

Summary

Background

The purpose of the visit to Mi Cocina was to address complaints of cooling issues during the summer of 2022. The restaurant is existing and was taken over and remodeled by Mi Cocina around 1-1/2 years ago. A TAB had never been completed. Since last summer, the owner had some non-functioning units serviced along with fixing some kinked ductwork. Scope of work is to perform a TAB on the equipment and evaluate systems in regard to the cooling issues.

On Site Findings

The building has many glass windows around the exterior and the kitchen is centered in the middle of the space. There is a smaller, separate building that was excluded from the scope. There is a radiant cooling/heating geothermal system that we identified during a plan review. The client said the system was not working but they were getting a contractor to repair it. Testing the radiant cooling system was excluded from the scope but during the TAB visit the client confirmed that the system was repaired and now operational.

The technician gathered initial airflow readings to get a baseline on the HVAC systems. See Table 1 below.

Unit	Area served	Design Airflow	Actual Airflow	% to design	Notes
AHU-1	Dining/Bar	3900	2241	57%	(1), (2)
AHU-2	Dining	3600	1943	54%	(1), (2)
AHU-3	Kitchen	4000	3982	99%	
MUA-1	Hoods	7400	7120	96%	
OAU-1	OA for AHU's	6000	1423	23%	
EF-1	Hood 2	-1700	-684	40%	(3)
EF-2	Hood 4	-2650	-2520	95%	
EF-3	Hood 3	-2650	-2307	87%	
EF-4	Hood 1	-1750	-1742	99%	
EF-5	Dish Hood	-375	0		(3)
EF-6	Restrooms	-300	-281	94%	
Net Airflow		+3975	+1009		
Pressure		+0.008" (slightly positive)			

Table 1. Initial Airflow measurements

Notes:

- 1) Ductwork is kinked causing reduced supply airflow.
- 2) Outside air to the AHU is higher than the supply causing the outside air to spill out of the return.
- 3) Rotation is backwards

The outside air dampers for AHU-1 and 2 were found cracked open. These were open and then the outside air for the OAU was balanced to design. No other improvements to airflow were possible on the items above due to mechanical issues with the systems.

Temperatures were measured for all systems during full cooling and all seemed to be cooling appropriately. It was a cool day outside so further temperature tests are recommended after repairs are complete and once it is closer to a design summer day outside.

Unit/Area	Temperature
AHU-1 - Bar	54.4 F / 79.1% RH
AHU-2 - Dining	58.9 F / 71.7% RH
AHU-3 - Kitchen	56.9 F / 56.0% RH
Outside	47.4 F / 80.4% RH
Ceiling Plenum	65.1 F / 66.1%

Table 2. Temperature measurements during full cooling

The systems were also inspected for mechanical and maintenance issues and the significant findings are listed in the section below.

Final Recommendations / Findings

1. **High Priority** – EF-5 serving the dish hood is rotating backwards. Needs to be fixed. It's a single phase fan so usually requires opening up the motor and switching internal leads. The low airflow on this fan will result in additional latent heat (moisture) being released into the building.
2. **High Priority** – EF-1 serving hood 2 is also rotating backwards. The low airflow on this fan will cause heat from the kitchen equipment to spill out into the space. This is 3 phase fan and can be fixed by flipping two of the phases of electricity. Usually we will do this but the insulation is worn on the wires and he did not feel it was safe to do this and could possibly short a wire. Recommend fixing wire and correcting the rotation.
3. **High Priority** - The condensing units for the AHU's are very dirty and the fins are damaged/degrading. They need to be cleaned to maximize the cooling capacity but probably also need to be replaced. There is also a leak in one of the condensers that Gene with Mi Cocina is looking for.
4. **High Priority** - AHU-1 and AHU-2 airflow are very low. There are high supply side static pressures on both units indicating the pressure is on that side of the system. The linear diffusers for these units have restricted ductwork and appear to be the major cause (see picture in issue pages). These ductwork transitions need to be repaired. Also the four 2x2 diffusers in the serving areas have no observable airflow. The ceiling is tight and the ductwork could not be fully examined. Recommend confirming that dampers are fully open and that the duct work is fully inspected for restrictions.
5. **High Priority** – All AHU's evaporator coils are dirty and need to be cleaned. This could be contributing to the low airflow as well.
6. **Low Priority** – The MUA and OAU condensers are dirty and need to be cleaned.

7. **Low Priority** – Building is designed for net airflow of +3975 CFM and is currently +5418 CFM. Lowering the outside air in the space would reduce the ventilation heat load in the space. Based on design day temperature in the mechanical drawings, it's estimated this could reduce the load by around 3 tons. Recommend lowering the MUA and OAU by around 3000 CFM total or as low as the manufacturer's recommend without sacrificing performance.
8. **Info only** – Prior to arrival the underfloor radiant cooling system was not functional but is now repaired. According to the existing plans, this system provides 112 MBtuh of cooling (9.3 tons) which is significant. If this system was not running last summer this could have been a major impact.
9. **Info only** – EF-3 airflow is slightly below design. Not recommended to increase since the hood it serves is working well.
10. **Info only** - The outside air for the AHU's is provided by the OAU unit. The outside air is higher than the supply causing outside air to spill out of the returns into the ceiling. Once supply air is improved this should be resolved.

Other issues identified not related to the cooling issue:

11. **Low Priority** - Gaps noted on filter banks for some of the hoods. Recommend resolving on hoods where present by installing correct combination of hood filters.
12. **Low Priority** – Recommend having fans cleaned and grease cups emptied. The grease cups on the roof are overflowing and causing grease to pool on the roof.
13. **Low Priority** – Exhaust fans do not have hinge kits. May consider installing for ease of grease duct cleaning.
14. **Low Priority** – Gas heat did not fire for the MUA. Recommend servicing.

The technician's issues with pictures are on the following pages. Followed by that section is the balance schedule, checklists, asset pages, and floor plan.

For any additional questions please contact:

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