Home Improvement Expert™ Factsheet

Kitchen Exhaust Fan

WHY HOME IMPROVEMENT EXPERT?

An easy way to get a quality job.

Research findings reveal significantly reduced energy savings and potential performance risks where home improvements are not properly installed. To help homeowners address this challenge, the U.S. Department of Energy has compiled world-class expert guidance from industry leaders and national laboratories in factsheets and checklists under the name ***Home Improvement Expert***. Homeowners can leverage these expert recommendations to help ensure quality installation by attaching Home Improvement Expert checklists to vendor contracts and ensuring the vendor completes and signs the checklist before accepting the work.

READY TO DO MORE?

This factsheet and accompanying checklist cover one of more than 20 home improvements covered by the U.S. Department of Energy Home Improvement Expert. Use them to help optimize energy savings and improve performance related to comfort, health, safety, and durability.

To download other checklists: basc.pnnl.gov/home-improvement-expert

For more customized home improvement recommendations:

- Get your ***Home Energy Score*** from a qualified assessor (www.home-energy-score.gov)
- Schedule an expert assessment through **Home Performance with ENERGY STAR®** (www.energystar.gov/homeperformance).

BENEFITS

Installed correctly, kitchen exhaust fans help ensure moisture, cooking odors, and fumes are effectively removed for a healthier indoor environment.

Cooking produces water vapor and fumes; it can also release fine particles of grease into the air. Gas stoves can add more emissions, like nitrogen dioxide and other combustion byproducts. Kitchen exhaust fans that duct air directly to the outdoors can effectively remove these emissions. This protection is substantially compromised with models that just filter the air and return it to the kitchen. Kitchen exhaust fan options include those that run continuously, those that operate manually as needed, and those that operate with multiple-speed settings. Make sure to select models that are both energy efficient and quiet.

RELATED HOME IMPROVEMENT CONSIDERATIONS

Before purchasing a new kitchen exhaust fan, consider working with a qualified home energy assessor to evaluate other related home performance needs and opportunities. This includes:

- integration of fresh air into the heating and cooling system to provide ventilation;
- integration of high-capture filters in the heating and cooling system return duct to more effectively remove particulates from the air you breathe; and
- evaluation of radon levels, which may be impacted by negative pressure resulting from the addition of kitchen exhaust fans.

For more information on exhaust fans, please search the Building America Solution Center, basc.pnnl.gov.

TIPS FOR HIRING A CONTRACTOR

- Look for licensed, insured, and certified contractors.
- Check references and reviews on home improvement web sites.
- Get multiple bids in writing.
- Check with your utility and state, local, and federal weatherization programs for rebates and incentives.
- Include the Home Improvement Expert™ checklist in bids and contracts to ensure quality installation.
- Consider using a Residential Energy Services Network (RESNET) certified Home Energy Rating System (HERS) rater, Building Performance Institute (BPI) certified Building Analyst, or other qualified professional (e.g., licensed engineer or architect) to inspect the work.

ENCLOSURE UPGRADES

- Attic Air Sealing and Insulation
- Basement Wall Insulation
- Framed Wall Insulation
- Masonry Wall Insulation
- Home Air Sealing
- Vented to Unvented Attic
- Vented to Unvented Crawl Space
- Window Replacement

HEATING & COOLING

- Air Conditioner Replacement
- Gas Furnace Replacement
- Heat Pump Replacement
- Duct Sealing and Insulation
- Oil or Gas Boiler Replacement

HOT WATER HEATING

- Gas Tank Water Heater
- Gas Tankless Water Heater
- Heat Pump Water Heater

FRESH AIR SYSTEM

- Bathroom Exhaust Fan
- Kitchen Exhaust Fan
- Balanced HRV/ERV
- Balanced Supply plus Exhaust
- Supply Integrated with HVAC

PROPER SEQUENCING OF HOME IMPROVEMENTS

Through the U.S. Department of Energy's Building America research program, expert guidance has been developed for optimizing whole-house energy-efficiency upgrades. This includes a recommended sequence for home improvements (shown below) to help ensure homeowners get the most out of their upgrade investments while minimizing potential harm from safety, indoor air quality, and moisture issues.

STEP 1: ENSURE SAFE AND DURABLE

Have experts assess opportunities to improve energy efficiency and identify comfort, moisture management, health, and safety issues.

STEP 2: ENSURE FRESH AIR

Ensure effective ventilation before increasing air tightness.

STEP 3: ENSURE MOISTURE CONTROL

Ensure adequate water protection before reducing the ability of walls to dry by adding air sealing and insulation.

STEP 4: ENSURE DRAFT-FREE

Capture air sealing opportunities not accessible after insulation is installed.

STEP 5: ENSURE THERMAL COMFORT

Insulate at least to the latest national code recommendations for your location after addressing related safety, indoor air quality, and moisture management issues.

ANYTIME: EQUIPMENT UPGRADES

Replace heating and cooling equipment, water heaters, windows, appliances, lighting, fans, and electronics when they fail or become out of date with ENERGY STAR® qualified products or better, and improve systems to operate more efficiently.

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For more resources, visit
basc.pnnl.gov/home-improvement-expert

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Home Improvement Expert™ Checklist

Kitchen Exhaust Fan

This U.S. Department of Energy checklist includes important specifications that can contribute to a complete and quality installation. All work shall comply with these specifications, all relevant codes and standards, and all manufacturer installation instructions. The contractor shall check each box on the checklist below and sign and date at the bottom to certify the work is completed.

PREPARATION

☐	Kitchen fans operated intermittently shall have a minimum flow rate of 100 cfm (cubic feet per minute) and fans operated continuously shall have a minimum flow rate of 25 cfm and provide ≥ 5 ACH (air changes per hour) based on kitchen volume.
☐	The maximum flow rate shall be determined in accordance with Home Ventilation Institute guidelines: https://www.hvi.org/publications/HowMuchVent.cfm. Consider a two-speed or multi-speed fan for best performance.
☐	The range-hood exhaust fan selected shall be ENERGY STAR certified.
☐	If connecting the new fan to an existing exhaust duct, the existing duct shall be checked to ensure it is made of rigid metal (e.g., galvanized steel, stainless steel, or copper), has a smooth interior surface, is equipped with a functioning back-draft damper, meets the maximum length guidelines specified in the IRC (2015 IRC Table M1506.2), and meets the minimum diameter or dimension guidelines specified in the fan manufacturer's installation instructions. If it does not, the homeowner shall be advised to replace or repair the exhaust duct as required.

INSTALLATION

☐	The kitchen exhaust fan shall be installed to vent outdoors, not into an attic, crawlspace, or space between floors.
☐	The exhaust duct outlet vent shall be located on the exterior of the home in a location where it does not direct air flow onto a walkway. It should be situated at least 10 feet from any air inlet, except where the exhaust outlet is located at least three feet above the air inlet.
☐	The outside termination of the exhaust duct shall be covered with louvers, a screen, or a grille.
☐	The exhaust duct shall be installed with the most direct route to the outside with as few bends as possible.
☐	All exhaust duct seams and connections shall be sealed with mastic or UL 181 tape.
☐	All ceiling and wall or roof penetrations shall be sealed with spray foam with exterior surfaces flashed as needed for full weather protection.
☐	Any installed exhaust fan operating in excess of 400 cfm shall be provided with a makeup air system that will automatically start and operate simultaneously with the exhaust fan and will provide makeup air at a rate approximately equal to the exhaust fan rate.

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COMMISSIONING

☐	The exhaust fan flow rate shall be measured using a flow hood, flow grid, or anemometer, in accordance with test procedures listed in ANSI/RESNET/ICC 380-2016. Adjustments shall be made to ensure the fan is providing the minimum flow rates specified above.
☐	At the completion of the work, a radon test kit shall be provided to the homeowner with a recommendation to initiate a radon remediation strategy if radon measurements exceed EPA acceptable levels.
☐	The home shall be inspected for the presence of a whole-house ventilation system. If one is present, the actual air flow shall be tested and verified to meet a target ventilation rate based on house size as follows: 50 cfm for up to 1,500 ft^2, 70 cfm for 1,501 to 2,500 ft^2, and 100 cfm for over 1,500 ft^2, per ASHRAE 62.2-2013. If the home has no whole-house ventilation system, or if the existing system does not meet the target ventilation rate, a recommendation shall be made to the homeowner to either install a new system or repair the existing system to meet the target ventilation rate.

I hereby certify that, to the best of my knowledge and ability, all checked items on the above checklist have been accomplished as part of completion of this home upgrade.

Contractor Signature: _____ Date: _____

Contracting Organization: _____

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