



A Healthy Buildings Guide to re-open restaurants: Restarting HVAC systems post COVID-19 shutdowns.

A comprehensive checklist by EcoEnergy Insights.

In recent months, most quick service and full service restaurants have been closed in line with efforts to combat the pandemic. This has made it imperative for the restaurant operators to ensure that their HVAC equipment are maintained properly during the closures and are ready for occupancy when they reopen. The restaurants need to be cleaned effectively during the closure period to reduce risk upon reopening.

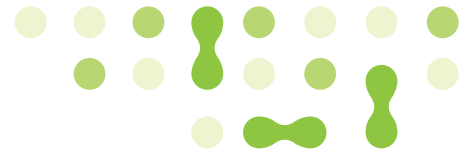
Based on industry best practices for maintaining and operating HVAC equipment, including recommendations and guidelines from American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) for HVAC systems in the time of the COVID-19 pandemic and beyond, the following 'to do' list was created for restaurant operators as they prepare to reopen their restaurants for business.

Purge

Equipment health checks

Prepare for start up

Run 'Normal' operations



Step 1: Purge

"Purging" involves removing contaminants inside the confined space by displacement with outside air to achieve acceptable contaminant levels relative to atmospheric levels. One of the best ways to achieve this is through "ventilation", which is the intentional introduction of outdoor air into a confined space by mechanical means to control indoor air quality.

Altered occupancy patterns during lockdown affect building heat load and indoor relative humidity levels, which can lead to conditions favoring mold growth. To prevent such situations, the building should be purged of stale air. At least one purge cycle is recommended after a complete shutdown.

Here is the list of actions we recommend:

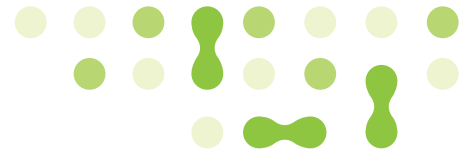
1. Ventilate the building floors utilizing maximum outdoor air, preferably during night hours or in the early morning hours.
2. This purge operation is to be done once during a shutdown, for approximately 6 hours in aggregate. Ventilation should be carried out after checking outdoor air humidity condition from weather forecasting website, to ensure that the operation is not carried out during outdoor conditions with high humidity i.e. greater than 70% RH.
3. The following steps can be followed:
 - a) Create a Purge schedule for the purge period (preferably starting from 12 am) in the controller for the direct expansion air conditioning (DX) system.
 - b) Ensure the fresh air intake operation by 'Firing Up' all the Treated Fresh Air units (TFA), fresh air and exhaust fans in the restaurant. Compressor operation of DX units will cool down the outdoor air.

Step 2: Conduct cyclic equipment health checks

In order to ensure that HVAC equipment are in a proper working condition, their performance should be periodically reviewed till the time of reopening of the restaurant. Equipment health can be periodically checked by operating them in conditions similar to full load environment.

Here is the list of actions we recommend:

1. Each DX unit should be exercised for approximately 45 minutes every 2 weeks during the period of the restaurant shutdown.
2. As turning ON all DX unit at the same time could lead to spike in Demand, DX units can be operated area-wise. We recommend splitting a space into Service Consumption Areas (SCA) and focusing on each SCA separately.
3. An example Health Check of DX units based on SCAs involves the following steps:
 - a. Set the DX unit to 'ON' Mode. Run the DX units on 'ON' Mode for 45 minutes.
 - b. Let the Group of DX units run based on SCAs in the above condition for 45 minutes.
 - c. After 45 minutes, check whether the zone temperature has met the desired restaurant temperature policy. If zone air temperature meets the desired level, conclude the exercise for the SCA by releasing all overrides and reverting the DX units back to normal condition.
4. After the health check condition reaches the steady state for a particular SCA, start the process on the remaining DX units (Hi-wall split unit, Ducted unit), one SCA at a time.



Step 3: Prepare for start up

A day before the scheduled opening of the restaurant or before pre-opening activities such as cleaning, the HVAC equipment should be operated in “occupied mode” for 12 hours. This will help the equipment purge any accumulated contamination so that the indoor environment is prepared for returning occupants.

Here is the list of actions we recommend:

1. Update schedules to the normal / adjusted site occupied hours.
2. If supported by the energy management system, update batch programs for planned schedules.

Step 4: Run ‘Normal’ operations

Following the startup preparation, the modes/schedules of HVAC equipment are to be returned to normal occupancy schedules. Restaurant operators should prioritize providing maximum outdoor air ventilation and maintaining the sensors and fresh air systems accordingly.

Here is the list of actions we recommend:

1. Update schedules to the normal / adjusted site occupied hours.
2. If supported by the energy management system, update batch programs for planned schedules.



Write to us at info.ecoenergy@carrier.com for more on restarting your restaurants.

About EcoEnergy Insights

EcoEnergy Insights is a leading provider of AI and IoT-enabled solutions to digitally transform building and equipment operations. Their CORTIX™ platform collects data from multiple sources, analyzes it, acts on defined deviations autonomously and offers predictive actionable insights. The platform, combined with expert human analytics, has been delivering award-winning outcomes in comfort, maintenance and energy efficiency across multiple industries such as retail, hospitality and banking. EcoEnergy Insights is a part of Carrier Global Corporation, a leading provider of innovative HVAC, refrigeration, fire, security and building automation technologies. For more information on EcoEnergy Insights and the CORTIX™ platform, visit www.ecoenergyinsights.com and www.cortix.ai.



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