

Summary

The purpose of the visit to the Psycho Bunny in Clearfork Mall was to evaluate comfort problems in the space.

The entire space is served by a 5 ton water source heat pump (WSHP). Initial airflow was taken via traverse of the main duct in the back room and by reading the supply diffuser in the back restroom. This total came out to be 1,473 cfm. Ideally airflow should be 2000 CFM so the measured airflow is low.

All diffusers will also be measured via flow hood. It was noticed that multiple diffusers in the sales floor area were lower than the others. The dampers are above the hard ceiling and not accessible for adjustment. One damper closest to the front door was visible and it appeared to be partially closed. The other diffusers in the space that were low on flow could be closed, but they were not visible to confirm.

Inside the WSHP there is an LED screen which indicates the motor speed the unit is running at. It constantly showed 70% even though the setpoint was 100%. Even during cooling mode the fan speed would not change. Contacted Trane to try and get technical support but they would not offer it. They sent an online form to fill out, but the unit does not fit the qualification for online tech support and a Trane technician will need to be dispatched to the site to resolve. Something is keeping the unit from ramping up to 100% and it needs to be fixed to improve airflow. By fan law the airflow would be 2104 CFM once sped up.

The WSHP condenser water is served from a building loop. There is no balancing valve provided so the flow could not be measured. There is an actuated temperature control valve installed that appears to be wired to the building BMS. The typical sequence of operation for these valves is that they open during a call for heating/cooling and close when there is no demand. However, it was noted that the valve did not open at all even during a call for cooling. It is possible there is a special sequence of operation provided by the building BMS but the Clearfork engineer on duty was unable to confirm this. The unit is discharging cold air (47 degrees).

Next Steps / Recommendations

1. A Trane technician needs to be dispatched to resolve the fan speed issue with the unit. The airflow is 1473 CFM (74% low) and is stuck at 70% even though the speed controller is set to 100%. By fan law calculation the airflow will be 2104 CFM when sped up which is within tolerance of the target airflow of 2000 CFM. This is the most critical issue that must be addressed.
2. The temperature control valve was not opening during a call for cooling although the unit was discharging cold air. The building engineer needs to confirm the sequence of operation and that the valve is operating properly. If not it needs to be repaired.
3. Once issues 1 and 2 are addressed, if there remains a comfort problem, recommend closing dampers for diffusers 1, 2, and 3 about halfway to push more air to the front of the house. Did not want to make this adjustment on site since with the low total flow, this could make the comfort issue worse.
4. Only necessary if items 1, 2, and 3 do not resolve the comfort problem. But need to ensure that all dampers in the sales floor are 100% open. They are above the hard ceiling and not accessible.