



Tumble Dryer




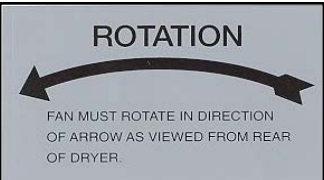
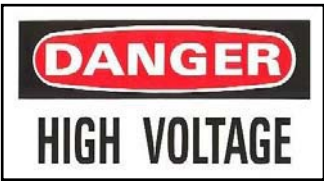

INSTRUCTION MANUAL





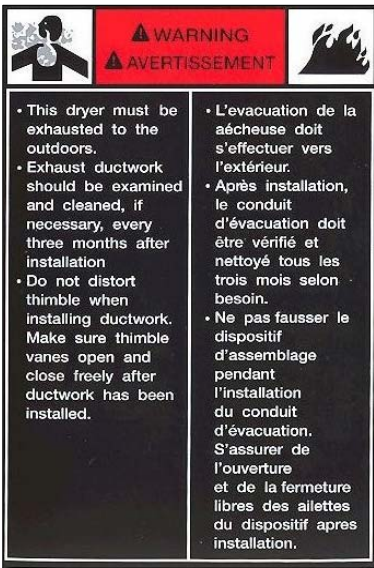
Model
DP200
DP250



KEY SYMBOLS

Anyone operating or servicing this machine must follow the safety rules in this manual. Particular attention must be paid to the **DANGER**, and **WARNING**, and **CAUTION** blocks which appear throughout the manual.

Symbols	Description
	<p>This warning symbol indicated the presence of hot surfaces that could cause serious burns. Stainless steel and steam lines can become extremely hot and should not be touched.</p>
	<p>IMPORTANT! Keep lint compartment clean</p>
	<p>WARNING! Dry only water washed fabrics. Do not use heat for drying foam rubber or similar textured rubber like materials.</p>
	<p>Information Alert to the correct direction of rotation.</p>
	<p>DANGER! High voltage present.</p>
	<p>DANGER! For the hand, Belts and pulley in motion. Do Not operate with out Guard.</p>

Symbols	Description
	<p>WARNING! Put DRYCLEANED Laundry into this dryer</p>
	<p>Information The machine is use 24 VAC. for control.</p>
	<p>IMPORTANT! Clean cylinder and check tumbler dryer operation by running a load of wet cloths at full heat for 20 minutes.</p>
	<p>WARNING! To reduce the risk of electric shock, disconnect electric power before servicing</p>
	<p>WARNING! This dryer must be exhausted to the outdoors. Exhaust ductwork should be examined and cleaned, if necessary, every three months after installation. Do not distort thimble when installing ductwork. Make sure thimble vanes open and close freely after ductwork has been installed.</p>

SECTION 1

IMPORTANT INFORMATION

A. RECEIVING AND HANDLING

The dryer is shipped in a protective stretch wrap cover with protective cardboard comers and top cover (or optional box) as a means of preventing damage in transit. Upon delivery, the dryer and / or protective packaging, and wooden skid **should be** visually inspected for shipping damage. If any damage whatsoever is noticed, inspect further before delivering carrier leaves.

Dryers damaged in shipment:

1. All dryers **should be** inspected upon receipt and before they are signed for.
2. If there is suspected damage or actual damage, the trucker's receipt **should be** so noted.
3. If the dryer is damaged beyond repair, it **should be** refused. Those dryers which were not damaged in a damaged shipment **should be** accepted, but the number received and number refused **must be** noted on the receipt.
4. If you determine that the dryer was damaged after the trucker has left your location, you should call the delivering carrier's freight terminal immediately and file a claim. The freight company considers this concealed damage. This type of freight claim is very difficult to get paid and becomes extremely difficult when more than a day or two passes after the freight was delivered. It is your responsibility to file freight claims. Dryers / parts damaged in transit **cannot** be claimed under warranty.
5. Freight claims are the responsibility of the consignee, and all claims **must be** filed at the receiving end.

Dryer assumes no responsibility for freight claims or damages.

6. If you need assistance in handling the situation, please contact the Dryer traffic manager

IMPORTANT: The dryer **must be** transported and handled in an upright position at all times.

B. SAFETY PRECAUTIONS

WARNING: For your safety, the information in this manual **must be** followed to minimize the risk of fire or explosion or to prevent property damage, personal injury or loss of life.

WARNING: The dryer must never be operated with any of the back guards, outer tops, or service panels removed. **PERSONAL INJURY** or **FIRE COULD RESULT.**

1. **DO NOT** store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
2. Purchaser / user should consult the local gas supplier for proper instructions to be followed in the event the user smells gas. The instructions **should be** posted in a prominent location.

IMPORTANT INFORMATION

3. What To Do If You Smell Gas:

- a. **DO NOT** tries to light any appliance.
 - b. **DO NOT** touches any electrical switch.
 - c. **DO NOT** uses any phone in your building.
 - d. Clear the room, building or area of all occupants.
 - e. Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - f. If you **cannot** reach your gas supplier, call the fire department.
4. Installation and service **must be** performed by a qualified installer, service agency, or the gas supplier.
 5. Dryer(s) **must be** exhausted to the outdoors.
 6. Although dryer produces a very versatile machine, there are some articles that, due to fabric compositional cleaning method, **should not be** dried in it.

WARNING: Dry only water – washed fabrics. **DO NOT** dry articles spotted or washed in dry cleaning solvents, a combustible detergent, or "all purpose" cleaner. **EXPLOSION COULD RESULT.**

WARNING: **DO NOT** dry rags or articles coated or contaminated with gasoline, kerosene, oil, paint, or wax. **EXPLOSION COULD RESULT.**

WARNING: **DO NOT** dry mop heads. Contamination by wax or flammable solvents will create a fire hazard.

WARNING: **DO NOT** use heat for drying articles that contain plastic, foam, sponge rubber, or similarly textured rubber – like materials. Drying in a heated basket (tumbler) may damage plastics or rubber and also may be a fire hazard.

7. A program **should be** established for the inspection and cleaning of the lint in the burner area, exhaust duct work and area around the back of the dryer. The frequency of inspection and cleaning can best be determined from experience at each location.

WARNING: The collection of lint in the burner area and exhaust duct work can create a potential fire hazard.

8. For personal safety, the dryer must be electrically grounded in accordance with local codes and / or the National Electric Code ANSI/NFPA NO. 70 – LATEST EDITION, or in Canada, the Canadian Electrical Codes Parts 1 & 2 CSA C22.1 – 1990 or LATEST EDITION.

NOTE: Failure to do so will **VOID THE WARRANTY.**

9. Under no circumstances should the dryer door switch, lint drawer switch or heat circuit safety devices ever be disabled.

WARNING: PERSONAL INJURY or FIRE COULD RESULT.

10. This dryer **is not** to be used in the presence of dry cleaning solvents or fumes.
11. Remove articles from the dryer as soon as the drying cycle has been completed.

IMPORTANT INFORMATION

WARNING: Articles left in the dryer after the drying and cooling cycles have been completed can create a fire hazard.

12. **DO NOT** operates steam dryers with more than 125 Psi steam pressure. Excessive steam pressure can damage steam coil and / or harm personnel.
13. Replace leaking flexible steam hoses or other steam fixtures immediately. **DO NOT** operate dryer with leaking flexible hoses. **PERSONAL INJURY MAY RESULT.**
14. Read and follow all caution and direction label attached to Dryer.

IMPORTANT: You must disconnect and lockout the electric supply and the gas supply or the steam supply before any covers or guards are remove from the machine to allow access to cleaning, adjusting, installation, or testing of any equipment per **OSHA (Occupational Safety and Health Administration) STANDARDS.**

SECTION 2

SPECIFICATIONS / COMPONENT IDENTIFICATION

A. TECHNICAL SPECIFICATIONS

1. Dryer Model 200 lb. Technical Specifications

Maximum Capacity (Dry Weight)		200 lbs.	90 kg.
Basket Diameter		59"	1499 mm.
Basket Depth		46 7/8"	1190 mm.
Basket Volume		74 cu. ft.	2.1 cu. m.
Door Opening (Diameter)		35 ½"	900 mm.
Door sill Height		32"	811 mm.
Cabinet Size (WxDxH)		65x79 ¼"x93 3/8"	1650x2012x2372
Basket Motor		3 HP.	2.25 kw.
Blower motor		10 HP.	7.5 kw.
Net weight (approx)		2535 lbs.	1149.6 kg.
Gas	Air flow	5,300 cfm.	150 cmm.
	Heat Input	750,000 Btu/hr	189,000 kcal/hr
	Gas inlet	1 ½"	38 mm.
	Air outlet	8x17 ½"	203x444.5 mm.
	Circuit Requirement 220-240/50-60/3	35.7 Amp.	35.7Amp.
	Circuit Requirement 380-440/50-60/3	20.5 Amp.	20.5 Amp.
	Shipping weight (approx)	2725 lbs.	1435.8 kg.
Steam	Air flow	6500 cfm.	184 cmm.
	Steam consumption	27 BHP	27 BHP
	Operating pressure	80-125 psi.	5.5-8.62 kg/sq cm.
	Steam supply	2"	50.8 mm.
	Steam return	2"	50.8 mm.
	Air outlet	8x17 ½"	203x444.5 mm.
	Circuit Requirement 220-240/50-60/3	35.7 Amp.	35.7 Amp.
	Circuit Requirement 380-440/50-60/3	20.5 Amp.	20.5 Amp.
	Shipping weight (approx)	3018 lbs.	1369 kg.

SPECIFICATION/COMPONENT IDENTIFICATION

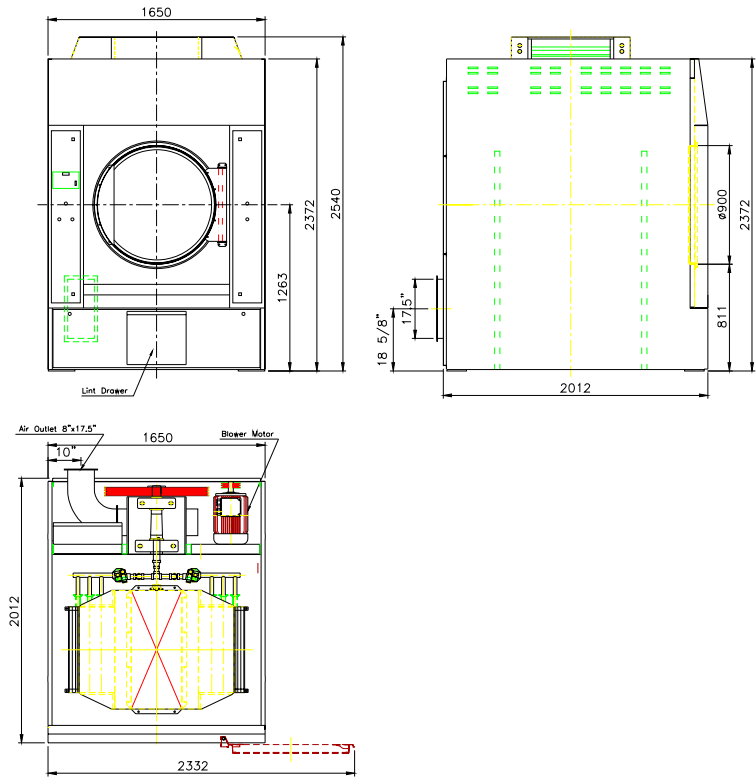
2. Dryer Model 250 lb. Technical Specifications

Maximum Capacity (Dry Weight)		250 lbs.	113 kg.
Basket Diameter		59"	1499 mm.
Basket Depth		48.82"	1240 mm.
Basket Volume		77.9 cu. ft.	2.2 cu. m.
Door Opening (Diameter)		35.43"	900 mm.
Door sill Height		31.93"	811 mm.
Cabinet Size (WxDxH)		65"x82.28"x93.38"	1650x2090x2372
Basket Motor		5 HP.	3.7 kw.
Blower motor		10 HP.	7.5 kw.
Net weight (approx)		2908 lbs.	1319 kg.
Gas	Air flow	5,500 cfm.	155.7 cmm.
	Heat Input	950,000 Btu/hr	235,620 kcal/hr
	Gas inlet	1 ½"	38.1 mm.
	Air outlet	11 ¼"x17 5/8"	286x448 mm.
	Circuit Requirement 220-240/50-60/3	40.5 Amp.	40.5 Amp.
	Circuit Requirement 380-440/50-60/3	23.2 Amp.	23.2 Amp.
	Shipping weight (approx)	3102 lbs.	1407 kg.
Steam	Air flow	6100 cfm.	172 cmm.
	Steam consumption	31 BHP	31 BHP
	Operating pressure	80-125 psi.	5.5-8.62 kg/sq cm.
	Steam supply	2"	50.8 mm.
	Steam return	2"	50.8 mm.
	Air outlet	11 ¼"x17 5/8"	286x448 mm.
	Circuit Requirement 220-240/50-60/3	40.5 Amp.	40.5 Amp.
	Circuit Requirement 380-440/50-60/3	23.2 Amp.	23.2 Amp.
Shipping weight (approx)	3432 lbs.	1556 kg.	

B. TECHNICAL DIMENSION

1. Dryer Model 200 lb. Technical Dimension

Gas Model



Steam Model

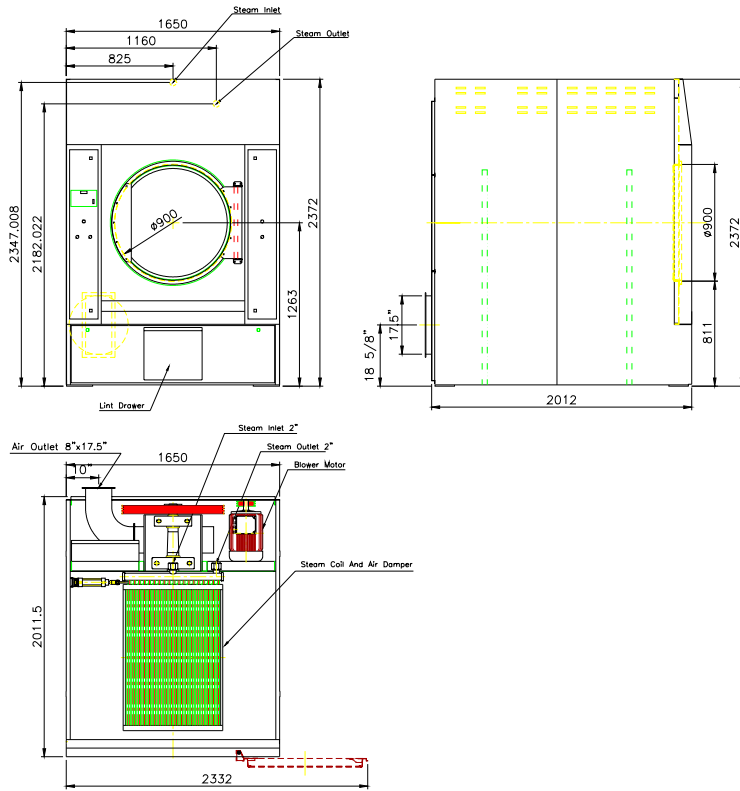


Figure.2-1 Dryer Model 200 lb. Technical Dimension

2. Dryer Model 250 lb. Technical Dimension

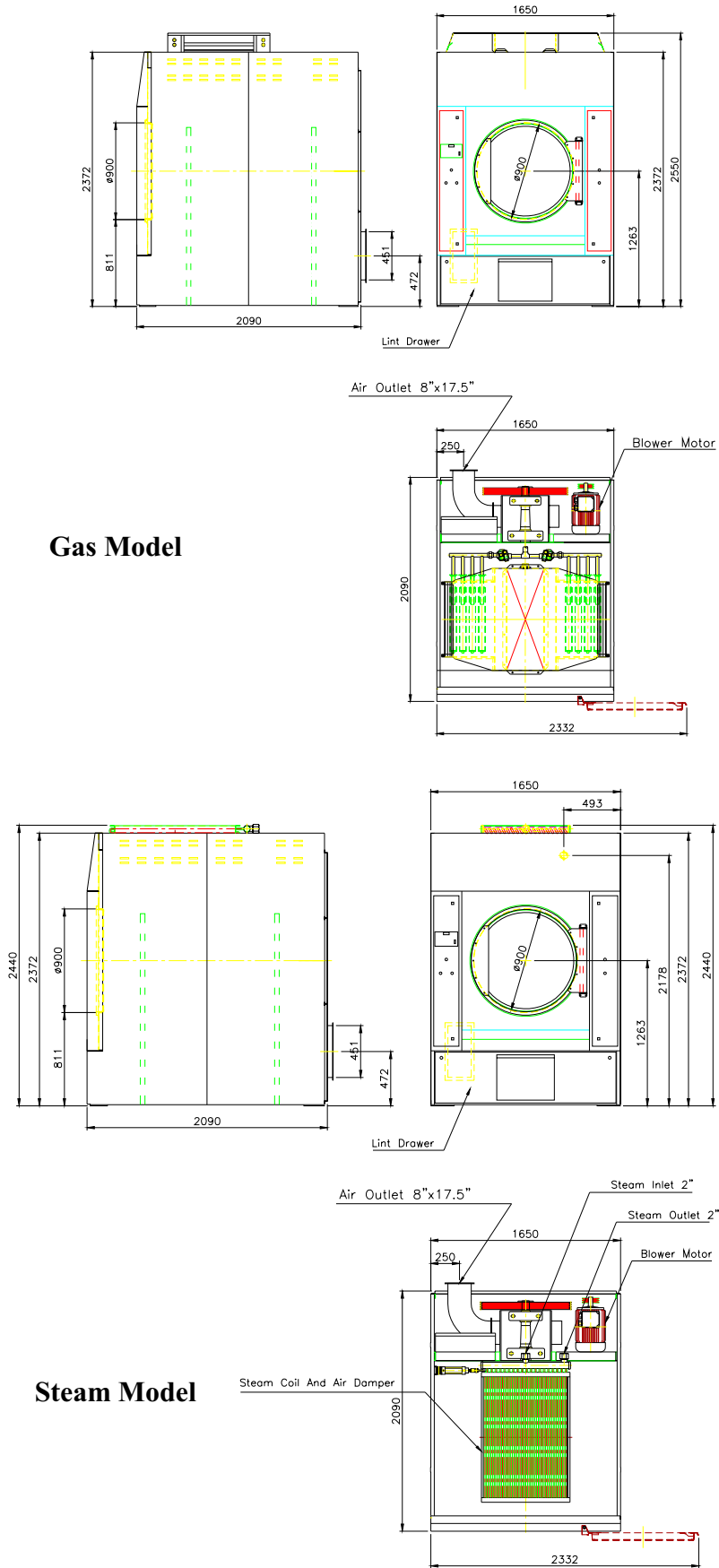


Figure.2-2 Dryer Model 250 lb. Technical Dimension

C. COMPONENT IDENTIFICATION

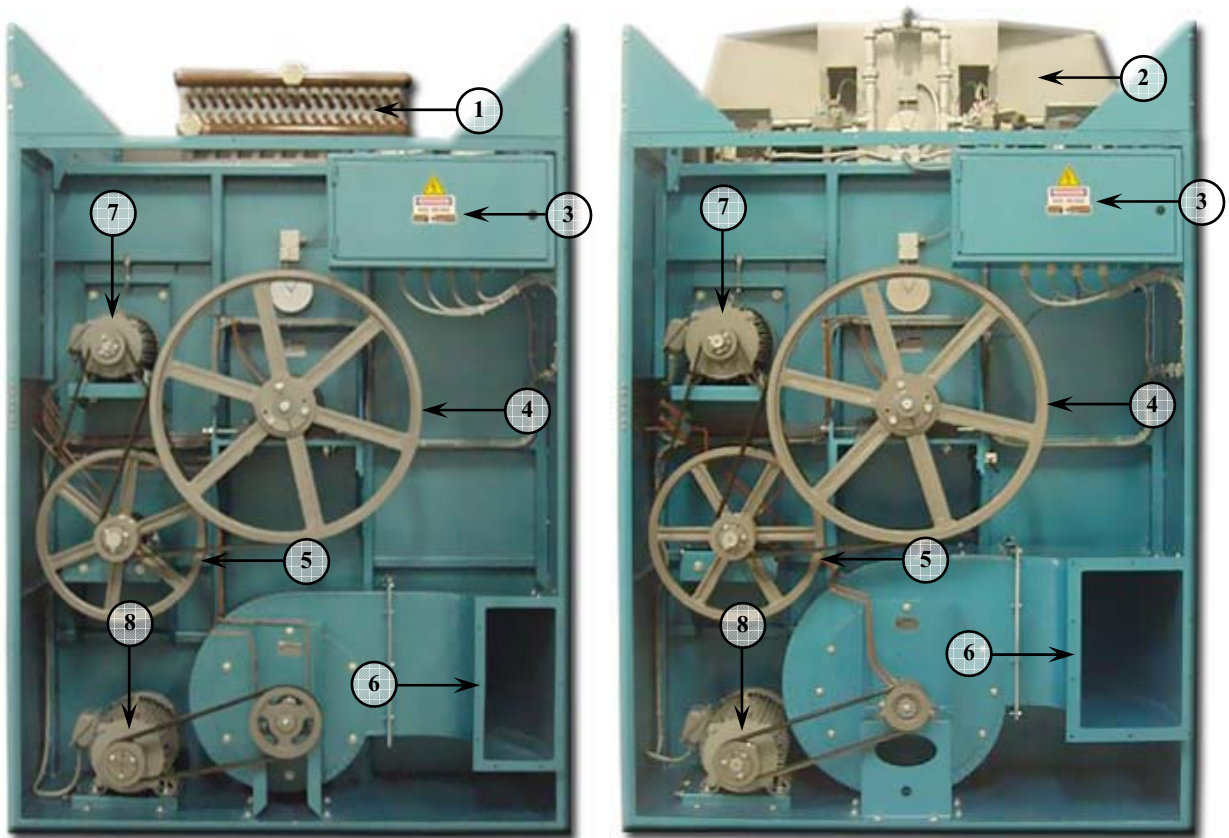
1. Dryer Model 200,250 lb. Front View



No.	Description
1	Microprocessor control/ Keyboard Panel Assembly (Control)
2.	Main controller panel
3.	Front panel assembly, top
4.	Panel front cabinet
5.	Main door assembly
6.	Front panel assembly, lower
7.	Door lint drawer filter
8.	Right side panel assembly

Figure.2-3 Dryer Model 200,250 lb. Front View

2. Dryer Model 200,250 lb. Rear View



No.	Description
1.	Heating element (Steam)
2.	Heating element (Gas)
3.	Electric service box
4.	Basket pulley
5.	Idler pulley
6.	Exhaust duct
7.	Basket drive motor
8.	Blower motor

Figure.2-4 Dryer Model 200,250 lb. Rear View

SECTION 3

INSTALLATION PROCEDURES

Installation **should be** performed by competent technicians in accordance with local and state codes. In the absence of these codes, installation **must conform** to applicable AMERICAN NATIONAL STANDARDS: ANSI Z223.1 -LATEST EDITION (NATIONAL FUEL CODE) or ANSI/NFPA No.70 LATEST EDITION (NATIONAL ELECTRIC CODE) or in CANADA, the installation **must conform** to applicable CANADIAN STANDARDS: CAN/CGA-B149.1-M91 (Natural Gas) or CAN/CGA-B149.2-M91 (L.P. Gas) or LATEST EDITION (for GENERAL INSTALLATION and GAS PLUMBING) or CANADIAN ELECTRICAL CODES PARTS 1 & 2 CSA C22.1-1990 or LATEST EDITION (for ELECTRICAL CONNECTIONS).

A. LOCATION REQUIREMENTS

Before installing the dryer, be sure the location conforms to local codes and ordinances. In the absence of such codes or ordinances location **must conform** with the National Fuel Gas Code ANSI Z223.1-LATEST EDITION, or in CANADA, the Canadian Installation Codes CAN/CGA-B149.1-M91 (Natural Gas) or CAN/CGA-B149.2-M91 (L.P. Gas) or LATEST EDITION.

1. The dryer **must be** installed on a sound level floor capable of supporting its weight. It is recommended that carpeting be removed from the floor area that the dryer is to rest on.
2. The dryer **must not be** installed or stored in an area where it will be exposed to water and/ or weather.
3. This dryer is for use in noncombustible locations.
4. Provisions for adequate air supply **must be** provided as noted in this manual (refer to **Fresh Air Supply** in **Section D**).
5. Clearance provisions **must be** made from combustible construction as noted in this manual (refer to **Dryer Enclosure Requirements** in **Section C**).
6. Provisions **must be** made for adequate clearances for servicing and for operation as noted in this manual (refer to **Dryer Enclosure Requirements** in **Section C**).
7. Dryer **must be** exhausted to the outdoors (refer to **Exhaust Requirements** in **Section E**).
8. Dryer **must be** located in an area where correct exhaust venting can be achieved as noted in this manual (refer to **Exhaust Requirements** in **Section E**).

IMPORTANT: Dryer **should** be located where a minimum amount of exhaust duct will be necessary.

INSTALLATION PROCEDURES

B. DRYER ENCLOSURE REQUIREMENTS

Even though a 12-inch clearance is acceptable, it is recommended that the rear of the dryer be positioned approximately two (2) feet (24-inches) from nearest obstruction (i.e., wall) for ease of installation, maintenance, and service. Bulkheads and partitions **should be** made from noncombustible materials.

The clearance between the bulkhead header and the dryer **must be** a minimum of 4-inches and must not extend more than 4-inches to the rear of the dryer front. The bulkhead facing must not be closed in all the way to the top of the dryer. A 2-inch clearance is required.

NOTE: Bulkhead facing should not be installed until after dryer is in place. Ceiling area must be located a minimum of 12-inches above the top of the dryer.

IMPORTANT: Even though a minimum of only 12-inches is required, 18-inches or more is suggested, for steam dryers and especially in cases where sprinkler heads are over the dryers.

NOTE: When fire sprinkler systems are located above the dryers, a minimum of 18-inches above the dryer console (module) is suggested. Dryers may be positioned side wall to side wall however, 1 or 2-inches is suggested between dryers or wall) for ease of installation and maintenance. Allowances must be made for the opening and closing of the control and lint doors.

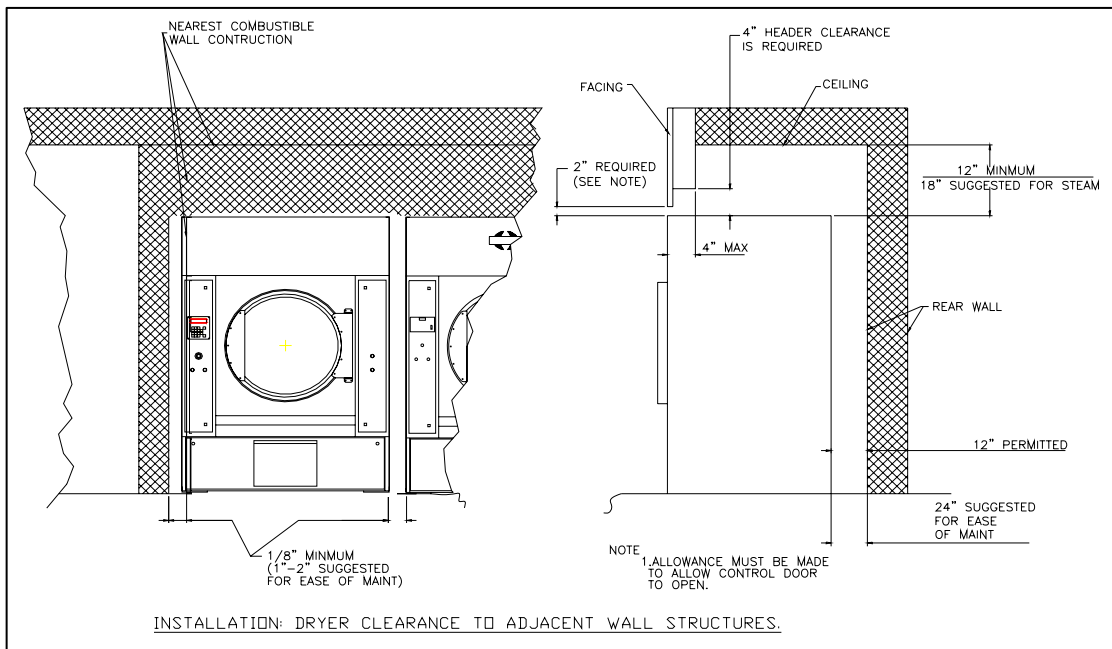


Figure.3-1 Dryer Enclosure Requirements.

INSTALLATION PROCEDURES

C. FRESH AIR SUPPLY

When the dryer is operating, it draws in room air, heats it, passes this air through the basket (tumbler), and exhausts it out of the building. Therefore, the room air **must be** continually replenished from the outdoors. If the make-up air is inadequate, drying time and drying efficiency will be adversely affected. Ignition problems and sail switch "fluttering" problems may result, as well as premature motor failure from overheating.

Air supply (make-up air) **must be** given careful consideration to assure proper performance of each dryer. An unrestricted source of air is necessary for each dryer. An air flow of 2,150 cfm (cubic feet per minute) must be supplied to each gas dryer and electric dryer with a 72 Kw oven, 2,500 cfm to each electric dryer with a 80 Kw oven, and 2,750 cfm for each steam dryer. As a general rule, an unrestricted air entrance from the outdoors (atmosphere) of a minimum of three (3) square feet is required for each gas dryer and 72 Kw electric dryer and a minimum of five (5) square feet for each steam dryer and 80 Kw electric dryer.

To compensate for the use of registers or louvers used over the openings, this make-up air area **must be** increased by approximately thirty-three (33) percent. Make-up air openings should not be located in an area directly near where exhaust vents exit the building.

It is not necessary to have a separate make-up air opening for each dryer. Common make-up air openings are acceptable. However, they **must be** set up in such a manner that the make-up air is distributed equally to **ALL** the dryers.

EXAMPLE: For a bank of six (6) gas dryers, two (2) openings measuring 3 feet by 3 feet (18 square feet) is acceptable.

Allowances **must be** made for remote or constricting passageways or where dryers are located at excessive altitudes or predominantly low pressure areas.

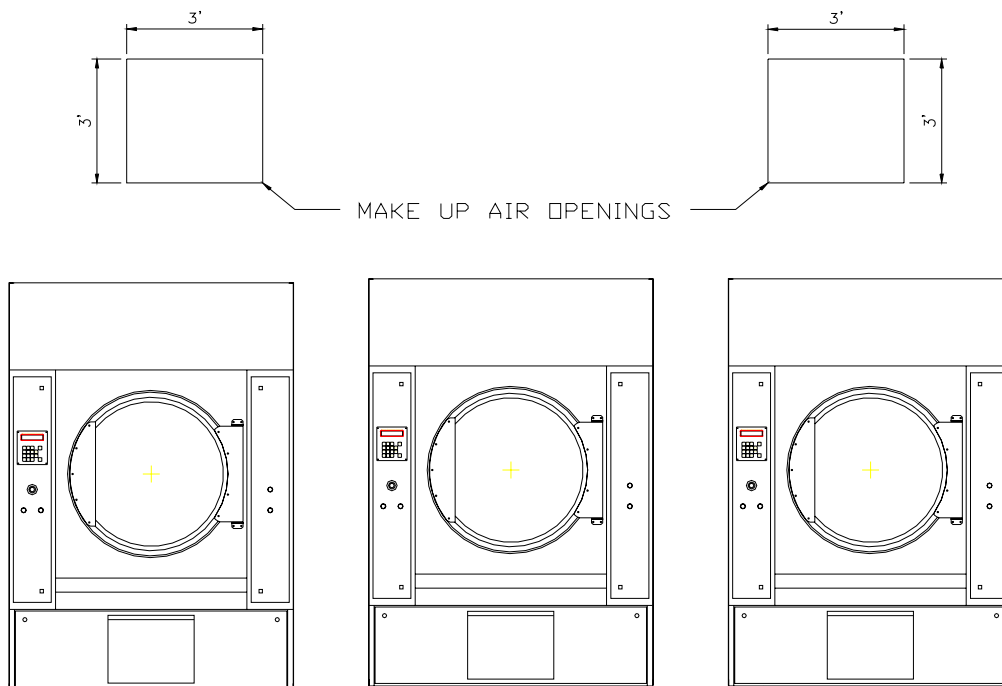


Figure.3-2 Typical installation makes up air openings

INSTALLATION PROCEDURES

IMPORTANT: Make-up air must be provided from a source free of dry cleaning solvent fumes. Make-up air that is contaminated by dry cleaning solvent fumes will result in irreparable damage to motors and other dryer components.

NOTE: Component failure due to dry cleaning solvent fumes VOIDS THE WARRANTY.

D. EXHAUST REQUIREMENTS

1. General Exhaust Duct Work Information

Exhaust duct work **should be** designed and installed by a competent technician. Improperly sized duct work will create excessive back pressure which will result in slow drying, increased use of energy, and shutdown of the burner by the airflow (sail) switch, burner hi-limit, or lint chamber hi-heat protector thermostat.

CAUTION: DRYER MUST BE EXHAUSTED TO THE OUTDOORS.

CAUTION: IMPROPERLY SIZED OR INSTALLED EXHAUST DUCT WORK CAN CREATE POTENTIAL FIRE HAZARD.

NOTE: When a dryer is exhausted separately, it is recommended that a back draft damper be installed.

NOTE: When dryers are exhausted into a multiple (common) exhaust line, each dryer **must be** supplied with a back draft damper.

The duct work **should be** laid out in such a way that the duct work travels as directly as possible to the outdoors with as few turns as possible. Single or independent dryer venting is recommended. When single dryer venting is used, the duct work from the dryer to the outside exhaust outlet **should not** exceed twenty (20) feet. In the case of multiple (common) dryer venting, the distance from the last dryer to the outside exhaust outlet **should not** exceed twenty (20) feet. The shape of the duct work is not critical so long as the minimum cross section area is provided. It is suggested that the use of 90° turns in ducting be avoided; use 30° and/ or 45° angles instead. The radius of the elbows should preferably be 1-1/2 times the diameter of the duct. Excluding basket/dryer elbow connections or elbows used for outside protection from the weather, no more than two (2) elbows **should be** used in the exhaust duct run. If more than two (2) elbows are used, the cross section area of the duct work **must be** increased in proportion to number of elbows added. **ALL** duct work **should be** smooth inside with no projections from sheet metal screws or other obstructions which will collect lint. When adding ducts, the duct to be added should overlap the duct to which it is to be connected. **ALL** duct work joints **must be** taped to prevent moisture and lint from escaping into the building. Inspection doors **should be** installed at strategic points in the exhaust duct work for periodic inspection and clean-out of lint from the duct work.

IMPORTANT: Exhaust back pressure measured by a manometer at each basket exhaust duct area **should not** exceed 0.3 inches of water column.

NOTE: Where the exhaust duct work passes through a wall, ceiling, or roof made of combustible materials, the opening **must be** 2-inches larger (all the way around) than the duct. The duct **must be** centered within this opening

Outside Duct Work Protection

To protect the outside end of horizontal duct work from the weather, a 90° elbow bent downward **should be** installed where the exhaust exits the building. If the exhaust duct work travels vertically up through the roof, it **should be** protected from the weather by using a 180° turn to point the opening downward. In either case, allow at least twice the diameter of the duct between the duct opening and the nearest obstruction.

INSTALLATION PROCEDURES

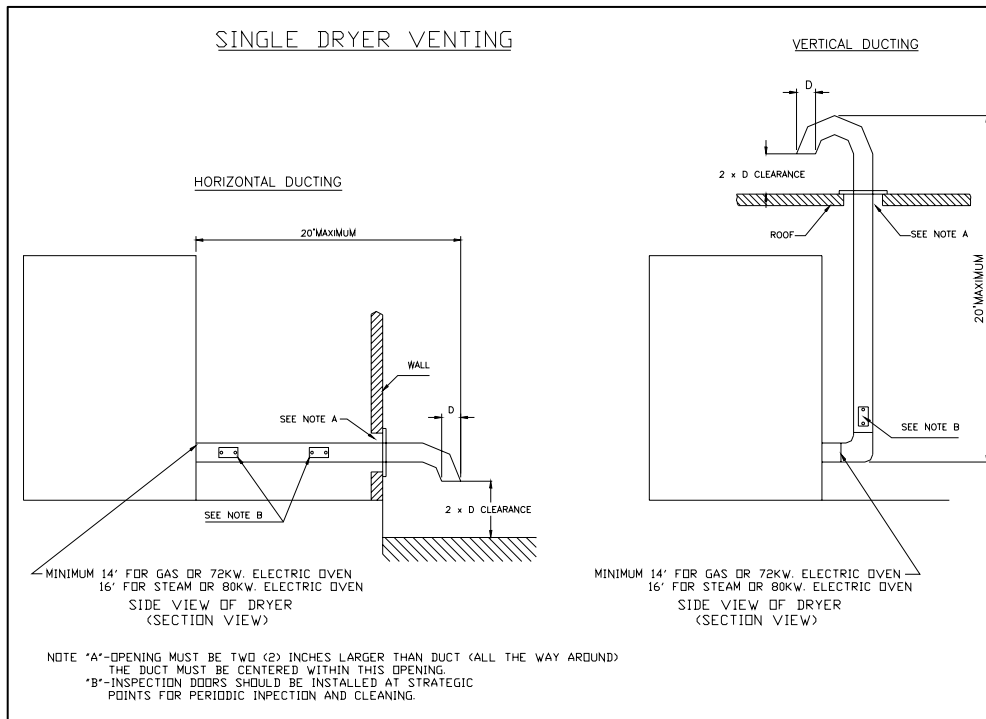


Figure.3-4 Single Dryer Venting

IMPORTANT: For extended duct work runs, the cross section area of the duct work can only be increased to an extent. Maximum proportional duct work runs **cannot** exceed twenty (20) feet more than the original limitations of twenty (20) feet with two (2) elbows. When the duct work approaches the maximum limits as noted in this manual, a professional heating venting air conditioning (HV AC) firm **should be** consulted for proper venting information.

ALL duct work **should be** smooth inside with no projections from sheet metal screws or other obstructions which will collect lint. When adding ducts, the duct to be added should overlap the duct to which it is to be connected. **ALL** duct work joints **must be** taped to prevent moisture and lint from escaping into the building. Inspection doors **should be** installed at strategic points in the exhaust duct work for periodic inspection and clean-out of lint from the duct work.

NOTE: Where the exhaust duct passes through a wall, ceiling, or roof made of combustible materials, the opening must be 2-inches larger (all the way around) than the duct. The duct **must be** centered within this opening.

Outside Duct Work Protection

To protect the outside end of horizontal duct work from the weather, a 90° elbow bent downward **should be** installed where the exhaust exits the building. If the exhaust duct work travels vertically up through the roof, it **should be** protected from the weather by using a 180° turn to point the opening downward. In either case, allow at least twice the diameter of the duct between the duct opening and nearest obstruction.

IMPORTANT: DO NOT use screens, louvers, or caps on the outside of opening of exhaust duct work.

INSTALLATION PROCEDURES

3. Multiple Dryer (Common) Venting

If it is not feasible to provide separate exhaust ducts for each dryer, ducts from individual dryers may be channeled into a "common main duct." The individual ducts should enter the bottom or side of the main duct at an angle not more than 45° in the direction of air flow and **should be** spaced at least 48-3/8 inches apart. The main duct **should be** tapered, with the diameter increasing before each individual 14-inch (minimum for gas dryers or 72 Kw electric dryers) or 16-inch (minimum for steam dryers or 80 Kw electric dryers) duct is added.

IMPORTANT: The DP is not provided with a back draft damper. When exhausted into a multiple (common) exhaust line, a back draft damper **must be** installed at each dryer duct.

IMPORTANT: No more than four (4) dryers **should be** connected to one main common duct.

The main duct may be any shape or cross sectional area, so long as the minimum cross section area is provided. These figures **must be** increased 10 square inches when rectangular main ducting is used, and the ratio of duct width to depth should not be greater than 3-1/2 to 1. These figures **must be** increased in proportion if the main duct run to the last dryer to where it exhausts to the outdoors is unusually long (over twenty [20] feet) or has numerous elbows (more than two [2]) in it. In calculating duct work size, the cross section area of a square or rectangular duct **must be** increased twenty (20) percent for each additional twenty (20) feet. The diameter of a round exhaust **must be** increased ten (10) percent for each additional twenty (20) feet. Each 90° elbow is equivalent to an additional thirty- (30) feet and each 45° elbow is equivalent to an additional fifteen (15) feet.

IMPORTANT: For extended duct work runs, the cross section area of the duct work can only be increased to an extent. Maximum proportional duct work runs **cannot** exceed twenty (20) feet more than the original limitations of twenty (20) feet with two (2) elbows. When the duct work approaches the maximum limits as noted in this manual, a professional HV AC firm should be consulted for proper venting information.

IMPORTANT: Exhaust back pressure measured by a manometer at each dryer exhaust duct area **should not** exceed 0.3 inches of water column.

The duct work **should be** smooth inside with no projections from sheet metal screws or other obstructions which will collect lint. When adding ducts, the duct to be added should overlap the duct to which it is to be connected. **ALL** duct work joints **must be** taped to prevent moisture and lint from escaping into the building. Inspection doors **should be** installed at strategic points in the exhaust duct work for periodic inspection and clean-out of lint from the duct work.

NOTE: Where the exhaust passes through a wall, ceiling, or roof made of combustible materials, the opening **must be** 2-inches larger (all the way around) than the duct. The duct **must be** centered within this opening.

Outside Duct Work Protection

To protect the outside end of horizontal duct work from the weather, a 90° elbow bent downward **should be** installed where the exhaust exits the building. If the exhaust duct work travels vertically up through the roof, it **should be** protected from the weather by using a 180° turn to point the opening downward. In either case, allow at least twice the diameter of the duct between the duct opening and nearest obstruction.

IMPORTANT: DO NOT use screens, louvers, or caps on the outside of opening of exhaust duct work.

INSTALLATION PROCEDURES

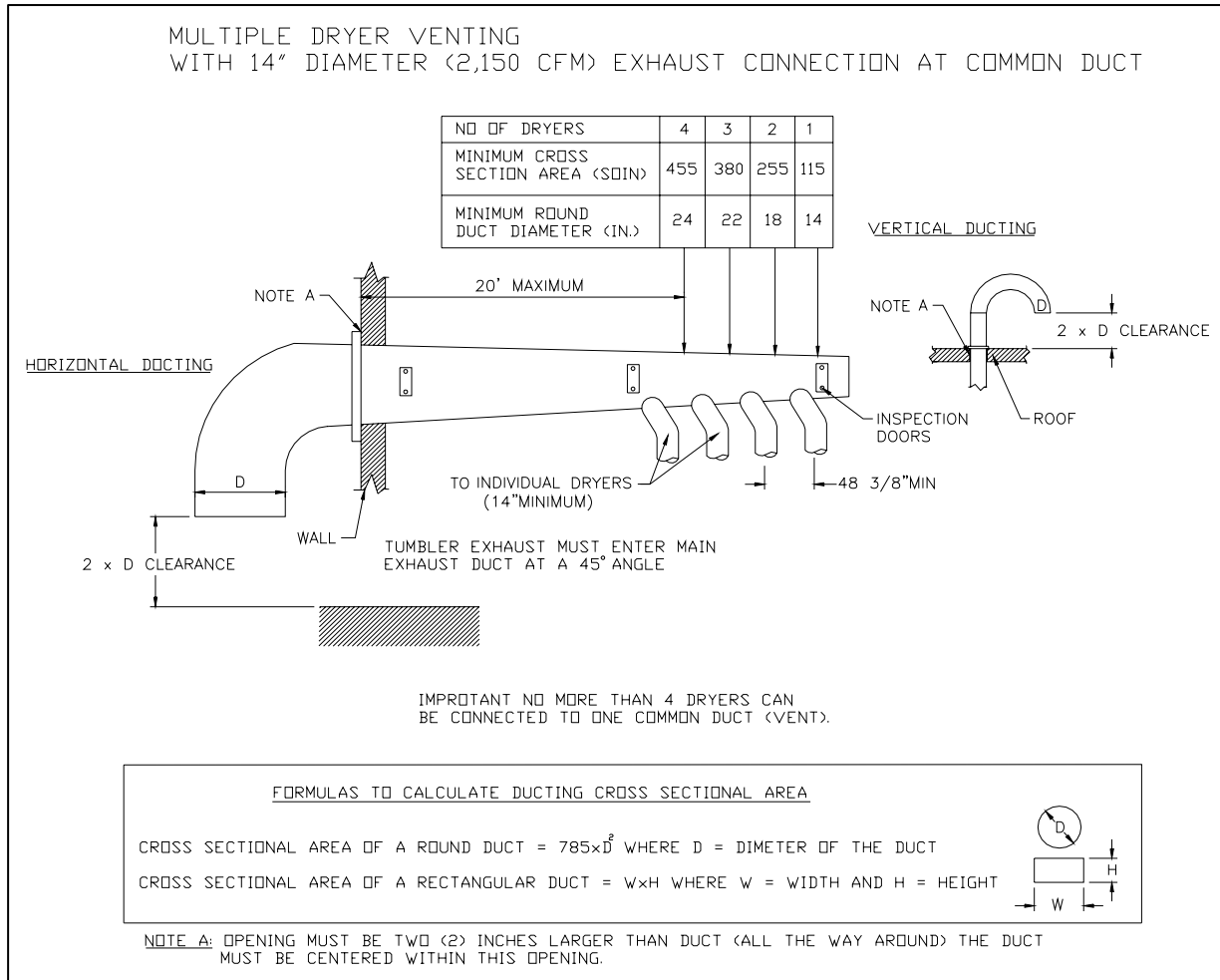


Figure.3-5 Multiple exhaust connection.

INSTALLATION PROCEDURES

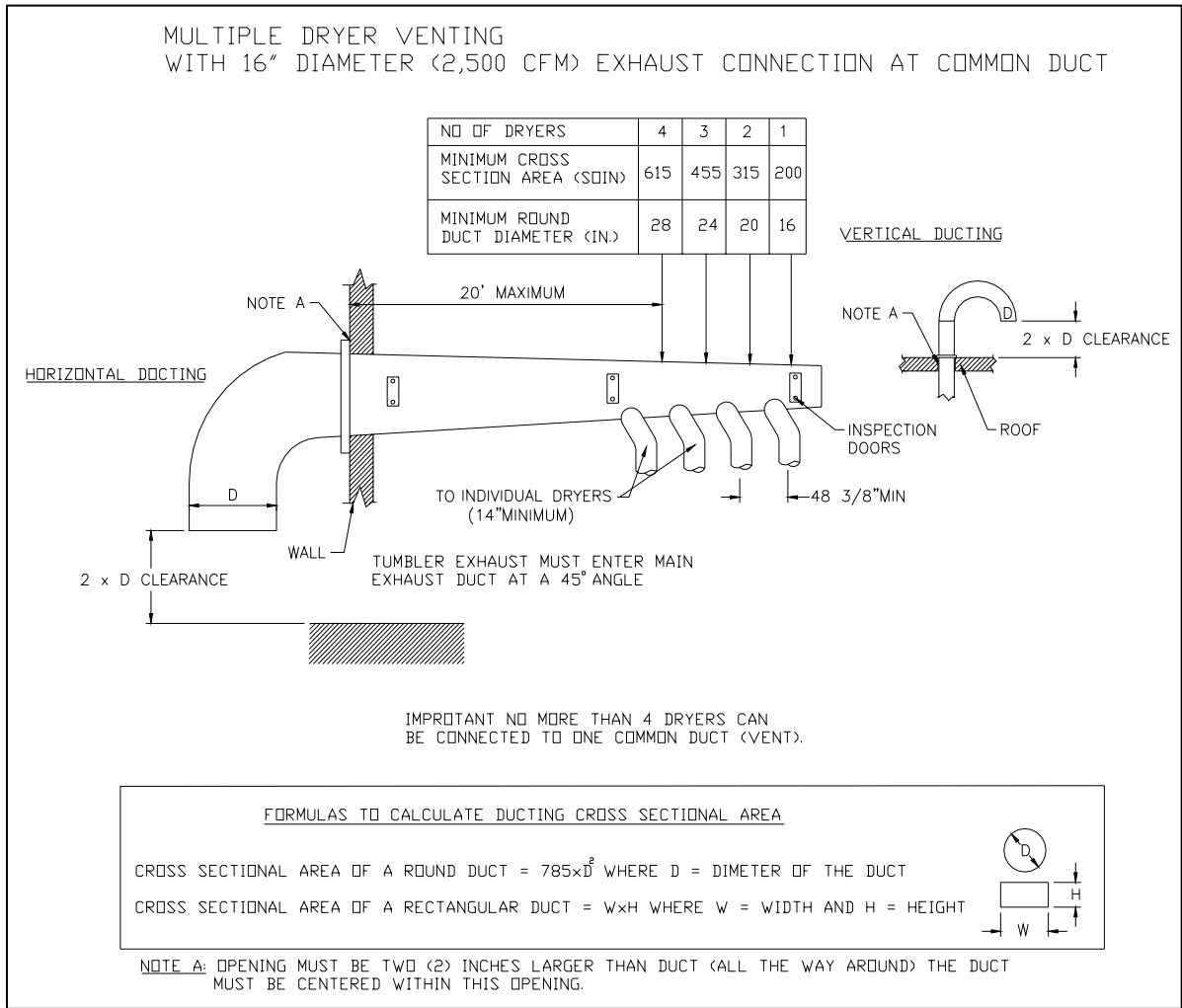


Figure.3-6 Multiple exhaust connection.

INSTALLATION PROCEDURES

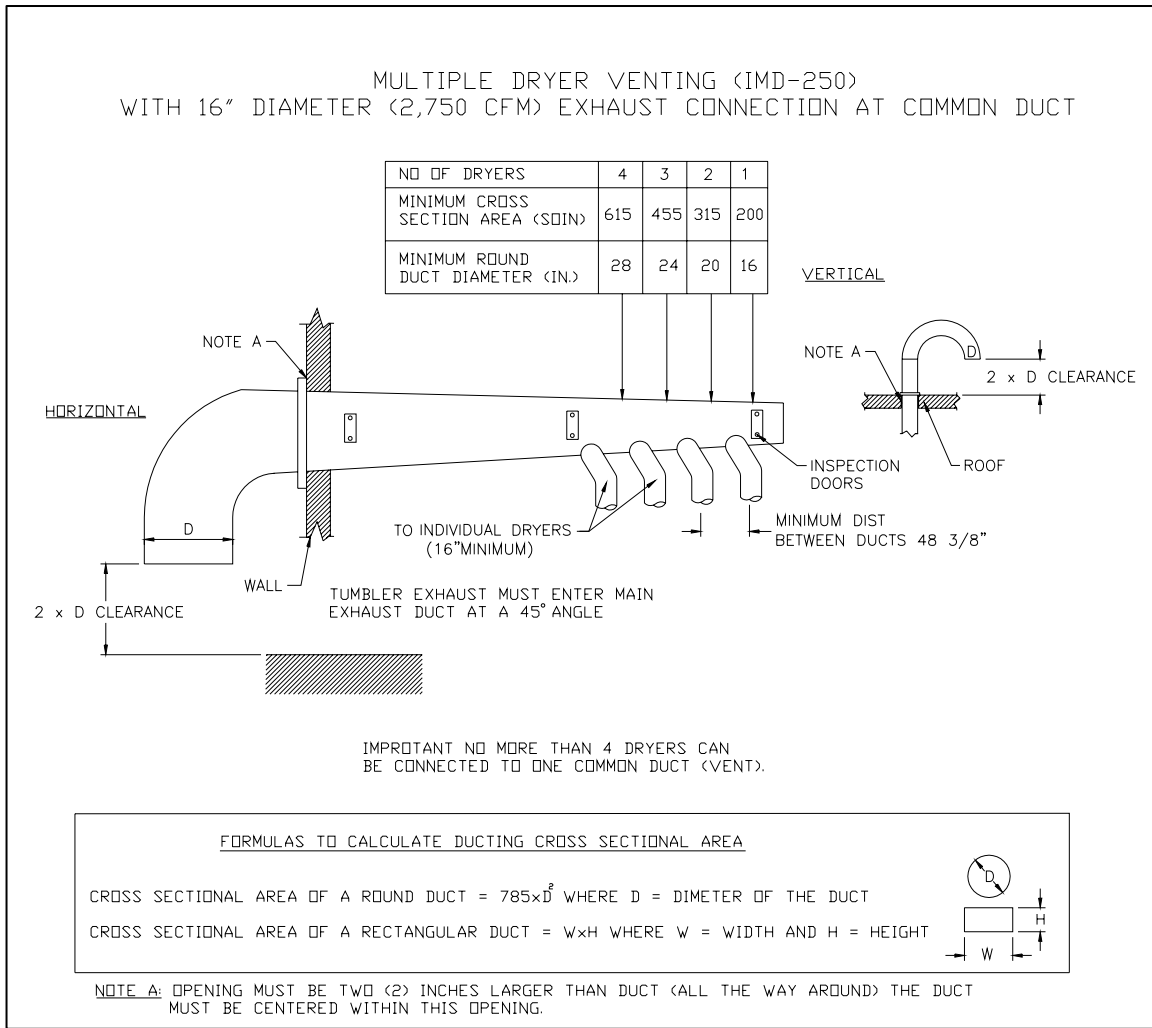


Figure.3-7 Multiple exhaust connection.

CAUTION: Improperly sized or installed exhaust duct work can create a potential fire hazard.

Where possible, it is desirable to provide a separate exhaust air duct for each dryer. The duct should go as directly as possible to the outside air. Avoid sharp 90° right-angle turns in the ducting; use 30° or 45° angles, instead. The radius of the elbows should preferably be 1-1/2 times the diameter of the duct. To protect the outside end of the duct from the weather, it may be bent downward as indicated. Leave at least twice the diameter of the duct as clearance between the duct opening and the nearest obstruction. If the exhaust duct goes through the roof, it may be protected from the weather by using a 180° turn to point the opening down. Allow at least twice the diameter of the duct as clearance from the nearest obstruction. **Do not** use screens or caps on the outside opening of the exhaust duct. The ducting should be smooth inside with no projections from sheet metal screws or other obstructions which will collect lint. When adding, ducts, the duct to be added should overlap the duct to which it is to be connected. Provide inspection doors for periodic clean-out of lint from the main duct.

If it is not feasible to provide separate exhaust ducts for each dryer, ducts from the individual dryers may be channeled into a common main duct. Each dryer is provided with a back draft damper. The individual ducts should enter the bottom or side of the main duct at an angle not

INSTALLATION PROCEDURES

more than 45°. The main duct should be tapered with the diameter increasing before each individual duct is added.

Inadequate exhaust facilities may cause high temperature limit switches or airflow switches to shut off the dryers. **Do not** disable the switches, which are provided for your safety. Instead, investigate the exhaust ducting. Any obstruction or air friction due to numerous elbows / fittings in the ducting will slow the passage of air through the system with resulting inefficiency and potential fire hazard.

E. ELECTRICAL INFORMATION

1. Electrical Requirements

It is your responsibility to have all electrical connections made by a properly licensed and competent electrician to assure that the electrical installation is adequate and conforms with local and state regulations or codes. In the absence of such codes, all electrical connections, material, and workmanship must conform to the applicable requirements of the NATIONAL ELECTRIC CODE ANSI/NFPA NO. 70- LATEST EDITION.

IMPORTANT: Failure to comply with these codes or ordinances and/or the requirements stipulated in this manual can result in personal injury or component failure.

NOTE: Component failure due to improper installation VOIDS THE WARRANTY. A separate circuit serving each dryer must be provided. The dryer must be connected to copper wire only. **Do not** use aluminum wire which could cause a fire hazard.

NOTE: The use of aluminum wire VOIDS THE WARRANTY.

2. Electrical Service Specifications

Table 3-1 Electrical Service Specification

Model 200 lb, 250 lb, Gas and Steam					
IMPORTANT: 208 V AC and 200-240 V AC ARE NOT THE SAME. When ordering, specify exact voltage.					
NOTES: A. Fuse ratings are dual element-time-delay-current limiting, class RK1 or RK5 only.					
B. Circuit breakers are thermal magnetic (industrial) type only. For others, calculate/ verify correct breaker size according to appliance amp draw rating and type of breaker used.					
C. Circuit breakers for 3 Phase dryers must be 3-pole type.					
Model	Voltage Service	Phase	Approx. Amp Draw	Wire Size	Circuit Breaker
200 lb.	200-240	3	36.7	8AWG / 10sq.mm.	50
	380-415	3	21.5	10AWG / 6sq.mm.	30
	440-480	3	19.1	10AWG / 6sq.mm.	25
250 lb.	200-240	3	41.5	6AWG / 16sq.mm.	60
	380-415	3	24.2	10AWG / 6sq.mm.	40
	440-480	3	21.8	10AWG / 6sq.mm.	30

*AWG Stranded Type Wire...for individual lengths less than 100 feet.
(Motor lead type wire is recommended.)

IMPORTANT: The dryer **must be** connected to the electrical supply shown on the data label that is affixed to the back of the dryer, at the upper right hand corner. In the case of 208 V AC or 230/240 V AC, the supply voltage **must match** the electric service specifications of the data label **exactly**.

INSTALLATION PROCEDURES

WARNING: 208 VAC and 230/240 VOLTS ARE NOT THE SAME. Any damage done to dryer components due to improper voltage connection will automatically VOID THE WARRANTY.

3. Grounding

A ground (earth) connection **must be** provided and installed in accordance with state and local codes. In the absence of these codes, grounding must conform to applicable requirements of the NATIONAL ELECTRIC CODE (ANSI/NFPA NO.70-1984). The ground connection may be to a proven earth ground at the location service panel.

For added personal safety, when possible, it is suggested that a separate ground wire (no.18 minimum) be connected from the ground connection of the dryer to a grounded cold water pipe. Do not ground to a gas pipe. The grounded cold water pipe **must have** metal to metal connection all the way to electrical ground. If there are any nonmetallic interruptions, such as, a meter, pump, plastic, rubber, or other insulating. Connectors, they **must be** jumped with no.4 copper wire and securely clamped to bare metal at both ends.

IMPORTANT: For personal safety and proper operation, the dryer **must be** grounded.

4. Electrical Connections

A wire diagram is located on the back side of the control (service) door for connection data.

The only electrical input connections to the dryer are the 3-phase (3Ø) power leads (L1, L2, L3, and sometimes Neutral) and ground.

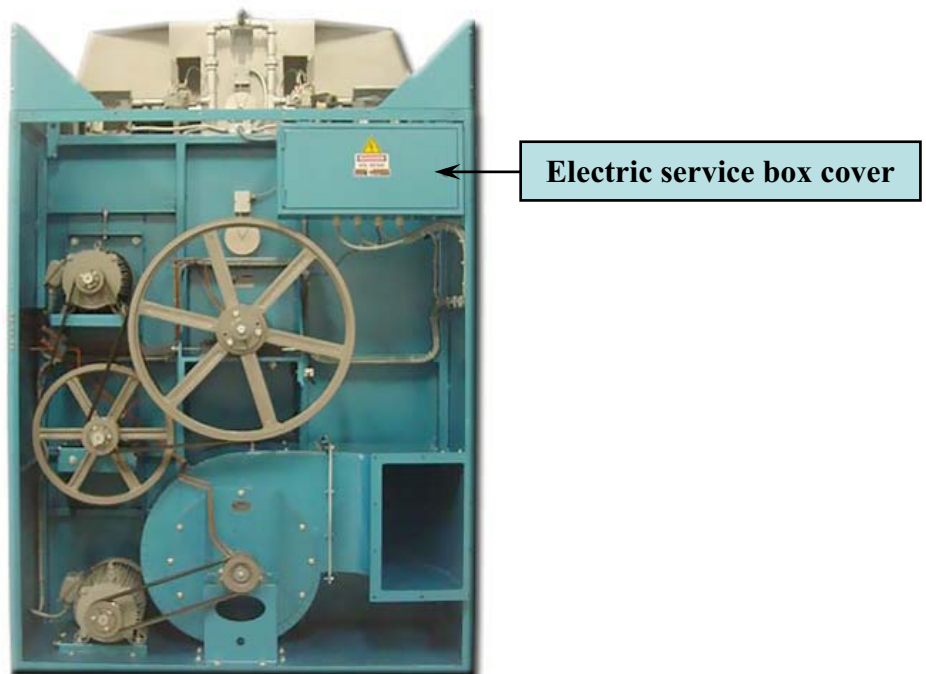


Figure.3-8 Electric service box cover position.

INSTALLATION PROCEDURES

Providing local codes permit, power to the dryer can be made by the use of a flexible U.L. listed cord/pigtail (wire size **must conform** to the rating of the dryer), or the dryer can be hard wired directly to the service breaker. In all cases, a strain relief **should be** used both where the wiring enters the dryer and the service box.

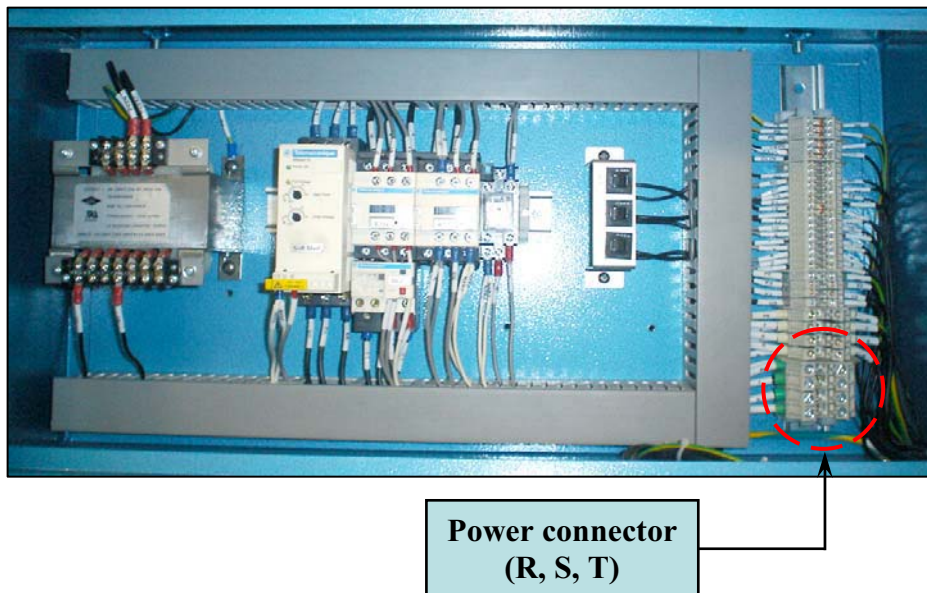


Figure.3-9 Electric Power Connector.

F. GAS INFORMATION

It is your responsibility to have all plumbing connections made by a qualified professional to assure that the gas plumbing installation is adequate and conforms to local and state regulations or codes. In the absence of such codes, all plumbing connections, material, and workmanship **must conform** to the applicable requirements of the National Fuel Gas Code ANSI Z223.1 – LATEST EDITION, or in Canada, the Canadian Installation Codes CAN/CGA – B149.1 – M91 (Natural Gas) or CAN/CGA – B149.2 – M91 (L.P. Gas) or LATEST EDITION.

IMPORTANT: Failure to comply with these codes or ordinances, and / or the requirements stipulated in this manual, can result in personal injury and improper operation of the dryer.

The dryer and its individual shut – off valve **must be** disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.5 kPa). The dryer **must be** isolated from the gas supply piping system by closing its individual manual shut – off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig (3.5 kPa).

IMPORTANT: Failure to isolate or disconnect dryer from supply as noted can cause irreparable damage to the gas valves **VOIDING THE WARRANTY.**

WARNING: FIRE or EXPLOSION COULD RESULT.

INSTALLATION PROCEDURES

1. Gas Supply

The gas dryer installation must meet the American National Standard: National Fuel Gas Code Z223.1 – LATEST EDITION, or in Canada, the Canadian Installation Codes CAN/CGA – B149.1 – M91 (Natural Gas) or CAN/CGA – B149.2 – M91 (L.P. Gas) or LATEST EDITION, as well as local codes and ordinances and **must be** done by a qualified professional

NOTE: Undersized gas piping will result in ignition problems, slow drying, increased use of energy, and can create a safety hazard.

The dryer **must be** connected to the type of heat / gas indicated on the dryer data label affixed to the back of the dryer at the upper right hand corner. If this information does not agree with the type of gas available, **DO NOT** operate the dryer. Contact the distributor who sold the dryer or the factory.

IMPORTANT: Any burner changes or conversions **must be** made by a qualified professional.

The input ratings shown on the dryer data label are for elevations of up to 2,000 feet, unless elevation requirements of over 2,000 feet were specified at the time the dryer order was placed with the factory. The adjustment or conversion of dryers in the field for elevations over 2,000 feet are made by changing each burner orifice. If this conversion is necessary, contact the distributor who sold the dryer or contact the Dryer factory.

2. Technical Gas Data

Table 3-2 Technical Gas Data

Description	Type of Gas	
	Natural (NG)	Liquid Propane (LPG)
Manifold Pressure	3.5 - 4.0 inches H ₂ O.	10.5 - 11.0 inches H ₂ O.
Inline Pressure	4.5 - 14.0 inches H ₂ O.	12.0 - 14.0 inches H ₂ O.
Drill Nozzle Size (Hole)	4 mm.	3 mm.
Inlet supply size (Minimum)	1-1/2 inches	1-1/2 inches
Inlet connection	1 inches	1 inches

1) Natural Gas

Regulation is controlled by the dryer gas valve's internal regulator. Incoming supply pressure **must be** consistent between a minimum of 4.5 inches and a maximum of 14.0 inches water column pressure.

2) Liquid Propane (L.P.) Gas

Dryers made for use with L.P. gas have the gas valve's internal pressure regulator blocked open so that the gas pressure **must be** regulated upstream of the dryer. The pressure measured at each gas valve pressure tap **must be** a consistent 11.0 inches water column. There is no regulator or regulation provided in an L.P. dryer. The water column pressure **must be** regulated at the source (L.P. tank) or an external regulator **must be** added to each dryer.

INSTALLATION PROCEDURES

Table 3-3 Gas Data

Machine Model	Consumption (Btu/hr)
Dryer 200 lb.	750,000
Dryer 250 lb.	950,000

1. Piping / Connections

All components / materials **must conform** to National Fuel Gas Code Specifications or in Canada, the Canadian Installation Codes (for General Installation and Gas Plumbing). It is important that gas pressure regulators meet applicable pressure requirements and that gas meters be rated for the total amount of all the appliance Btu's being supplied.

The dryer is provided with a 1 – inch N.P.T. inlet pipe connection extending out the back area of the burner box. The minimum pipe size connection (supply line) to the dryer is 1 – inch N.P.T. For ease of servicing, the gas supply line of each dryer **must have** its own shut – off valve.

The size of the main gas supply line (header) will vary depending on the distance this line travels from the gas meter or, in the case of L.P. gas, the supply tank, other gas – operated appliances on the same supply line, etc. Specific information regarding supply line size **should be** determined by the gas supplier.

NOTE: Undersized gas supply piping can create a low or inconsistent pressure which will result in erratic operation of the burner ignition system.

Consistent gas pressure is essential at all gas connections. It is recommended that a 1 – inch pipe gas loop be installed in the supply line serving a bank of dryers. An in – line pressure regulator **must be** installed in the gas supply line (header) if the (natural) gas pressure exceeds 12.0 inches of water column pressure.

IMPORTANT: A water column pressure of 3.5 to 4.0 inches for natural gas and 11.0 inches for L.P. dryers is required at the gas valve pressure tap of each dryer for proper and safe operation.

A 1/8 – inch N.P.T. plugged tap, accessible for a test gauge connection, **must be** installed in the main gas supply line immediately upstream of each dryer.

IMPORTANT: Pipe joint compounds that resist the action of natural and L.P gases **must be** used.

IMPORTANT: Test all connections for leaks by brushing on a soapy water solution (liquid detergent works well).

WARNING: **NEVER** test for leaks with a flame.

All components / materials **must conform** to National Fuel Gas Code Specifications ANSI Z223.1 – LATEST EDITION, or in Canada, the Canadian Installation Codes CAN/CGA – B149.1 – M91 (Natural Gas) or CAN/CGA – B149.2 – M91 (L.P. Gas) or LATEST EDITION.

It is important that gas pressure regulators meet applicable pressure requirements, and that gas meters be rated for the total amount of appliance Btu's being supplied.

IMPORTANT: The dryer and its individual shut – off valve **must be** disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.5 kPa).

INSTALLATION PROCEDURES

NOTE: The dryer **must be** isolated from the gas supply piping system by closing its individual manual shut off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig (3.5 kpa).

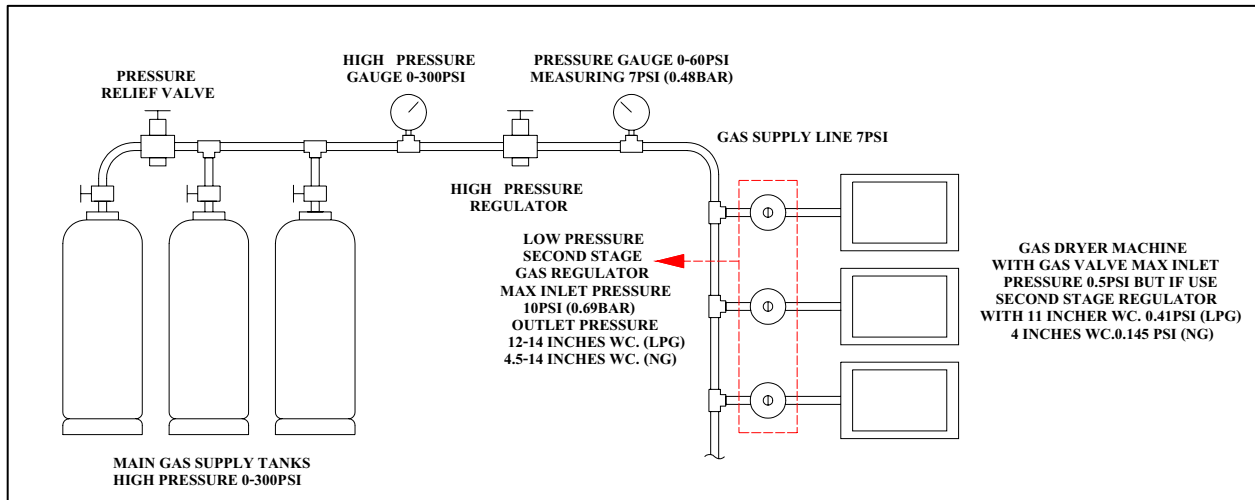


Figure.3-10 Typical of Gas Installation

G. STEAM INFORMATION

Piping **must be** installed in accordance with good commercial steam system practice. Care must be exercised when leveling steam dryers in final position. After leveling the dryer, check the downward pitch of the heat exchanger from front to rear with a level. Likewise, check the downward pitch of the return condensate manifold toward its outlet part. Absence of these downward pitches will result in probable water hammer and premature heat exchanger fracture and leakage.

The presence of condensate in the steam will cause water hammer and subsequent heat exchanger failure. The steam supply connection **must be** taken from the top of a well-dripped steam main. If the supply run-out to the dryer exceeds 20 feet, it should be dripped just before the control valve with a proper trap and dirt pocket.

It is your responsibility to have **ALL** steam plumbing connections made by a qualified professional to assure that the installation is adequate and conforms with local and state regulations or codes.

IMPORTANT: Failure to comply with the requirements stipulated in this manual can result in component failure which will **VOID THE WARRANTY**.

1. Steam Requirements High Pressure

- Inlet ---- 2-inch supply line connection.
- Return --- 2-inch return line connection.

Table 3-4 Steam Requirements High Pressure

Operating Steam Pressure	
Maximum	125 psig
Minimum	100 psig
Heat Input (Normal Load)	27 Bhp
Consumption (Approximate)	800 lbs/hr

2. Installation Instructions

To insure that an adequate supply of steam is provided, be sure that the steam supply and steam return lines are sized and laid out as stipulated in this manual. Inadequate steam supply and steam return lines or improper steam plumbing will result in poor performance and can cause component failure. Clean, dry, regulated steam **must be** provided to the dryer.

IMPORTANT: Steam coil failure due to water hammer by wet steam will VOID THE WARRANTY.

The presence of condensate in the steam supply will cause water hammer and subsequent heat exchanger failure. The steam supply connection into the main supply line must be made with a minimum 10” riser. This will prevent any condensate from draining towards the dryer.

The steam supply piping to the dryer must include a 12" rise along with a drip trap and check valve. This will prevent any condensate from entering the steam coil.

Flexible hoses or couplings **must be** used. The dryer vibrates slightly. when it runs, and this will cause the steam coil connections to crack if they are hard piped to the supply and return mains.

Shut-off valves for each dryer should be installed in the supply, return, and drip trap return lines. This will allow the dryer to be isolated from the supply and return mains if the dryer needs maintenance work.

Install a float and thermostatic steam trap and check valve at least 12” below steam coil as near to the coil as possible.

A vacuum breaker **should be** installed in the piping. This will prevent the condensing steam from causing a vacuum inside the coil and possibly damaging the coil.

The supply and return lines **should be** insulated. This will save energy and provide for the safety of the operator and maintenance personnel.

Water pockets in the supply line, caused by low points, will provide wet steam to the coil possibly causing coil damage. All horizontal runs of steam supply piping should be pitched ¼” every foot back towards the steam supply header, causing any condensate in the line to drain to the Header. Install a bypass trap in any low point to eliminate wet steam.

Do not elevate the condensate return line after the float and thermostatic trap. Drain only by gravity into a properly vented low pressure return line or condensate tank.

INSTALLATION PROCEDURES

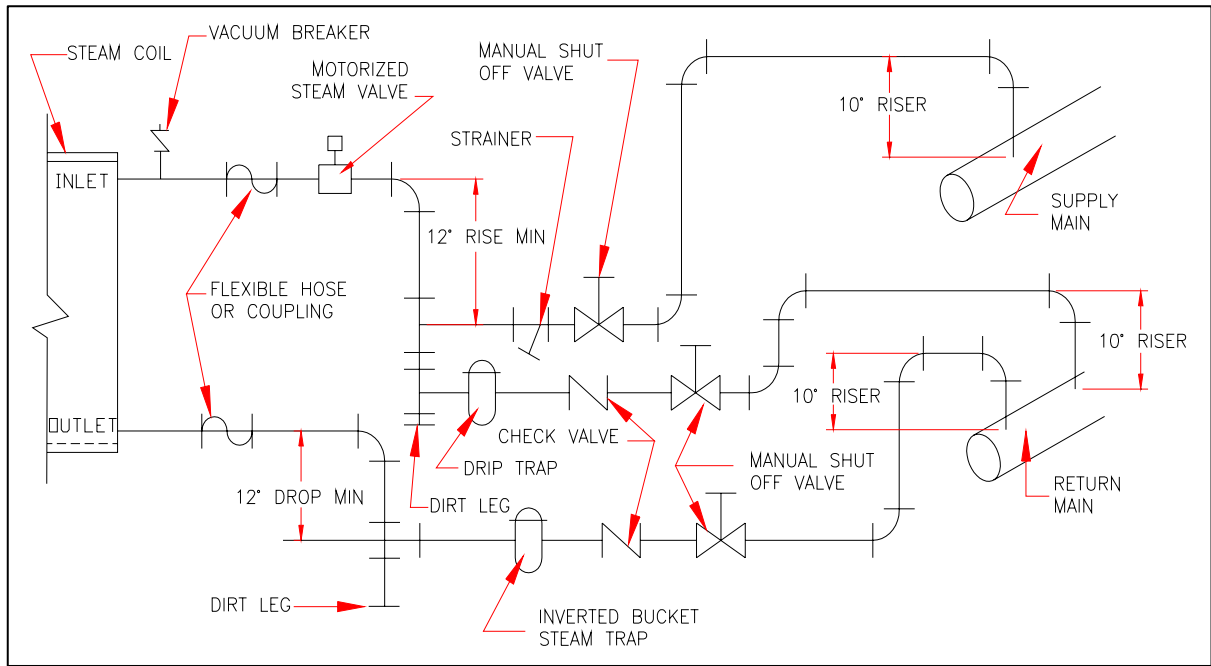


Figure.3-11 Steam Damper System.

3. Steam Damper Air System Connections

The dryer is manufactured with a pneumatic (piston) damper system which requires an external supply of compressed air. The air connection is made to the steam damper solenoid valve which is located at the rear inner top area of the dryer just above the electric service relay box

Air Requirements

Table 3-5 Table For Air Pressure.

Compressed Air Supply	Air Pressure
Normal	80 psi
Minimum Supply	70 psi
Maximum Supply	90 psi

Air Connection

Air connection to system 8 mm.

No air regulation or filtration is provided with the dryer. External regulation/ filtration of 80 psi **must be** provided. It is suggested that a regulator / filter gauge arrangement be added to the compressed air line just before the dryer connection. This is necessary to insure that correct and clean air pressure is achieved.

4. Steam Damper System Operations

The dryer steam damper, as. Allows the coil to stay constantly charged eliminating repeated expansion and contraction. When the damper is opened, the air immediately passes through the already hot coil, providing instant heat to start the drying process. When the damper is closed, ambient air is drawn directly into the basket (tumbler), allowing a rapid cool down.

INSTALLATION PROCEDURES

Diagram 1 shows the damper in the heating (open) mode, allowing heat into the basket (tumbler). **Diagram 2** shows the damper in the cool down (closed) mode, pulling ambient air directly into the basket (tumbler) without passing through the coils.

NOTE: With the dryer off or with no air supply, the damper is in the cool down mode as shown in Diagram 2.

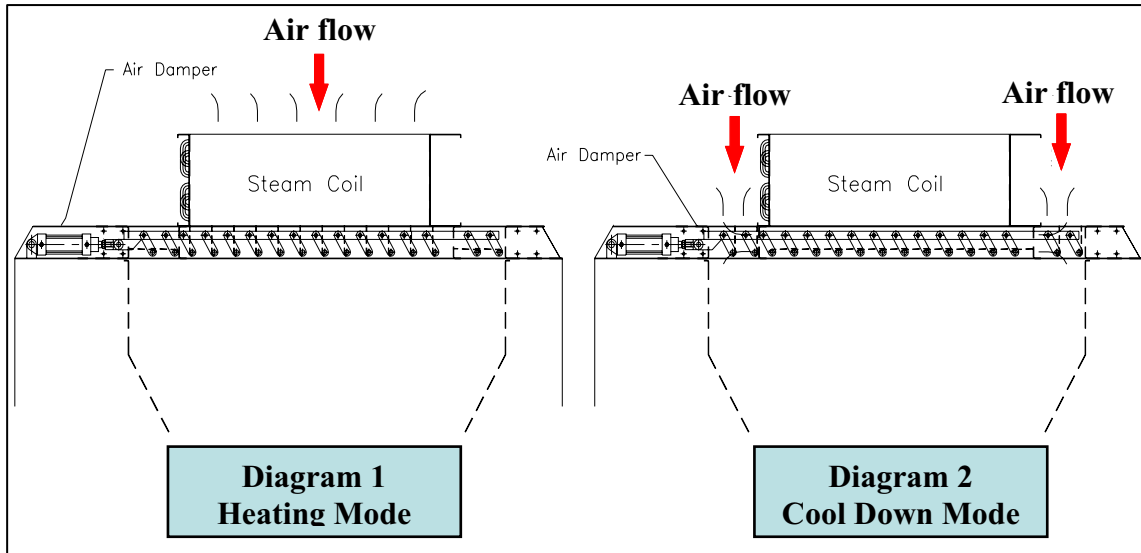


Figure.3-12 Steam Damper System.

5. Steam Damper Air Piston (Flow Control) Operation Adjustment

Although the damper operation was tested and adjusted prior to shipping at 80 Psi, steam damper operation **must be** checked before the dryer is put into operation. damper air adjustment is necessary, locate flow control valve and make necessary adjustments as noted below.

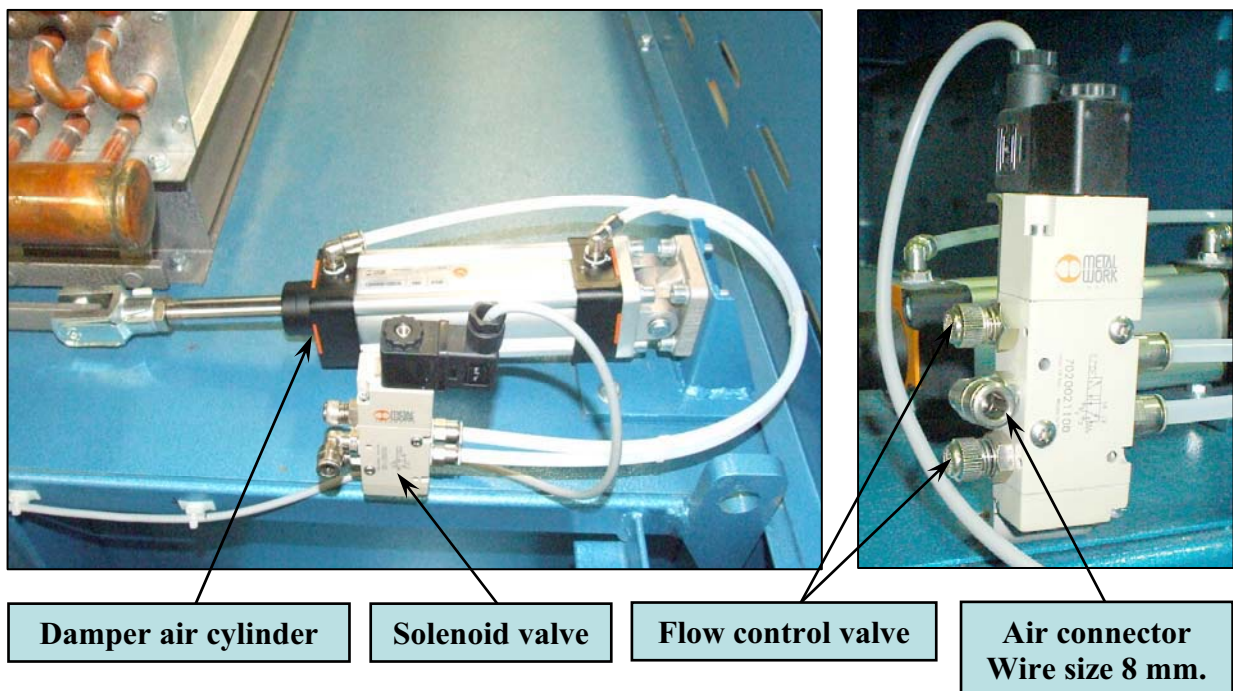


Figure.3-13 Steam Damper Operation Adjustment

INSTALLATION PROCEDURES

H. PREPARATION FOR OPERATION/START

The following items should be checked before attempting to operate the dryer:

1. Read and follow **ALL** "CAUTION," "WARNING," and "DIRECTION" labels attached to the dryer.
2. Check incoming supply voltage to be sure that it is the same as indicated on the dryer data label located in the front top console area. In the case of 208 V AC or 230/240 V AC, the supply voltage **must match** the electric service **exactly**.
3. GAS MODELS -check to assure that the dryer is connected to the type of heat/ gas indicated on the dryer data label.
4. GAS MODELS -the sail switch damper assembly was installed and readjusted at the factory prior to shipping. However, each sail switch adjustment **must be** checked to assure that this important safety control is functioning.
5. GAS MODELS -be sure that **ALL** gas shut-off valves are in the open position.
6. Be sure **ALL** back panels (guards) and electric box covers have been replaced.
7. Check **ALL** service doors to assure that they are closed and secured in place.
8. Be sure lint drawer is securely in place.

NOTE: LINE DRAWER MUST BE ALL THE WAY IN PLACE TO ACTIVATE SAFETY SWITCH OTHERWISE THE DRYER WILL NOT START.

9. Rotate the basket (tumbler/ drum) by hand to be sure it moves freely.
10. Check bolts, nuts, screws, terminals, and fittings for security.
11. STEAM MODELS -check to insure air supply (80 psi) is on to the dryer.
12. STEAM MODELS -check to insure **ALL** steam shut-off valves are open.
13. STEAM MODELS -check steam damper operation.
14. Check tumbler bearing set screws to insure they are **ALL** tight.

I. PREOPERATIONAL TESTS

All dryers are thoroughly tested and inspected before leaving the factory. However, a preoperational test should be performed before the dryer is publicly used. It is possible that adjustments have changed in transit or due to marginal location (installation) conditions.

1. Turn on electric power to the dryer.
2. Make sure the main door is closed and the lint drawer is securely in place.
3. Refer to the Operating Instructions for starting your particular model dryer.
4. Check to insure that the basket (tumbler) starts in the clockwise (CW) direction. Additionally, check the direction of the blower motor impellor (fan) to insure that impellor (fan) rotates in the clockwise (CW) direction as viewed from the front. If it is, the phasing is correct. If the phasing is incorrect, reverse two (2) of the leads at L1, L2, or L3 of the power supply connections made to the dryer.

IMPORTANT: Dryer blower motor impellor / fan as viewed from the front **must turn** in the clockwise (CW) direction, otherwise dryer efficiency will drastically be reduced and premature component failure can result.

INSTALLATION PROCEDURES

5. Heat Circuit Operation Test

Gas Models

1) When the dryer is first started (during initial start-up), the burner has a tendency not to ignite on the first attempt. This is because the gas supply piping is filled with air, so it may take a few minutes for this air to be purged from the lines.

2) The dryer is equipped with a direct spark ignition (DSI) system which has internal diagnostics. If ignition is not established after the first attempt, the heat circuit DSI module will lock out until it is manually reset. To reset the DSI system, open and close main door and restart dryer (press the "ENTER/START" key).

NOTE: During the purging period, check to be sure that **ALL** gas shut-off valves are open.

3) Once ignition is established, a gas pressure test **should be** taken at the gas valve pressure tap of each dryer to assure that the water column pressure is correct and consistent.

NOTE: Water column pressure requirements (measured at the gas valve pressure tap)...

Natural Gas..... 4 Inches Water Column

L.P. Gas..... 11 Inches Water Column

IMPORTANT: There is no regulator provided in an L.P. dryer. The water column pressure **must be** regulated at the source (L.P. tank), or an external regulator **must be** added to each dryer.

Steam Models

1) Check to insure that steam damper is functioning properly.

2) The steam damper **should not** "slam" (open or closed) when it reaches the end of (piston) travel. Additionally, the steam damper **should not** bind and/ or stop during travel. If either of these conditions occur, the flow control **must be** adjusted. Refer to the bottom illustration for air adjustment instructions.

4. Make a complete operational check of all safety related circuits:

- a. Door switch
- b. Hi-limit thermostat
- c. Cycling thermostat
- d. Sail switch (gas and electric models only)

NOTE: The sail switch can be checked for proper operation by opening the lint door while the heating circuit (gas burner / electric oven) is active (on). The heating unit should shut off within a few seconds. If not, make necessary adjustments to sail switch.

5. Make a complete operational check of all operating controls.

NOTE: If computer program changes are required, refer to the Computer Programming Section of the manual supplied with the dryer.

6. The dryer **should be** operated through one (1) complete cycle to assure that no further adjustments are necessary and that all components are functioning properly.

INSTALLATION PROCEDURES

IMPORTANT: The dryer basket is (tumbler) treated with a protective coating. DE suggests tumbling old clothes or material in the basket (tumbler), using a mild detergent to remove the protective coating.

7. Check the electric service phase sequence (3-phase [3Ø] models only). While the dryer is operating, check to see if the blower wheel (fan) is rotating in the proper direction. Looking from the front, the blower wheel (impellor / fan) should spin in the clockwise direction. If it is, the phasing is correct. If the phasing is incorrect, reverse the two (2) leads at connections L1, L2, or L3 of the power supply to the dryer.

IMPORTANT: If the blower wheel (impellor /fan) is rotating in the wrong direction, this will not only drastically reduce drying efficiency, but it can also cause – premature component failure.