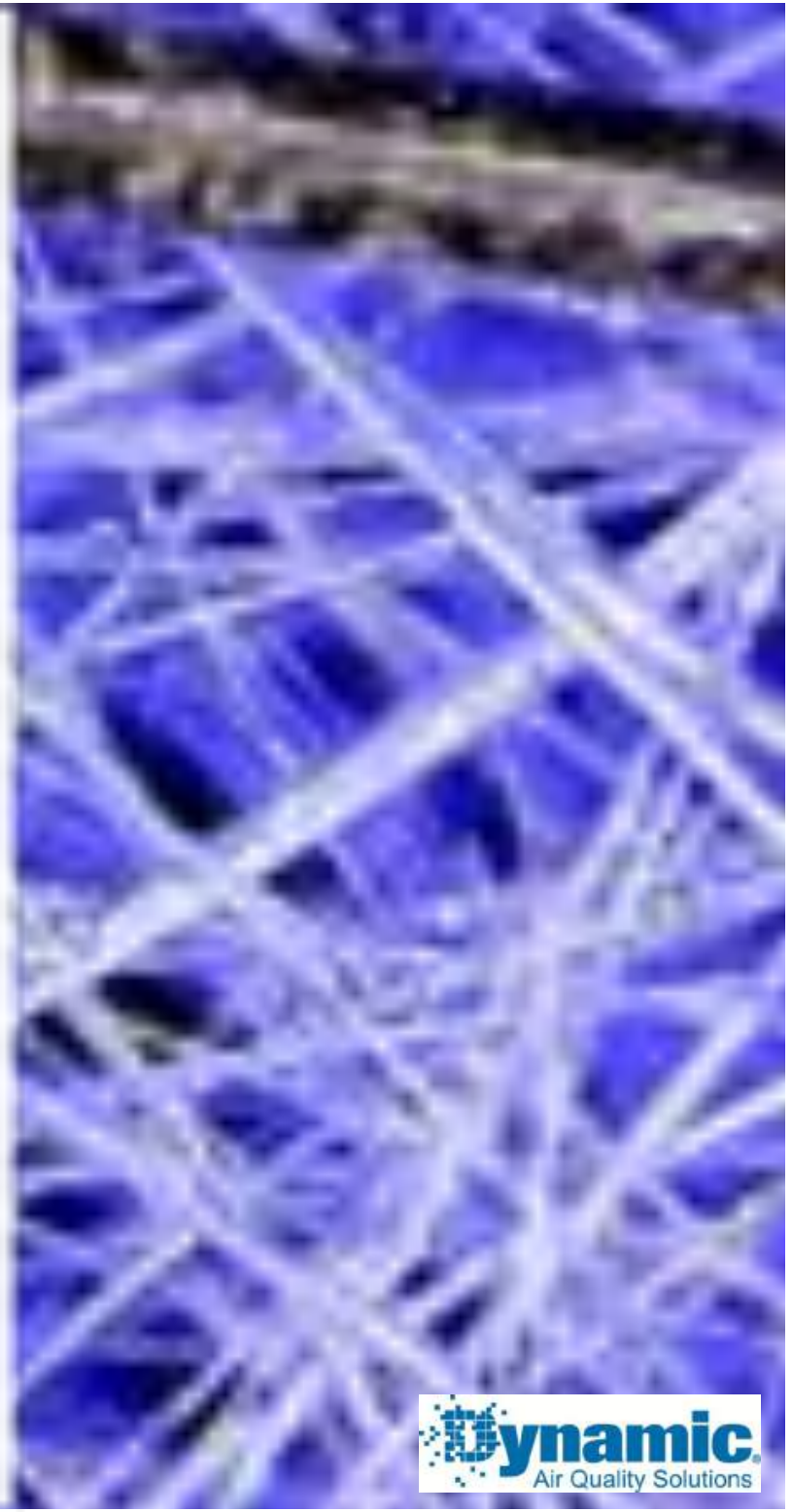
PANEL AIR CLEANERS (PAC)

- Replace Low-Efficiency Passive Filters
- Fits in Standard 1” and 2” Filter Racks
- Capture, Hold, Kill UVC Options
- Up to MERV 13 Performance in Re-circ System
- TVOC and Ultrafine Particulate Removal
- Easy to Use, Maintain, and Replace

MAINTAIN IAQ

REMOVE ODORS

NO OZONE



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ACTIVELY POLARIZED MEDIA

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PASSIVE FILTER MECHANISMS

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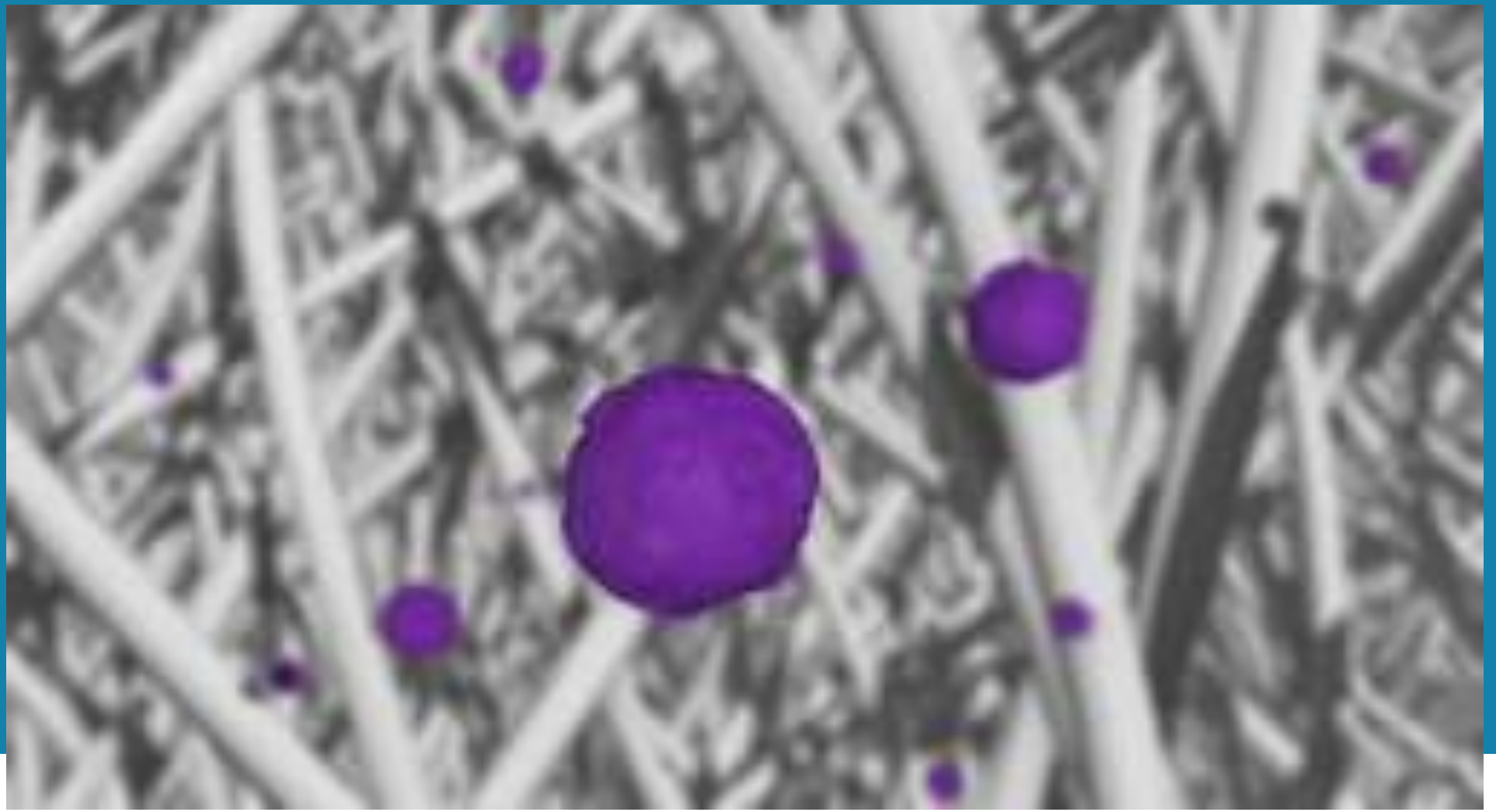

POLARIZATION & ELECTROSTATIC ATTRACTION

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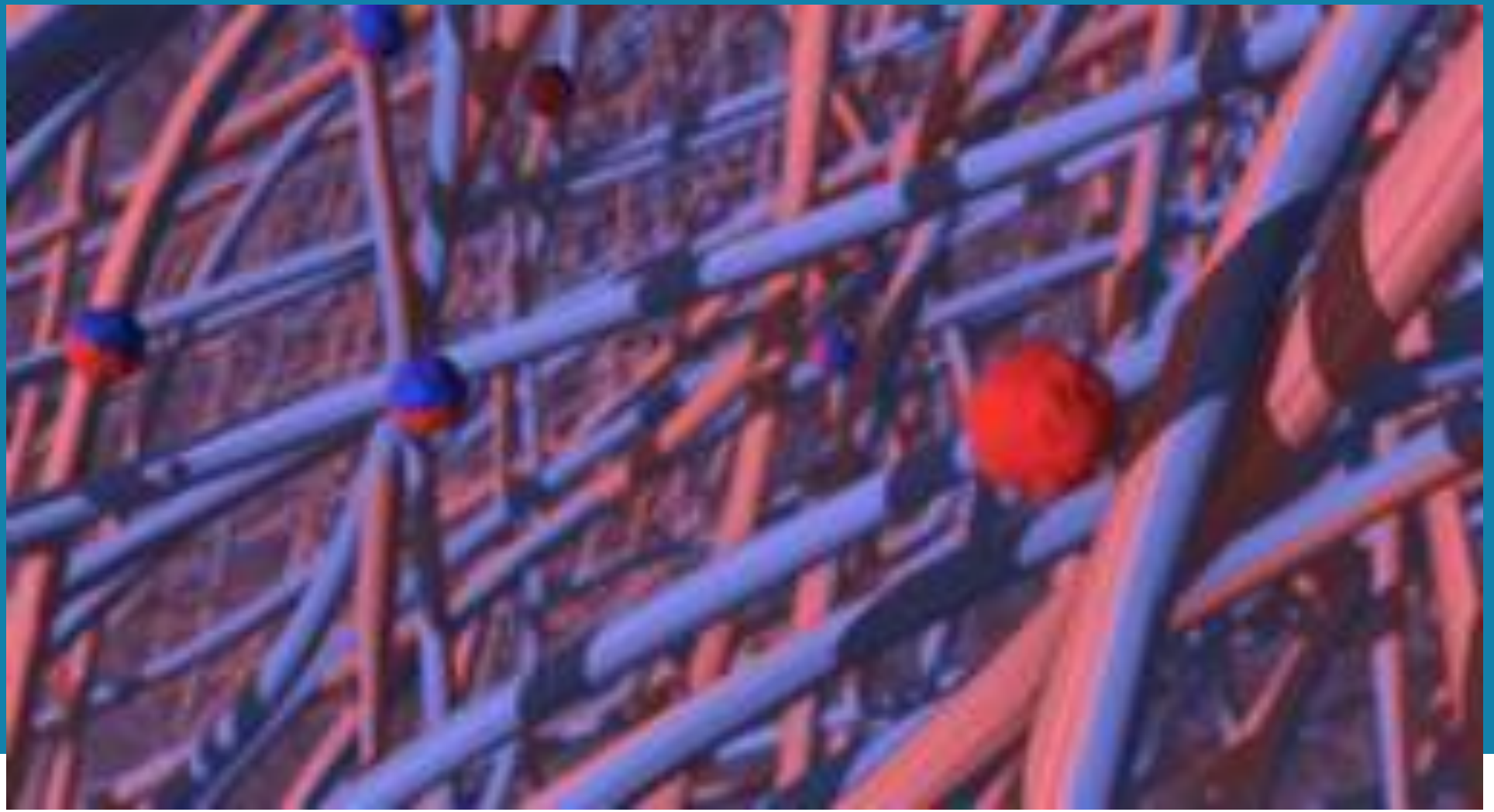

PARTICLE EXCITEMENT & AGGLOMERATION

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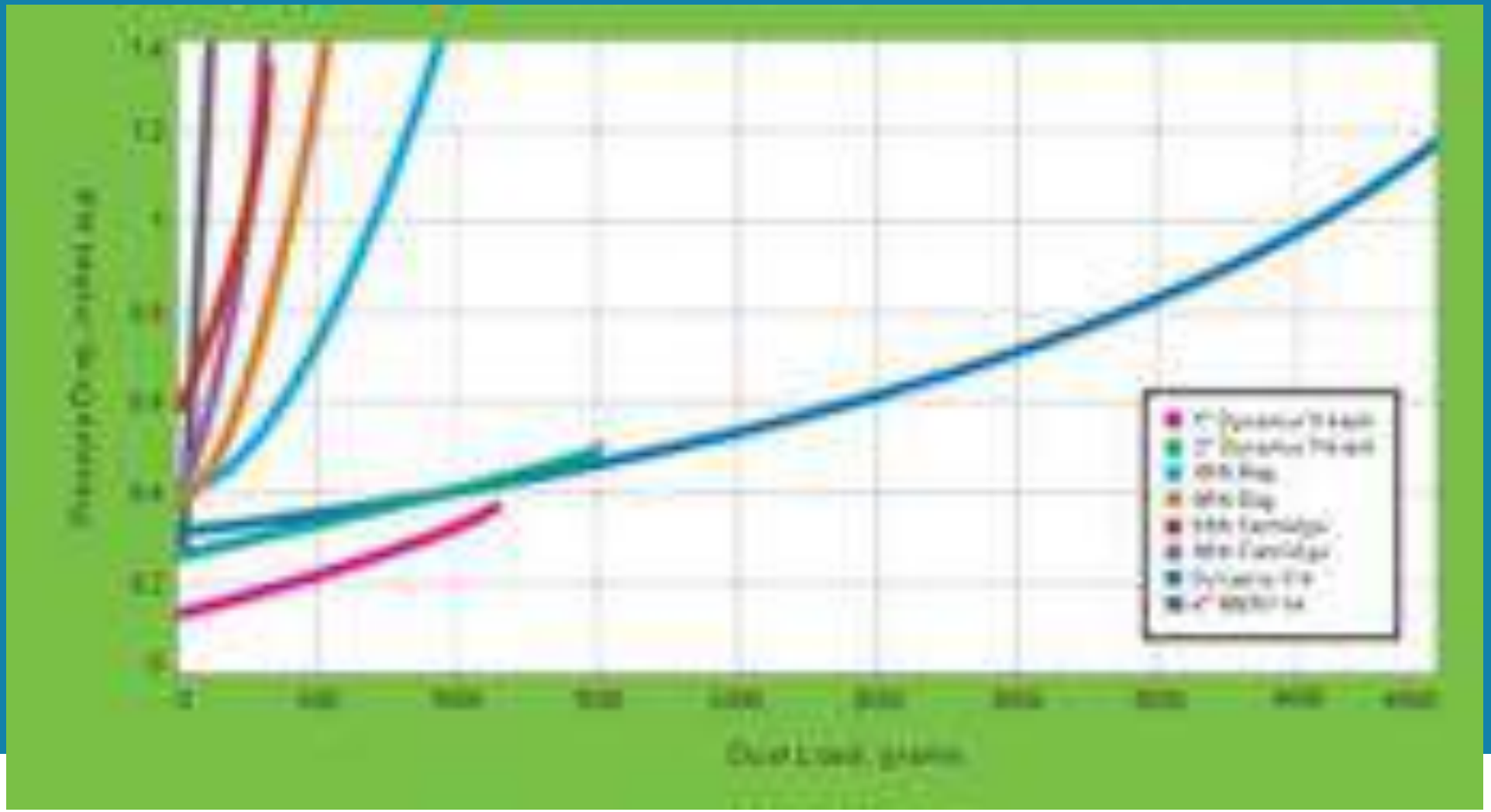

MAXIMUM DUST LOADING

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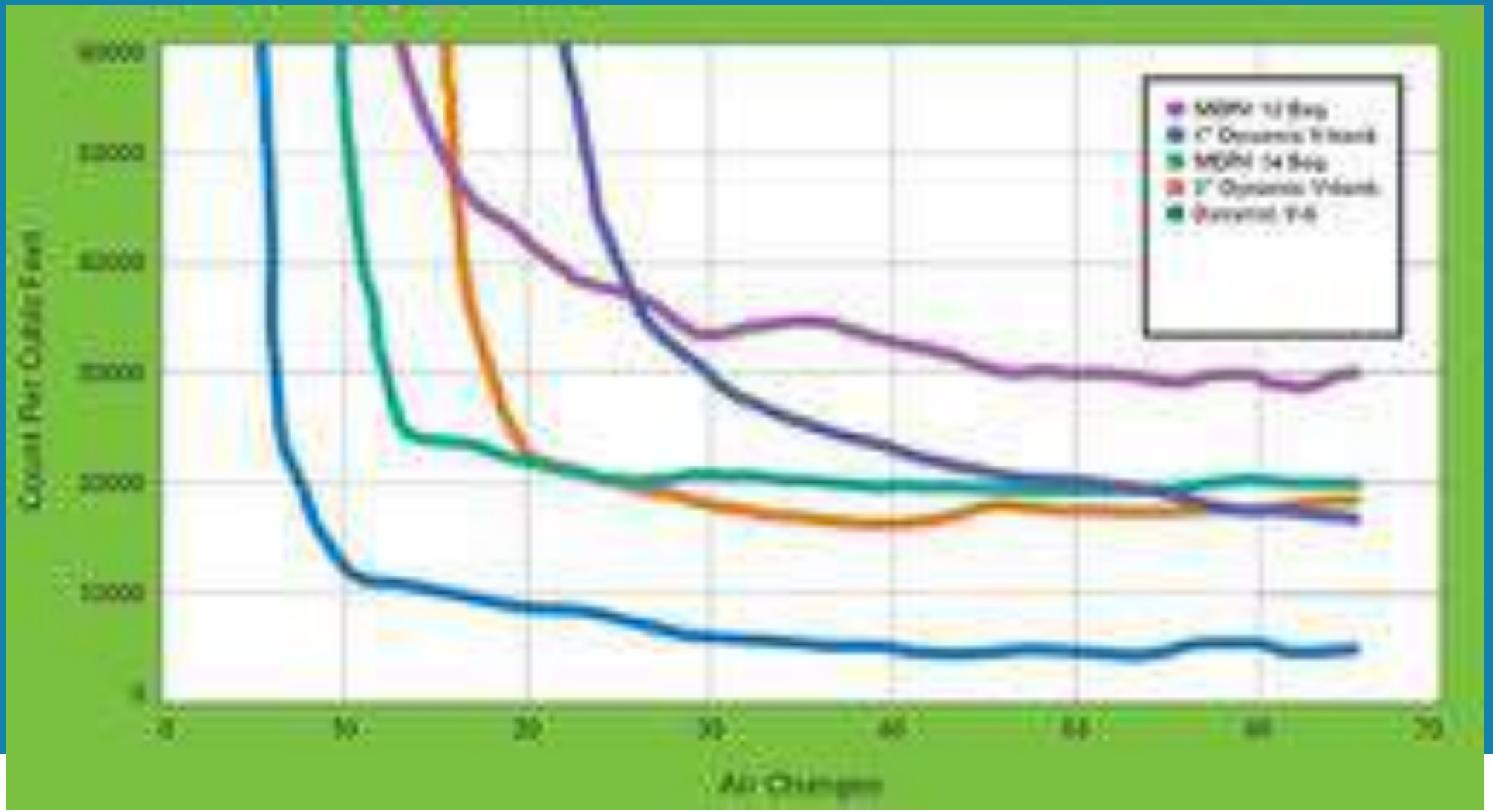

MAXIMUM CLEANING

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TVOC AND ODOR REMOVAL

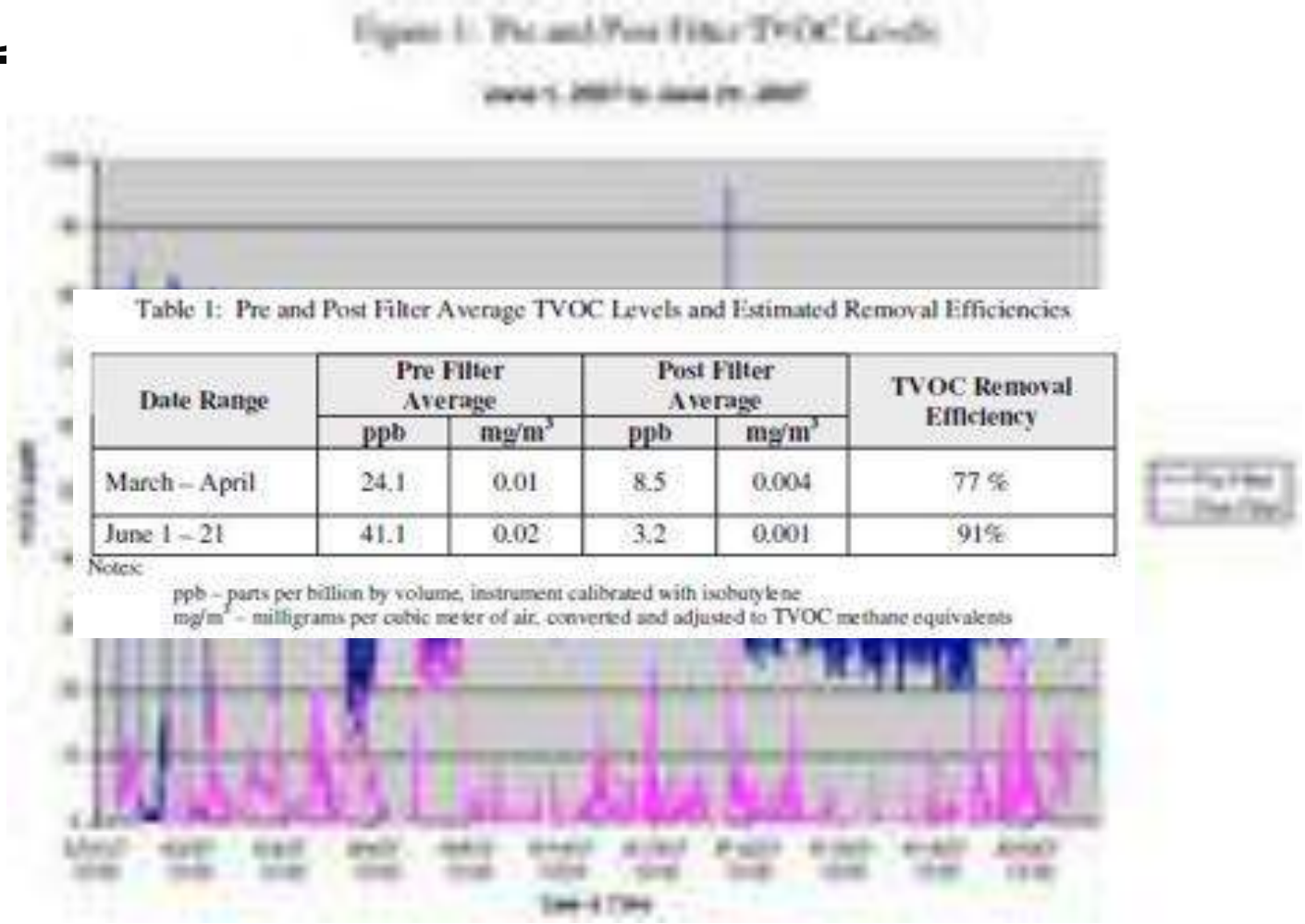

Table 1: Pre and Post Filter Average TVOC Levels and Estimated Removal Efficiencies

Date Range	Pre Filter Average		Post Filter Average		TVOC Removal Efficiency
	ppb	mg/m^3	ppb	mg/m^3	
March – April	24.1	0.01	8.5	0.004	77 %
June 1 – 21	41.1	0.02	3.2	0.001	91%

Notes:

ppb – parts per billion by volume, instrument calibrated with isobutylene
mg/m^3 – milligrams per cubic meter of air, converted and adjusted to TVOC methane equivalents

V8 PERFORMANCE AND IMPACTS

- MERV 13-15+
- 1/3 the operating cost of passive filters
- Reduced maintenance
- Removes Ultrafine Particle (UFPs)
- Significant reduction of VOCs and odors
- No need for pre-filters
- Typical design midlife of ~0.5" w.g. and .7-.8" Dirty
- 30-50% Less cost of ownership over 15 years
- ROIs of 15-30%

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OFFICE BUILDING RENOVATION
ASHRAE HEADQUARTERS
ATLANTA, GEORGIA

IAQ & MAINTENANCE

7-YEAR MEDIA REPLACEMENT

ASHRAE HEADQUARTERS

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CLASS-A OFFICE BUILDING
2121 K STREET NW
WASHINGTON D.C.

EXCEEDING STANDARDS

92-99% UFP REDUCTION VS OUTSIDE AIR

2121 K. STREET, D.C.

www.DynamicAQS.com

Dynamic Air Quality Solutions

ENERGY & REDUCED BHP

55% REDUCTION AT PEAK HOURS

HOSPITAL VIAMED

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WHERE TO?

Wider application of MERV 13 filtration (Changes to Leed/Well?)

Changes in systems design to optimize contaminant control

- Airflow direction and pattern
- Higher ventilation rates
- More effective contaminant capture (eg bathrooms)
- Space and building pressurization

Expanded use of localized air cleaning and ventilation

- Supply grille filtration
- Supplemental air cleaning systems and air change rates

Expanded use of UVGI optimized for airborne inactivation

And……..

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THANK YOU

QUESTIONS?

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