ACCUREX

Dedicated Outdoor Air Systems

Understanding when Dedicated Outdoor Air Systems make sense for foodservice kitchen ventilation projects

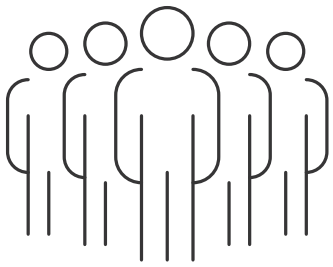
- Open-Kitchen Concepts
- Food Halls
- Small Restaurants
- Fast Food Venues
- Ghost Kitchen Facilities
- Event Venues
- Dining Rooms with High Occupancy

COMFORT IN EVERY CORNER

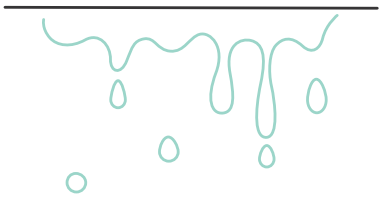
Experience and expertise matter. At Accurex, we engineer commercial kitchen ventilation systems that are tailored to meet your needs and built to stand up to fluctuating kitchen environments. Our industry-leading, energy-efficient Dedicated Outdoor Air Systems (DOAS) are the perfect solution for commercial kitchens that require a higher percentage of outside air, fully conditioned for complete temperature and humidity control inside your kitchen and dining spaces. Our focus is on creating a building that breathes and functions for ultimate comfort so you can focus on what matters – satisfying every guest. Improperly regulated ventilation systems in buildings, such as overly humid environments, can lead to poor building health and serious health hazards for staff and guests. Designing the proper ventilation system for your space can ensure a safe environment for all.

WHY IS COMFORT IMPORTANT?

- Feeling uncomfortable takes the focus of your guests away from the food and the experience.
- According to the EPA, Americans on average spend 90% of their time indoors, and often restaurant staff spend more hours than most inside your building.
- Too much moisture in the air heightens patron discomfort and has the potential for increased viral transmission.†



†ASHRAE Position Document on Infectious Aerosols, 4/14/2020



INDOOR RAIN CHALLENGES

- The potential for a situation called “indoor rain” (caused by large temperature differences between your space and the air you bring in) can lead to duct sweating and leakage from the units.
- ASHRAE studies on human comfort recommend a 70°F dry bulb temperature at 50% relative humidity.

THE ACCUREX SOLUTION

Our DOAS units handle the tempering and dehumidification requirements of both the kitchen and the dining area for 100% conditioned air and complete humidity control, resulting in total comfort for your staff and guests.

ADVANTAGES OF APPLYING ACCUREX DOAS

- Fully conditions air for optimum employee and patron comfort.
- May eliminate the need for a dedicated make-up air unit and some or all rooftop units – saving space on the roof, installation time, and the expense of having multiple units.

IDEAL APPLICATIONS

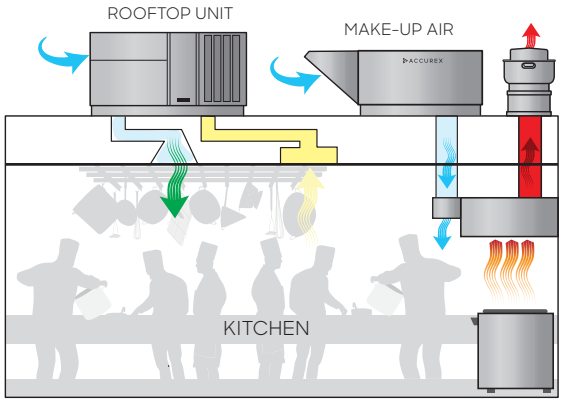
- Open-concept kitchens
- Food halls
- Teaching kitchens
- Open dining rooms with high occupancy
- Convenience stores
- Small restaurants
- Fast food chains
- Event venues
- Larger food halls
- Ghost kitchen facilities

SCENARIO 1:
KITCHEN (SMALL RESTAURANT, FAST FOOD CHAINS)

Traditional restaurant with specific front of house (dining) and back of house (kitchen) operations

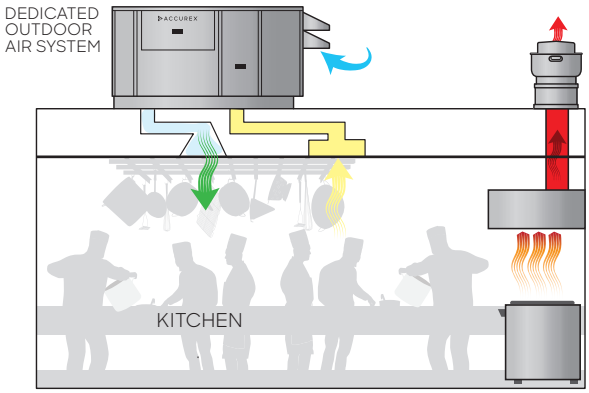
FOCUS: KITCHEN

A TRADITIONAL RESTAURANT DESIGN WITH MAKE-UP AIR AND ROOFTOP UNIT (RTU)



A traditional design utilizes both Make-up Air (MUA) and HVAC Rooftop Units (RTU). MUA is typically used to 'make up' around 80% of air exhausted through the hood. The RTU over the kitchen is used to make up the rest and condition the kitchen space. With RTUs there are limitations on the capacity of outside air they can handle.

A RESTAURANT DESIGN WITH DEDICATED OUTDOOR AIR UNIT



A DOAS unit can combine the functions of a make-up air unit and RTU in the kitchen, potentially allowing you to replace the need for both with a single unit. A DOAS unit also removes moisture before entering the kitchen, versus trying to control it after.

ADVANTAGES

MUA & RTUs	DOAS
· Dedicated units for two different functions	· Single curb/roof penetration · Single run of power · Reduced footprint on roof · Full temperature AND humidity control · Single unit crane lift to roof · Single control sequence integral to DOAS

CONTROL OF DOAS

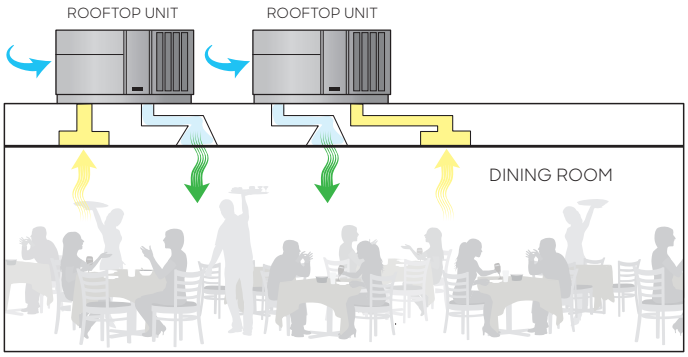
The DOAS is set up for either partial recirculation or 100% outside air, both of which can provide tempering in unoccupied mode with recirculated air. For partial recirculation, the supply fan runs at a constant speed, while the outside air/recirculation damper modulates based on the kitchen hood operation. If configured as 100% outside air, the supply fan modulates based on kitchen hood operation.

SCENARIO 2:
HIGH OCCUPANCY DINING (LARGE RESTAURANT, EVENT VENUES)

Venue without a distinct front of house and back of house operation, with cooking happening near customers.

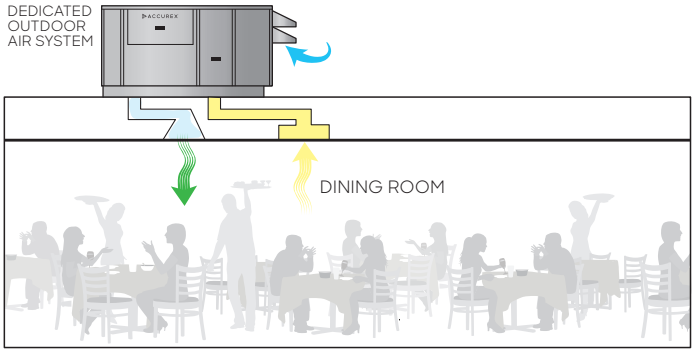
FOCUS: DINING

DINING ROOM WITH MULTIPLE ROOFTOP UNITS



A traditional design utilizes HVAC Rooftop Units (RTU). A dining space requires a certain amount of ventilation to temper the space, as well as a certain amount of outside air based on size and occupancy. Due to the limitations on outside air capacity on RTUs, multiple units are typically required. This often results in oversupplying, requiring more diffusers and ductwork.

DINING ROOM WITH SINGLE DOAS UNIT



Since a DOAS unit is designed for high percentages of outside air, you can typically reduce the number of installed units as well as design the unit to supply the exact amount of air necessary to meet code and desired space conditions. This reduces the number of units, ductwork, and diffusers required.

ADVANTAGES

MULTIPLE RTUs	DOAS
· Dedicated units for zone control	· Single curb/roof penetration · Single run of power · Single unit crane lift to roof · Reduced footprint on roof · Full temperature and humidity control · Single control sequence integral to DOAS

CONTROL OF DOAS

The DOAS is set up for partial recirculation, where the supply fan runs at a constant speed, while the outside air/recirculation damper modulates based on building pressure. When the DOAS supplying the dining space isn't required to make-up the kitchen hood exhaust, Single Zone or Multiple Zone VAV (duct pressure) control is available. Each of these options will provide tempering in unoccupied mode with recirculated air.

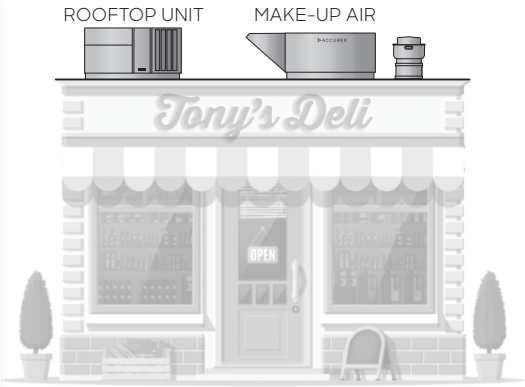
SCENARIO 3:
SINGLE SPACE (SMALL FOOTPRINT, OPEN CONCEPT)

Venue without a distinct front-of-house and back-of-house operation, cooking near customers

FOCUS: BUILDING

- Convenience stores
- Small restaurants
- Fast food chains
- Open-kitchen concepts
- Food halls
- Teaching kitchens
- Open dining rooms with high occupancy

BUILDING WITH MULTIPLE SUPPLY UNITS



With the limited tempering capacity of a rooftop unit, the effect of minimally tempered, high-percentage outdoor air from the MUA may dominate the space. Without adequate temperature and humidity control, a small space gets uncomfortable fast and display cases quickly fog up.

BUILDING WITH SINGLE DOAS UNIT

By replacing the multiple units with a single DOAS unit, you can ensure precise temperature control throughout the space and still make up the high amount of outside air required from the kitchen hood.

ADVANTAGES

MUA & RTUs	DOAS
· Dedicated units for two different functions	· Full temperature and humidity control · Reduced footprint on roof · Single curb/roof penetration · Single run of power · Single unit crane lift to roof · Single control sequence integral to DOAS

CONTROL OF DOAS

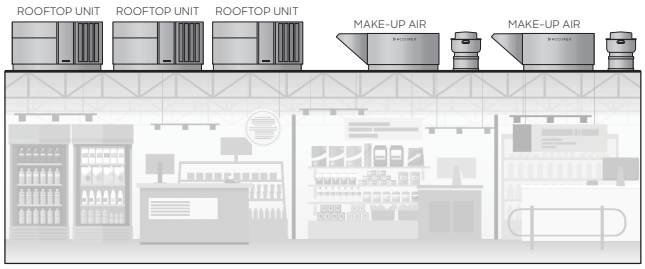
The DOAS is set up for partial recirculation, where the supply fan runs at a constant speed, while the outside air/recirculation damper modulates based on the kitchen hood operation or building pressure. This will provide tempering in unoccupied mode with recirculated air.

SCENARIO 4:
HIGH VOLUME OPERATION (FOOD HALLS, GHOST KITCHEN FACILITIES)

Venue with large or multiple kitchen operations

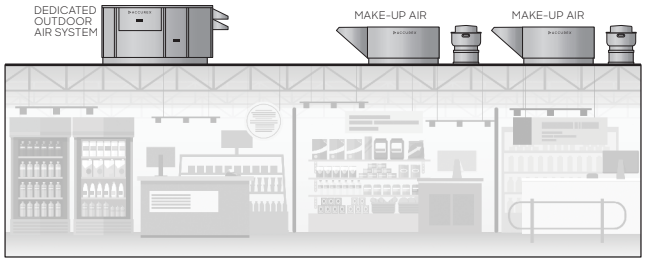
FOCUS: BUILDING

BUILDING WITH MULTIPLE MUA AND MULTIPLE RTUS



With many hoods in operation exhausting large amounts of air, many RTUs would be necessary to meet code requirements for outside air and keep the space comfortable and safe. More RTUs mean more roof penetrations, higher installation costs, and more complicated control scenarios.

BUILDING WITH MULTIPLE MUA AND DOAS



You can simplify the space by replacing multiple RTUs with fewer DOAS units, simplifying controls and reducing installation costs.

ADVANTAGES

MULTIPLE RTUs	DOAS
	· Full temperature and humidity control · Reduced footprint on roof · Fewer curb/roof penetrations · Fewer runs of power · Fewer units crane lift to roof · Fewer control sequences integral to DOAS

CONTROL OF DOAS

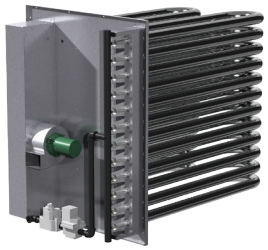
The DOAS is set up for partial recirculation, where the supply fan runs at a constant speed, while the outside air/recirculation damper modulates based on building pressure. When the DOAS supplying the dining space isn't required to make-up the kitchen hood exhaust, Multiple Zone VAV (duct pressure) control is also available. Either option will provide tempering in unoccupied mode with recirculated air.

VARIABLE VOLUME TEMPERATURE CONTROL

Accurex DOAS allows for variable volume control for additional operational and energy efficiencies, saving money and energy with industry-leading turndown capabilities.

By utilizing high turndown furnaces for heating and digital or inverter scrolls for cooling, Accurex DOAS units provide consistent temperature throughout the space to avoid large swings that can lead to discomfort.

HEATING
HIGH TURNDOWN FURNACE



Industry-leading technology for the tubular-style heat exchanger delivers:

- Up to 16:1 furnace turndown for precise temperature control
- Less cycling during part-load conditions
- Commissioning sequence for easy start up

COMPARE THE DIFFERENCE OF OUTSIDE AIR TEMPERATURE FLUCTUATION

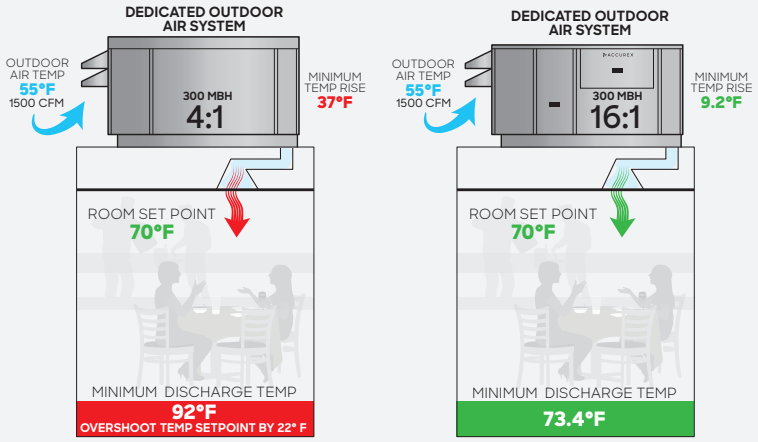
With indirect gas, a 4:1 turndown means that at least 25% of the heat that the furnace is designed to generate will be added to the space anytime there is a call for heat. A high turndown furnace allows heat to be added at smaller quantities, reducing your risk of adding too much heat to the space or continuous cycling of the furnace.

Applications that require higher furnace turndown:

Variable Volume - where the amount of air is significantly reduced from the design airflow at any given time.

Part-Load Conditions - the outside air temperature still requires heat, but isn't as cold as the winter temperatures the unit was designed around.

DOAS UNITS WITH VARIABLE SUPPLY FAN CONTROL, RUNNING AT 50% OF DESIGN AIRFLOW



COOLING
INVERTER COMPRESSOR

Available from 5 to 70 tons and features:

- Improved part-load efficiency
- Integrated Energy Efficiency Ratio (IEER) up to 22.1 with an average improvement over a digital scroll compressor of 15 to 20%
- Reduced sound levels
- Precise temperature and humidity control

For more information on applying the DOAS product offering, click to view our **Product Brochure or visit Accurex.com**

ACCUREX

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