

I N S T R U C T I O N S

Economy Frigmat® Dry Ice Maker - CATALOG NUMBER H38876-0000

WARNING

Because of the pressures and temperatures involved when working with liquid and/or solid carbon dioxide (CO₂), always wear safety glasses and insulated gloves. Do not tamper with the inlet or relief valve, (13), it is set at 35 psi and locked. Never operate the Frigmat® Dry Ice Maker if the handle is not fully down. Return the unit to the factory for any repairs other than replacing the O-rings or filter. The units are factory set for the greatest efficiency and safety.

INTRODUCTION

Although the operation of the Frigmat® Dry Ice Maker is standardized, each unit will exhibit certain individual characteristics in use. It is important to recognize these individual characteristics and note them in order that all personnel may use the instrument with equal ease and convenience.

For example, the inlet valve, which controls the entrance of liquid CO₂, may perform most efficiently at some particular setting (1/4 open, 1/8 open, etc.). The average filling time of the unit at that particular setting should be noted. The unit should not be stored in excessively warm areas, nor should the CO₂ cylinders. Please review the information in this brochure for assurance of satisfactory performance and convenience when using the Frigmat® Dry Ice Maker.

NOTE:

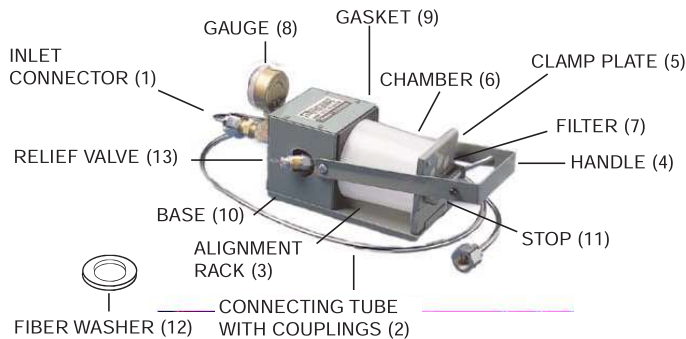
When ordering cylinders of CO₂ from your supplier, specify cylinders equipped with a dip tube. These cylinders can be used in an upright position. If the cylinder does not have a dip tube, lay the cylinder on its side with the valve lower than the cylinder.

INSTRUCTIONS

The Frigmat® Dry Ice Maker is shipped completely assembled, however before attempting to operate the unit, it is advisable to recheck the assembly as follows:

To Disassemble:

Press down with one hand on the clamp plate (5) while pulling up on the handle (4) with the other hand until the handle moves freely and the clamp plate is released. Move the handle upward until it and the clamp plate are clear of the chamber (6). Remove the chamber.



To Reassemble:

- Place the chamber (6) on the alignment rack (3) and pressed against the gasket (9).
- Lower the handle (4) and clamp plate (5) so the clamp plate is between the chamber (6) and the stop (11) when the clamp plate is resting on the base (10).

OPERATION:

- Attach one end of the connecting tube (2) to the inlet connector (1) on the end of the dry ice maker using a coupling and fiber washer (12). Tighten with a wrench.
- Attach the other end of the connecting tube and fiber washer to the CO₂ cylinder and tighten with a wrench.
- Open the valve on the CO₂ cylinder approximately 1/8 of a turn while observing the pressure gauge (8). It is important to maintain the pressure below 10 psi; if the pressure is greater than 10 psi, reduce the flow of CO₂. Liquid CO₂ will enter the dry ice maker and vaporize. There will be an escape of gas around the inlet

connector and through the holes in the clamp plate. This is normal and is no cause for concern. In about 1 to 2 minutes, the volume of gas escaping will diminish, indicating that the dry ice chamber is full.

- Turn the CO₂ cylinder valve clockwise to shut off the CO₂.
- Allow a few seconds for venting excess gas. Disassemble dry ice chamber as described and remove dry ice block from the chamber.
- Reassemble dry ice chamber as described and the Frigmat® Dry Ice Maker is ready to produce another block of dry ice.

PRINCIPLES OF OPERATION:

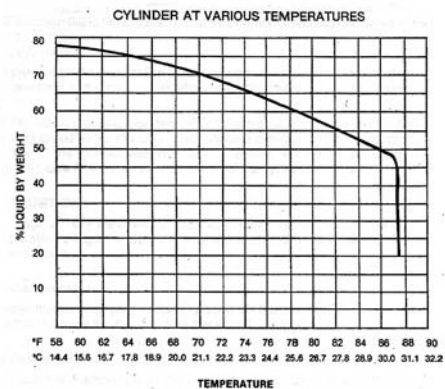
The Frigmat® Dry Ice Maker utilizes the Joule-Thomson effect to produce solid CO₂ from liquid CO₂. The liquid CO₂ enters the cavity through a valve and orifice. It reaches the valve at cylinder pressure, which is in excess of 850 psi, and is then allowed to vaporize at essentially atmospheric pressure. The chamber and body and entire system are cooled by the vaporizing CO₂. The expanded cold gas is exhausted around the external portion of the orifice and throttling valve to further cool the incoming liquid. The result is a progressive chilling of both the incoming liquid and the dry ice maker until a temperature is reached at which the incoming liquid is directly converted to hard-packed carbon dioxide snow. As more liquid is frozen, the snow is compressed inside the chamber to produce the solid dry ice cake.

VARIATIONS OF LIQUID CONTENT IN CO₂:

When CO₂ cylinders are filled with gas, the cylinder pressure is maintained at between 700 and 850 psi. Under this pressure, approximately 30 percent of the cylinder volume is filled with gas while the remainder contains liquid.

The Frigmat® Dry Ice Maker will produce dry ice only from liquid CO₂. The amount of dry ice which can be made is a function of the amount of liquid present in the cylinder. This in turn, is a function of the temperature of the cylinder.

A cooler cylinder contains more liquid and thus can produce more dry ice. As the following chart indicates at 60°F (15.6°C) approximately 77% by weight of the CO₂ is liquid. At 70°F (21°C) liquid content has decreased to 70%, while at 80°F (26.7°C) it is only 58%. If the temperature of the cylinder is above 88°F (31°C), the critical temperature, only gas is present and dry ice cannot be made.



PARTS LIST FOR ECONOMY FRIGMAT®

Number	Description
93887-6614	Chamber (6)
93887-6611	Gasket (9)
99919-0250	Pigtail Assembly USA
90378-0620	Pigtail Assembly Europe
93887-6615	Filter (7)
99932-1054	Gage 0-100 psi (8)
99919-0280	Washer, Pigtail Assembly (12)



BEL-ART PRODUCTS