Window Air-Conditioning Units

Before purchasing an air-conditioning unit, see King & Queen Apartments' Rules & Regulations regarding Air-Conditioning (section C. 10, pp. 9-10).

Preparing for Installation

- **Always have an assistant to help you.**
- **Never attempt to install any window air-conditioning unit alone.**
- **You risk the possibility of hurting yourself or injuring others by attempting to install the unit alone.**
- **You also run the risk the possibility of dropping and damaging the unit, and causing damage to other property below.**

Checkpoints Prior to Installation

1. Carefully remove the unit from the packaging case and **follow the manufacturer's installation instructions**; however;
    a. **DO NOT** use nails, screws or brackets to secure the unit to the wall, window sill, window, window jamb or window sashes.
    b. **DO NOT** install or attach a support bracket(s) underneath the air-conditioner and onto to the building.
2. **If an extension cord is required, the cord must be 12-gauge electrical extension cord to handle the electrical load from the air-conditioning unit.**
3. **DO NOT plug the unit in until after it is fully installed.**

Upon Installation*

1. Assemble and prepare the air-conditioning unit per the owner's manual and installation instructions.
2. Before installing the unit, carefully set the A/C Drip Pan (provided by owner) onto the window sill as shown. The A/C Drip Pan is required for all window air-conditioning units at King & Queen Apartments to prevent condensation from the unit from dripping onto the building.
3. Install the unit in the window, making sure that the A/C Drip Pan is underneath the window air-conditioning unit and that the unit is holding the A/C Drip Pan in place.
4. Be sure to center the unit in the middle of the window.
5. Holding the unit, carefully pull down the window sash. The window should rest on the unit behind the window filler panel frames.
6. Extend the side panels to both sides of the window, against each window frame.
7. To better insulate the window, the window unit and your apartment, it is recommended that you try one or more of the following:
    a. Use the foam strips provided by the manufacturer of the air conditioning unit, or purchase foam strips to install at the window.
    b. Use rigid foam panels or side insulating panels to cover the sides of the air-conditioning unit.
    c. Use duct tape only to tape joints on the side panels for air leaks. Do not use duct tape to tape the air-conditioning unit to the wall, sill, or window.

8. **DO NOT** use duct tape to secure the side panels of the unit to the wall, window sill, window, window jamb or window sashes.
9. **DO NOT** drill holes, screw, nail or attached anything to the wall, window sill, window, window jamb, window frame or window sashes.
10. If holes are drilled, screwed or nailed into the window sash, you will be charged the cost of replacing the damaged sash.
11. **To secure the window from being opened from the outside, insert security tension rod (provided in apartment) between the lower sash (when raised above the air-conditioning unit) and top of the inside of the window.** Twist rod to adjust length.

Preparing for Removal

- **Always have an assistant to help you.**
- **Never attempt to install any window air-conditioning unit alone.**
- **You risk the possibility of hurting yourself or injuring others by attempting to install the unit alone.**
- **You also run the risk the possibility of dropping and damaging the unit, and causing damage to other property below.**

Checkpoints Prior to Removal

1. Remove unit from window or seal it up completely on the inside after the cooling season is over; otherwise, air will leak through the unit itself.
2. Before removing the unit from the window, be sure that it is not longer holding any water in the evaporation pan. If water is still in the pan, it could drain out into the interior of the apartment when the unit it taken out of the window.

Upon Removal*

1. Before removing the unit, be sure to:
    a. Unplug the power cord,
    b. Remove the wooden dowels between the lower and upper sash,
    c. Lay a towel onto the floor onto which to set the unit.
2. While holding pressure on the unit where the window rests behind the window filler panel frames so it will not fall backwards on its own weight, carefully pull window sash up.
3. Keeping pressure on the top of the unit, carefully pull the unit from the window, while also keeping the A/C Drip Pan from falling.
4. Set the unit onto the towel and pull the A/C drip pan from the window sill.

* If you do not feel comfortable either installing or removing your window air-conditioning unit yourself, please feel free to contact our installation contractor, Dustin Turlington, at DTurlington@CrossroadBuilders.com or at 757-817-4080 to set up a time to install and/or remove your window unit(s). You will be charged a service fee at the time of installation and/or removal.

For more information on installing a window air-conditioner, see attached US Department of Energy and the National Renewable Energy Laboratory information sheet.

Building America Case Study:
Technology Solutions for Existing Homes

A Homeowner's Guide to Window Air Conditioner Installation for Efficiency and Comfort

PROJECT INFORMATION

Building Component: HVAC

Application: Retrofit; single and/or multi-family

Year Tested: 2012

Applicable Climate Zone(s): All

PERFORMANCE DATA

Cost of Window A/C unit: $150–$600

Cost of Materials for Improved Installation: $10–$15

Energy Savings: up to 7% cooling savings, or up to 280 kWh/year

Electricity Bill Savings: up to $31/year; enough to pay for the cost of the unit over its lifetime

FOR MORE INFORMATION

Read the full report, Laboratory Performance Testing of Residential Window Air Conditioners, NREL/TP-5500-57617, February 2013. *www.nrel.gov/docs/fy13osti/57617.pdf*

Building America SM U.S. Department of Energy

Homeowners in the United States spend one out of every eight dollars of utility costs on cooling their living space. Window air conditioners (A/Cs) are an inexpensive alternative to central systems, and are sold in greater numbers each year than all other residential cooling systems. They are purchased to cool a specific room and are easy for anyone to install. In contrast to these benefits, window A/Cs come at a cost—they operate less efficiently (using more energy to do the same cooling) than most other residential A/C systems.

Researchers at the National Renewable Energy Laboratory (NREL) studied window A/Cs on behalf of the U.S. Department of Energy's Building America program, to understand how they perform and how they could be improved.

The study showed that window A/C installation resulted in significant air leakage—equivalent to having a 5-in^2 hole in the outside wall. All summer long, hot outdoor air flows into the home, as shown in the figure to the right, making the A/C run longer and use more energy. This outdoor air reduces comfort for occupants through increased heat and often carries humidity into the home.

A portion of the cool air leaving the A/C is recirculated back into the unit because the outlet and inlet are so close together. Thus, that cool air does not help cool off the home and is a secondary waste of energy. Also, the researchers verified the importance of appliance maintenance and cleaning.

> **"Air sealing around the window and the air conditioner is critical for best performance"**
>
> —Chuck Booten, Ph.D., Senior Engineer, NREL

Finally, NREL's team identified simple measures to improve both efficiency and comfort. Accessories provided by manufacturers can be replaced with inexpensive hardware store materials to improve a window A/C installation, increase efficiency, improve comfort, and lower utility bills with a payback of less than one year.

Typical air leakage pathways increase electricity use and decrease comfort. *Illustration by Marjorie Schott, NREL*

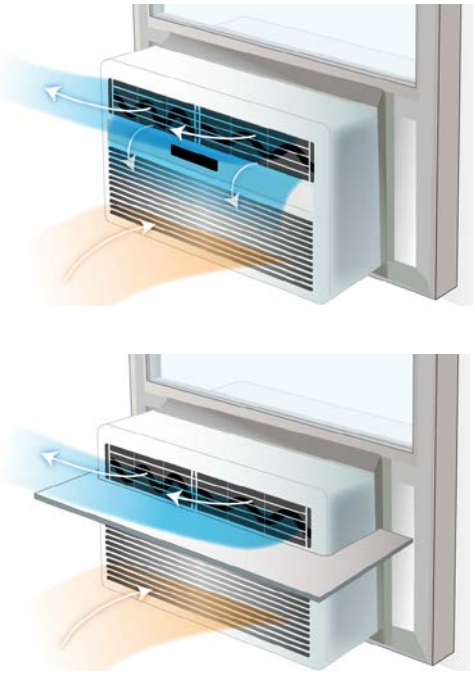
Five Easy Steps to Limit Window A/C Infiltration

1. Remove accordion panels. Typically, a sliding keeper can be removed. Pull the frame out, then remove another keeper from the side of the A/C. *(Do not remove top and bottom braces; they hold the unit in the window. Use manufacturer-supplied hardware to secure the window in place after replacing the unit.)*
2. Cut and install rigid foam panels to fill the spaces beside the A/C. Measure the thickness of the window sash to determine foam thickness; ¾–1½ in. thick will fit most window frame channels. Some foams have a skin to help protect the foam from weather. Exterior grade tape can be used to cover outside surface of foam for increased durability. If this is done, work from bottom to top and overlap tape so water will drain appropriately. (Cost of foam: $3–$10 for multiple windows.)
3. Foam strips provided by the manufacturer for sealing between sashes are prone to air leaks. Instead, use backer rod (closed cell cylindrical foam) between sashes. Measure gap thicknesses to select appropriate size. (Cost of backer rod: ~$4, enough for multiple windows.)
4. No matter what foam is used, it is important to also plug the top of the side channels.
5. Use tape to secure the foam panels and prevent air leaks around joints. Tape the foam panels to the window, window frame, and A/C; tape the top and bottom of the A/C. Different colors of tape are available. If window frames are painted, consider using tape with a less aggressive bond to prevent peeling. (Cost of one roll of duct tape: ~$6, enough for multiple windows.)

Go Further: Address Cool Air Recirculation

To further enhance performance, install a diverter between the cool air supply and room air return of the air conditioner. This reduces short-circuiting of air from the supply to the return and maximizes the amount of cool air that goes into the room, saving energy and money.

Diverters can be made from ¼-in. medium density fiberboard or similar material. (Cost for one sheet of fiberboard: ~$5.)



Installing a diverter (bottom) helps to maximize cool air flow from the A/C unit. *Illustration by Marjorie Schott, NREL*

The Bottom Line

- Air leakage wastes energy and costs money, but homeowners can reduce this leakage easily.
- Recirculation of air near the unit lowers efficiency and can be easily reduced.
- Periodic cleaning of intake and exhaust grills on both the indoor and outdoor portion of the unit can help maintain efficient performance.
- Remove unit from window or seal it up completely on the inside after cooling season is over; otherwise, air will leak through the unit itself.

U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy

For more information, visit:
www.buildingamerica.gov

The U.S. Department of Energy's Building America program is engineering the American home for energy performance, durability, quality, affordability, and comfort.

DOE/GO-102013-3920 • June 2013
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