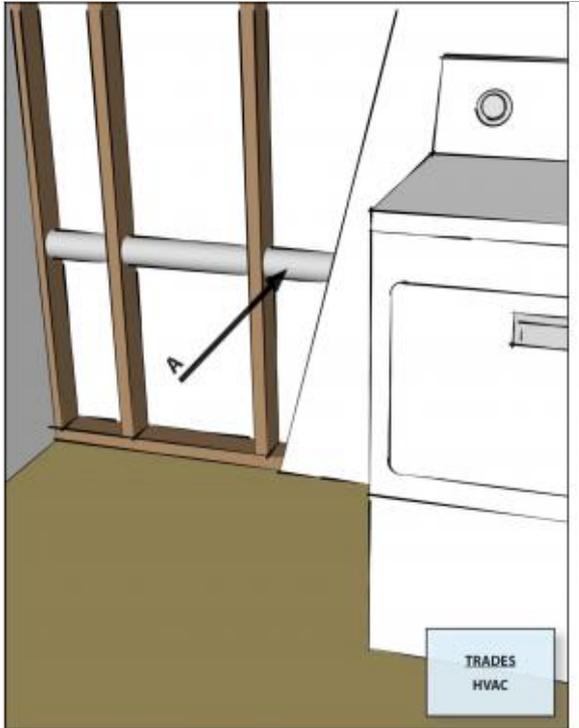


Proper Clothes Dryer Venting

Last Updated: 03/14/2018

Scope



Clothes dryers vented directly to outdoors, except for ventless dryers equipped with a condensate drain

Vent clothes dryers directly to the outdoors, except for ventless dryers equipped with a condensate drain.

- Use smooth metal ducting ? 35 feet in calculated length, supported ? every 12 feet.
- Locate duct terminus ? 3 feet from other openings.
- At the terminating end of the exhaust duct (at the exterior wall), install a louvered backdraft damper with a hood.
- Don't cover the end of the duct with screening.
- Install per manufacturer's instructions and local code.
- Do not use devices that remove lint and bring the heat back into the home. This adds unwanted moisture to the house.
- Do not exhaust dryers within 10 feet of the AC condenser, which could contribute to poor HVAC operations.

See the [Compliance Tab](#) for related codes and standards and criteria to meet the requirements of national programs such as DOE's Zero Energy Ready Home program, ENERGY STAR Certified Homes, and Indoor airPLUS.

Description

Clothes dryers vent about a gallon of water for each typical load of laundry. If this vent empties into a crawlspace, attic, or other building cavity, the potential for moisture-related damage is significant (see the Training tab). Clothes dryers must vent directly to the outside using approved exhaust duct. Vinyl, nylon, and foil ducts are not recommended and if used will void the warranty of most dryers ([Cranor 2005](#)). These spiral duct designs often trap lint, which can clog the duct, requiring the dryer to work harder and longer to dry clothes and also causing it to increase dryer temperature. Not only is a poorly exhausting dryer less efficient, it can also be a fire hazard due to the flammability of the collected lint ([NFPA 2013](#)). The use of PVC pipe for dryer exhaust ducts is also not allowed per all standards and specifications.

Per the requirements of the International Residential Code, Section M1502 (2009-2018 IRC), the clothes dryer exhaust duct should be made of galvanized steel or galvanized aluminum rigid or semi-rigid metal with a smooth interior finish and a duct diameter of 4 inches. Short, straight, horizontal duct runs are the most effective. Runs should be horizontal with a slight downward angle if at all possible to allow any condensation from water vapor in the exhaust air to drain. The duct length from the wall to the outlet terminal should be no more than 35 feet, including equivalent length for any fittings. Or, follow the duct length recommendations specified by the manufacturer (2009-2018 IRC M1502, see Compliance tab). The duct should be secured in place and supported at 12-foot intervals. Avoid sags in the duct. See the IRC for calculating duct length, taking into account duct diameter and bends in the duct.

The transition duct (the visible piece of duct connecting the dryer to the wall) can be up to 8 feet and should be listed in accordance with UL 2158A; there are some semi-rigid metal transition duct products that are UL listed. The ducts should be joined with clamps or foil tape. Screws or similar fasteners that can protrude into the inside of the duct and catch lint must not be used. The exhaust duct should terminate outside the building at least 3 feet from any building opening and at least 10 feet from an AC or heat pump condenser. The duct termination should be fitted with a closeable gravity or automatic damper. A louvered damper is more effective than a single hinged door. No screen should be installed in the duct terminus (IRC M1502.3, see Compliance tab).

When the clothes dryer is not installed at the time of occupancy, the exhaust duct opening inside the home should be capped or plugged and marked as “dryer duct, future use.” If the dryer duct is run through walls where nails or screws from finish carpentry or other work are likely to penetrate the ducting then protective steel sheet metal plates (? 1.6mm) should be installed on the finished face of framing members where there is less than 1.25 inches between the duct and the finished face of the framing (2009-2018 IRC M1502).

When installing the interior duct terminus in the laundry area inside the home, consider using a telescoping rigid metal transition duct or installing an inset box in the wall where the dryer will be located to allow space in the wall cavity for the connecting duct to come up from the floor to the port on the back of the dryer. This inset allows the connecting duct to be straight and not be crushed or looped behind the dryer in ways that severely restrict air flow and can cause a fire hazard from trapped lint. There are several commercially available products or this inset can be constructed on site with 2x4 blocking, drywall, tape and mud to airseal the seams ([Bailes 2010](#)).

How to Install Dryer Exhaust Duct

1. Install a rigid metal (aluminum or galvanized steel) exhaust duct connecting the transition duct to the exhaust duct outlet terminal. The exhaust duct should be rigid metal 4 inches in diameter and no more than 35 feet in length or as specified by the duct manufacturer. This length should be decreased by 2.5 feet for every 45-degree bend the duct makes and 5 feet for every 90-degree bend the duct makes. Any joints should be installed in the direction of air flow.
2. Support the duct at least every 12 feet, and at all joints. Avoid sags. Air seal any joints with foil tape.
3. At the interior wall, connect the exhaust duct to a transition duct that connects directly to the dryer. The transition duct should be UL-2158A listed and should be no longer than 8 feet. Short, direct, semi-rigid metal transition duct is preferred. The ducts should be joined with clamps or foil tape, not screws or similar fasteners that can protrude into the inside of the duct and trap lint.
4. Locate the exhaust terminal at least 3 feet from any door or window and away from the fresh air intake of a high-efficiency furnace, water heater, or any other HVAC intake. It should also be located away from air conditioning or heat pump condensing units installed outside. Avoid terminating the duct at the roof. If possible, locate the exhaust terminal so that the exhaust duct will run horizontally with a slightly downward slope (1/4 inch per foot) to reduce the possibility that condensation will accumulate ([Cranor 2005](#)).
5. At the terminating end of the exhaust duct (at the exterior wall), install a backdraft damper. The hood opening should point down and should be at least 12 inches above the ground ([Cranor 2005](#)). A louvered damper is more effective than a single hinged door. No screen should be installed in the duct terminus. Flash and caulk the exterior wall penetration.
6. Insulate ducts in unconditioned spaces, especially in cold climates, to avoid condensation.

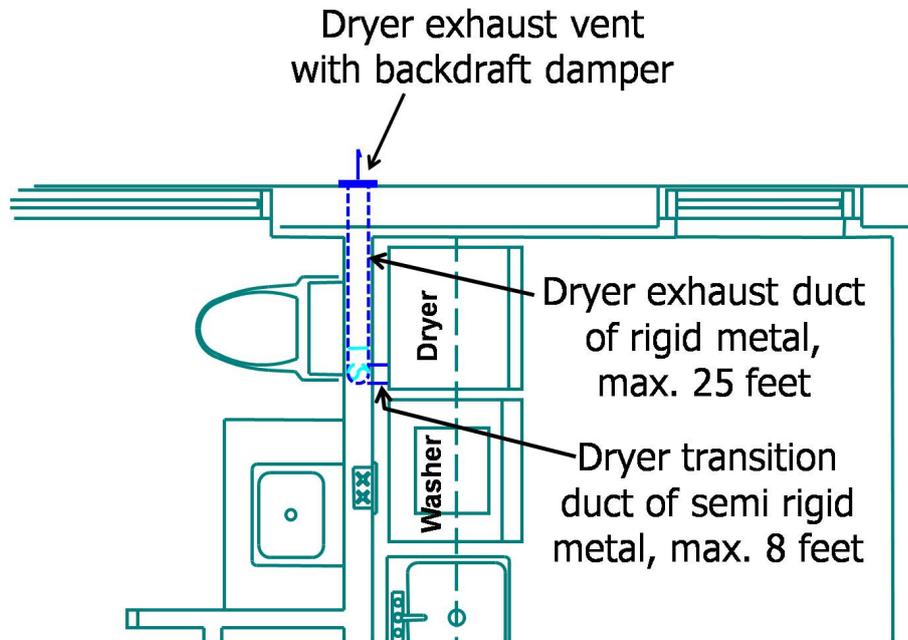


Figure 1 - The dryer exhaust duct should vent directly to the exterior in a short, straight line, via a smooth, rigid metal duct.

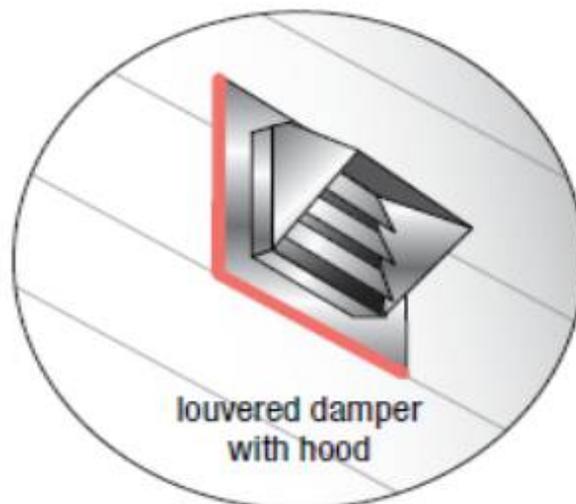


Figure 2 - At the outlet of the dryer exhaust duct, install a hooded vent with a louvered damper.

Recommendations for the Home Owner

Homeowner education is important for the long-term safe operation of a clothes dryer. Consider providing the homeowner with the following recommendations ([from InterNACHI](#)).

- Always use a lint filter or screen.
- Clean the lint filter before or after each load of laundry.
- Remove any visible lint within the dryer.
- At least once a year, have a professional technician clean the dryer exhaust pipe.
- Gas dryers should be cleaned and serviced regularly by a professional.
- Follow the manufacturer's operating instructions and don't overload the dryer. Also, don't attempt to dry soaking wet laundry that hasn't been wrung out or gone through a washing machine's spin cycle to remove excess moisture.
- Turn off the dryer when leaving home and before going to bed.
- Install a fire extinguisher in the laundry area.
- Install a smoke alarm in the laundry area.
- Install a CO alarm in the laundry area for a gas dryer.

Ensuring Success

Verify with a visual inspection that the clothes dryer vents directly to the outdoors or is a ventless dryer equipped with a condensate drain.

Climate

No climate specific information applies.

Training

Right and Wrong Images



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Display Image: [Retrofit 3.jpg](#)



Display Image: [HVAC75_ClothesDryerVent-Wr_NACHI.jpg](#)



Display Image: [Retrofit 2.jpg](#)



Display Image: [Retrofit 1.jpg](#)

CAD

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 Homes \(Version 3, Rev. 08\)](#)

Clothes dryer are not specifically addressed.

[DOE Zero Energy Ready Home](#)

Exhibit 1: Mandatory Requirements. Certified under EPA Indoor airPLUS.

[EPA Indoor airPLUS](#)

3.2 Corrosion-proof rodent/bird screens installed at all openings that cannot be fully sealed. (Not required for clothes dryer vents.)

4.6 Clothes dryers vented to the outdoors or plumbed to a drain according to manufacturer's supplies or returns. Conventional clothes dryers shall be vented to the outdoors. Electric condensing dryers shall be plumbed to a drain according to manufacturer's instructions.

[2009, 2012, 2015, and 2018 IRC](#)

M1502 Clothes Dryer Exhaust. Follow manufacturer's instruction and the requirements of Section M1502 which states that dryer exhaust systems to be independent of all other systems and convey the moisture to the outdoors, unless listed and labeled condensing (ductless) dryers are used. M1502 also specifies dryer duct materials (metal with smooth interior, not plastic), dimensions (min. 4 inch diameter), support (min. every 4 feet in 2009 IRC, every 12 ft in 2012 IRC), calculated duct length (max 25 feet in 2009 IRC, 35 feet in 2012 IRC), transitions (max. 8 feet), exhaust duct terminations (to outside of building at least 3 feet from building opening, with damper, no screens), etc. See M1502 for more requirements.

Retrofit: [2009, 2012, 2015, and 2018 IRC](#)

Section N1101.3 (Section N1107.1.1 in 2015 and 2018 IRC). Additions, alterations, renovations, or repairs shall conform to the provisions of this code, without requiring the unaltered portions of the existing building to comply with this code. (See code for additional requirements and exceptions.)

Appendix J regulates the repair, renovation, alteration, and reconstruction of existing buildings and is intended to encourage their continued safe use.

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. [4 Products for Enhancing Air Flow in Dryer Vents](#)

Author(s): Bailes

Organization(s): Energy Vanguard

Publication Date: December, 2010

Article describing products that can enhance the efficiency and safety of clothes dryer vents.

2. [DOE Zero Energy Ready Home National Program Requirements](#)

Author(s): Department of Energy

Organization(s): DOE

Publication Date: April, 2017

Standard requirements for DOE's Zero Energy Ready Home national program certification.

3. [Dryer Safety Tips](#)

Author(s): National Fire Protection Association

Organization(s): National Fire Protection Association

Publication Date: January, 2013

Information sheet with safety tips for dryers.

4. [ENERGY STAR Certified Homes, Version 3 \(Rev. 07\) Inspection Checklists for National Program Requirements](#)

Author(s): U.S. Environmental Protection Agency

Organization(s): EPA

Publication Date: June, 2013

Standard document containing the rater checklists and national program requirements for ENERGY STAR Certified Homes, Version 3 (Rev. 7).

5. [Inspecting the Dryer Exhaust](#)

Author(s): Nich, Gromicko

Organization(s): International Association of Certified Home Inspectors

Publication Date: March, 2018

Article describing the correct installation of clothes dryer exhaust ducts.

6. [The Facts about Clothes Dryer Exhaust Systems](#)

Author(s): Cranor

Organization(s): American Society of Home Inspectors

Publication Date: April, 2005

Document outlining the importance of keeping dryer exhaust ducts clean.

*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

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