

SERVICE MANUAL

for



EXHAUSTING DRYERS

Remove and Destroy Service Manual LIT603197-A

Whirlpool CORPORATION
Benton Harbor, Michigan.

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INTRODUCTION

This manual is intended to help you plan and install an exhaust system for WHIRLPOOL clothes dryers. Although it is not possible to include every kind of installation that might be encountered, the examples illustrated represent a majority of exhausting systems.

There is an occasional reference to a brand name product. These are included only as examples of products available and are not necessarily recommended or endorsed by Whirlpool Corporation.



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WHY EXHAUST A CLOTHES DRYER?

There are four basic reasons for exhausting a clothes dryer:

1. To meet codes requirements (in some cases)
2. To remove moisture from laundry area
3. To avoid lint accumulation in the laundry area
4. To remove excessive heat from laundry area

CODES REQUIREMENTS

The Federal Standard for Manufactured Home Construction and Safety Standard, Title 24CFR, Part 32-80 [formerly the Federal Standard for Mobile Home Construction and Safety, Title 24, HUD (Part 280), 1975] requires gas dryers to be exhausted to the outside air. Further, the exhaust duct shall not be connected to any other duct, vent or chimney; it shall not terminate below the mobile home and it shall not be connected with screws.

There are other codes requiring clothes dryers to be exhausted when installed in confined spaces where specified clearances from combustible surfaces cannot be met.

Undoubtedly there are local codes and ordinances in some communities which may affect dryer exhausting. Consult your local building inspector for information.

MOISTURE

A 14-pound (dry weight) towel load contains a large amount of water when it is removed from the automatic washer. The dryer must remove this water and discharge it from the drum. When the dryer is not exhausted outside, this moist air will be recirculated through the dryer, reducing the efficiency.

Also, exhausting moisture into the room can damage paneling, loosen cement on linoleum floors and picture hangers, and cause condensation on windows and walls in cold weather.

LINT

Even though the dryer is equipped with a lint screen, fine particles of lint do get through the screen and are exhausted. Besides being unsightly and a potential fire hazard, this fine lint can interfere with the air intakes on furnaces, refrigerators, and freezers and may even be circulated into the dryer motor, causing it to overheat.

HEAT

In order to remove moisture from the garments in the dryer, heat is generated to vaporize the water. Generally, air temperature leaving the dryer is in the 150°F range. Discharging 120 cubic feet of 150°F air per minute into a small laundry room can soon raise the room temperature and humidity, making it very uncomfortable.

EXHAUST SPECIFICATIONS

Exhaust systems for Whirlpool dryers should have the capacity to handle 150 CFM of air for each dryer in the system. The critical factor in an exhaust system is the back pressure developed. Our specifications are that there should be pressure of 0 to 0.6 inches of water column at the connection to the dryer.

Measurement of back pressure should be made with an empty dryer, clean lint screen, and the dryer operating in the AIR cycle (no heat). Measurements are made with an inclined manometer, such as Dwyer model 102 (0-2" range) or Dwyer model 172 (0-1" range). Both of these instruments are portable and easy to use. *Figure 1* illustrates the recommended procedure for measuring back pressure.

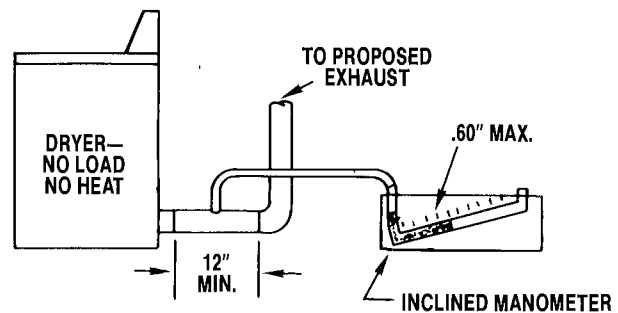
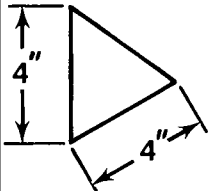
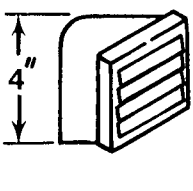
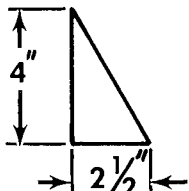


FIGURE 1

EXHAUST CHART:

These charts, included in dryer installation instructions, show the maximum length of exhaust systems for large and super capacity dryers. The maximum length is determined by the type of duct material (rigid or flexible metal), number of 90° turns, and the type of exhaust hood. These charts are all that is needed to determine the length of most common systems.

MODELS PRIOR TO 1984				
Number of 90° Turns	EXHAUST HOOD TYPE			
				
0	43 ft.	41 ft.	36 ft.	Maximum Length Of 4" Dia. Rigid Metal Duct.
1	33 ft.	31 ft.	26 ft.	
2	23 ft.	21 ft.	16 ft.	
0	30 ft.	29 ft.	24 ft.	Maximum Length Of 4" Dia. Flexible Metal Duct.
1	24 ft.	23 ft.	18 ft.	
2	16 ft.	15 ft.	10 ft.	
1984 AND LATER				
0	64 ft.	64 ft.	58 ft.	Maximum Length Of 4" Diameter Rigid Metal Duct
1	54 ft.	54 ft.	48 ft.	
2	44 ft.	44 ft.	38 ft.	
3	35 ft.	35 ft.	29 ft.	
4	27 ft.	27 ft.	21 ft.	
0	36 ft.	36 ft.	28 ft.	Maximum Length Of 4" Diameter Flexible Metal Duct
1	31 ft.	31 ft.	23 ft.	
2	27 ft.	27 ft.	19 ft.	
3	25 ft.	25 ft.	17 ft.	
4	23 ft.	23 ft.	15 ft.	

ACCESSORIES & WHERE TO PURCHASE THEM

Various exhaust kits are generally available from any appliance parts distributor. Whirlpool dealers who do their own installation or service will also have some exhaust system parts in stock. Likewise, TECH-CARE® Service Companies generally stock some exhaust system parts. The following is a partial list of standard exhaust accessories available.

ACCESSORIES

4" EXHAUST HOODS

4" ROUND ALUMINUM PIPE

4" FLEXIBLE METAL DUCT

4" HOOD & PIPE KITS

4" HOOD & DUCT KITS

ALUMINUM WINDOW PLATES

CLEAR PLASTIC WINDOW PLATES

ADJUSTABLE WINDOW PLATES

2" x 6" RECTANGULAR DUCT

CLOSE COUPLED KIT

4" HOLE SAW

4" SCREW CLAMP

4" SPRING CLAMP

4" DRAFT DIVERTER

The following accessories are available from Whirlpool Corporation:

- 4" Flexible Metal Duct
7 ft. length part no. 279569
- 4" Louvered Exhaust Hood
1 piece part no. 279399
12 pieces part no. 279400

Exhaust Deflector Kit LCK4000 part no. 346001

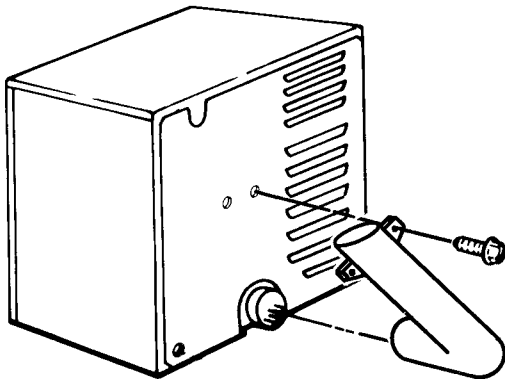


FIGURE 2

INSTALLING AN EXHAUST SYSTEM

TOOLS NEEDED

Proper tools are important for ease of installation of an exhaust system. A 1/2" drill with a 1/4" long shank drill bit and 4" hole saw is recommended for cutting the hole through the wall. For a one-time application, a saber saw or keyhole saw might be used, but this method is more time-consuming and the results are not likely to be as neat.

A pair of pliers, tin snips, tape measure, regular screwdriver, duct tape and caulking compound are also required to make a good installation.

BASIC BASEMENT INSTALLATIONS

Select the best location for the exhaust hood, considering the following factors: close proximity to dryer; freedom from plumbing, wiring and other obstructions; aesthetic appearance on outside of house.

Having selected the exhaust hood location, drill a pilot hole, using a long shanked drill bit, from the inside of the house to the outside. See Figure 3.

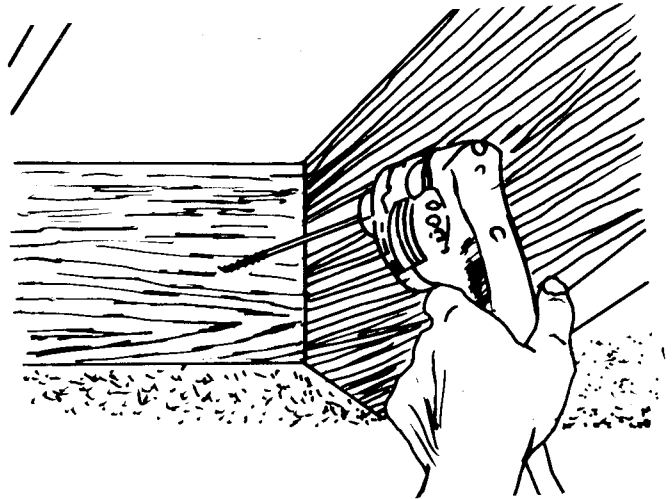


FIGURE 3

Next, working from the exterior of the house, cut the hole with a 4" hole saw, using the pilot hole as a locator. Special saws and drills are available for cutting brick and other masonry. See Figure 4.

WARNING: When cutting through hollow walls, make certain there is no plumbing or wiring in the location of the hole, to avoid water leaks or potential electrical shock.

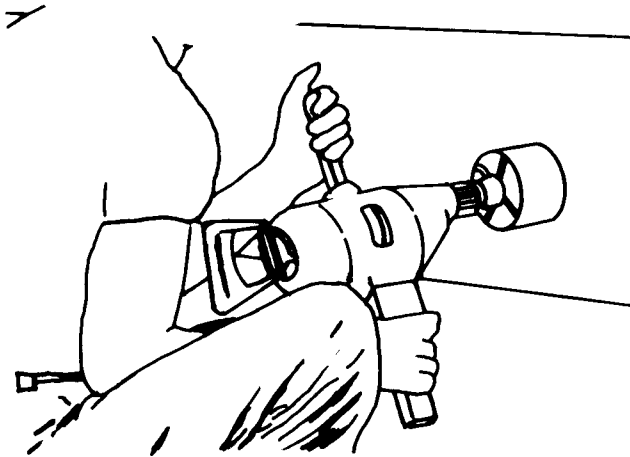


FIGURE 4

Now the exhaust hood is inserted into the hole. Apply a bead of caulking compound around the exhaust hood pipe and press hood firmly against surface of the house. Then fasten hood to wall, using screws through the holes in the flange on the hood. See Figure 5.

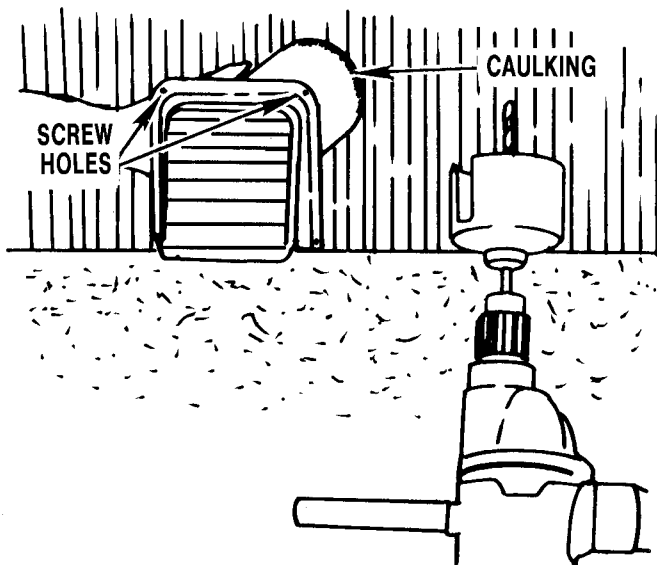


FIGURE 5

Some exhaust kits contain a circular ring or plate which somewhat dresses up the hole inside the house. Apply a small bead of caulking compound to this ring and slip it over the exhaust hood pipe inside the house.

Next, install an elbow on the connection at the dryer and on the exhaust hood. The dryer connection (Figure 6) accepts the female end of the elbow. The exhaust hood accepts the male end of the elbow. Be sure the male ends of the pipe face away from the dryer, in the direction of air flow, to prevent excessive lint accumulation. See Figure 7.

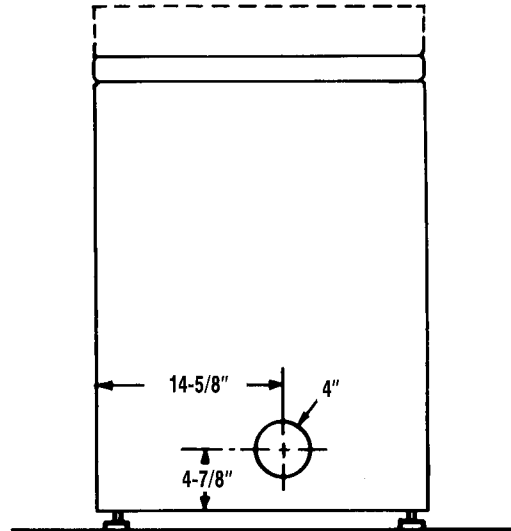


FIGURE 6

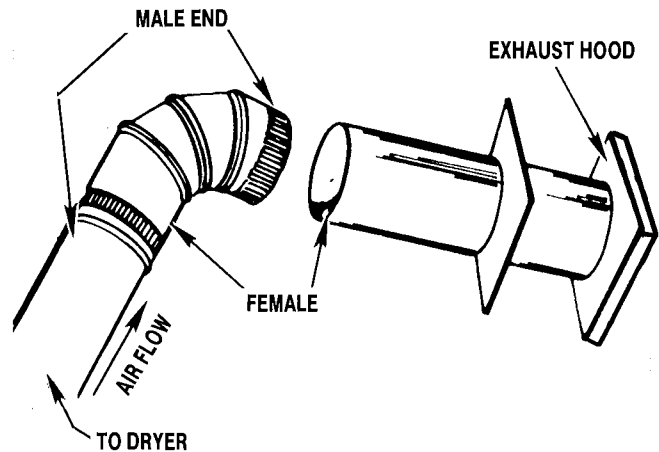
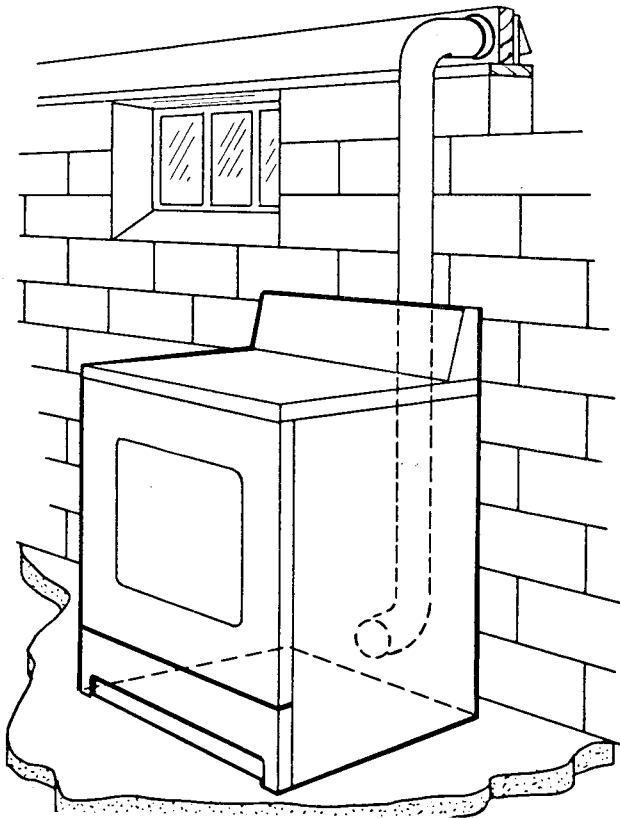


FIGURE 7

Measure the length of 4" pipe required. Exhaust pipe usually comes in 2-foot lengths, so the last piece will need to be cut with tin snips to fit installation. After pipe has been assembled, wrap joints with duct tape where necessary, to assure a tight connection. DO NOT use screws to secure joints, as they will cause lint to accumulate, severely affecting the efficiency of the dryer.

The installation of the exhaust system is now complete and will look similar to the illustration in Figure 8.



BASEMENT LOCATION USING OUTSIDE WALL

FIGURE 8

INSTALLATION USING FLEXIBLE METAL DUCT

Kits are available in 7-foot lengths. Only flexible metal duct is recommended.

Install the exhaust hood as described in the previous section on pages 3-4. Measure the length of flexible metal duct needed. Stretch the ducting and cut to the required length.

Fasten the ducting to the dryer exhaust connection, using a 4" clamp (Figure 9). Move dryer into installation position and connect the other end of the flexible metal ducting to the exhaust hood, also using a clamp. Inspect exhaust duct to make sure it is fully extended. Do not kink or crush the duct.

**WARNING: POTENTIAL FIRE HAZARD
 DO NOT USE NON-METALLIC FLEXIBLE DUCT SINCE IT IS A POTENTIAL FIRE HAZARD.**

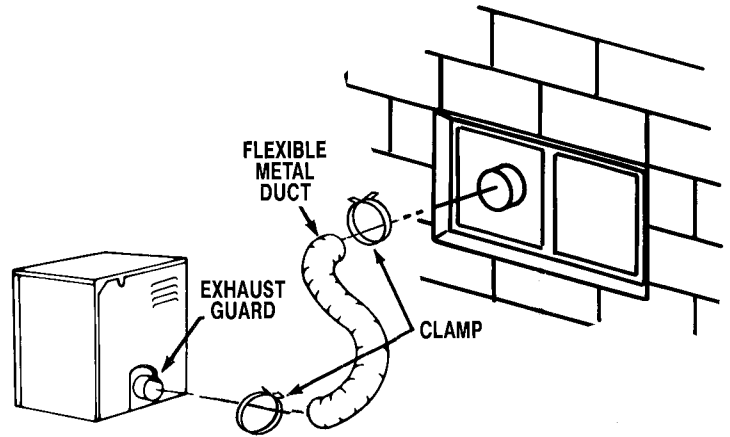


FIGURE 9

INSTALLATION THROUGH THE BASEMENT WINDOW

If the homeowner does not want to cut a hole through the side of the house for the exhaust hood, the hood can be installed in a basement window. Window plates of several sizes with a 4" pre-cut round hole are available in both aluminum and clear plastic. The plastic window plate has the advantage of letting light through.

To install the exhaust hood, first remove the window pane and check its size against the window plate. Cut the plate as needed to match the size of the window pane. Tin snips can be used to cut the aluminum plate; either saw or use a glass cutter on plexiglass window plates.

Before installing the window plate, mount the exhaust hood to the window plate. Insert the pipe through the hole and apply caulking compound around pipe on both sides of plate. Then press hood and trim ring or plate firmly against window plate. Be sure outlet of the hood is facing the correct direction and fasten hood to window plate with sheet metal screws.

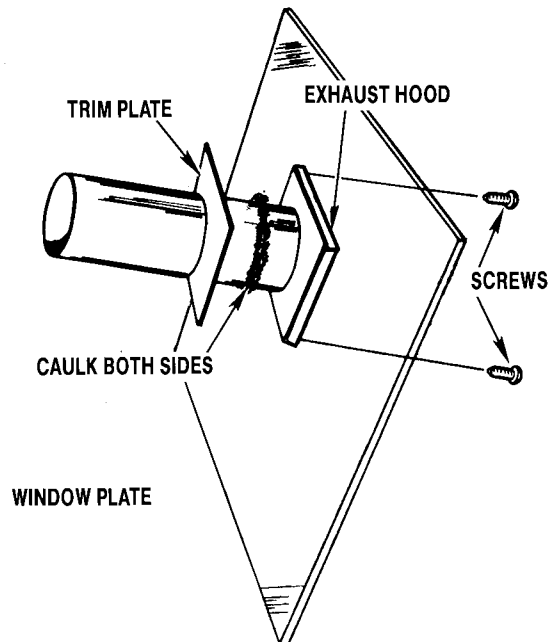


FIGURE 10

The window plate may now be installed in the window frame and either rigid or flexible metal exhaust duct can be installed as described in the previous two sections.

ABOVE-THE-GROUND INSTALLATIONS

When the dryer is located in a room above ground level, there are several acceptable ways to install the exhaust system. Preferably, the dryer should be installed on an outside wall to simplify the exhaust system.

Several exhaust systems will be described in this section: straight through the wall, straight through the wall with a close coupled kit, through the floor, through the roof, through a window and recessed installations.

Straight Through the Wall

This is the best way to exhaust a clothes dryer. Whenever possible, use a short, straight through-the-wall system. Not only are fewer materials required, but the dryer will dry clothes more efficiently. *Figure 11* illustrates this kind of installation.

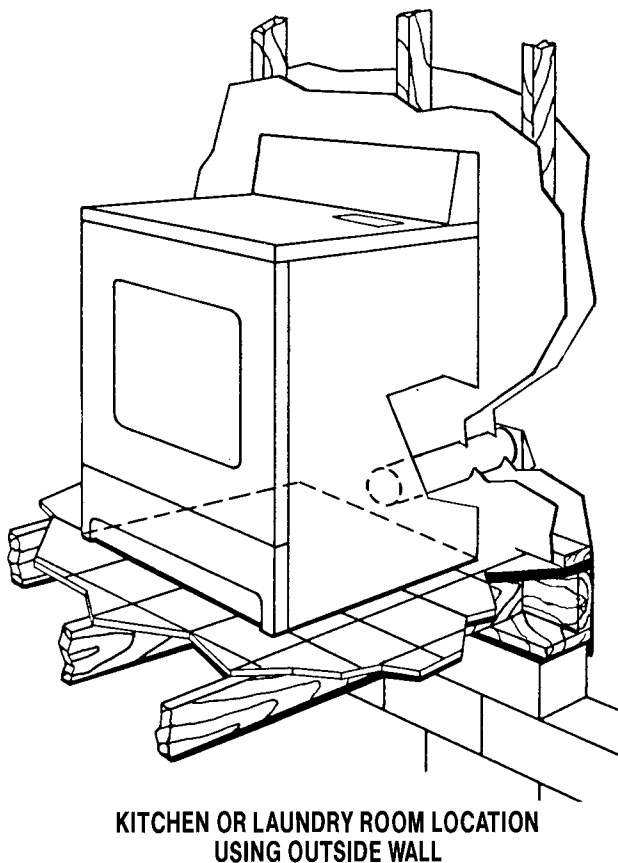


FIGURE 11

The key to installing a straight through-the-wall exhaust is accurately locating the hole for the exhaust hood. Measurements should be made with the dryer in its desired location and with the leveling legs adjusted to the proper height. Refer to pages 3-4 for installing the hood, giving particular attention to plumbing or electrical wiring that may be in the wall.

If, even after careful measurement, the exhaust hood and dryer outlet don't quite match, don't give up—there is a solution. A short piece (6"-12") of flexible metal ducting can be installed to make up for the mismatch.

Through the Floor

In some instances it may be desirable to exhaust the dryer under the floor. If, for example, the dryer cannot be installed on an outside wall, the exhaust system can go through the floor and along the floor joists to an outside wall, as illustrated in *Figure 12*.

The exhaust hood should be located at least 12" above the ground. In areas where drifting leaves and snow collect, the hood should be installed higher so it will not be blocked.

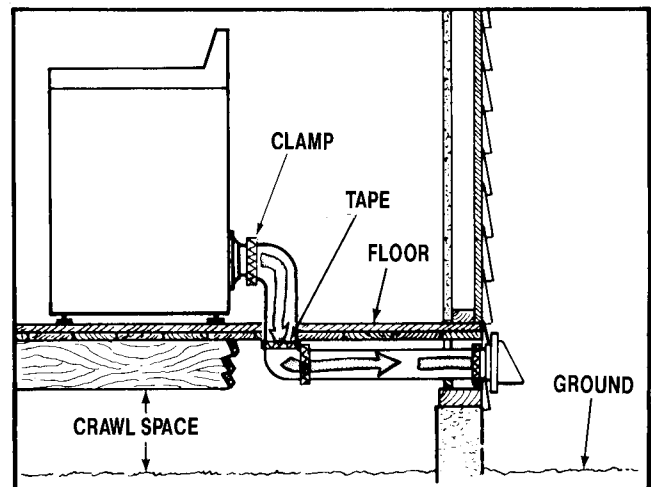


FIGURE 12

When installing this kind of exhaust system, be sure that the horizontal exhaust pipe is not tilted toward the dryer. A tilted horizontal run will trap water and lint, restricting the system, as illustrated in *Figure 13*.

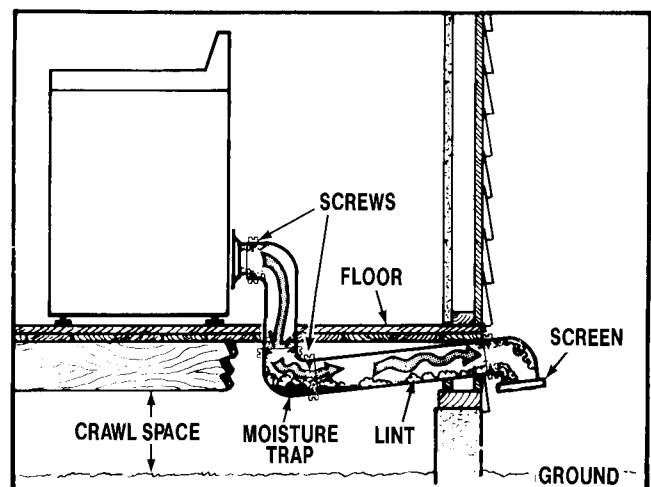


FIGURE 13

Exhausting Through the Roof

Another alternative to exhausting straight through an outside wall is going up through the ceiling and roof. Check with your local building inspector to determine if special requirements must be met. The following special parts will be required for this installation: vent cap, roof flashing, and storm collar.

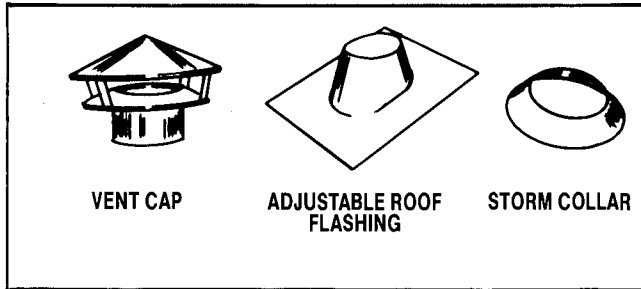


FIGURE 14

After cutting the hole in the roof, the roof flashing should be fitted tightly over the hole, meshing into the shingles on the roof. The exhaust pipe is then installed and the storm collar fitted around the exhaust pipe. The storm collar should be caulked, using one of the plastic caulking materials. The vent cap can then be installed and the remainder of the exhaust pipe can be run to the dryer.

The completed installation through-the-roof is illustrated in Figure 15.

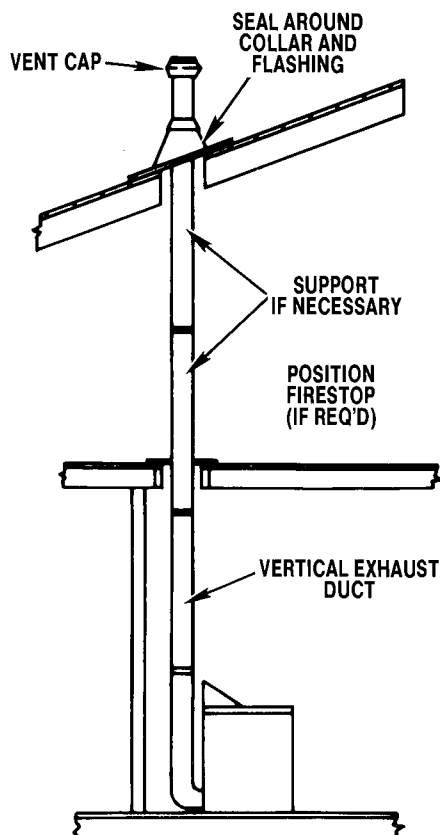


FIGURE 15

RECESSED INSTALLATIONS

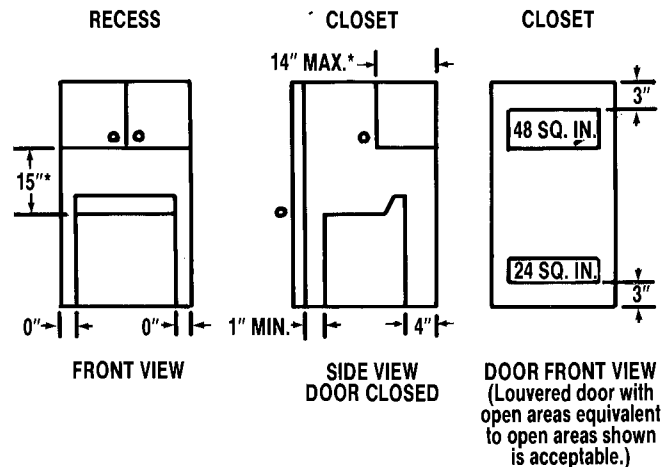
Installing a clothes dryer in a recessed area or alcove poses some special problems which must be considered. For example, if the dryer is to be installed with no clearance to the rear, it MUST be exhausted outside. Also, if there is a shelf or cabinet above the dryer, the dryer MUST be exhausted outdoors. Even then, the bottom of the shelf can be no closer than 15" from the dryer top, and cannot extend more than 14" from the rear wall. See Figure 16.

If this small alcove or recessed area has a door, it becomes a closet, and further requirements must be met.

ANY DRYER INSTALLED IN A CLOSET MUST BE EXHAUSTED TO THE OUTSIDE.

Further, the closet door must have unobstructed openings near the top and the bottom. The sizes of these openings are given in Figure 16.

RECESS OR CLOSET INSTALLATION



*A shelf or cabinet is not permitted above a dryer that is not exhausted to the outside.

MINIMUM INSTALLATION SPACING

Companion appliance spacings should be considered.

NOTE: No other fuel burning appliance may be installed in the same closet.

FIGURE 16

MOBILE HOME INSTALLATIONS

Any dryer installed in a mobile home must be exhausted to the outside, using metal ducting that will not support combustion. If the dryer is exhausted through the floor, and the area under the mobile home is enclosed, the exhaust system must extend to the outside of the enclosure. Extension beyond the enclosure will prevent the accumulation of lint and moisture under the mobile home and is a codes requirement for gas dryers.

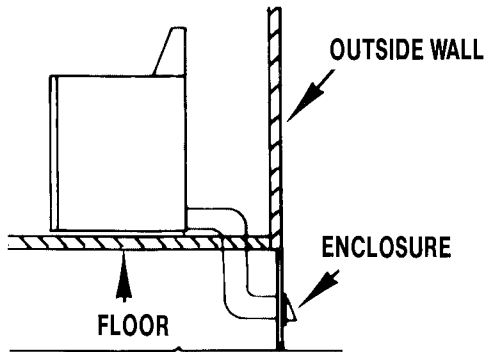


FIGURE 17

Refer to the instructions on pages 3-4 for installing the exhaust hood and page 6 for a through-the-floor exhaust system installation.

EXHAUST RECIRCULATION DEVICES

There are exhaust kits available that allow the filtered exhaust air to be directed inside to conserve energy during winter months. These devices may be used with Whirlpool dryers, providing their use does not violate national or local codes and providing the device does not restrict exhaust air flow. If you use one of these kits, be aware that excessive moisture in the home can cause many problems and that you may see an increase in the time required to dry a load. Also, if you use one of these kits, you must maintain it properly to avoid excessive lint build-up, which can affect the dryer's performance.

MULTIPLE DRYER SYSTEMS

Connecting a number of dryers to a single exhaust system is quite common, both in coin laundry stores as well as in many apartment buildings. There are basically three multiple dryer exhaust systems.

The horizontal system is most common, where a bank of dryers are all located in one room and exhausted through a common duct.

The vertical system is used in some apartment buildings that have a washer and dryer on each floor. Each dryer is exhausted into the same central vertical duct.

The combination system may be used in hi-rise apartments, with a bank of dryers installed at several different levels. Each of these banks then exhaust into a central vertical duct.

HORIZONTAL EXHAUST SYSTEMS

A bank of up to eight dryers may be installed on a central horizontal duct of proper size. With the exhaust system illustrated in *Figure 18*, no auxiliary blower is required in the central duct. Four-inch diameter aluminum pipe should be used to connect each dryer to the central duct.

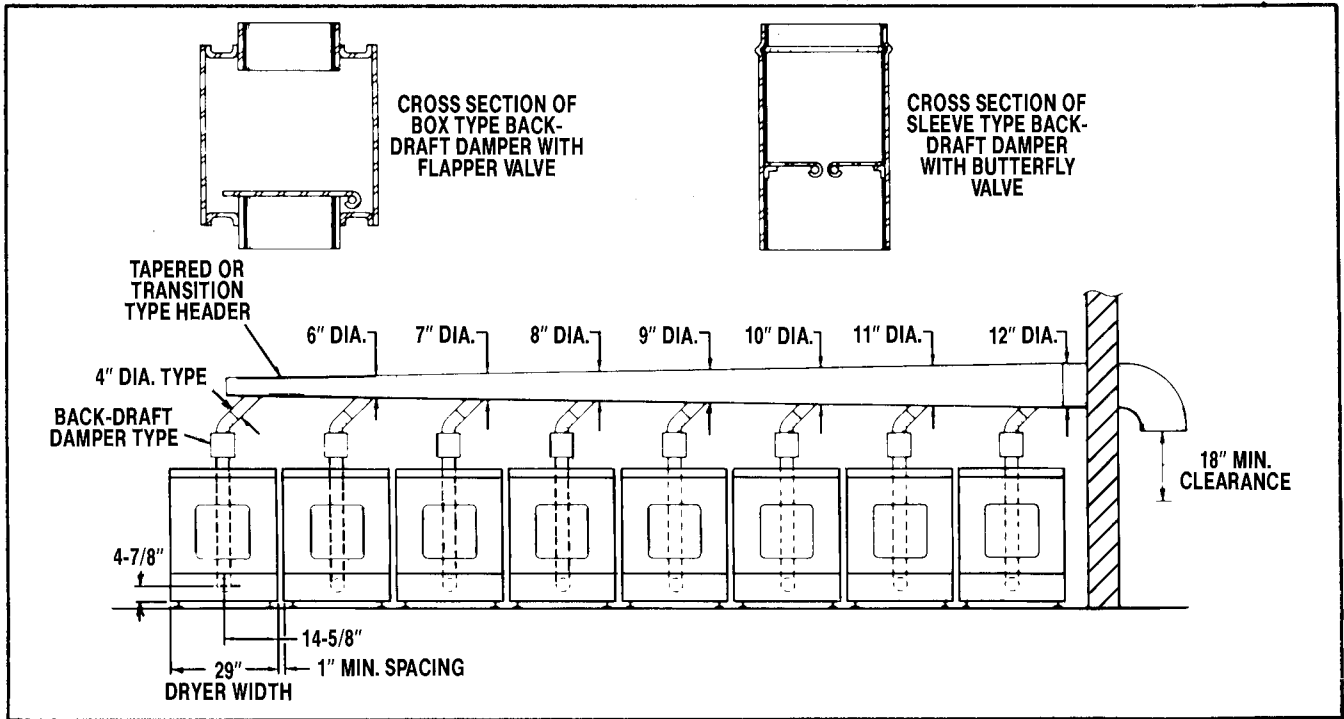


FIGURE 18

Preferably, the central duct should be round rather than rectangular, to reduce lint accumulation.

A backdraft damper should be installed between the dryer and the central duct. The top of *Figure 18* illustrates two different constructions of backdraft dampers. Dampers are available from Heating and Cooling or Sheet Metal Contractors.

The angle at which the 4" pipe enters the central duct should be no greater than 45°. See *Figure 19*. Larger entry angles cause excessive turbulence in the central duct.

The outlet of the central duct may be screened, but provisions must be made for periodic inspection and cleaning of lint from the central duct. Only experience can tell how frequently lint will need to be removed from the ducts, but frequent inspections should enable you to establish your own timetable.

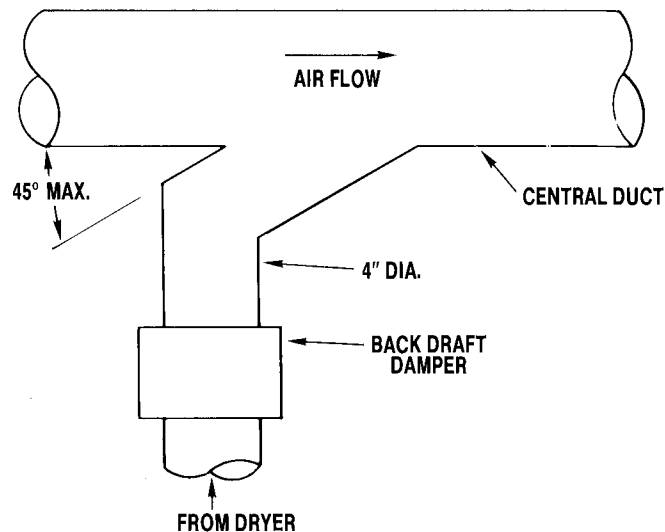


FIGURE 19

VERTICAL EXHAUST SYSTEMS

Multiple vertical exhaust systems must be designed specifically for each application. It is recommended that an architect and/or heating/cooling contractor be consulted for designing the system.

The following guidelines should be considered in the design of a central exhaust system:

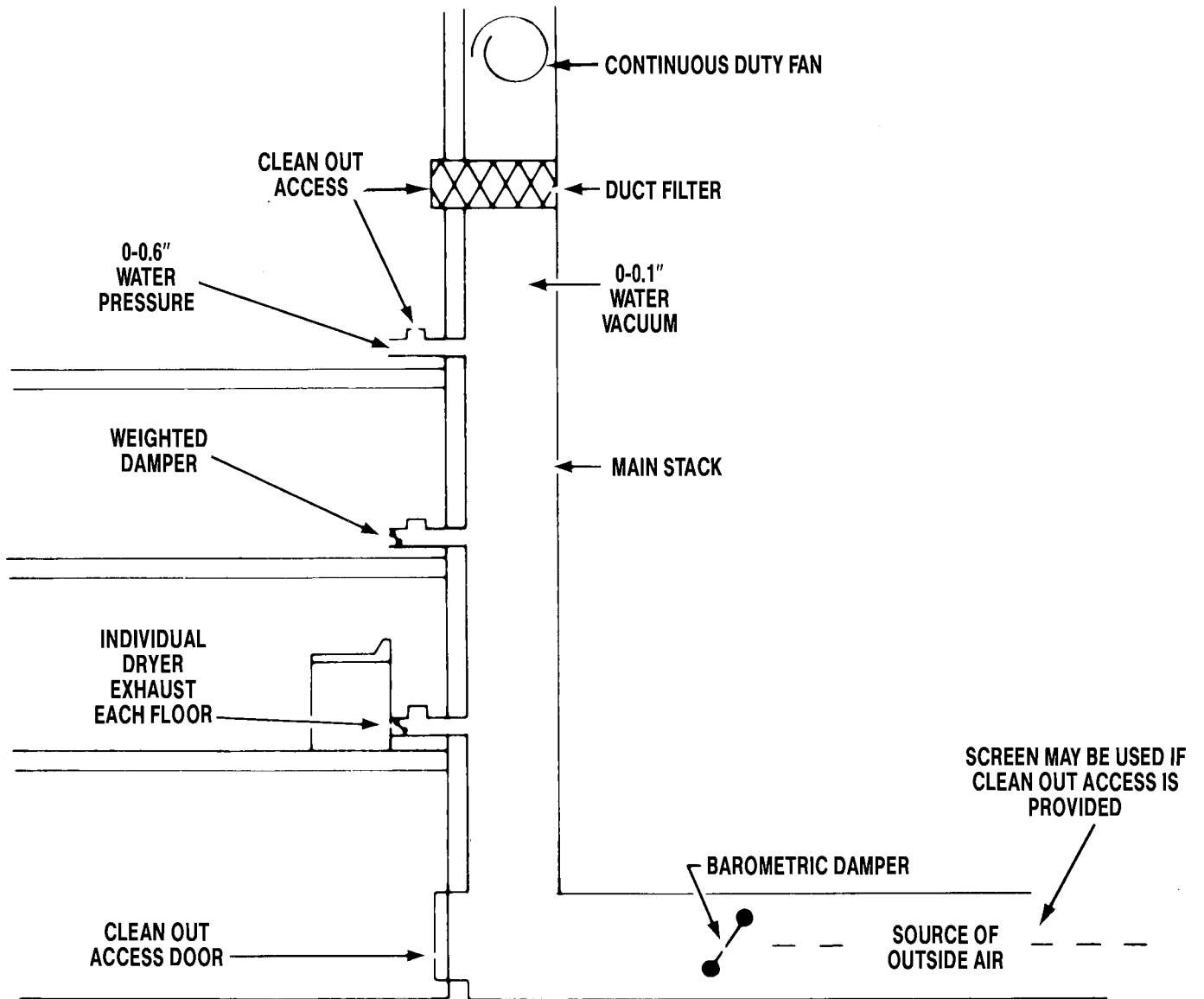
DRYER:

- 1.** Provide all dryers with individual lint screens before connecting to any central exhaust duct system.
- 2.** Exhaust individual dryers to the central exhaust duct system with proper size ducting to assure adequate performance of each dryer. (Dryer has 4" exhaust duct connections.)
- 3.** Install barometric dampers on each individual dryer exhaust duct. These dampers may be used for balancing out the overall duct system. Dampers may be secured or built locally from a sheet metal fabricator.

CENTRAL DUCT SYSTEM:

- 1.** Provide from 0 to 0.1" of water column vacuum in the central exhaust duct and from 0 to 0.6" of water column pressure at the connection of each dryer exhaust vent under all conditions of each dryer's operations. To accomplish this, an exhaust blower and automatic damper in the central duct may be used.
- 2.** Design the central duct system for sufficient capacity to handle the maximum anticipated number of dryers operated at one time. (Provisions should be made to remove 200 CFM of air per dryer.)
- 3.** Consider moisture, lint and air temperatures in the design of the central duct system. (Maximum exhaust temperature of the dryer should not exceed 200° F under normal operating conditions.)
- 4.** Provide for periodic inspection and clean-out of lint accumulation in the central duct system and blower (if used). Large-capacity lint screens of proper design may be used in the central exhaust duct if checked and cleaned frequently.

The following illustration shows a typical vertical exhaust system. *NOTE: To measure the 0 to 0.6" water column pressure at the dryer, refer to the instructions under "EXHAUST SPECIFICATIONS" on page 1.*



TYPICAL VERTICAL TYPE EXHAUST INSTALLATION

FIGURE 20

COMBINATION EXHAUST SYSTEMS

When a combination system is used, first size the horizontal duct for the number of dryers on each level. The duct sizes shown in *Figure 18* can be used. For example, a bank of three dryers would require a duct tapering from four to seven inches.

A weighted damper should be installed at the connection of each dryer to the horizontal duct, so that back pressure may be adjusted to be in the 0.6" water column range.

As in "Vertical Systems," the following guidelines should be used in designing the vertical portion of a combination exhaust system:

1. Provide from 0 to 0.1" of water column vacuum in the central exhaust duct and from 0 to 0.6" of water column pressure at the connection of each dryer exhaust vent under all conditions of each dryer's operations. An exhaust blower and automatic damper in the central duct may be used to accomplish this.
2. Design the central duct system for sufficient capacity to handle the maximum anticipated number of dryers operated at one time. (Provisions should be made to remove 200 CFM of air per dryer.)
3. Consider moisture, lint, and air temperatures in the design of the central duct system. (Maximum exhaust temperatures of the dryer should not exceed 200°F under normal operating conditions.)
4. Provide for periodic inspection and clean-out of lint accumulation in the central duct system and blower (if used). Large-capacity lint screens of proper design may be used if the central exhaust duct is checked and cleaned frequently.

Figure 21 illustrates a typical combination exhaust system.

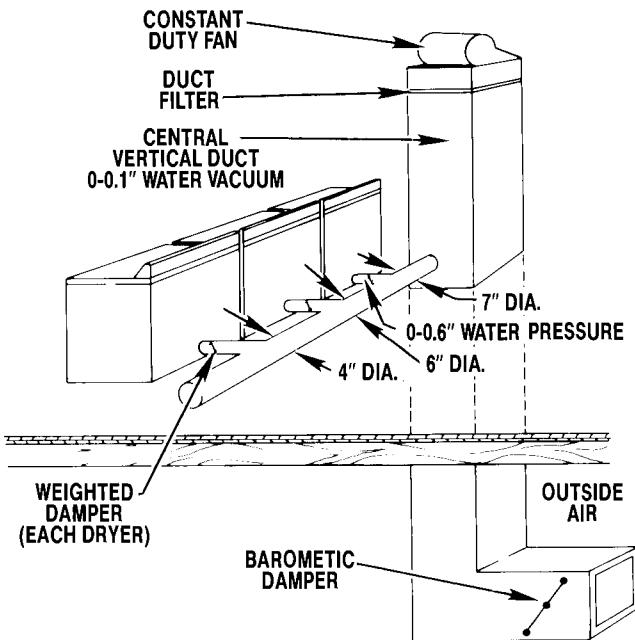


FIGURE 21

INSPECTION AND CLEANING

Every exhaust system should be inspected periodically to be assured it is intact and free from lint. The frequency of these inspections will vary, depending on the system and usage of the dryer. For single-family usage, an annual inspection will probably be adequate. In commercial usage or multiple dryer systems, a 90-day inspection may be more suitable. Also, slow drying complaints or a hot dryer top indicate the need for inspecting the exhaust system.

Disconnect the exhaust duct at the dryer and at the exhaust hood. Inspect the interior of the duct and remove any lint accumulation. Particular attention should be given to the exhaust hood. Lint collects in the exhaust hood so that the flapper will not open or close completely. After cleaning, check to make sure the flapper moves freely.

Reassemble the exhaust duct, making sure the joints are secure.

NOTE: It is important that you only use the 4" duct recommended when installing the exhaust system. It may appear that the difference between the 4" exhaust and the 3" is very little. However, as you can readily see, if you use a 3" duct the exhaust area is drastically reduced.

The example below shows that there is 5-1/2 sq. inches more area in the 4" duct as compared to the 3" duct.

