NATIONAL TAB
INTELLIGENCE

1329 E Kemper Rd
Suite 4210
Cincinnati, OH 45246
[855] 682 6822

TECHNICAL SUMMARY

The purpose of this visit was to balance two new exhaust hoods installed at the store, as well as perform a total flow air balance and evaluation to seek out any opportunity to improve the comfort and performance of the HVAC system.

HOOD EXHAUST & ASSOCIATED FANS

Both the Griddle exhaust hood (HD-1) and the Fryer exhaust Hood (HD-2) are exhausting their design airflow of 1500 cfm. Their respective fans, PRV-2 (griddle) and PRV-3 (fryer), are misaligned on their curbs. It appears this misalignment is due to the original installation of the grease duct; the duct is not centered. As result, the hood exhaust fans had to be set at much higher than typical setpoints to achieve design airflow. This is causing unnecessary energy usage and strain on the exhaust fans. Recommend the fans are properly aligned with the duct. Once corrected, we anticipate the exhaust rates of both hoods to significantly increase. The PRV setpoints will need to be lowered and hoods rebalanced.

ROOF TOP UNITS (RTUs)

Two Lennox RTUs serve this Culvers location. A 12.5-ton unit serves the Dining space (RTU-1), and a 15-ton unit serves the Kitchen space (RTU-2). Both units have humidity control. Their sensors are wired, and dehumidification appears to be operating. RTU-1 was operating dehumidification during TAB. Both units are controlled via thermostat and are wired for occupancy, operating on a schedule. The occupancy scheduling is important to maintain building pressurization. When the hoods are powered on, both units need to be operating in occupied mode. This means their fans are running and outside air dampers are opening to their setpoints. In this system, the RTUs replace the air exhausted by the PRVs to “make-up” the difference and maintain building pressurization. A positively pressurized restaurant is important to keep out contaminants, force out smoke and odors, and prevent untreated, unwanted, or humid air from entering the space.

Upon arrival to this location, initial building pressure was measured around -0.029” W.C. which is outside of the standard tolerance of -0.02” to +0.02” W.C.. We measured the airflow of both RTUs to see what changes could be made to improve the building pressurization. For performance and efficiency, RTUs should operate at or around 350 Cubic Feet per Minute (CFM) of supply airflow.

RTU-1:

The dining room unit was measured to be supplying 4,427 cfm, or 354 cfm/ton. This is within design and no adjustments were made to the unit’s fan speed. The outside air was initially measured at 957 cfm. Because the unit has humidity control, we increased the outside air to an acceptable ratio to help bring the building closer to a positive state. The unit needs some maintenance as outlined in the Report below. According to staff, this unit maintains temperature in the dining room during hot weather. It

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appears the unit also has Fresh Air Tempering as an installed option. Recommend this is enabled to prevent cold air from being driven into the space when unit operates in fan only during winter season.

RTU-2:

The Kitchen unit is supplying 3,503 cfm or 234 cfm/ton. 589 cfm of that 3,503cfm, is routed to the serving line diffusers, out of the kitchen. These diffusers are typically served by the dining room unit. Staff notes that it becomes hot in the kitchen, especially on the cookline, and during the current heatwave the kitchen is only able to maintain 80 degrees.

The unit is significantly low on airflow, operating at 66% of the airflow it should be providing. The unit could not be sped up during our visit because the motor sheave is locked and frozen in place, unable to be adjusted. There does not appear to be much adjustment left on the pulley, maybe 1 turn, and a pulley change is recommended to bring RTU-2 closer to an efficient airflow. The unit is mounted on a curb adapter, this could be inhibiting airflow, we often find these to be restrictive. The blower wheel was found to be very dirty, and cleaning this effectively will increase airflow.

If airflow on RTU-2 is substantially increased, we recommend some changes to the cookline area to help improve the distribution of air, improve comfort, and prevent any hood capture issues. Currently, there are three 4-way diffusers installed on the cookline. If airflow is increased to these diffusers, they will likely cause hood capture issues. We recommend these 4-ways are switched to perforated style, and three additional perforated diffusers, if possible, are installed on the cookline. This will allow more air to be distributed, and not be disruptive to hood capture. Note that the diffuser serving the office was found disconnected from the system with its flex laying in the ceiling.

Outside air on this unit was initially measured at 989 cfm. We increased this slightly to 1217 cfm, an acceptable ratio for a humiditrol RTU. If the airflow on this unit is increased, we will be able to slightly lower the ratio of outside air to supply air, while still increasing the total make-up air and bringing the building positive.

CONCLUSION

As a result of these changes, the building is now operating at around -0.006” W.C., which is within standard tolerance and a much-improved state. Further recommendations and issues are listed through the Report below. By increasing the total airflow on RTU-2 with the recommended changes, as well as addressing the other noted issues in the report, the building should become a much more comfortable, controlled, and positively pressurized environment. Recommend consulting National Tab if changes are made.

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