Condensing Clothes Dryers

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Scope

Install a new clothes washer in a new home.

- Select an energy-efficient condensing clothes dryer.
- Look for ENERGY STAR-certified models.
- Install the new condensing clothes dryer.

See the Compliance Tab for related codes and standards requirements, and criteria to meet national programs such as DOE's Zero Energy Ready Home program, ENERGY STAR Certified Homes, and Indoor airPLUS.
Conventional vented clothes dryers pull air from the room, heat this air, blow it into the tumble chamber of the clothes dryer, and then exhaust the moisture-laden air through a vent to the outside. This process consumes a lot of energy and wastes energy, as is evident in the high temperature of the exhaust air. Because they exhaust air outside, conventional clothes dryers contribute to the depressurization of the home, which can inadvertently pull in unconditioned air from locations such as the garage, attic, crawlspace, or outside if the house isn’t well air-sealed. They could also potentially encourage conditions for backdrafting of atmospheric vented combustion appliances if there are any located in the home. Because they pull in unconditioned air and pull conditioned air out of the home, they can also cause the heating, ventilation, and air-conditioning (HVAC) equipment to work harder. Studies estimate up to 25% of the total heat put into a conventional dryer is exhausted out the dryer vent (ENERGY STAR Residential Clothes Dryers 2011).

In May 2014, the U.S. Environmental Protection Agency (EPA) announced an ENERGY STAR criteria for electric and gas clothes dryers, to recognize models that cut energy use by 20% compared to the federal minimum efficiency requirements that went into effect in 2015 (Figure 1). Over 80% of U.S. homes have a clothes dryer, accounting for 6% of residential electricity consumption. Dryers achieving the ENERGY STAR label reduce energy use with improved moisture sensors, auto shutoff, steam cycle options, and optional connected and smart grid features. Among the most efficient models are condensing dryers and heat pump dryers, which work like condensing dryers but replace the condenser with a heat pump for even greater efficiency (Figure 2). These condenser dryers and heat pump dryers can save 20% to 60% compared to conventional clothes dryers. Condenser dryers take in ambient air, heat it in a heat exchanger, circulate it in the drum to absorb moisture from the wet clothes, send it to the heat exchanger where the air is cooled, releasing the moisture to a condensate drain, then recirculate the air to the heat exchanger to repeat the process until the clothes are dry (ENERGY STAR Clothes Dryers 2017). Because they are ventless, there is no need to add an exterior hole in the wall and no time spent installing and connecting a vent duct. This means they’re easier to install, and they remove the fire risk associated with a clogged dryer vent. Since they dry clothes at lower temperatures, condensing dryers are gentler on clothes than conventional dryers.

However, there are some issues to consider when purchasing a condensing dryer. They can be more expensive to purchase and many of the models available are small or medium sized rather than large sized. They may also take longer to dry a load of clothes, potentially double the time of a conventional dryer. The dryer should be located in a part of the home that maintains a temperature of at least 40 °F for the condensing dryer to work properly. Condensing dryers require some periodic maintenance. The condenser should be rinsed and cleaned once every few months. The condensation (water) must be drained or emptied after each load. The secondary lint traps should be emptied monthly.

Do not install the condensing dryer beside a refrigerator since the warm air can affect the thermostat of the refrigerator. Make sure the room in which the dryer is located has sufficient airflow (e.g., not a small enclosed or tight room without windows).

Figure 1. Condensing clothes dryers are ventless, easier to install, save energy, and they are gentler on clothes (Source: US EPA).
How to Select and Install a New Energy-Efficient Condensing Clothes Dryer

1. Select a new, energy-efficient condensing clothes dryer.

   - Before choosing a new clothes dryer (or helping the homeowner to choose a new clothes dryer), use a tape measure to determine the space constraints in the spot designated for the clothes dryer.
   - Use a tape measure to determine the space constraints of doorways and hallways to ensure that the new model can be moved to its installation location.
   - Choose a condensing clothes dryer model that meets the needs of the household. The following criteria should be considered during the selection process: capacity/volume, space, features/controls, connectivity, and energy efficiency.
   - Note the location of the lint traps and condensate tray (if not draining the condensate) to ensure they can be accessed easily for routine maintenance.
   - Use the ENERGY STAR Product Finder to identify and determine the energy use of new ENERGY STAR-certified condensing clothes dryer models (Figure 3). The “Other Features and Characteristics” filter can be used to identify condensing clothes dryer models with connected functionality, which would allow the homeowner to potentially save more money if the utility company offers demand response services. Also see the which clothes dryer models earned ENERGY STAR’s Most Efficient Award for 2017.
   - Check the Database of State Incentives for Renewables & Efficiency® or the ENERGY STAR Rebate Finder to determine whether a condensing clothes dryer model is eligible for a rebate or incentive in your area.

2. Install the new condensing clothes dryer.

   - Use a dolly or hand truck to move the new condensing clothes dryer close to the area where it will be installed. Before doing so, put floor mats or paper along the route to protect the floor. Sweep out the dryer location to remove any dust or dirt. Make sure the temperature at the dryer location will stay above 40 °F or else the condensing dryer will not operate properly. Do not install the condensing dryer beside a refrigerator since the warm air can affect the thermostat of the refrigerator. Make sure the room in which the dryer is located has sufficient airflow (e.g., is not a small enclosed or tight room without windows).
   - Remove the packaging from the condensing clothes dryer. Ask the homeowner to keep the box and packaging materials for a few days in case the unit has to be returned for replacement or repair.
Shut off power to the condensing clothes dryer at the breaker panel and place a piece of tape over the breaker switch to ensure no one turns it back on while you’re working.

Before moving the dryer into its designated space, determine a method for condensate disposal.

Condensate Disposal
- When clothes drying is in progress, condensed water is pumped into a container using the drain hose in the back of the dryer. If the homeowner prefers to use the container to collect the condensed water, remind the homeowner that it must be emptied after each cycle.
- The condensed water can also be drained directly into a utility sink or drain. If draining into a sink or drain, make sure the drain line is within the maximum head and length specifications in the user’s manual. If the drain line is not long enough, extensions are available as aftermarket accessories. Make sure the drain line is not kinked.
- If draining into a waste water standpipe, connect the drain line into a non-return valve using a clamp. This valve will prevent water from flowing back into the dryer. Then, attach the other end of the non-return valve to a second, shorter drain line using a clamp. Connect the end of this drain line to a sink-connecting nut using a clamp. Attach the sink-connecting nut to a connector at the Y-adapter attached to the sink wastewater stand pipe.
- If draining directly into a utility sink, use a clamp to attach the drain line to the water tap or edge of the sink. Use the curved guide to prevent the drain hose from becoming kinked. Before securing the clamp, slowly guide the drain line so the end is near the tub of the sink.

Connect the electrical cord into a grounded three-prong outlet. Do not remove the ground prong, do not use an adapter, and do not use an extension cord. Failure to follow these instructions can result in fire or electrical shock.

Move the dryer into its footprint, adjust the feet to leave an airflow gap of at least 3/8-inch between the floor or top of carpet and the bottom of the dryer. This airflow gap must not be blocked by the toe-kick panel.

Make sure the dryer is level by adjusting the feet and checking a leveler tool to ensure the dryer top is horizontal and the sides are vertical.

Turn the power on at the breaker.

Test run the condensing clothes dryer. Make sure there are no leaks in the drain line. If the dryer isn’t drying clothing properly, contact the seller or manufacturer and ask for assistance.

3. Set up an Internet-connected condensing clothes dryer.

- The condensing clothes dryer manufacturer will have an app available for download on a smartphone, tablet, or other mobile device. Download the app on the homeowner’s preferred device. The app will guide you through all of the steps to connect the condensing clothes dryer. Different manufacturers and models have different steps for network connection. The following steps are generalized.
- Open the app on the device and sign in or create a WiFi connect account. This account will allow you to associate any connected appliances with the homeowner’s device.
- Find the connected appliance information label on the condensing clothes dryer. This label contains the network name and password for the unit.
- In the app, type in the password from the information label.
- Go to the mobile device’s WiFi settings and choose the network name found on the information label. This will start the communication between the app and condensing clothes dryer.
- Once the communication between the mobile device and condensing clothes dryer is complete, the app will ask the user to choose the home network. Find the home’s WiFi network and enter the password to connect the device to this network.
- Communication between the mobile device and the home network will begin, connecting the condensing clothes dryer to the home network. The condensing clothes dryer is connected once the app says “connected.”

4. Provide product literature and instructions to the homeowner.

- Provide the homeowner with any manufacturer product literature and warranty information.
- Submit, or supply to the homeowner to submit, paperwork for any applicable utility rebates or tax incentives.
- Provide the homeowner with tips for getting the most energy-efficient performance from their clothes dryer. Here are some resource-saving clothes-drying tips for homeowners:
- Dry full loads.
- Dry towels and heavier cottons in a separate load from lighter-weight clothes.
- Don't over-dry clothes. If the condensing clothes dryer has a moisture sensor, use it.
- Clean the lint screen in the dryer after every load to improve air circulation.
- Consider air-drying clothes on clothes lines or drying racks.
Ensuring Success
Climate

No climate specific information applies.
Training

Right and Wrong Images
None Available
Compliance

The Compliance tab contains both program and code information. Code language is excerpted and summarized below. For exact code language, refer to the applicable code, which may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our webmaster if you find broken links.

ENERGY STAR Certified Condensing Clothes Dryers Criteria

ENERGY STAR calls for clothes dryer models to meet certain criteria to receive qualification for the ENERGY STAR label and promotion on the certified products list.
More Info.

Access to some references may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our webmaster if you find broken links.

Case Studies
None Available

References and Resources*

1. **EIA 2015 Residential Energy Consumption Survey (RECS)**
   - **Author(s):** EIA
   - **Organization(s):** EIA
   - **Publication Date:** June, 2016
   
   Federal statistics about national energy consumption in residential homes.

2. **Energy Saver: Laundry**
   - **Author(s):** Department of Energy
   - **Organization(s):** DOE
   - **Publication Date:** December, 2017
   
   DOE's consumer information about energy and laundry.

3. **ENERGY STAR Certified Clothes Dryers Buying Guidance**
   - **Author(s):** U.S. Environmental Protection Agency
   - **Organization(s):** EPA
   - **Publication Date:** December, 2017
   
   ENERGY STAR clothes dryer buying guidance for consumers.

4. **ENERGY STAR Certified Clothes Dryers Criteria**
   - **Author(s):** U.S. Environmental Protection Agency
   - **Organization(s):** EPA
   - **Publication Date:** December, 2017
   
   ENERGY STAR criteria for clothes dryers.

5. **ENERGY STAR Market & Industry Scoping Report: Residential Clothes Dryers**
   - **Author(s):** U.S. Environmental Protection Agency
   - **Organization(s):** EPA
   - **Publication Date:** November, 2011
   
   EPA's market report about residential clothes dryers.

6. **Heat-Pump Clothes Dryers**
   - **Author(s):** Rice
   - **Organization(s):** Green Building Advisor
   - **Publication Date:** January, 2015
   
   Blog post about heat pump clothes dryers.

7. **Measured Performance of Heat Pump Clothes Dryers**
   - **Author(s):** Martin, Sutherland, Parker
   - **Organization(s):** FSEC
   - **Publication Date:** August, 2016
   
   Report on testing results from a 53 home monitored sample, long-term energy use of electric resistance clothes dryers.

*Publication dates are shown for formal documents. Dates are not shown for non-dated media. Access dates for referenced, non-dated media, such as web sites, are shown in the measure guide text.

Contributors to this Guide
The following authors and organizations contributed to the content in this Guide.

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