Pre-Installation - Guidelines & Checklist
Dry Ice Manufacturing System – Pelletizers
PE 80
Revision 10

The Cold Jet Project Lead and Customer Project Lead who will oversee the successful installation of the pelletizer and maximize the performance of the new dry ice manufacturing. system:

Cold Jet Project Lead	Telephone	Email

Customer Project Lead	Telephone	Email

Revision 10 – January 2025

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Cold Jet
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Introduction

Before any pelletizer can be installed, the owner/operator must prepare the site for installation and operation. It is the owner's responsibility to verify all the necessary preparations have been made to the installation site and meet the specifications and guidelines detailed in this publication. This may include but is not limited to:

- Providing an indoor space with standard industrial flooring.
- Installing a liquid CO_2 tank and supply pipeline system up to the connection point at the pelletizer (the PE 80 pelletizers is supplied with a 5 meter (16.5 IN) insulated liquid CO_2 flex hose)
- Installing a gaseous CO_2 exhaust pipeline from the pelletizer to free vent at a safe position.
- Installing a power supply that is sufficient and up to code.
- Providing proper room ventilation and other CO_2 safety measures.
- Determine which options and other manufacturing accessories to add/prepare for maximizing production performance and capabilities.

The owner is responsible for transmitting the specifications in this publication to other third-party contractors involved in the pre-installation preparations of the site. Failure to properly prepare the site may delay the installation and/or optimal performance of the pelletizer. The graphics used in this manual may show pelletizer details and installation components that may be different than what is used. Components may have been removed for illustrative purposes or the continuing improvement of the pelletizer's design may cause changes that are not included in this publication.

Unpacking and preparation before installation.

This machine was assembled and tested at Cold Jet's test center before being created and shipped as one unit. Follow the steps below to unpack and inspect the machine from the shipping container.

1. Examine the transport box for any damage occurred during transportation.
2. Remove the top and side plates from the transport box.
3. Unbolt the 4 bolts that secure the PE 80 to the pallet.
4. Examine the PE 80 for external transport damage.

The Pelletizer package consist of the following items:

- Pelletizer PE 80
- Insulated hose for liquid CO_2 supply with 3/8" BSP connectors at both end – 5 meter (15.6 IN).
- Gas exhaust silencer mounted on the gas vent connector.
- Recommended Spare Part Kit (if agreed and specified on the order)
- Instruction Manual (see also www.coldjetconnect.com)

Pre-Installation by the Customer

Pre-Installation of the machine at the site must be carried out by the owner/operator.

Machine owner/operator are responsible for the physical installation, utility connections, and CO_2 supply required to bring a new machine into service.

Production Space Requirements

- Adequate ventilation, natural or forced, must be provided to prevent the build-up of CO_2 during production.
- A system to monitor CO_2 levels that will alert personnel when CO_2 levels become too high and pose a safety hazard.
- The machine shall be sheltered from the wind and weather and operate in a recommended environment with an ambient temperature between 5°C and 40°C (41°F and 104°F).
- The machine must be placed on a horizontal, concrete floor with adequate load carrying capacity.
- The physical distance from the pelletizer to walls, columns or any firm/solid object in the surrounding area must not be less than 1 meter.

Liquid CO_2 Supply System

Cold Jet recommends the supply line for the liquid CO_2 from the storage tank to the pelletizer to be direct (with limited bends) and well insulated. Before reaching the pelletizer, the pipeline must have an upwards inclination of 2%. Bends or deflections must not be right angled, the recommended radius of the bending would be equal to 5x the internal diameter of the pipe. This will help prevent the formation of gas and maintain the temperature of the liquid CO_2 thus improving the performance of the pelletizer.
It is the responsibility of the owner/installer of the liquid CO_2 supply system to determine the best supply line route and the insulation needed with reference to local safety design code and requirements.

Liquid CO_2 supply systems	**PE 80**
Supply pressure (min-max)	13-18 bar (189-261 psi) Optimum performance range 16-18 bar (232-261 psi)
Supply pressure variance	+/- 2.0 bar (29 psi)
Flow rate - minimum	200 kg/hr
Pelletizer design pressure (PRV–setting)	24.1 bar (250 psi)
Liquid CO_2 line size recommended ID	12.7 mm (0.5 in)
Liquid CO_2 connection at pelletizer	EU: 3/8-inch BSP - 60° cone
Liquid CO_2 Line insulation	Min. 50 mm (3.0 in) Industrial Insulation - (Urethane Foam - PVC/Alu jacket)

If the pelletizer were to be installed inside a building and next to a wall, Cold Jet recommends to place a closing/opening valve on the CO_2 pipeline close to the pelletizer, on the section between the pelletizer and the inner side of the wall. This is in order to have the possibility of a quick interruption of the CO_2 flow to the pelletizer, instead of having to exit the building and stop the flow from the main valve at the tank. Cold Jet also recommends placing a degassing or safety valve on the outer section of the CO_2 pipeline, between the tank and the building (outside the building, to evacuate the CO_2 gas into the open air).

The liquid CO_2 quality in use must meet the general purity requirement of commercial industrial/food grade specifications and must be free of oil and have a purity of minimum 99.9%. For optimum performance and high-density pellets quality the water (H_2O) content should not exceed 35 ppmv (parts per million by volume) and not be less than 5 ppmv - or equivalent to a dew point temperature of -66°C to -51°C (-86.8°F to -59.8°F). If only very dry CO_2 is present, please contact Cold Jet for optimal special extrusion process design and settings.

Please note that the CO_2 supply tank capacity must always be in proportion to the actual dry ice pellet production rate! (It takes about 2,5 kg of LCO_2 to produce 1 kg of dry ice)

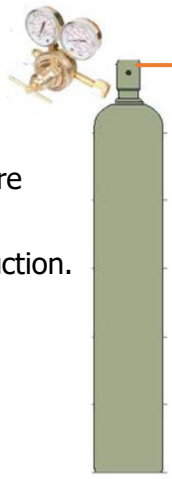
NOTE: If the liquid CO_2 supply line is serving more than one pelletizer, other CO_2 consuming machinery, or is longer than 25 m (82 ft) the owner should consult with the CO_2 piping contractor for an optimal design for a stable and gas-free liquid CO_2 supply to the pelletizer.

Dewar Option

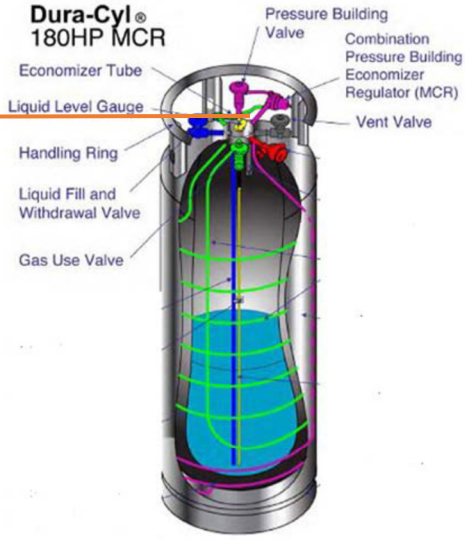
A Dewar tank can be used as a last resort if liquid vessel is not an option. This can provide liquid for the PE 80 pelletizer for adequate production. The Dewar tank must have a CO_2 gas cylinder connected to maintain a proper feeding pressure to the pelletizer as the Dewar does not have a pressure build up function. How to connect the Dewar is described below:

1. From high delivery pressure regulator, connect reg outlet to the VENT valve on the high-pressure CO_2 Liq. Dewar. This s/b a 350 psi CO_2 Dewar see the PN at bottom of the page.
2. Set delivery pressure on regulator to about 300 to 325 psi.
3. The dewars LIQUID valve s/b connected to the dry ice machine CO_2 feed.
4. When CO_2 starts flowing you will then want to be sure and open the VENT valve on the dewar & cylinder, this will help ensure that you maintain a pressure in the dewar of 300 to 325 psi.

Note
Be sure to have a few add. 50 lbs. high pressure cylinders on hand to maintain stable production.



EX 2-50



EX 2LC230-350

180HP pictured above, but connection labeling is the same for a 230-liter Dewar.

When using a LCO_2 dewar the PE 80 pelletizer may generate a "low CO_2 pressure" error and shut down when the incoming pressure drops below 13 bar (188 psi). To maintain adequate pressure and optimize consumption of the dewar's available LCO_2, a separate high pressure CO_2 food-grade gas cylinder may be used. Cold Jet emphasizes the importance of safe and responsible handling of these high-pressure CO_2 cylinders and it is the customer's responsibility to consult with their gas supplier on proper installation or maintenance. Mishandling or improper use can lead to serious injuries or property damage. Always prioritize safety and exercise extreme caution when handling these high-pressure CO_2 cylinders.

Liquid CO_2 Degasser System

To achieve a consistent, high-quality supply of liquid CO_2 to the pelletizer, Cold Jet recommends the installation of an automatic gas venting system, such as the Armstrong Kit.
Installing an automatic gas venting system will improve the performance of the pelletizer and increase dry ice production.

The installation of the Armstrong Kit, or similar system, is optional and is the responsibility of the installer of the liquid CO_2 supply system and piping up to the pelletizer connection.

CO_2 Gas Exhaust System

An exhaust pipeline with an internal diameter greater than 25,4 mm (1 inch) shall be installed to facilitate the exhaust CO_2 gas from the dry ice production process. The exhaust CO_2 gas must be vented at a safe location outside of the building with a weatherproof outlet that prevents rainwater or other contaminants from blocking or creating back-pressure on the pelletizer.

The CO_2 exhaust could have a temperature as low as -60°C (-76°F) and for a pressure of 1 bar (14.5 psi) which may generate condensation. Cold Jet recommends installing an Armaflex insulation or similar industrial insulation product to prevent this condensation from dripping down onto the machine or production room floor causing a potential safety hazard. The type of material chosen for the degassing pipe must be suitable for a temperature of -60°C (-76°F). Avoid bends or any obstacles that might provoke the formation of snow or ice plugs.

Electrical Service & Supply

The Pelletizer requires a three-phase power supply. The power source must be grounded:

- For machines in the US: use a Solidly Grounded WYE Source.
- For machines outside the US: use a TN-S grounding acc. to IEC 60364.
- All phases must be balanced, and voltages must be within ±10%.

The customer is responsible for the electrical installation of the pelletizer. This includes the power cable and main circuit breaker which meet the specifications below. The main circuit must be suitable for proper lock out / tag out in accordance with international and national standards and requirements.

Electrical Service & Supply	**PE 80**
Voltage AC/ Frequency (50Hz)	3 x 400 VAC/50Hz
Upstream supplier fuse (max)	16 A
Voltage AC/ Frequency (60Hz)	3 x 480 VAC/60Hz
Upstream supplier fuse (max)	20 A
Voltage AC/ Frequency (60Hz)	3 x 220 VAC/60Hz
Upstream supplier fuse (max)	20 A

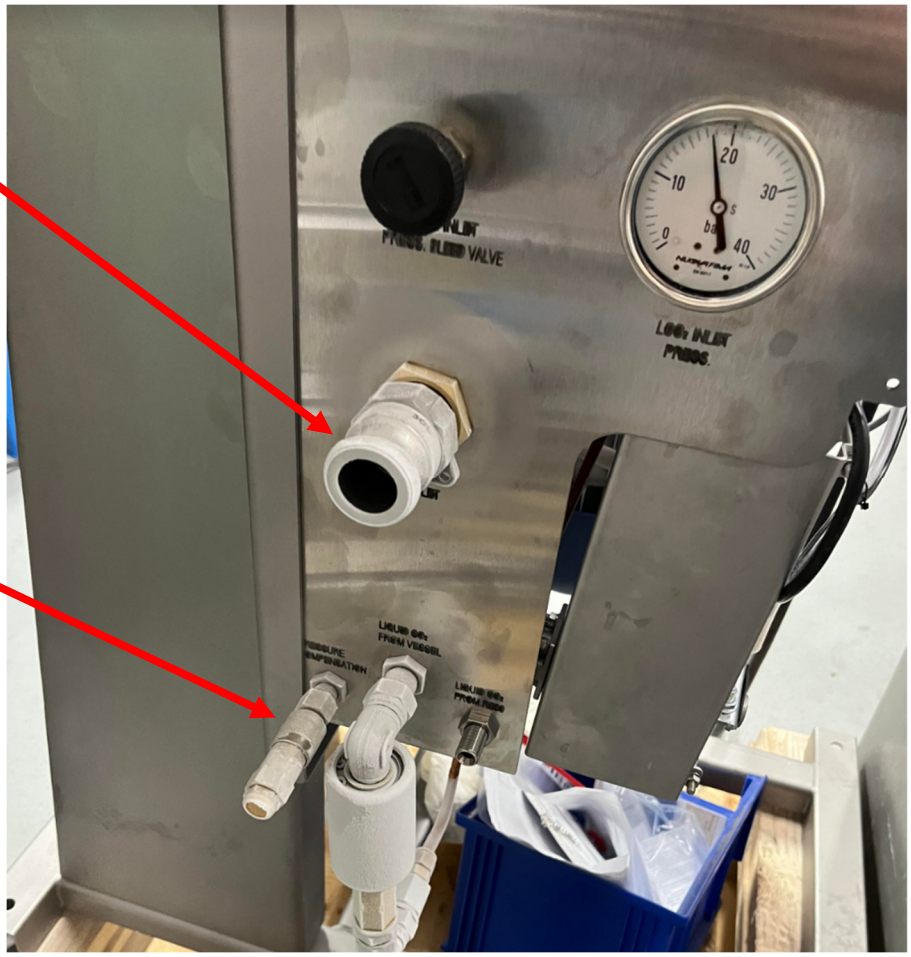
Degassing

The pelletizer should be mounted with a degassing hose. The machine does not have a degassing hose attached, this is required to be added according to the specific installation on site. If a hose is not attached, the pelletizer will vent where the machine is located.

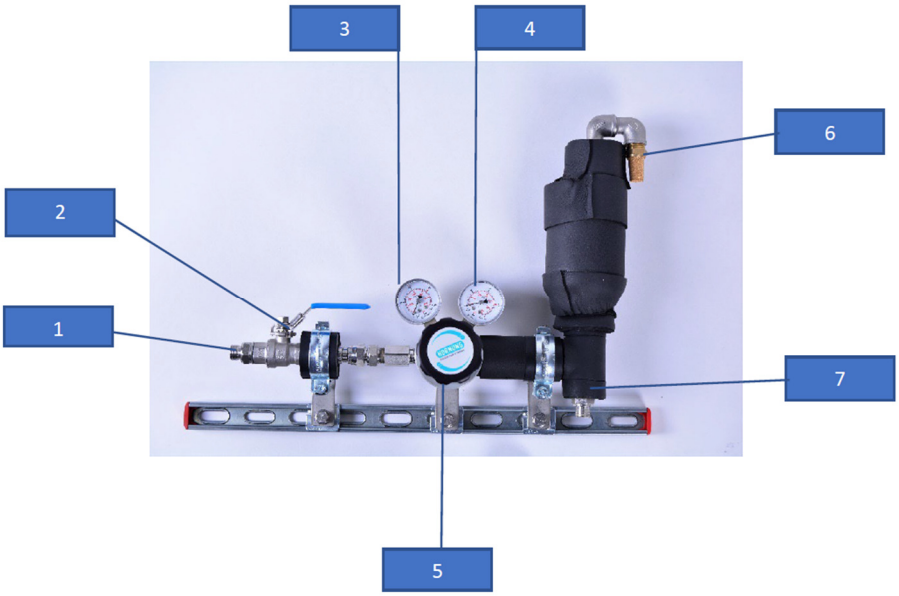
The pelletizer is delivered with a male cam coupling to connect the degassing hose. The degassing hose is delivered with female cam coupling in both ends and with a 1-inch male cam coupling, with female BSP thread and an adapter for 1-inch NPT thread.
To avoid CO2 gas discharged inside the building, disconnect the silencer on the pressure compensation outlet and mount a hose to led the CO2 outside the building.

1 inch degassing cam coupling

Pressure compensation connection



Pressure reducer kit (TP700000)



1. Inlet from battery
2. Shut-off valve
3. Inlet pressure gauge
4. Outlet pressure gauge
5. Adjustable knob for outlet pressure (16-18 bar)
6. Gas vent release
7. Outlet to PE 80 Pelletizer

Carbon Dioxide (CO_2) and Dry Ice Properties

At a temperature of -15°C (5°F) under normal atmospheric pressure, carbon dioxide has a density of 1.87 kg/m3 (0.12 lbs./ft3) and is 1.5 times heavier than air. It is a colorless and odorless gas with a slightly pungent odor at higher concentrations and spreads along the ground.
Carbon dioxide gas will collect in low-lying areas such as pits and cellars. Request the Material Data Safety Sheet (MSDS) from your local CO_2 supplier.

Dry Ice Production Process

The expansion of liquid carbon dioxide at pressure 16-18 bar (217.6-261.1 psi) to atmospheric pressure is how the pelletizers produce CO_2-snow at a temperature of -78.5°C (-109.3°F). The CO_2-snow is then compressed to form high-density dry ice pellets.

Safety Hazards

Dry ice is extremely cold and may cause severe frost bite or tissue damage when in direct contact with exposed skin. Always wear protective gloves and clothing when handling dry ice. CO_2 is classified as a non-flammable and non-toxic gas. It is normally present in the atmospheric air at a level of approximately 0.04%. It is a normal product of metabolism being held in bodily fluids and tissues where it forms part of the body's normal chemical environment. Higher concentration can cause suffocation. Operate the pelletizer in a well-ventilated work area with continuous CO_2-level monitoring. The effects of CO_2 are entirely independent of the effects of oxygen deficiency.

Therefore, CO_2 concentrations at 3-5% causes headaches, fast breathing and discomfort while higher concentrations may cause unconsciousness, suffocation or respiratory arrest. The legal exposure limit set by OSHA is a 0.5% average over an 8-hour workday.
Always use a CO_2 monitoring/alarm system when working with machinery that emits CO_2 in a confined room/space.

Operation and maintenance should only be performed by authorized and trained personnel.
Below are some basic safety guidelines:

- Follow local governing codes to ensure a minimum standard of safety.
- Wear protective gloves, safety glasses, and ear plugs.
- Operate the pelletizer in a well-ventilated work area with a CO_2 monitoring/alarm system.

Pre-Installation Checklist

The owner should use the checklist below to prepare for the installation of their pelletizer. It is the owner's responsibility to verify all the necessary preparations that have been made for the installation site and meet the specifications and guidelines detailed in this publication.
If you have requested and ordered Cold Jet to execute onsite commissioning, start-up and training please complete below checklist and send it to your contact at Cold Jet or our service mailbox service@coldjet.com (Americas + APAC) or service.eu@coldjet.com (Europe/EMEA).

Completed	Task
·	The installation site of the pelletizer is indoors, well-ventilated, with sufficient. clearances on all sides (including the top).
·	The installation of the CO_2 supply tank is complete and has been filled by the owner-selected CO_2 supplier (refer to "Liquid CO_2 Supply System" on page 6).
·	The supply pipeline has been installed and meets the specifications described in "Liquid CO_2 Supply System" on page 6.
·	At the end of the pipeline a conic reduction to 3/8" (male thread) is installed.
·	The exhaust pipeline has been installed and meets the specifications described in "Gas CO_2 Exhaust System" on page 7.
·	The physical distance from the pelletizer to walls, columns or any firm/solid object in the surrounding area must not be less than 1 meter.
·	Electrical connections have been established and are in compliance with the regional specifications described in "Electrical Service & Supply" on page 8.
·	Images have been provided to Cold Jet of the above-mentioned points.

Pre-Installation Confirmation Form

I hereby verify the pre-installation preparations listed above have been completed.

Customer:

_____

Order:

_____

Owner/Contact:

_____

Signature:

_____

Date:

_____

Notes/Remarks to Cold Jet:

_____

Contact Information

Find the customer support and technical services contact information for your region in the table below:

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