

ROCIS Checklist: Optimizing Residential Air Handlers for 24/7 Filtration

In order to operate the fan continuously in a typical residential air handler, ideally, the following conditions should be met.

Follow this checklist to identify deficiencies in the current system and improvements which need to be made. The appropriate intervention varies in response to the performance of the individual HVAC system.

- 1) The blower fan watt-draw is <150 watts, ideally <100 watts, in the continuous mode.
- 2) The air flow is adjusted to 300 - 400 cfm in the continuous mode, while fan is set for the optimum flow rate for both heating and cooling. (350 - 400 cfm/ton in AC mode, heating mode set for proper heat rise range.)
- 3) The TESP (total external static pressure) is equal to or less than the maximum specified on the manufacturer's name plate.
- 4) A wide (usually 4") high quality MERV 13 air filter is within a filter slot that provides a good seal to minimize air bypass. A wide, high quality filter will not be as subject to clogging and will not offer as much resistance to air flow as a 1" filter.
- 5) The duct system is primarily within the conditioned space of the building, with little evidence of duct leakage to the outside.

The primary actions ROCIS takes to achieve the conditions in the checklist

- 1) ECM change-out to achieve lower watt-draw.
 - Caveat – If the TESP is high, the ECM may perform worse in terms of watt-draw than the original PSC motor
 - Therefore, the ECM change-out is only advisable if the static pressure of the system is lower than the name plate rating, and also if we can use a fat filter with a minimal chance of becoming clogged
- 2) Replace the return drop with a larger cross section area return that includes a horizontal filter slot for a larger filter, as well as room for a pre/post filter, and smooth radius turns allowing unobstructed air flow into furnace.
 - Over 50% of the systems checked have restrictions in the return-side ductwork. In many cases, a larger, and better design for air flow in the return drop can improve the static pressure. In addition, by moving the filter slot to a horizontal position, and making it larger and deeper in dimensions (usually 20" x 25", instead of 16" x 25), the static pressure drop thru the filter is reduced. The 90 degree angle at the bottom of the vertical duct is fabricated with a curve on both the throat and the heel to minimize static at this location.
- 3) Adjust the fan setting for optimum air flow for the continuous, heating, and cooling mode. In most cases, the fan is wired to default to continuous mode. This may also be able to be controlled at the thermostat.
 - An added benefit of this intervention is that with lower face velocity over a larger filter, the filter will more effectively remove small particles.