

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



Frigimat® EZ Dry Ice Maker

Catalog No. H38878-0010

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. 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 Frigimat® EZ 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.

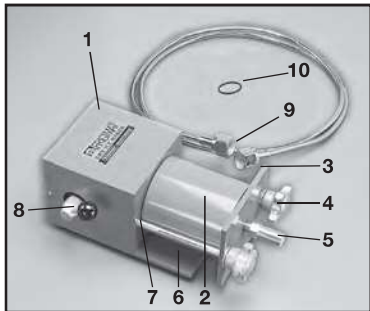
For example, the inlet valve, which controls the entrance of liquid CO₂, may perform most efficiently at some particular setting (1/4 open, 1/8 open, etc.). The average

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 Frigimat® EZ 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 Frigimat® 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:

Loosen the two clamping knobs (4); slide the front end plate (3) forward, and then remove the dry ice chamber with O-rings (2).

To Reassemble:

- Place the chamber (2) on the base (6) between the clamping screws rods (7) making sure that contact is made with O-rings.
- Slide the front end plate (3) against the dry ice chamber (2).
- Make Sure that the slide hole in the relief valve (5) faces downward.
- Tighten the two clamping knobs (4).

OPERATION:

- Attach one end of the pigtail assembly (connecting tube) to the inlet connector (1) on the side of the dry ice maker using a coupling (9) and Washer (10). Tighten with a wrench.
- Attach the other ends in the same manner to the CO₂ cylinder and tighten with a wrench. Note: On European and Japanese models, connect the end marked CO₂
- Close the inlet valve (8) on the Frigimat® Dry Ice Maker. Then open the valve on the CO₂ cylinder and check for leaks at the two connections.

D. Move the inlet valve handle (8) approximately 1/8 to 1/4 turn counterclockwise. Liquid CO₂ will then enter the dry ice maker and vaporize. There will be an escape of gas around the inlet valve handle and inlet tube. 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.

E. Turn the inlet handle (8) clockwise to shut off the CO₂.

F. Allow a few seconds for venting excess gas. Dissassemble dry ice chamber as described and remove dry ice block from the chamber.

PRINCIPLES OF OPERATION:

The Frigimat® 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 Frigimat® EZ 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.

