

# Tumble Dryers



## Tumble Dryers

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Tumble dryers are rated by the American Gas Association based upon performance and a specific dry weight load. For example, a 50 pound (22.7 kg) tumble dryer has a maximum dry weight capacity of 50 pounds (22.7 kg). However, a dry weight 50 pound (22.7 kg) load will dry faster and more efficiently in a larger tumble dryer. When using low-medium "G" force washer-extractors (80 to 180 "G" force) drying capacity must be increased.

- A. Depending on soil levels, washers can process (1) to (2) loads per hour, including loading and unloading time. To keep from having wet linen waiting for a tumble dryer, the tumble dryer must dry the same load in a similar amount of time. A general rule for sizing tumble dryers is one size larger than the washer-extractor

*Example: When using a 60 pound (27.2 kg) Superhigh-extract washer-extractor, the companion tumble dryer should be 75 pound (34 kg).*

Linen material and weave, moisture retention after extraction and tumble dryer BTU capacity also affect tumble dryer requirements.

If part of the volume of laundry is to be ironed, tumble dryer capacity can be reduced accordingly. Contact the flatwork finisher manufacturer for details.

- B. It is usually desirable to enclose the tumble dryers to segregate the make-up air supply, especially if the laundry room is air conditioned or has some sort of environmental control. Tumble dryer enclosures provide (2) significant benefits:
- The tumble dryers do not use conditioned room air for combustion make-up air. This makes operating both the environmental system and the tumble dryers less expensive because air cooled to 75 degrees F (24 degrees C) is not taken from the room and reheated to 160-180 degrees (71-82 degrees C)!
  - Heat emissions from the tumble dryers are reduced up to 80%. A good rule of thumb for estimating heat emission from a tumble dryer (or ironer) is to figure each exposed face will emit 2% of the rated BTU input. If a tumble dryer is not enclosed, there are 5 (the front, both sides, the rear and the top) faces exposed, so the heat emitted is 5 x 0.02 x rated BTU input, or 10%. If the same tumble dryer is enclosed, the only face exposed is the front, so the heat emission would be 1 x 0.02 x rated BTU input. Pretty big difference!

Noise from motors, belts, chains and the airflow in the exhaust duct is also reduced by enclosing tumble dryers.

There are occasions when enclosing tumble dryers is not suitable, so use good judgment for each situation. Always provide enough space for service at the rear of the tumble dryers as well as a properly sized combustion make-up air source. See the section titled "MAKE-UP AIR REQUIREMENTS", page 9, for guidelines on proper sizing.

## Make-Up Air Requirements

A tumble dryer uses forced air exhaust and requires provisions for make-up air to replace the air exhausted by the tumble dryer.

**IMPORTANT: Do not obstruct the flow of combustion and ventilation air.**

The manufacturer's recommended make-up air opening for each tumble dryer is:

MODEL NUMBER	MAX. AIR FLOW CFM / CMM	MAX. ALLOWABLE STATIC PRESSURE (INCHES W.C.)	MFG'S RECOMMENDED MAKE-UP AIR OPENING SQ. IN. / SQ. CM
UT025	450 / 12.7	0.8	144 / 929
UT030	450 / 12.7	0.8	144 / 929
UT035	520 / 14.7	0.6	144 / 929
UTT30	2 X 400 / 2 X 11.3	0.9	220 / 1419
UTT45	2 X 600 / 2 X 17	0.9	288 / 1858
UT050N/L	750 / 21.2	0.5	144 / 929
UT050E	750 / 21.2	0.5	144 / 929
UT050S	750 / 21.2	0.5	144 / 929
UT055	700 / 19.8	0.6	144 / 929
UT075N/L (60 Hz.)	920 / 26.1	0.5	195 / 1258
UT075N/L (50 Hz.)	750 / 21.2	0.5	195 / 1258
UT075E	750 / 21.2	0.5	195 / 1258
UT075S	750 / 21.2	0.5	195 / 1258
UTF75N/L	1100 / 31.1	0.5	250 / 1613
UT120N/L	1600 / 45.3	0.3	360 / 2323
UT120S	1600 / 45.3	0.3	360 / 2323
UT170N/L	2450 / 69.38	0.3	575 / 3710
UT170S	2450 / 69.38	0.3	575 / 3710

Protective louvers in the opening to the outdoors can reduce air movement by approximately 40 percent. The opening must compensate for the area taken up by the louvers.

The make-up air openings for a room containing tumble dryer(s) must be increased sufficiently to prevent downdrafts in any of the vents when all tumble dryers are in operation. Do not locate gravity vented appliances between tumble dryer(s) and make-up air openings. If it is necessary to duct make-up air to the tumble dryer(s), increase the area of the duct work by 25 percent to compensate for any restriction in air movement.

**IMPORTANT: Solvent gases and vapors from dry-cleaning machines create acids when drawn through the heater of a tumble dryer. These acids are corrosive to the tumble dryer as well as to the laundry being dried. Be sure make-up air is free of solvent gases and vapors.**

## Venting Requirements

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### WARNING

**A tumble dryer produces combustible lint. To reduce the risk of fire, and the accumulation of combustion gases, the tumble dryer must be exhausted to the outdoors. To reduce the risk of fire and accumulation of combustible gases, DO NOT exhaust tumble dryer air into a window well, gas vent, chimney, or enclosed unventilated area such as an attic, wall, ceiling, crawl space under a building, or concealed space of a building.**

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For maximum efficiency and minimum lint accumulation, tumble dryer air must be exhausted to the outdoors by the shortest possible route.

Proper sized exhaust ducts are essential for proper operation. All elbows should be sweep type. Exhaust ducts must be assembled so the interior surfaces are smooth so that the joints do not permit the accumulation of lint. Do not use sheet metal screws to join vent sections. Improperly sized or assembled ductwork causes excess back pressure which results in slow drying, lint collecting in the duct, lint blowing back into the room, and increased fire hazard.

**Exhaust ducts shall be constructed of sheet metal or other noncombustible material. Such ducts must be equivalent in strength and corrosion resistance to ducts made of galvanized sheet steel not less than 0.0195 inches (0.495 mm) thick.**

## INDIVIDUAL VENTING

For maximum efficiency and performance, it is preferred to exhaust tumble dryer(s) individually to the outdoors. **At no point may the cross area of installed venting be less than the cross area of the exhaust thimble of the tumble dryer.**

The maximum allowable length venting is 14 feet (4.3 m) and two 90° elbows or equivalent. If the equivalent length of a duct required for an installation exceeds the maximum allowable equivalent length, the diameter of a round duct must be increased by 10% for each additional 20 feet (6.1 m). Cross section area of a rectangular duct must be increased by 20% for each additional 20 feet (6.1 m). The table below shows how to determine equivalent venting:

DUCT DIAMETER	EQUIVALENT LENGTH OF STRAIGHT DUCT
6" (15.2 cm)	One 90° elbow = 7 feet (2.1 m)
8" (20.3 cm)	One 90° elbow = 9.3 feet (2.83 m)
10" (25.40 cm)	One 90° elbow = 11.6 feet (3.5 m)
12" (30.48 cm)	One 90° elbow = 14 feet (4.3 m)
14" (35.56 cm)	One 90° elbow = 16 feet (4.9 m)
16" (40.64 cm)	One 90° elbow = 18.7 feet (5.7 m)
18" (45.72 cm)	One 90° elbow = 21 feet (6.4 m)
Equivalent Length (feet) = 1.7 x Duct Diameter (inches)	

*Example:* A 12" diameter duct's equivalent length of 14 feet of duct and two 90° elbows is:

$$\begin{aligned} \text{Equivalent Length} &= 14 \text{ feet} + (2) 90^\circ \text{ elbows} \\ &= 14 \text{ feet} + 14 \text{ feet} + 14 \text{ feet} \\ &= 42 \text{ feet (12.8 m)} \end{aligned}$$

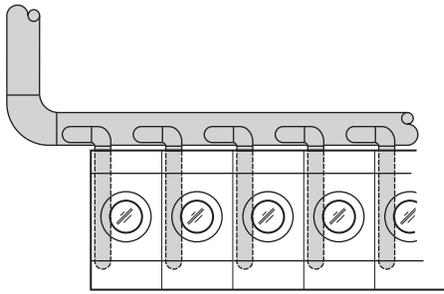
With the tumble dryer in operation, airflow at any point in the duct must be at least 1200 feet (366 m) per minute to insure that the lint remains airborne.

## MANIFOLD VENTING

While it is preferable to exhaust tumble dryers individually to the outdoors, a main collector duct may be used if it is sized according to illustration on Page 7. This illustration indicates minimum diameters, and should be increased if the collector length exceeds 20 feet (6.1 m). The collector duct may be rectangular in cross section, as long as the area is not reduced. Provisions should be made for lint removal and cleaning of the collector duct.

The collector duct must be tapered as shown on Page 7. The individual tumble dryer ducts must enter the collector duct at a 45° angle in the direction of air flow. **Never connect a tumble dryer duct at a 90° angle to the collector duct. Doing so will cause excessive back pressure, resulting in poor performance. Never connect two tumble dryer exhaust ducts directly across from each other at the point of entry to the collector duct.**

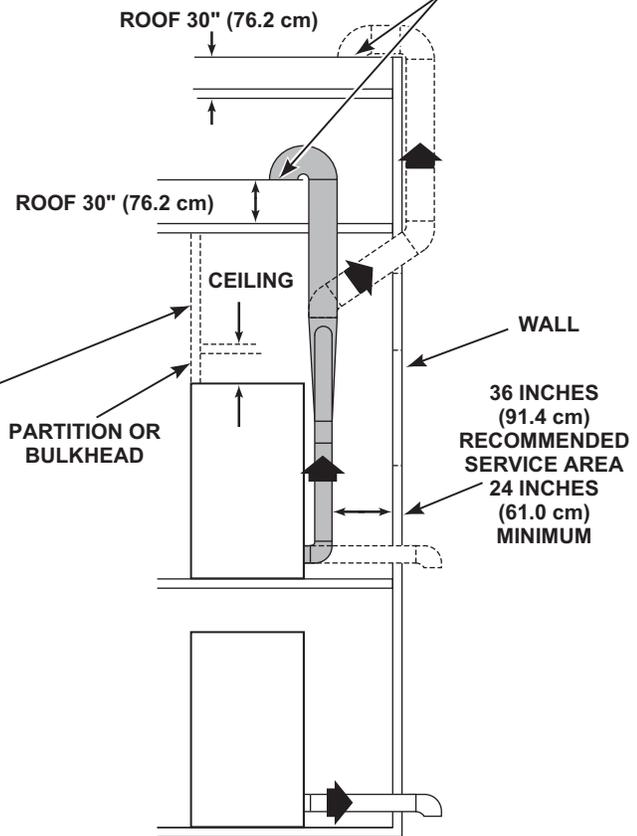
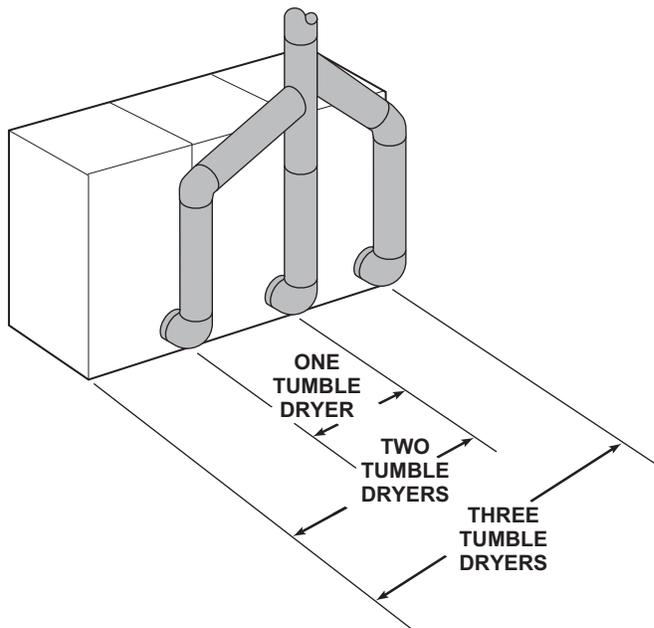
**Section 9 - Tumble Dryers**



**FOR BEST PERFORMANCE** provide an individual exhaust duct for each tumble dryer. Do not install a hot water heater in room containing tumble dryers. It is better to have the water heater in a separate room with a separate air inlet.

**NOTE:** Do not install wire mesh or screen in this opening as lint will build up and prevent proper discharge of air from tumble dryers.

**REMOVABLE STRIP OF PANEL IN FRAMING WALL TO PERMIT REMOVAL OF TUMBLE DRYER FROM FRAMING WALL**



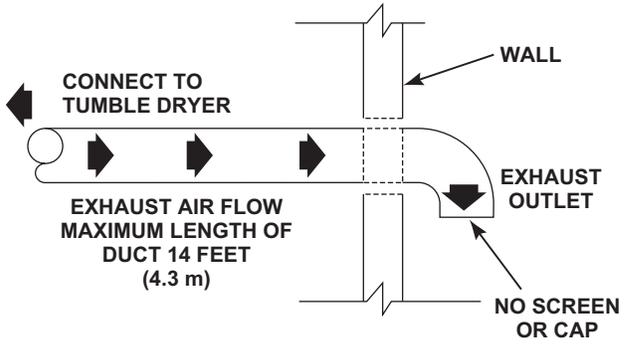
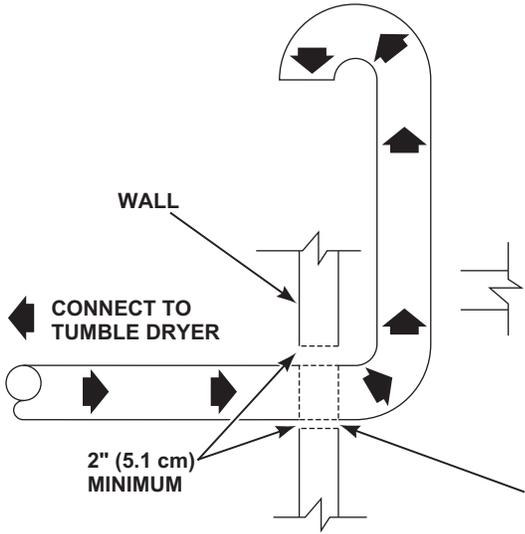
**CONSULT YOUR LOCAL BUILDING CODE FOR REGULATIONS WHICH MAY ALSO APPLY**

**NOTE:** Inside of duct shall be smooth. Do not use sheet metal screws to join sections.

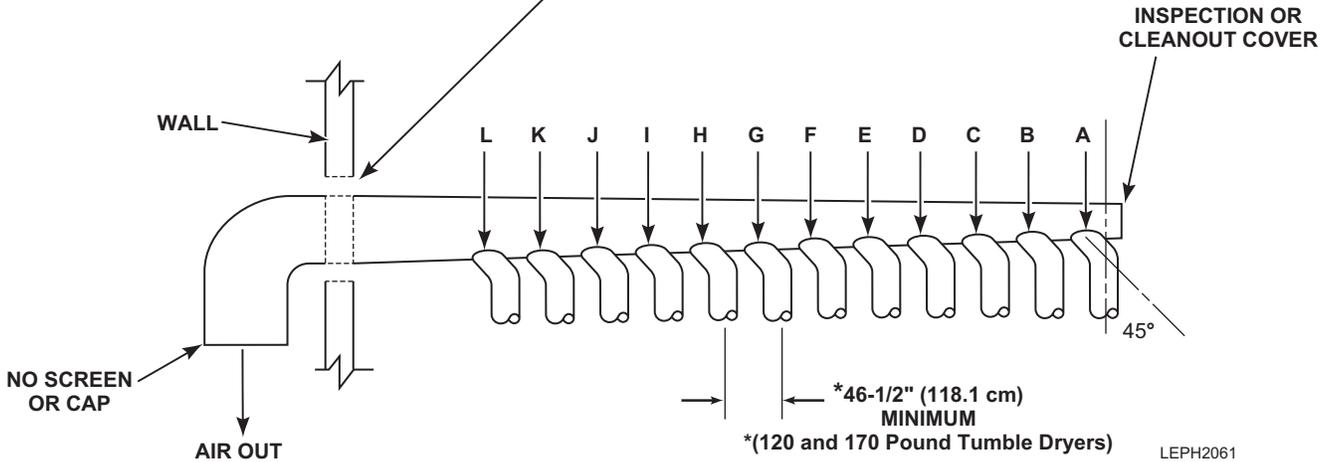
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**VERTICAL EXHAUST INSTALLATION**

**HORIZONTAL EXHAUST INSTALLATION**



**NOTE: WHERE THE EXHAUST DUCT PIERCES A COMBUSTIBLE WALL OR CEILING, AN OPENING HAVING A DIAMETER FOUR INCHES (10.2 cm) LARGER THAN THE DIAMETER OF THE EXHAUST DUCT SHALL BE PROVIDED AND THE EXHAUST DUCT CENTERED WITHIN THE OPENING.**



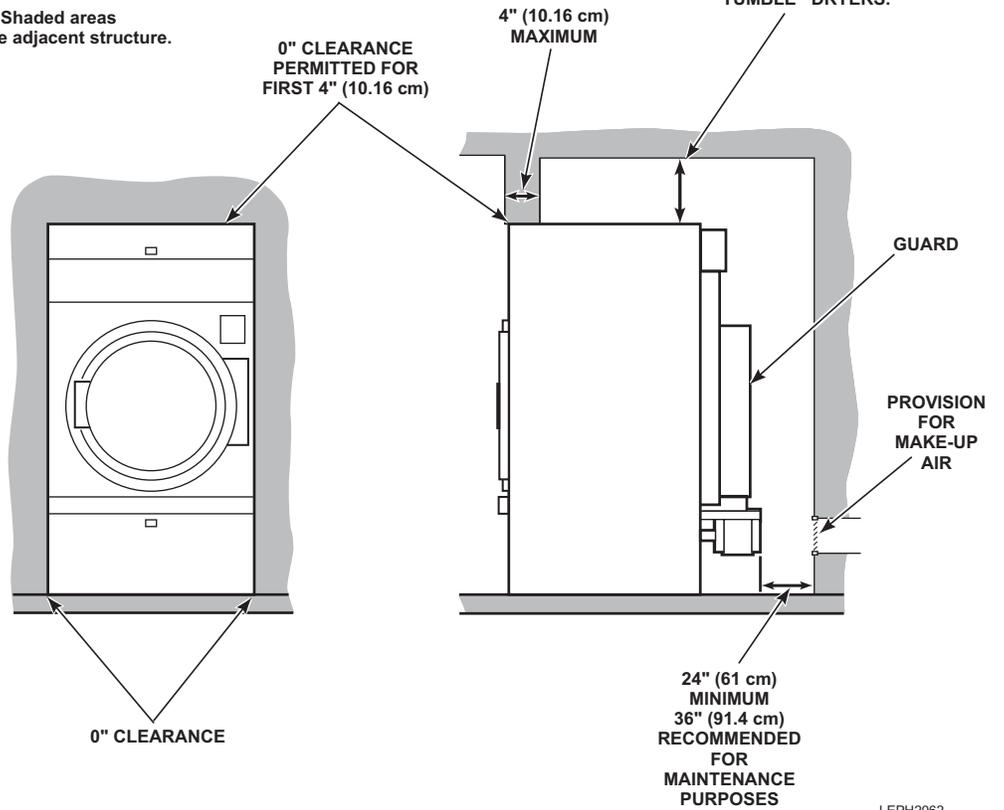
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DUCT STATION	MINIMUM DIAMETER			
	25, 30 POUND ELECTRIC AND STEAM	35, 50, TT30, TT45, 55, 75 POUND GAS, ELECTRIC AND STEAM	F75 AND 120 POUND GAS AND STEAM	170 POUND GAS AND STEAM
A	7" (17.8 cm)	9" (22.9 cm)	10" (25.4 cm)	12" (30.5 cm)
B	9" (22.9 cm)	12" (30.5 cm)	15" (38.1 cm)	17" (43.2 cm)
C	11" (27.9 cm)	15" (38.1 cm)	18" (45.7 cm)	21" (53.3 cm)
D	13" (33 cm)	17" (43.2 cm)	21" (53.3 cm)	24" (60.1 cm)
E	15" (38 cm)	19" (48.3 cm)	24" (61.0 cm)	27" (68.6 cm)
F	16" (40.6 cm)	21" (53.3 cm)	26" (66.0 cm)	30" (76.2 cm)
G	18" (45.7 cm)	23" (58.4 cm)	28" (71.1 cm)	32" (81.3 cm)
H	19" (48.3 cm)	25" (63.5 cm)	30" (76.2 cm)	34" (86.4 cm)
I	20" (50.8 cm)	26" (66.0 cm)	32" (81.3 cm)	36" (91.4 cm)
J	21" (53.3 cm)	27" (68.6 cm)	33" (83.8 cm)	38" (96.5 cm)
K	23" (58.4 cm)	29" (73.9 cm)	35" (88.9 cm)	40" (101.6 cm)
L	23" (58.4 cm)	30" (76.2 cm)	36" (91.4 cm)	42" (106.7 cm)

# Tumble Dryer Enclosure

NOTE: Shaded areas indicate adjacent structure.

**NOTICE:** CLEARANCE AT TOP OF TUMBLE DRYERS CABINET FROM COMBUSTIBLE CONSTRUCTION MUST BE A MINIMUM OF 12 INCHES (304.8 mm) FOR 30, 50 AND 75 POUND TUMBLE DRYERS; AND 4 INCHES (101.6 mm) FOR 120 AND 170 POUND TUMBLE DRYERS.



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# Tumble Dryer Conversion Table

Conversion Table		
Multiply	By	To Obtain
BTU	.252	kCal
BTU	1055	Joules
Inch	2.54	Centimeters
Inches W.C.	.036	Pounds / sq. inch
Inches W.C.	.249	kPa
lbf / inch <sup>2</sup> (psi)	.0369	kPa
Pounds / sq. in.	.06895	Bars
Pounds / sq. in.	.070	kg / sq. cm.
Pounds (lbs.)	.454	Kilograms
Boiler Horsepower	33479	BTU
Boiler Horsepower	34.5	lbs. Steam / hr.
CFM	.471	liters / second