

Procedures and calculations that affect your bottom line

- Fact:** Did you know that annually cleaning HVAC coils reduces energy consumption enough, in most cases, to pay for the cleaning cost in six months?
- Fact:** Did you know that neglecting condenser and evaporator coils can increase energy consumption of each unit by more than 15%?
- Fact:** Coil cleaning also saves money by prolonging the operating life of each unit by reducing the run time.
- Fact:** Besides energy dollar savings each year, our customers also benefit from independent equipment evaluations at each location and an effective asset tracking solution system.

How does coil cleaning affect your bottom line?

What can you expect if HVAC coils aren't kept clean?

- Higher than necessary electric bills
- Excessive and unnecessary repair bills
- Premature component failure
- Lack of humidity removal
- Compressor failures
- Loss of cooling capacity

Most modern air conditioners are designed to operate within much smaller tolerances than they did 20 years ago. With emphasis being placed on higher operating efficiencies (known as S.E.E.R. or E.E.R.), air conditioners are being asked to deliver the **maximum** amount of work for the **least** amount of electrical consumption. Therefore, any field conditions that cause deviations from optimum operation can have a detrimental effect on the performance and life of a unit.

If you expect your air conditioner to perform reliably for years to come, a small investment in preventative maintenance pays for itself through lower electric bills, repair costs and replacement expenditures.

When components like coils are exceptionally dirty, motors and compressors have to work harder to deliver cool air to the facility. This directly affects your electric bill at each location. The added work load results in higher current draw to operate the motor and the compressor. Additionally, when a motor or compressor has to work harder, it is also more likely to fail.

Any restrictions caused by dirty coils place stress on all of the components in the refrigeration cycle. The compressor removes heat and humidity from the air by pumping refrigerant through the evaporator and condenser coils. The air is also cleaned as it passes through the filter media within the unit. If the coils are dirty, airflow is restricted and the coils cannot effectively dissipate heat and remove humidity. This causes "stress" on the system, especially the compressors.

Increased energy cost at 10¢, 15¢ and 20¢ per kWh*

	Volts	Amps	Watts	kW	Annual Cost	Increase In Energy Consumption with Dirty Coils	10¢ per kWh	15¢ per kWh	20¢ per kWh
5 Ton Unit	480	20	16608	16.6	\$1,792.00	0% with clean coils	-	-	-
	480	21	17483	17.4	\$1,879.00	5%	\$87.00	\$130.50	\$174.00
	480	22	18268	18.2	\$1,965.00	10%	\$173.00	\$259.50	\$346.00
	480	23	19099	19.1	\$2,062.00	15%	\$270.00	\$405.00	\$540.00
10 Ton Unit	480	40	33216	33.2	\$3,584.00	0% with clean coils	-	-	-
	480	42	34966	34.8	\$3,758.00	5%	\$174.00	\$261.00	\$348.00
	480	44	36536	36.4	\$3,930.00	10%	\$346.00	\$519.00	\$692.00
	480	46	38198	38.2	\$4,124.00	15%	\$540.00	\$810.00	\$1,080.00
20 Ton Unit	480	80	66432	66.4	\$7,168.00	0% with clean coils	-	-	-
	480	84	69753	69.6	\$7,516.00	5%	\$348.00	\$522.00	\$696.00
	480	88	73072	72.8	\$7,860.00	10%	\$692.00	\$1,038.00	\$1,384.00
	480	92	76396	76.4	\$8,248.00	15%	\$1,080.00	\$1,620.00	\$2,160.00

*Based on 3Phase equipment, operating six hours per day for 180 days of cooling.

HVAC Coil Cleaning Procedures

1. Our Service Teams make the appropriate introductions with store management, assess unit access, water sources, and set up equipment without disturbing store operations and customers.

2. The disconnect is turned off and trash and debris are removed from the unit and surrounding area. Condensers are then washed, starting in the opposite direction of the air flow to prevent pushing obstructions deeper into the coil. The coils must be washed from both directions (continuing until exiting water is clear).

3. An evaluation and data collection for each unit is done before and after the coil cleaning service is performed.

4. Specialized equipment and tips will be used in order to protect the coils (all coils need to be cleaned at a perpendicular angle or directly facing the coil).

5. Condenser coils with more than one row of tubing (folded to cover two sides of the RTU) must have the additional rows separated (splitting the coils). When splitting the condenser coils, units over ten tons will require an additional technician.

6. The condenser coils are split and debris and lint accumulation are removed from between the coils. While the coils are separated, extreme care is exercised to prevent damaging or puncturing the copper tubing. In order to do this, tools to support the coils must be used to protect the roof membrane from damage.

7. Cleaning solutions such as FSG or an equivalent noncorrosive detergent is often used as well as tap or hot water depending on customer specs.

8. Compressed air is used where water may impact inventory or customers. Using compressed air would also apply to any unit where control power or any other power outside the unit disconnect is a concern.

9. When cleaning the evaporator coil, we place a plastic panel inside the unit and utilize a vacuum if necessary to ensure that water does not enter the return duct or the building.

10. All screws in panels or doors are installed and lost screws are replaced. The technician uses #10X3/4, 5/16 self tapping screws. If the screws are stripped, #12 oversized screws are used to secure panel or door.

11. The base pan (floor) area is washed in as many compartments as possible. Dirt and debris are also washed off the RTU exterior and away from the unit. All debris and trash from the area around the rooftop units are removed.

12. After the evaluation is performed, each location will have an assessment report of each unit. The report will include a store, and before & after photo of each unit. Additional photos will be taken of the issues listed below and of any other problems found:

- Excessive dirt or clogged condenser coils
- Excessive dirt or clogged evaporator coils
- Loose belt
- Freon leak
- Condenser fan problem (locked rotor, vibration, or noise)
- Evaporator fan problem (locked rotor, dirty, vibration, or noise)
- Compressor problem (short cycle or unusual noise)
- Drain line or P-trap problem
- Drain pan (clogged, leaking, or not sloping—no fall or pitch)
- Visual wire or contactor problem
- Frozen coil
- Filter problem (improper size, fit, or bypass)
- Condenser coil hail damage
- Economizer problem (not working below 55–60°, dampers, or filters)
- Dead unit
- Other

13. If the unit is not operational, the appropriate contact for that location will be notified. Anything not critical may remain in the assessment report. The assessment report and photos will be available in an interactive database within 48 hours from the date of the service.

14. All Data will also be available in a CSV file format for your asset management system.

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