An Overlooked Key to Efficiency: Coil Cleaning

When searching for ways to slash your facility’s bottom line, start with periodic coil cleaning to reduce dirt, residue and energy costs.

Most commercial buildings use air handling units with heating and/or cooling coils to maintain temperature and humidity within the facility. These coils are normally protected from debris by filtration, but even the best filters only remove 40-50 percent of airborne debris in the recirculating building air. Over time, coils become coated with deposits that reduce heat transfer efficiency and lead to increased energy costs.

Periodic coil cleaning performed by trained professionals using proper equipment produces significant benefits, including increased tenant comfort and reduced utility costs. Service companies that use steam cleaning can provide superior cleaning services without using chemicals.

Heating and/or cooling coils within an air handling unit lower or raise the air temperature and control humidity within the building to maintain tenant comfort. Cooling coils containing refrigerant are called direct expansion cooling coils or evaporators. Other cooling coils (typically found in larger buildings) use water from a chiller within the facility. Heating coils normally use either steam or hot water during the heating cycle. Some buildings use the heating coil year-round for reheat, which means the hot air tempers the combined air to prevent overcooling or overheating a zone.

Inside the air handling unit, air passes over the coils to change air temperature and/or humidity. Cooling coils lower humidity by removing moisture from the air, which means, in most areas of the country, cooling coils are wet during the cooling season. Wet coils create the perfect environment for collecting dust and debris. As the cycle repeats, the coils collect enough airborne debris to reduce efficiency and/or capacity.

Filtration is the initial step in protecting coils from airborne debris (smog, humidity, sand, etc.) around a building. Selecting air filter technology is usually based on budget considerations and operational needs. A basic, cost-effective filter can ease a building’s budget, but it may only remove 10 percent of airborne debris. With this type of filter the coils lose capacity quickly and will need frequent cleaning. Conversely, filters with a higher capacity — 30-40 percent or above — cost more, but they do a better job cleaning the air, thereby keeping the coil cleaner longer.

Understanding the technology is essential when selecting a filter for a specific building. This is because the type of filtration used will impact the frequency of both filter replacement and coil cleaning.

Even with a good filtration system, cleaning the coils is important. Simply stated: it is much easier to clean unsoiled coils than to wait until they are dirty to address cleaning them. Buildings with new or newly-replaced equipment have an excellent opportunity to initiate a good preventative maintenance (PM) program that includes regular coil cleaning to maintain coil capacity and efficiency. Regular coil cleaning will help maintain the equipment, thereby prolonging its lifespan, and reduce facility energy costs.

Although coil cleaning is an important part of a PM program, many buildings fail to regularly schedule cleaning because the coils are hard to access, or personnel is limited, so there is not enough work time for the task. Another primary obstacle is selecting the correct coil cleaning equipment. Pressure is not the only consideration for coil cleaning; water volume along with pressure must be addressed. For example, a 500 psi power washer supplying 4 gpm will clean much better than a 4,000 psi power washer supplying 2 gpm. Essentially, the more water driven through the coil during a cleaning, the better.

However, high-pressure power washers are not a good fit for coil cleaning in commercial buildings due to the dangers they
pose to both the equipment and the technician. In these buildings it is ideal to use a high-volume, low-pressure power washer. These units are expensive and often hard to find as they are specially made for professionals in the HVAC industry. When building a PM program and considering the cost of good equipment and the maintenance of that equipment, it is often more advantageous to invest in professional coil cleaning. By doing so, equipment purchase and maintenance costs are not a factor.

When coil cleaning is professionally done, safety liabilities for a facility’s onsite personnel, as well as building tenants, are reduced. Minimum required personal protective equipment (PPE) for chemically cleaning coils includes a half-face or full-face respirator with tight fitting goggles, a hard hat with face shield, rubber gloves, and a Tyvek suit. This PPE is necessary as alkaline cleaners can damage eyes or sinuses and cause skin irritation.

When chemically cleaning the coils, extra caution must be taken for building tenants, as some could be sensitive, or even allergic, to cleaners used. Such coil cleaning projects may need to be scheduled when the building is unoccupied, making sure to leave enough time for residual fumes to clear out.

Another consideration is electrical equipment and/or sensitive electronics that must be protected prior to the chemical cleaning process. Hiring trained professionals who know the appropriate cleaning application for each situation reduces a facility’s liability. It is important to make sure the professional
pertaining to the specific coil cleaning chemicals used during the cleaning process.

The accepted industry standard is to clean indoor coils at least once a year. Even if the coils appear clean, there can be a biofilm in the drain pan or on the leaving side of the coil that can become airborne. Cleaning indoor coils with steam and/or alkaline cleaner on a routine basis is by far the best practice for maintaining a clean building environment. Steam cleaning indoor coils is a very precise procedure requiring specialized units that use low-pressure wet steam to provide a safe, chemical-free cleaning. It is advisable to hire a qualified coil cleaning contractor for steam cleaning, rather than having facilities personnel attempt the job.

Professional cleaning a building’s coils on a routine basis will improve tenant comfort, increase system reliability and reduce overall operational costs. A professional coil cleaning company can perform air volume testing before and after cleaning using an air flow meter called an Anemometer. These tests clearly show the effectiveness of indoor coil cleaning. It is common to see a 30-50 percent rise in air flow across a coil that has not been cleaned in several years. Increased air flow results in a more efficient unit, which leads to a decrease in operational costs.

Tom Worley is the operations manager for Chem-Aqua Services.