



30 YEARS OF INDUSTRY EXPERIENCE

A DIVISION OF P&S GROUP

PROVIDING THE COMPLETE SOLUTION TO CUT LABOR AND MATERIAL COST FOR
YOUR NEXT PROJECT.

An Introduction to Underfloor Services Distribution



SELECT **PREFAB**
SOLUTIONS

Building Structure



Access Floor



Plug & Play
Power



Underfloor
HVAC System

UNDERFLOOR
SERVICES
DISTRIBUTION

Access Floors

Plug & Play
Power

Underfloor Air

Floor Coverings

Underfloor Services Distribution

Underfloor Services Distribution Team



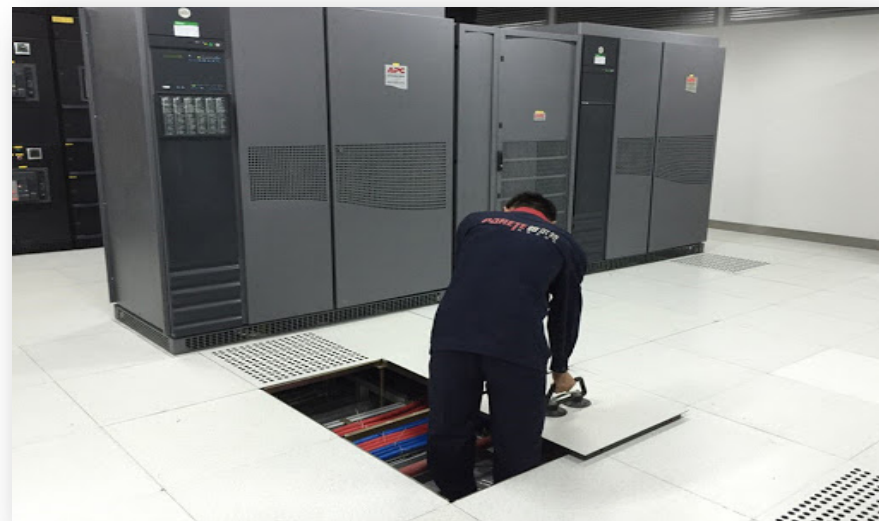
Top10 Reasons to engage the SPS Team

1. 20 Years Experience, All Building Types
2. Over 1,000 Projects 1,000 to 1.2 Million SF
3. 29 Countries, Every Climate Type
4. Over 100 Million SF Installed
5. Broadest Application Product Line
6. Comprehensive Design Support Team
7. Focused Application experience
8. Lower First & Life Cycle Cost
9. Total Package Coordination
10. On-site Project Management

Access Floors



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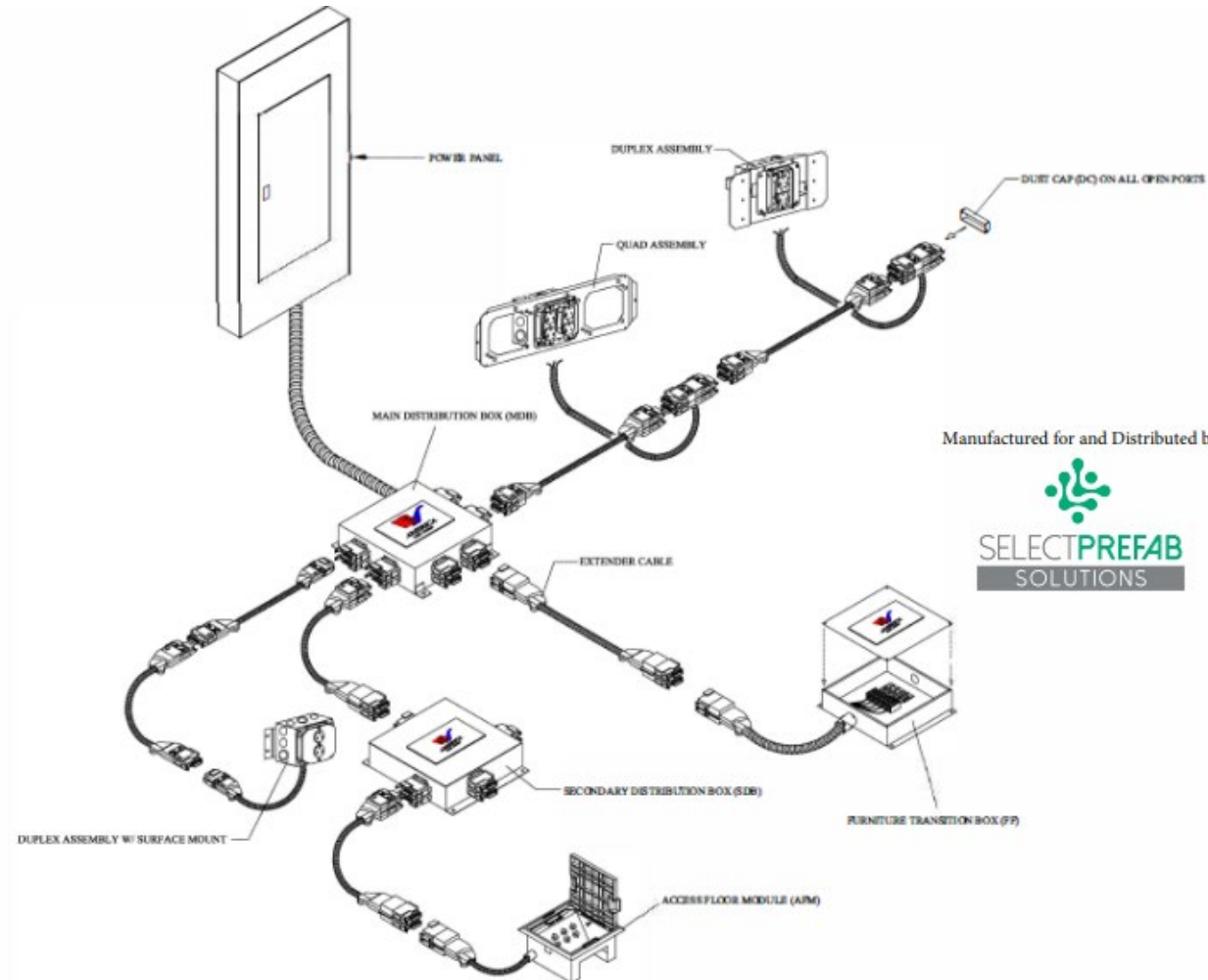
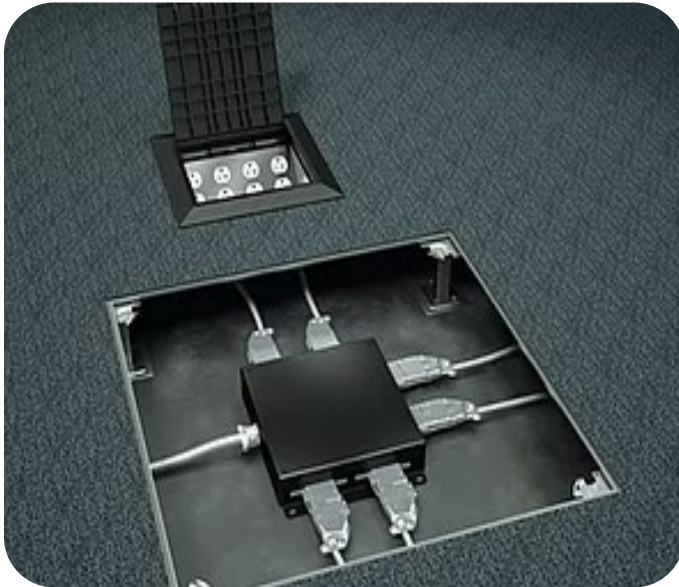
Plug & Play
Power

Underfloor Air
Floor Coverings

“Plug & Play” Power System



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“Peel & Stick” Luxury Floor Coverings



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Applications

Private Office Buildings

Military Buildings

Libraries

Call Centers

Data Centers



Education

Casinos

Airports

Medical

Retail

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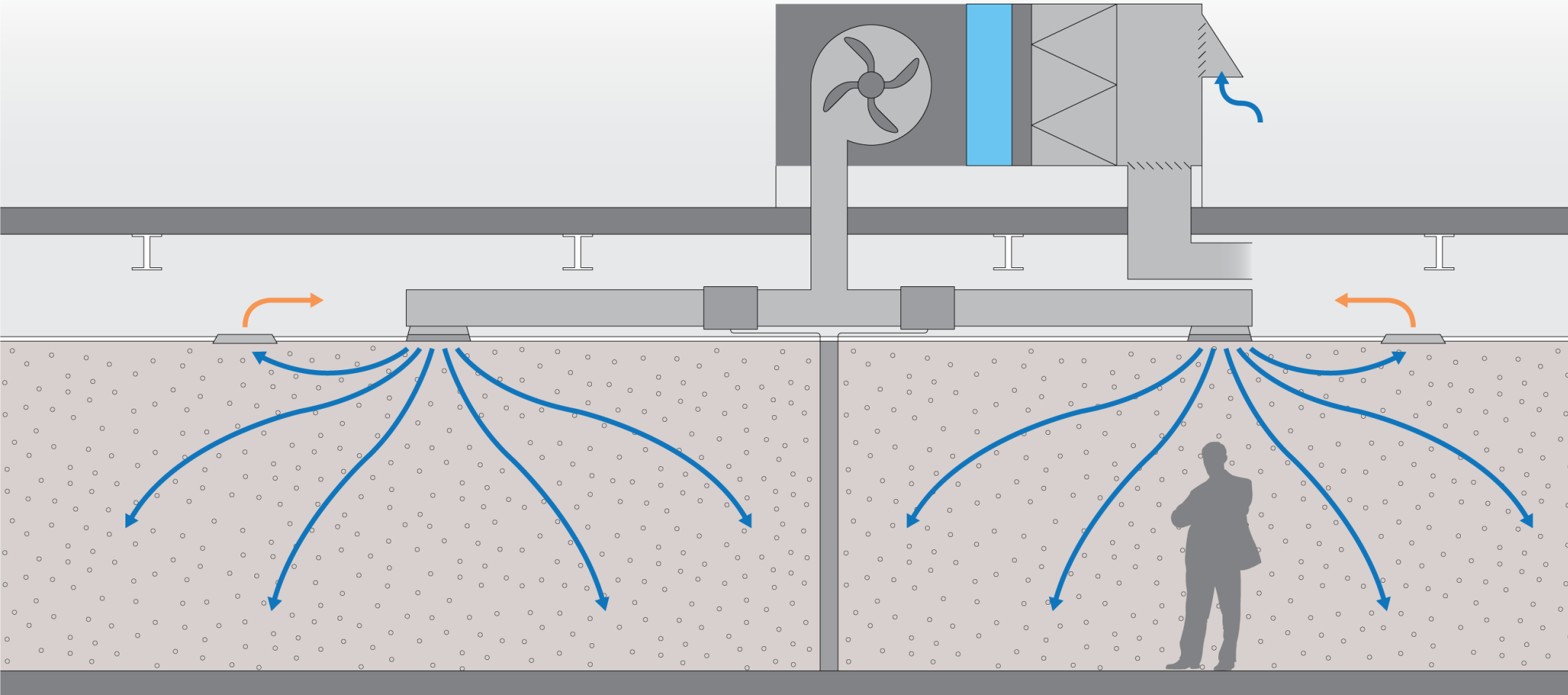
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Floor Coverings

New & Renovation Projects



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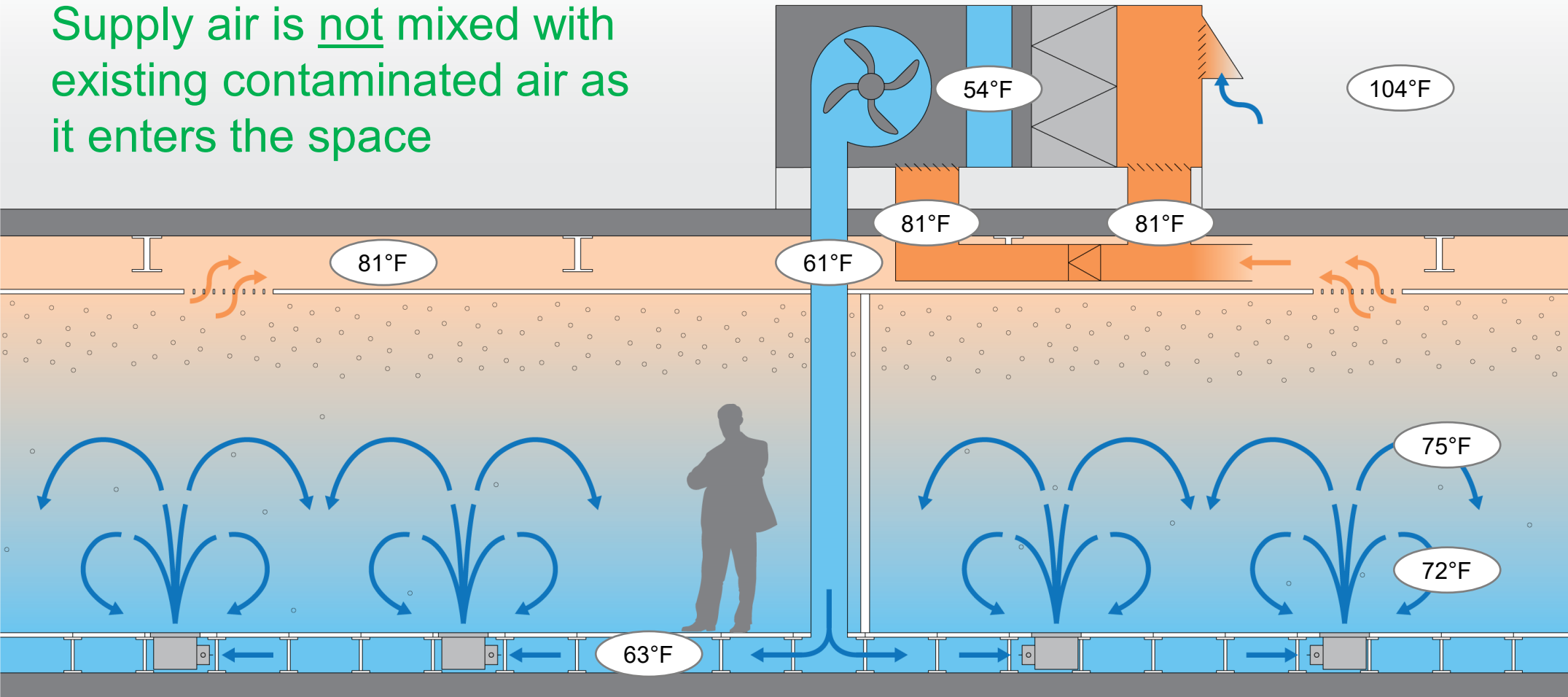
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Conventional Overhead (Mixing Systems)

Zone Pollutant Transfer

Supply air is not mixed with existing contaminated air as it enters the space



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Underfloor Air Conditioning (Stratified Systems)

What is the Value of Human Health in Office Buildings?



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UFAD

Modern Separation System



Overhead

Traditional Mixing System

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Floor Coverings

Overhead systems fully mix clean & contaminated air in the room to the occupants.

(UFAD) Underfloor Air Delivery ELIMINATES the Overhead mixing problems.



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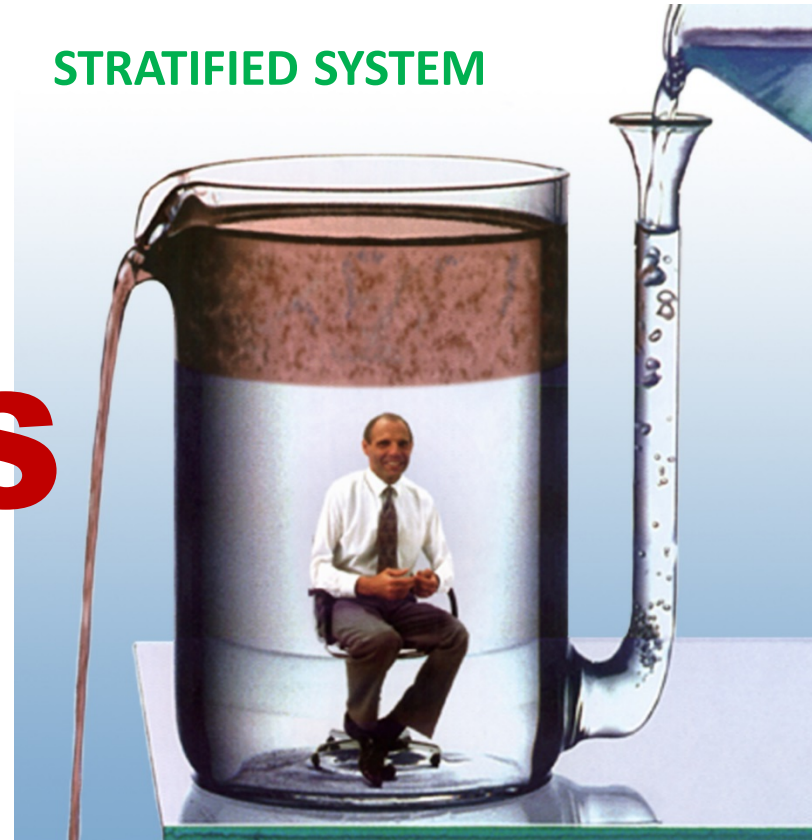
Underfloor Air

Floor Coverings



Conventional VAV

VS



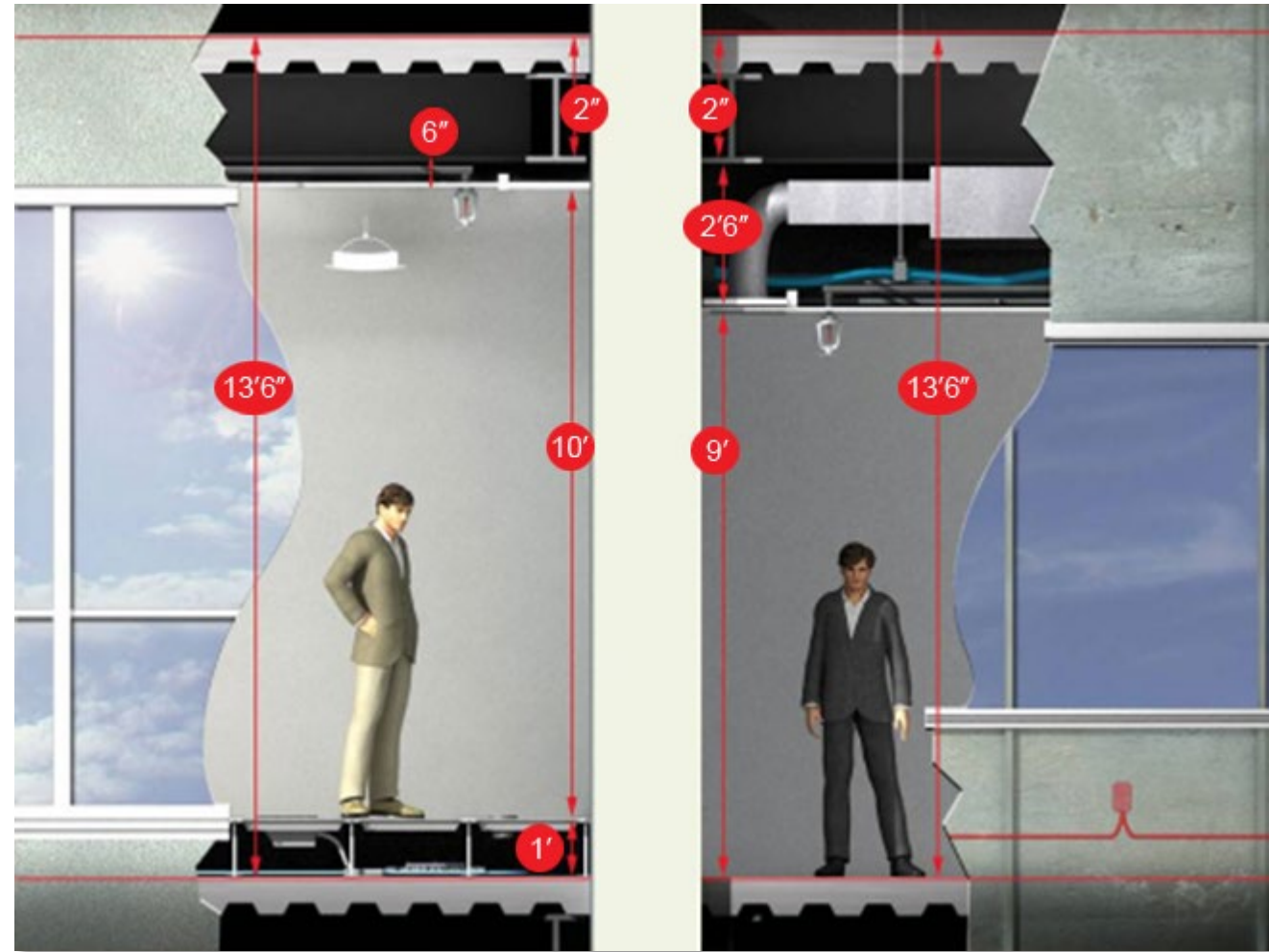
AirFixture Underfloor Air

Air Flow: Mixing Systems vs. Stratified Systems



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- Reduction in overhead duct work leads to taller ceilings
- Increased windows sizes improve day-lighting and views
- Reduce slab-to-slab height
- Reduced run lengths
- Promotes reuse of materials
- Wire & cable only where it is needed
- Reduced ductwork
- Eliminate drop-ceiling



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High Performance & Material Efficiency Benefits



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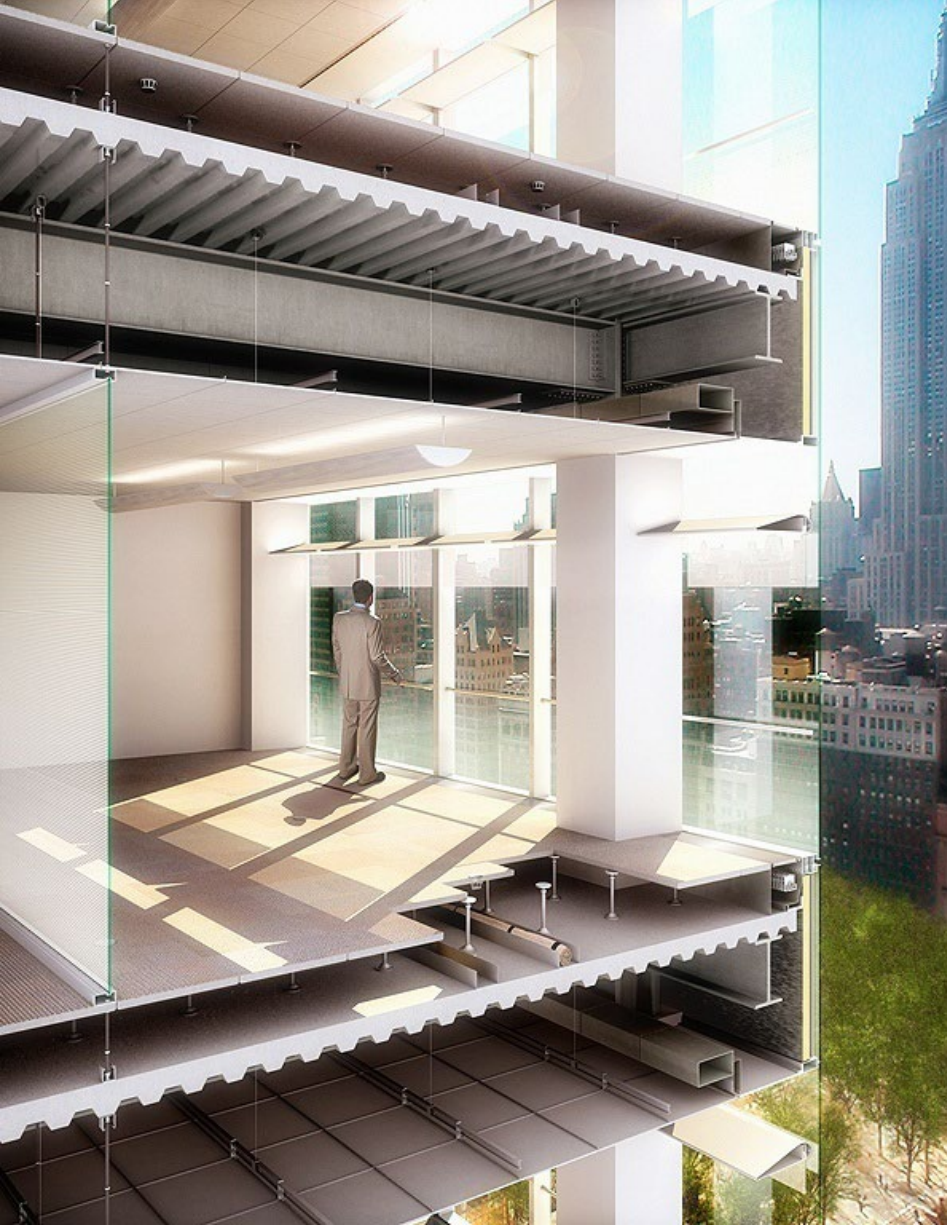
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Floor Coverings



1. Improved Flexibility of building services
2. Achieve cost effective LEED certification
3. Improved Ventilation Efficiency and indoor air quality
4. Improved occupant Comfort, Productivity and Health
5. Reduced Energy Use (Cost Savings)
6. Reduced First & Life-Cycle Costs
7. Reduce Slab-to-Slab Heights & Façade Costs



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Benefits of UFAD

Sustainable, High Performance, Better Value!



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Strategies	Daylighting	IAQ	Flexibility	Energy	Water	Material	Life-Cycle Cost	Total
Slab-to-Slab Thermal Glazing	✓			✓			✓	3
Lighting System Controls	✓			✓			✓	3
Modular Walls & Furniture			✓			✓	✓	3
Green Roofs				✓			✓	2
Rainwater Collection/Reuse					✓		✓	2
Ergonomic Seating							✓	1
Sound Masking							✓	1
Underfloor Service Distribution	✓	✓	✓	✓		✓	✓	6

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Comparing Strategies



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Coach 10 Hudson Yards Tower C
New York, New York



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Coach 10 Hudson Yards Tower C
New York, New York



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20 East End Avenue Luxury Tower
New York, New York



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Novartis Office Building
East Hanover, New Jersey



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Novartis Office Building
East Hanover, New Jersey



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Novartis Office Building
East Hanover, New Jersey



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Grand Egyptian Museum
Giza, Egypt



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Surrey City Centre Public Library
Surrey, British Columbia



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DST Round House
Kansas City, Kansas



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DST Round House
Kansas City, Kansas



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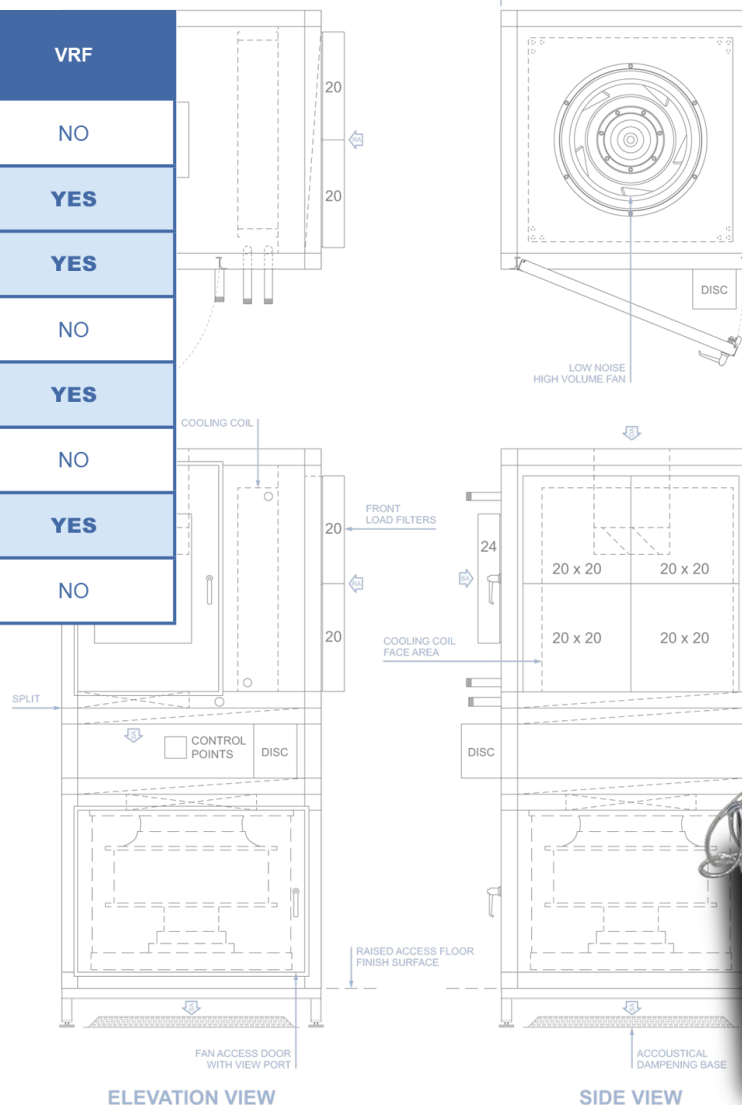
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Floor Coverings

PLAN VIEW
TOP TIER

PLAN VIEW
BOTTOM TIER



	8" AirFixture Low Profile UFAD System	Overhead VAV	Self-Contained Package Unit with Overhead VAV	VRF
Low Installed Mechanical Cost	YES	NO	YES	NO
50% Mechanical Closet Size Reduction	YES	NO	NO	YES
Quiet Performance	YES	NO	NO	YES
Lower Building Heights	YES	NO	NO	NO
Lower Energy Costs	YES	NO	NO	YES
Flexible Building Construction	YES	NO	NO	NO
Employee Comfort	YES	NO	NO	YES
Improved Ventilation Effectiveness	YES	NO	NO	NO

The clear winner.

ELEVATION VIEW

SIDE VIEW

QT-35 Downflow Air Handling Unit

UFAD Systems & Products



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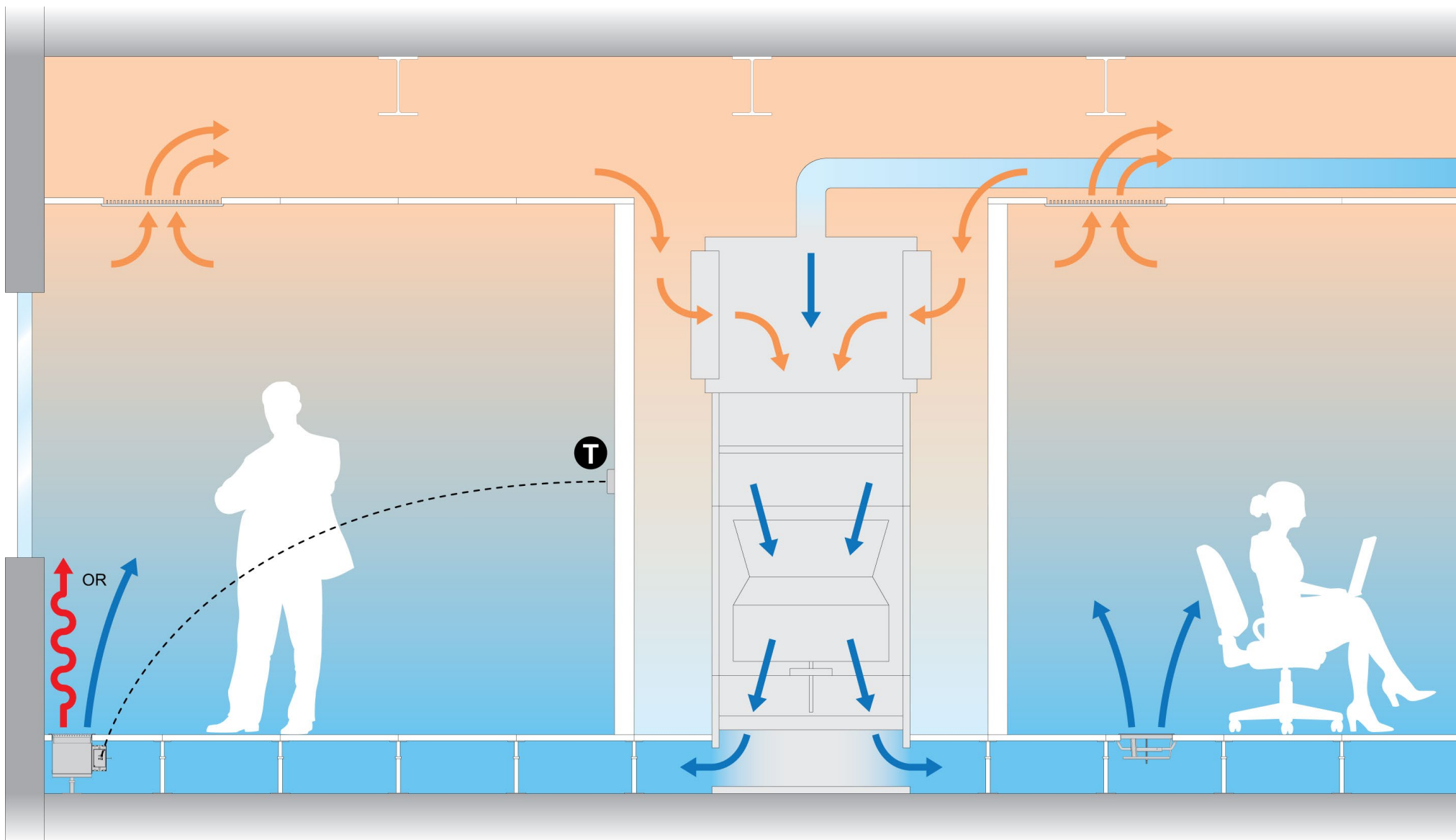
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Underfloor Air

Floor Coverings

8-14"
(203-356mm)
Finish Floor
Height



System 5: CV diffusers everywhere, with supply airway partitions containing different and appropriate air temps for each affected zone. Column mixing units are often included.

Advantages: No underfloor obstruction, ability to vary underfloor air temp by exposure, use of low temp outside air (ideal for tall buildings)



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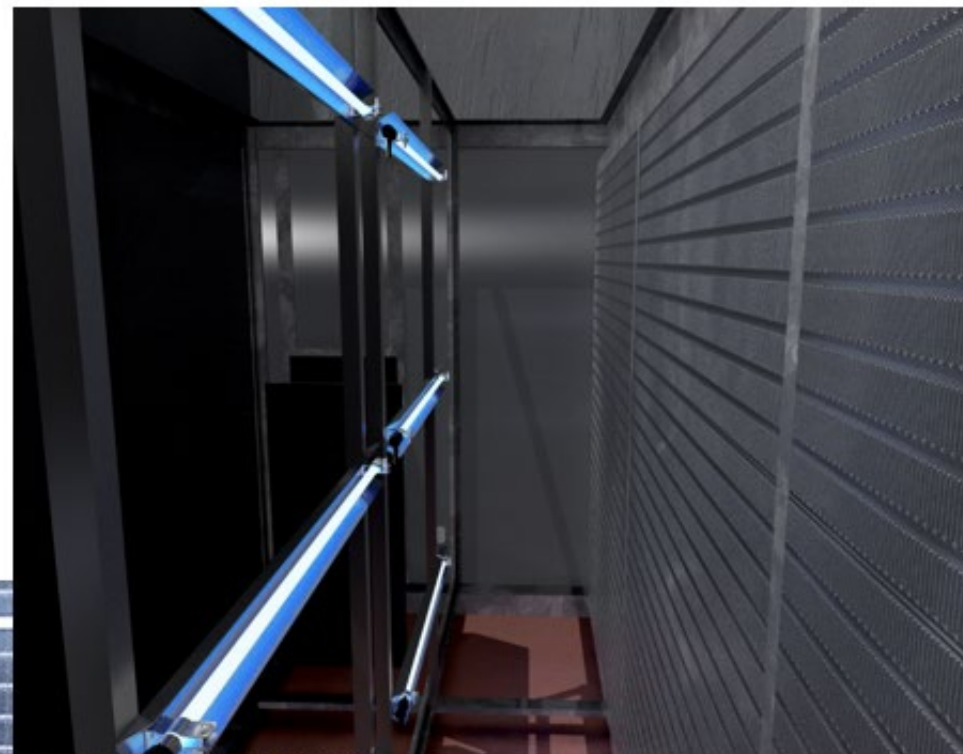
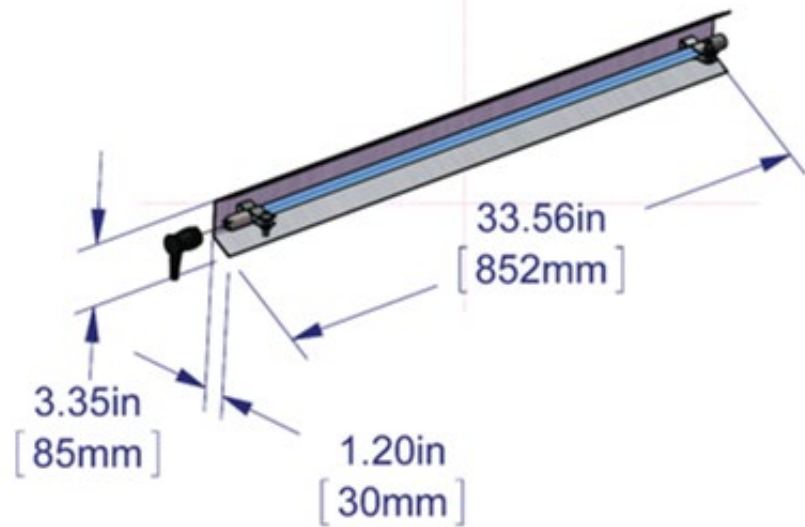
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UV lighting

Mechanical First Cost Can be less than traditional overhead VAV



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COST ANALYSIS OF A 900,000 SF PROPOSED OFFICE BUILDING

UFAD Cost Model

Major Cost Difference Between Overhead Air and Underfloor Air

Base Budget Breakout	Traditional Overhead Air Distribution			Underfloor Air Distribution			Cost Difference	% Difference
	C&S	TI	Total	C&S	TI	Total		
HVAC Piping	\$2,398,874	\$0	\$2,398,874	\$2,555,144	\$0	\$2,555,144	\$156,270	
Sheet Metal	\$4,993,857	\$3,139,176	\$8,133,033	\$1,451,201	\$0	\$1,451,201	(\$6,681,832)	
HVAC Equipment	\$7,313,921	\$1,429,235	\$8,743,156	\$7,048,490	\$2,865,568	\$9,914,058	\$1,170,902	
Raised Access Floor	\$0	\$0	\$0	\$414,879	\$5,360,155	\$5,775,034	\$5,775,034	
HVAC Subcontractors	\$2,607,720	\$1,938,901	\$4,546,621	\$2,532,779	\$232,235	\$2,765,014	(\$1,781,607)	
TOTAL	\$17,314,372	\$6,507,312	\$23,821,684	\$14,002,493	\$8,457,958	\$22,460,451	(\$1,361,233)	-5.7%

Savings/SF

900,000 sft (\$1.51)

COST REDUCTIONS

Sheet metal

Test & Balance

Controls

BIM Coordination

COST ADDS

Piping

Raised Floor

Air Towers

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The Challenge



Finned Tube Radiators

The Solution



SoHo Fan-Powered Terminals



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Floor Coverings



SoHo-w

- 20 Gauge (1mm) galvanized steel trough housing, pre-painted flat black
- Threaded leveling legs for unit height adjustment
- Coils are rated in accordance with AHRI standard 410
- Supply and return water connections located on one end of the trough; custom configurations and dimensions are available
- Hot or chilled water can be passed through based on building / season demands and facility operators control
- IEQ double deflection drain pan extends under entire fin pack and headers (cooling models only)
- Trough interior (including the drain pan) is fully lined with ArmaFlex (style) flexible closed cell insulation, to prevent undesirable condensate formation
- 24VDC variable speed ECM cross-flow fans (sizes and configurations based on trough / heater length)
- Compatible with standard 24VAC Plug & Play or 120V / 208V / 230V / 277V electrical supplies
- Extruded aluminum or Stainless Steel linear grille, rated for nominal 800lbs. (363kg) load strength
- Grilles available in ten (10) standard colors; customized colors and finishes can be provided to match architectural design (specify on order)



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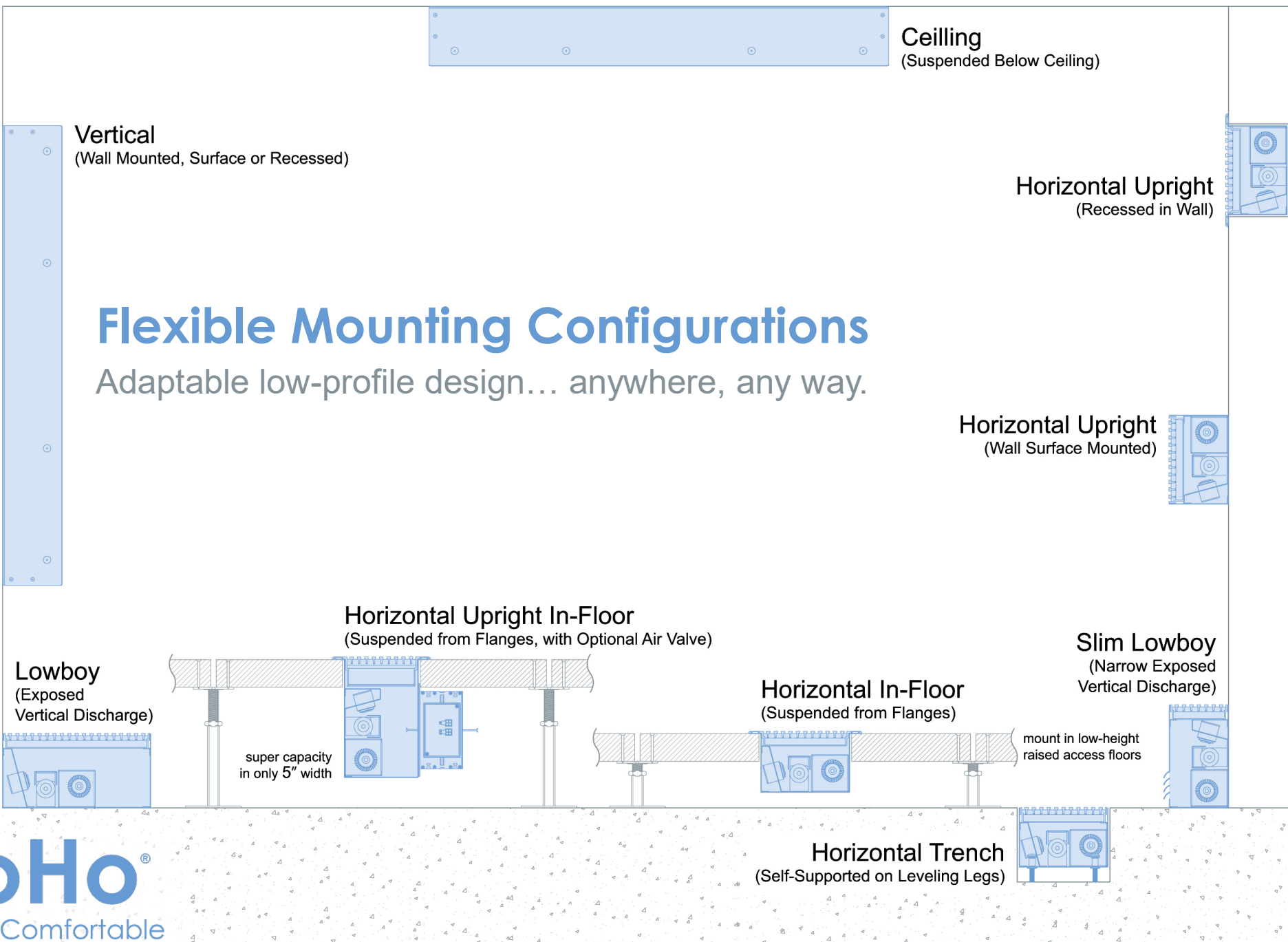
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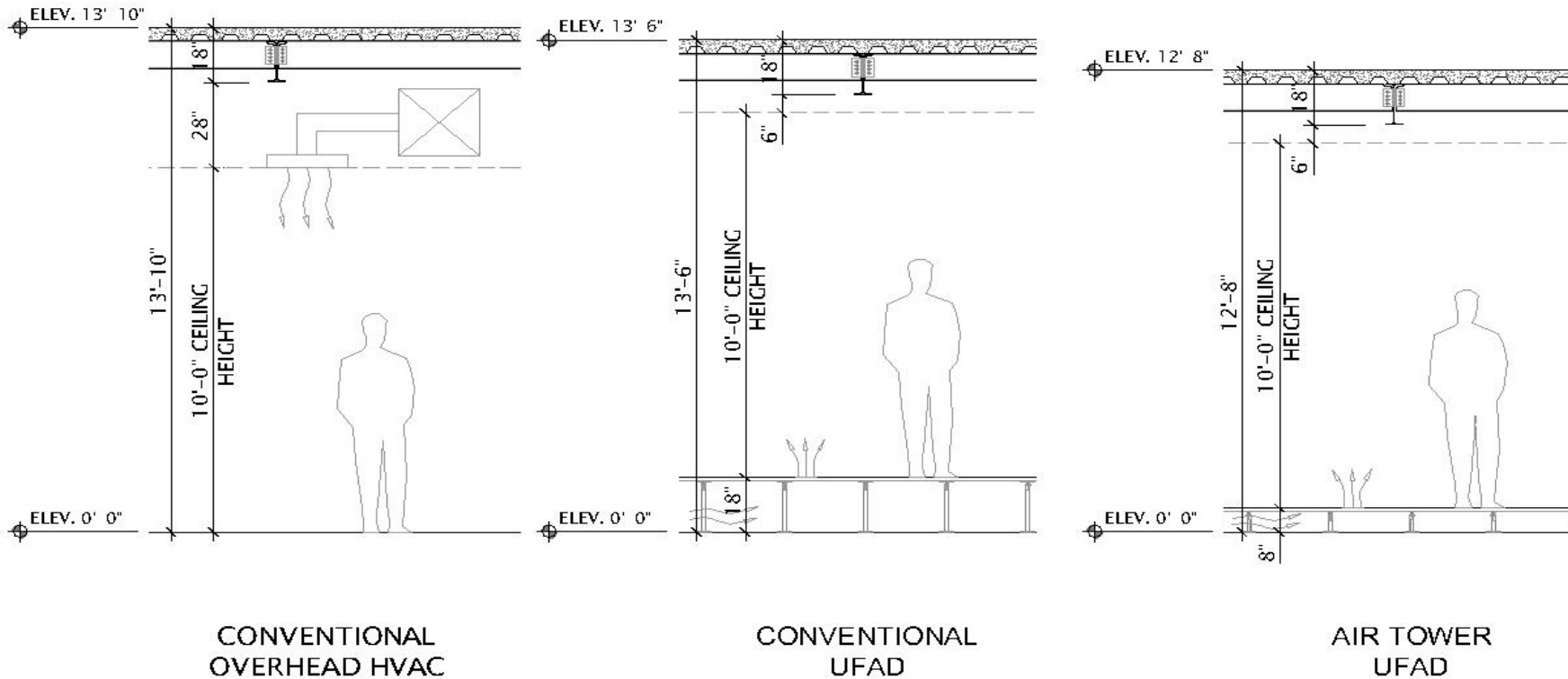


Developer Cost Savings



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FLOOR TO FLOOR HEIGHT REDUCTIONS



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SCALE: 1/4" = 1'-0"



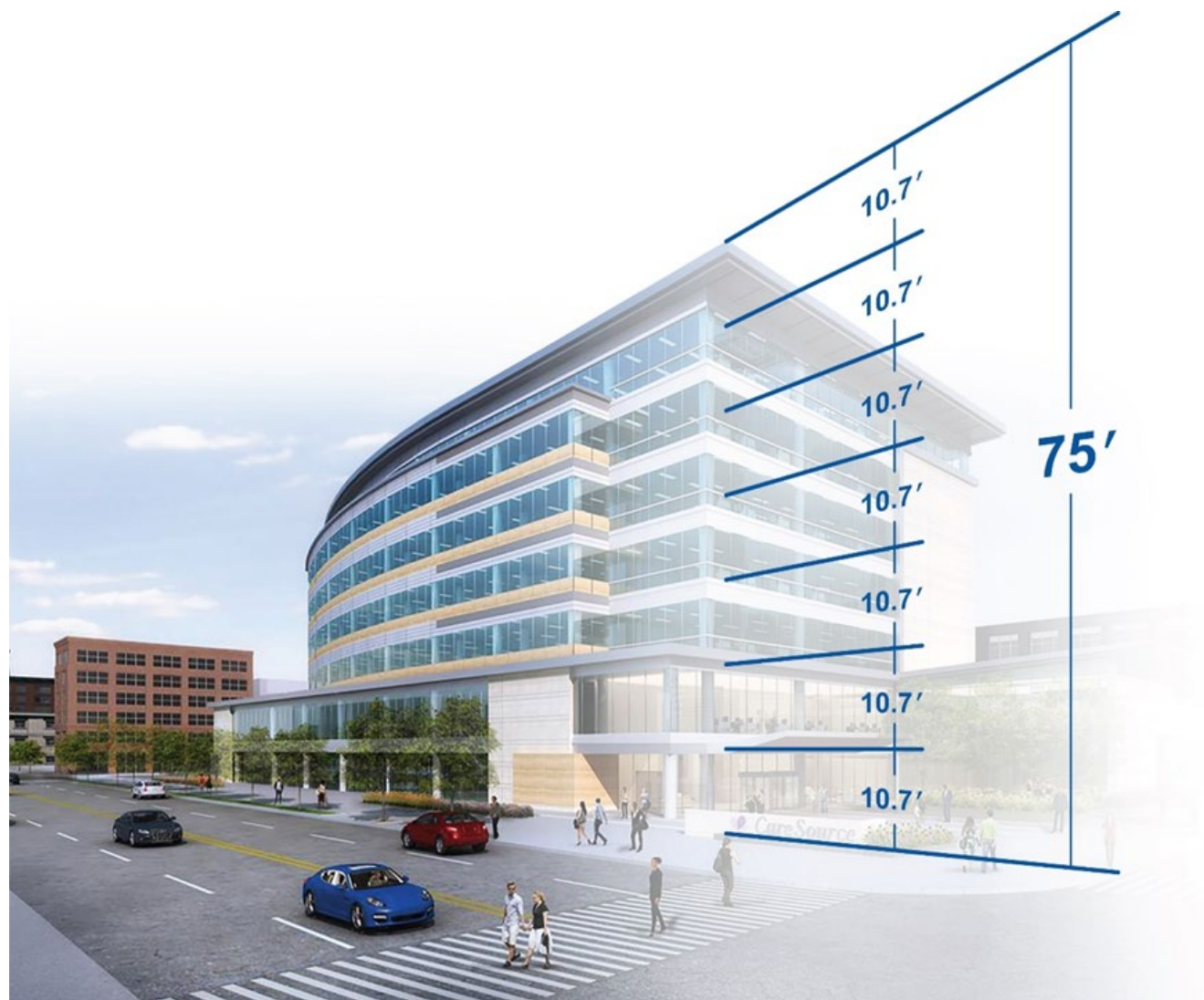
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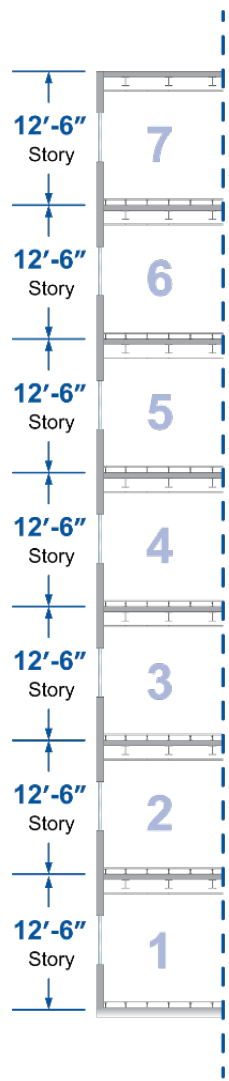
Floor Coverings



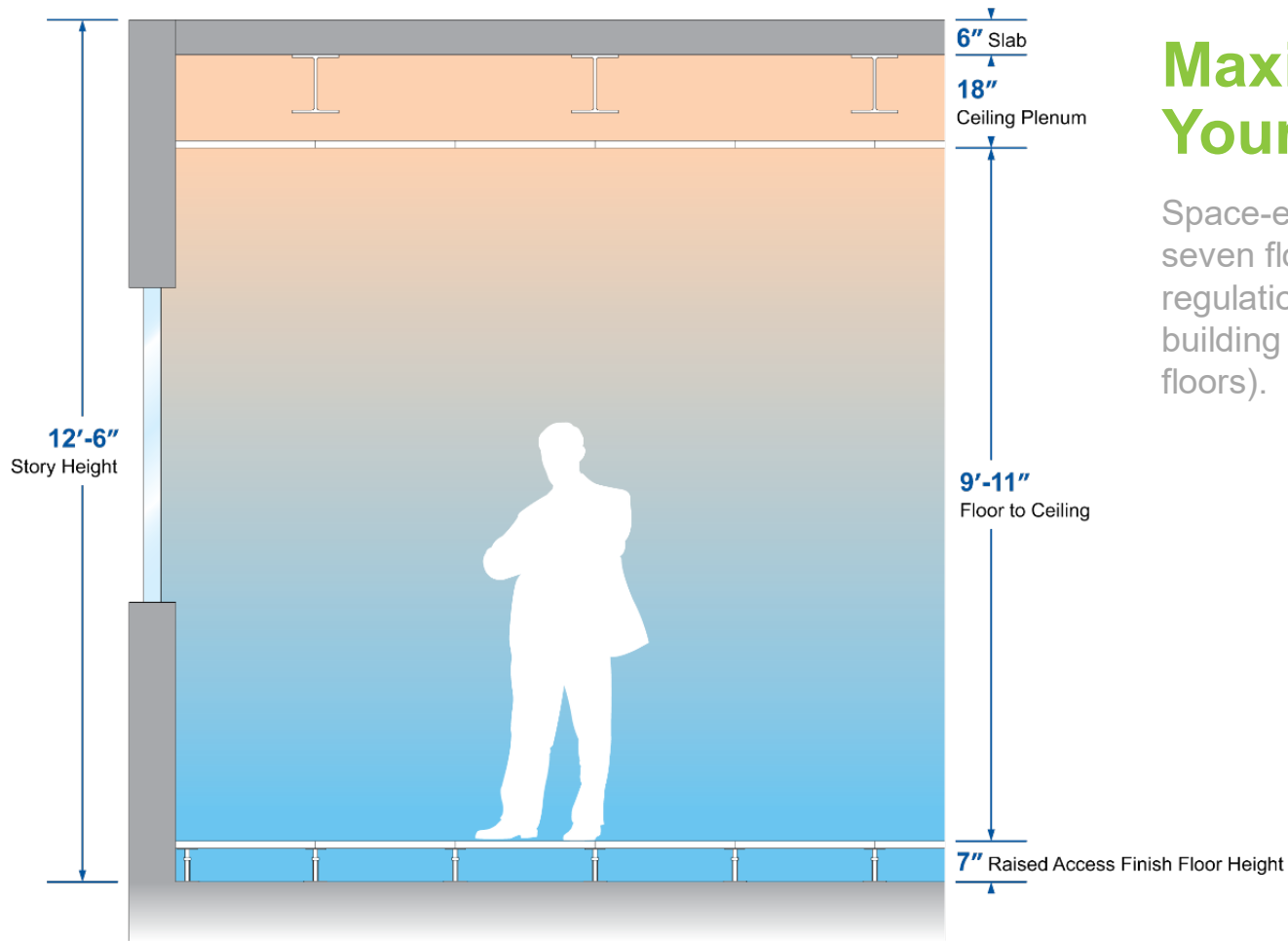
How do you fit
seven stories
into a six-story
space?

(Hint... the answer
is **UFAD!**)

Stay Low-Rise: Turning Six Stories into Seven!



Single Story Detail



Lowest Level of Fire Department Access (Slab on Grade)

Maximize Your Real Estate!

Space-efficient UFAD allows seven floors to fit within the regulation height of a low-rise building (typically limited to six floors).

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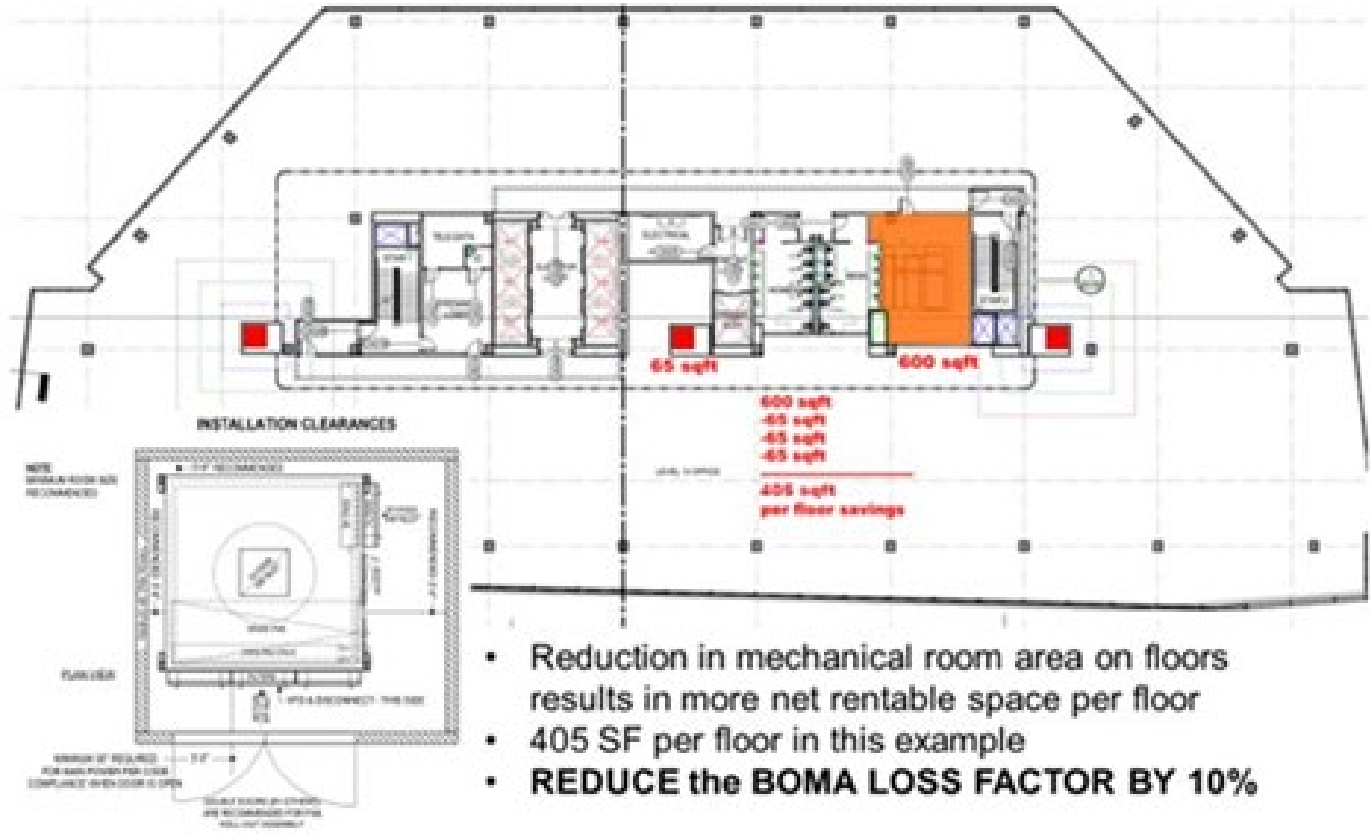
Plug & Play Power

Underfloor Air

Floor Coverings

Stay Low-Rise: Turning Six Stories into Seven!

Increase Rentable Space



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Developer Cost Savings



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COST REDUCTION

12" Reduction in Floor to Floor Building Height:

- Cost PSF of Façade \$125.00

Includes windows, steel, concrete, paint, drywall

10 story, 200,000 SF building, first cost savings can be $\$75,000/\text{Floor} \times 10 = \$750,000$

NET RENTABLE SPACE SAVINGS

- Air Towers can cut in half the mech room required
- Resulting in up to a 10% reduction in the BOMA Loss Factor for a building

For every 150 SF Returned as net rentable for a typical 20,000 SF floor plate, there is an annuity of \$.30 PSF PER YEAR

Building Valuation (Simplified) $I = p * s * h$

Where:

I = revenue from the sale of property

P = the price of 1 sf of useable floor area

S = the useable area of one floor

H = the number of floors

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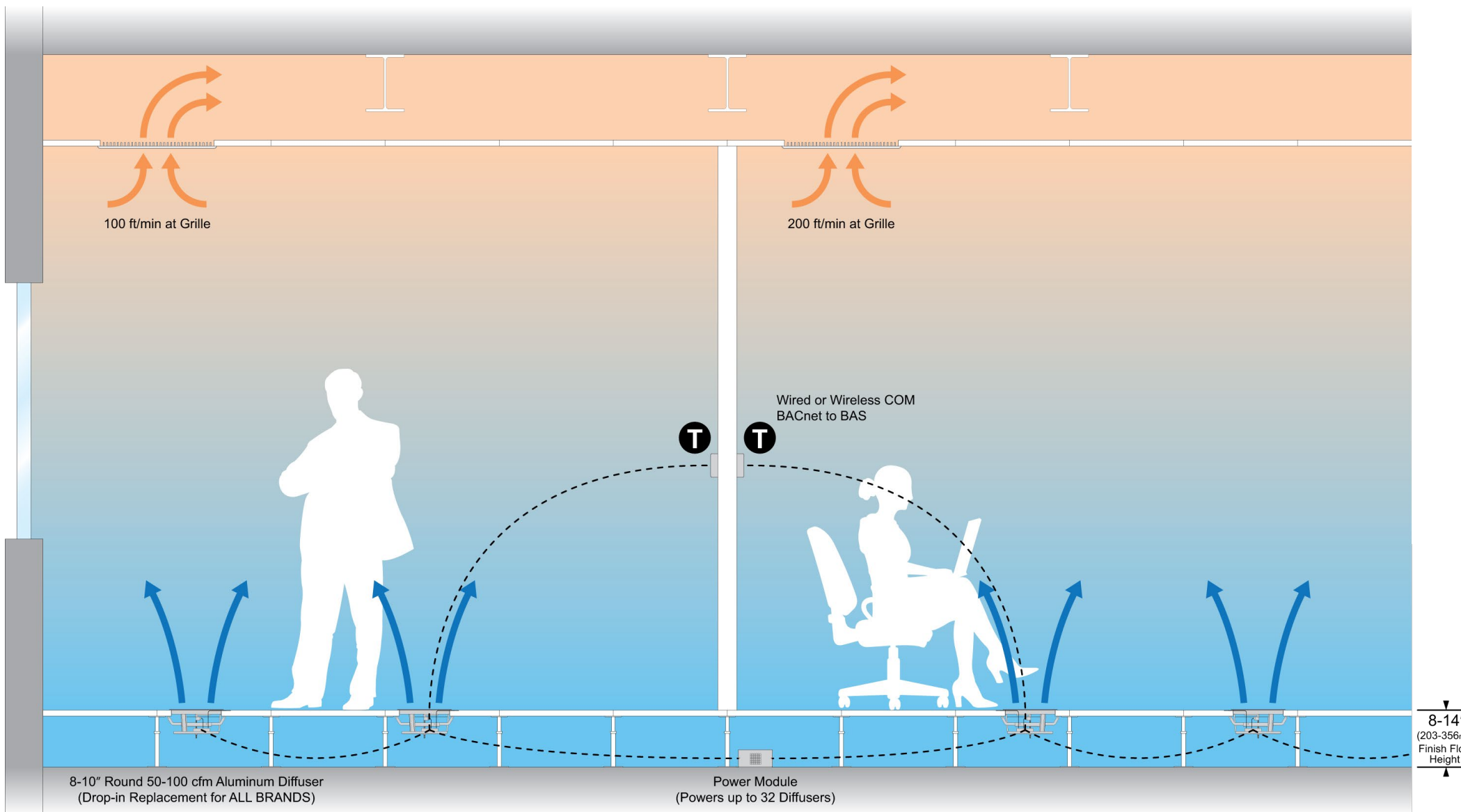
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System 17: Drop-in VAV cooling with wired power and controls.



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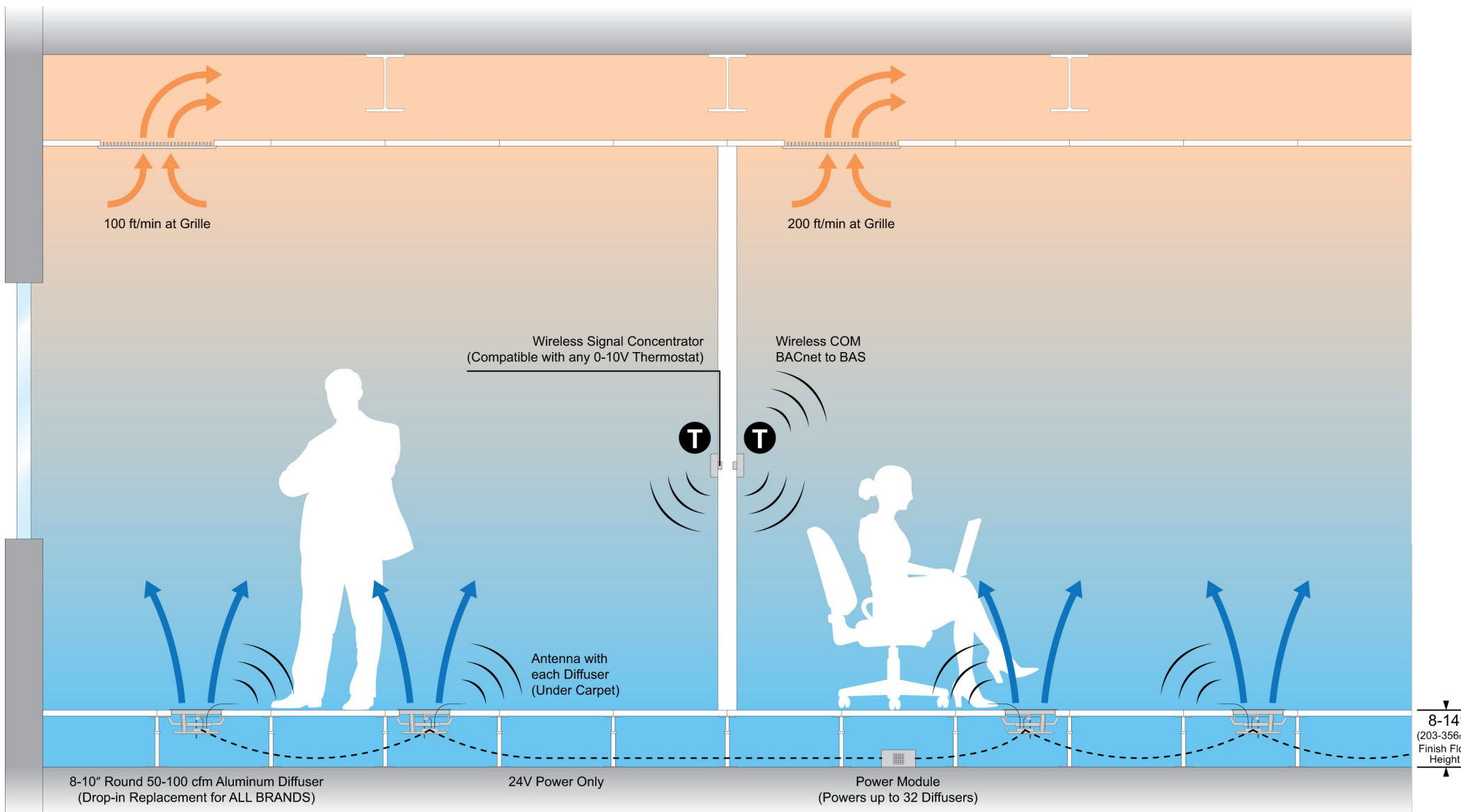
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System 18: Drop-in VAV cooling with wired power / wireless controls.



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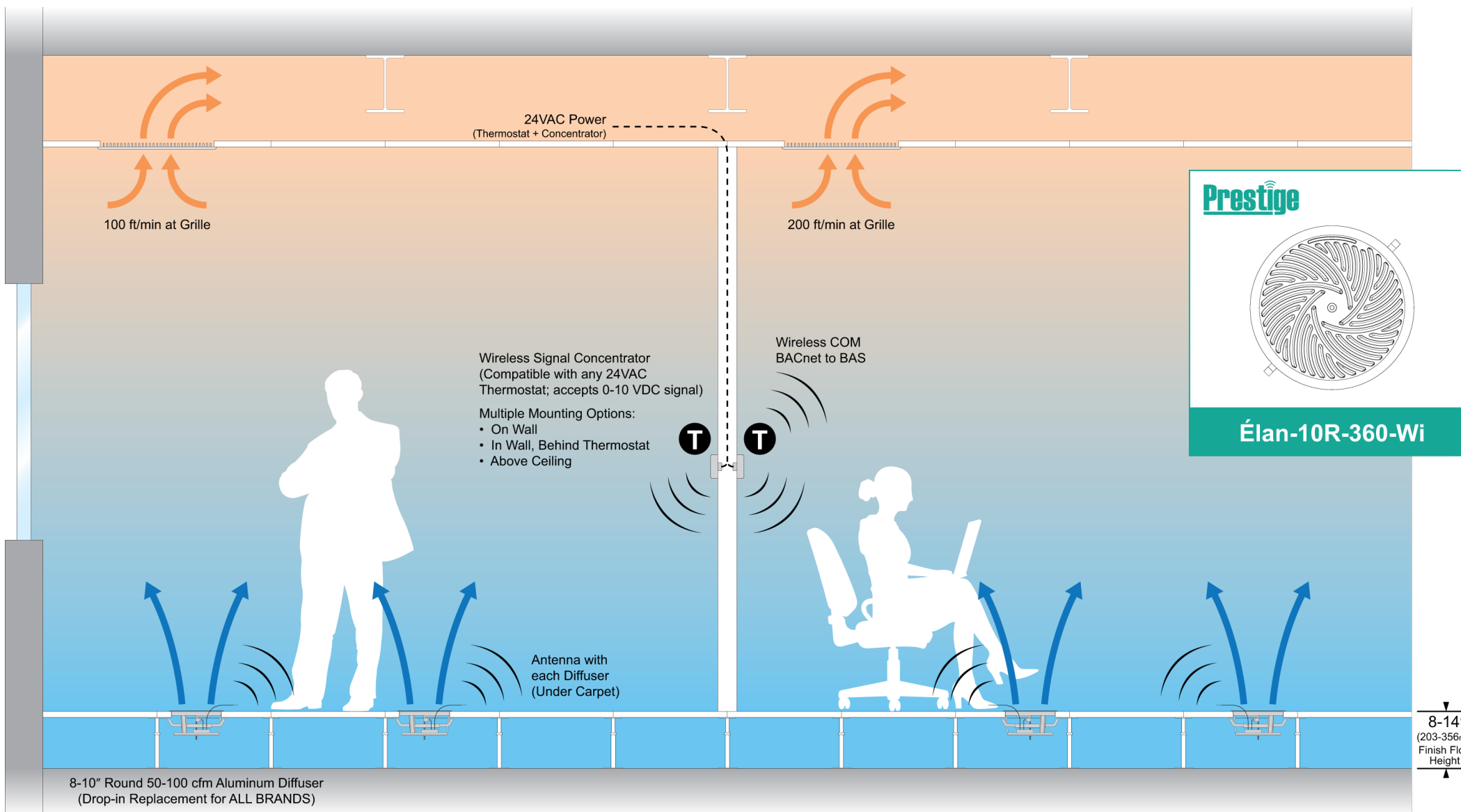
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System 19: Drop-in VAV cooling with fully wireless power and controls.

Completely Wireless!!

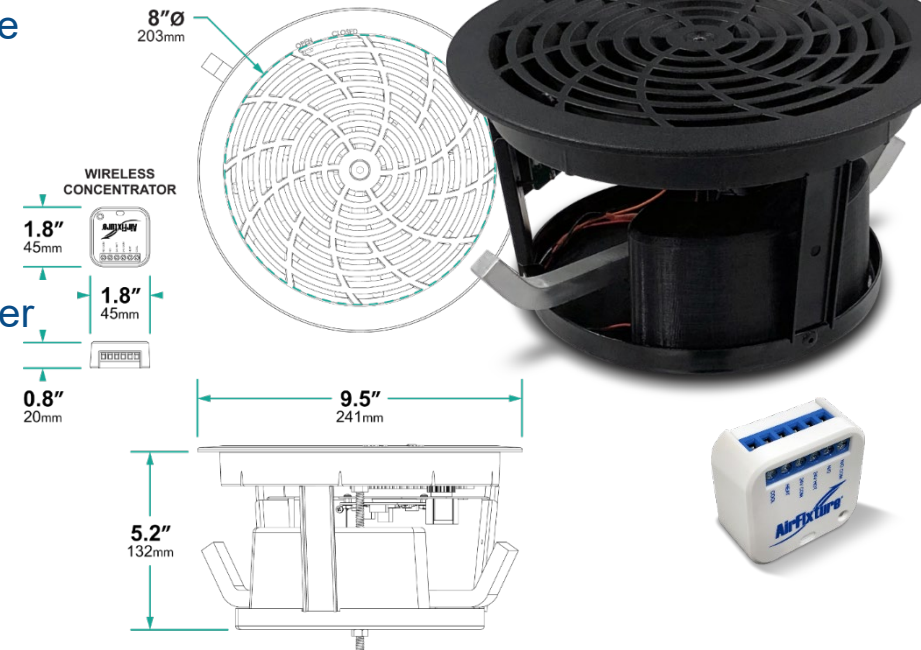


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Prestige Features:

- Thermostat Controlled Motorized Diffuser Plate
- User-Controlled Manual Damper
- Unobstructed Zones of Over 300 feet
- Up to 32 Diffusers per Concentrator
- Projected 10-year Battery Life (Ultra-Low Power Consumption)
- 5 years Parts and Labor Warranty
- Ships Fully Assembled; Quick & Easy Install



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Prestige



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Underfloor Air Distribution Systems Best Practices & Lessons Learned

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Contact us for a 1 hr Lunch and Learn Presentation!