



Multifamily Facility Management Services

GENERAL AIR SEALING

Description:

All buildings experience a continual exchange of indoor air for outdoor air. In some buildings this happens mechanically. However, most multifamily buildings and a lot of small commercial buildings rely solely on natural forces for air exchange. Warm air rises in the building and leaks out on the upper levels while cold air flows in through cracks at lower levels to replace it. In addition, air is often forced in on the windward side and sucked out on the leeward.

To conserve energy, air exchange should be reduced to the minimum that provides adequate air quality. This means sealing unwanted air leaks, both the readily visible leaks around doors and windows, and the “bypasses” that leak heated air through openings in the building’s interior into the attic or walls. These bypasses are often created during initial construction and cause not only heat loss, but also the potential for structural damage through moisture condensation.

Sealing leaks will produce small direct savings. In addition, by reducing drafts, sealing leaks will also increase the occupants’ comfort level, possibly allowing the thermostat setting to be reduced. Below, is a list of potential areas which can be sealed to conserve energy:

Install Weather-stripping

Weather-stripping is useful any time there are two building materials that open and close or move against each other (like between a door and its jamb). Weather-stripping should be checked annually for wear and replaced if worn or missing. Places to weather-strip include:

- around all operable windows and doors (including thresholds)
- around attic access hatches or chutes
- around electrical outlets (use gaskets designed to fit behind face plates)
- outside air dampers for combustion, ventilation or exhaust fans
- dampers and access doors on rooftop heating and cooling units

Several different types of weather-stripping are currently available for doors and windows. Some have a spring-metal “V-strip” construction, others are made with rubber or foam gasket sealer. Magnetic strip type are also available. Each of these different products has different ideal applications. The spring metal type is the most durable for weather-stripping doors. If the door is ill fitting, some planing may be required for a weather tight fit which does not bind.

Magnetic weather-stripping is also applicable to doors and, if installed correctly, seems to provide a particularly nice seal. For weather-stripping windows, vinyl or metal V-strip is best. Metal is the most durable, but may require more work in order to get a good fit. Foam gasket weather-stripping works best on attic access hatches and damper blades.

Complete General Caulking and Sealing

Caulking or joint sealer should be used to eliminate leaks wherever different parts of a building meet, wherever different types of building materials join, and wherever there are obvious cracks or holes. Leaks should be sealed from the inside to reduce infiltration and exfiltration, and to keep building moisture out of wall and roof cavities. Common areas to seal include:

- cracks or holes in the foundation wall
- where gas or water pipes, electrical or phone service enters the building
- around combination storm windows (but leave weep holes at the bottom open)
- gaps where putty has fallen out of windows, or cracks in window glass
- where window and door frames meet an exterior wall
- around any inoperable windows and doors
- where the floor meets the exterior wall (behind baseboard)
- around through-the-wall air conditioners
- where flues, ducts, recessed lights, plumbing stacks or wiring penetrate the attic

Caulk is available in an assortment of colors as well as clear. There are many different kinds of caulking, each with different characteristics. The major types are summarized below:

<u>Type</u>	<u>Cost</u>	<u>Life</u>	<u>Use</u>	<u>Paintability</u>	<u>Adherence</u>
oil or resin	Low	5 years	Inside	Yes	Good
butyl rubber	Moderate	5 - 15 years	Inside	Yes	Moderate
acrylic latex	Moderate	10 year	Inside	Yes	Good
siliconized acrylic	Moderate	15 - 20 years	Inside or Out	Yes	Good
silicone	High	20 years	Inside or Out	No	Moderate

For larger gaps either foam rod gasket material (available in various diameters) or polyurethane foam (available in aerosol cans) can be used. With any of these caulking or sealing products, be sure to follow manufacturers' guidelines for installation.

Install Double Glazing

Adding a storm window to a single glazed window, or replacing a single glazed window with a new double glazed window, will cut the window's heat loss in half and greatly reduce air leakage. When purchasing a storm window, look for windows that have strong frames and sturdy corner joints (mitered and welded or overlapped). The storm window should also have a weep system that allows condensing moisture to drain out. If the existing prime window is in poor condition, a replacement double glazed thermal window may be the best solution. The

window should have low emissivity to reduce the radiation losses or gains and an exterior clad, low maintenance frame (usually aluminum or vinyl). Also consider windows that have argon gas sealed between the panes for added efficiency. Switching to smaller windows is another good strategy.

Seal Unused Doors and Windows

A considerable amount of leakage and heat loss can be prevented by insulating unused doors or windows in a building with foam board insulation sheets or fiberglass batts. The interior can be covered with sheet-rock or paneling to provide a finished surface. Cracks or openings around these surfaces should then be sealed with caulking or another suitable material. Do not seal emergency exit doors or windows that provide necessary light.

Install an Air Lock Entry

Single entry doors that experience heavy, continuous pedestrian traffic need an entryway to reduce infiltration and heat loss. This is especially true for doors located on the north side of the building or that face the prevailing winds. Barring restrictions from local building codes, the entry can be built on the inside or outside of the building. To prevent collisions when the two sets of doors are opened simultaneously, the entry should be long enough, or, if space is limited, an L-shaped design can be used instead. If a double entry is too expensive, one option is to build a doorless windbreak instead and add the doors at a later date.

Reducing Infiltration Around Loading Docks

Delivery bays and loading docks can be a huge source of infiltration and heat loss, increasing operational expenses and causing discomfort for occupants working in and around these areas. However, techniques for improving docking bays must not interfere with the efficient and timely loading and unloading of goods. Possible solutions are to:

- replace worn weather-stripping around overhead doors
- replace existing overhead doors with special insulated overhead doors
- install fast opening and closing motors on overhead doors
- install plastic strips with double overlap to minimize drafts when doors are open
- build a wind break to block prevailing winds
- install canvas canopies or dock seals around the exterior of single entry doors
- build an enclosed loading dock

How to Implement:

Obviously caulking and weather-stripping can be completed by minimally trained maintenance staff. Such staff may also be qualified to seal any unused doors and windows. Very skilled maintenance staff or a hired contractor should be used to install storm windows, build a double entry, or make alterations to the loading dock. All local building codes and requirements should be reviewed and met for any of these retrofits.

In addition, a skilled, specialized contractor (often referred to as a House Doctor) will need to be hired to identify and seal bypasses that are not obvious. A diagnostic tool called a “blower door” should always be used for this job. The blower door is used to pressurize or depressurize an individual unit (in the case of a large multifamily building), or the entire building (in the case of a small multifamily or commercial building). The contractor will use smoke sticks to pinpoint unseen leakage areas which need to be addressed. Such a contractor may or may not also employ an infrared camera to help identify leaks. These unseen air leaks and bypasses are among the most important to seal in any building, so this process should not be neglected. Once identified, these leaks will be sealed by the contractor using appropriate materials. Upon completion of the job, the blower door will register the reduced leakage area or air exchange rate.

Note: A common source of air exchange and leakage in multifamily buildings, and some small commercial buildings, is windows left open by the occupants. It is pointless to limit excess air exchange unless this huge source of leakage is reduced or eliminated first. Conditions that will minimize open windows can be created by improving the control of the heating system. Therefore, any issues relevant to heating control should be addressed before air exchange issues.