

COB INDUSTRIES, INC.

# QWIK-FREEZER®

**Portable Pipe Freezing Equipment**



Qwik-Freezer® equipment utilizes liquid carbon dioxide (CO<sub>2</sub>) to freeze stationary water in selected sections of pipe or tubing. By producing very low "dry ice" temperatures, Qwik-Freezer® forms a secure inline ice plug. This temporarily isolates the water in the system and allows modifications to be made without draining down or shutting off supplies.

# OPERATING MANUAL

# QWIK-FREEZER

## OPERATING PROCEDURE FOR PORTABLE PIPE FREEZING EQUIPMENT

### STEP 1: SET-UP PREPARATIONS

1. Be sure there is more than enough liquid CO<sub>2</sub> on hand for the job (refer to Freezing table for the amount need to complete initial freeze only). If you intend to hold a freeze, extra cylinders will be needed. Use only cylinders fitted with a siphon tube or dip tube.
2. Keep the cylinder upright and keep it cool. The unit operates best when the temperature of the cylinder is kept below 77° f. It will not work if the cylinder temperature reaches 88° F. Keep the cylinder out of direct sunlight. If necessary keep the cylinder in a drum filled with water and ice.
3. Make sure there is no flow of water through the pipe. **Flowing water will not freeze!** Insure outside surface of pipe is clean of all foreign matter.
4. Water should be 68° F or colder. Warm water will take much longer to freeze. Always freeze on a horizontal line whenever possible. If attempting a vertical freeze the water temperature must be colder than 68 f. Additional injections and waiting time will also be necessary. A vertical pipe may take up to twice as long as a horizontal line and the CO<sub>2</sub> consumption will double.
5. Do not attempt to freeze close to a main line which has flowing water. The turbulence can prevent formation of ice plug. (Figure 1 shows how Qwik-freezer should be used close to a main line with flowing water). A minimum of 12" (1" pipe) from water main is required. For every 1" of pipe diameter, add 12" from main. (see Figure 1).
6. Connect hose(s) to nozzle(s) on the jacket and to cylinder(s). Make sure nozzle is clear and tight. Open cylinder valve briefly and check that the orifices are clear. If clogged, remove and clean.
7. Fit the jacket around the pipe by pressing the sealing strips together and tie cords tightly around the pipe. Some escaping CO<sub>2</sub> is common around the nozzle and end seam of jacket.
8. If a torch is to be used keep the jacket a minimum of 12 inches away from the point of repair for each inch of the pipe diameter on carbon steel. Triple the distance for copper tubing.
9. Double freezing: to block the flow on both sides of the valve, (see Figure 2) ice plugs must be kept far apart to eliminate pressure build up. Minimum of 2 feet between plugs is necessary on lines smaller than 3 inches in diameter with pressure of 60 PSI or less (see Figure 2). Higher pressure than 60 PSI will require much greater separation. Also for pipe diameters of 3 - 8 inches separate and additional 1 FOOT FOR EVERY INCH OF PIPE DIAMETER.

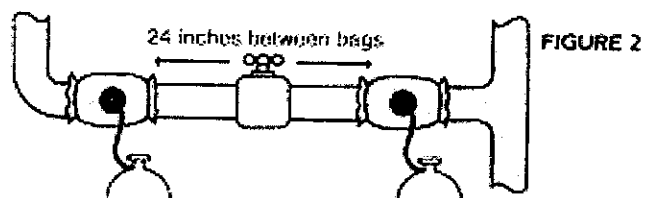
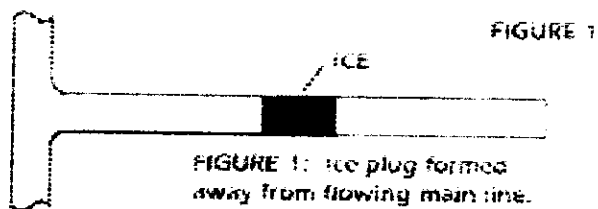
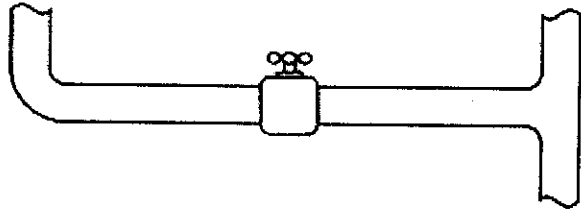
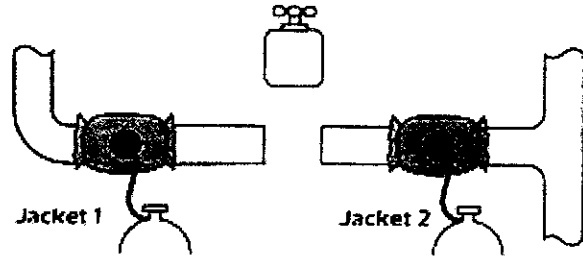


FIGURE 2: FOR PIPE SIZES SMALLER THAN 3" DIAMETER WITH 60 PSI OR LESS. LARGER PIPE SIZES AND HIGHER PRESSURE REQUIRE MUCH GREATER SEPARATION. FOR DOUBLE FREEZING PROCEDURES, CONTACT CUSTOMER SERVICE AT 1-800-431-1311 EXT 100.

## A Typical Qwik-Freezer\* Application: Replacing a Defective Valve.



The water must be brought to a static condition. The Qwik-Freezer jacket (orange) is then wrapped around the pipe at a nearby upstream location. Injecting liquid CO<sub>2</sub> into the jacket rapidly freezes the water in the pipe, permitting valve



removal for servicing or replacement. The illustration shows position of a second Qwik-Freezer jacket and tank used when a double freeze is required to block flow on both sides of the valve.

10. When freezing close to a valve, the valve should be opened. If the valve is closed follow procedures for Double Freezing ( Paragraph 9) for the distance required between the plug and the closed valve.
11. **IMPORTANT:** to insure compliance with freezing table, be sure to accurately log all information on timing log included with each Qwik -Freezer Kit.

### 10.STEP 2: BEGINNING THE FREEZE

1. Open cylinder valve fully and inject liquid CO<sub>2</sub> (for times see Freezing Table). The jacket will fill with solid dry ice. (After more

than 1 injection).

2. **IMPORTANT:** During the freezing period break up the formation of dry ice by pressing jacket firmly and vigorously tap the jacket with rubber mallet to ensure dry ice is packed evenly around the pipe, and in contact with the pipe for best results.

On pipe diameters of 4-8" inches it may be necessary to shift the jacket 90 after each of the first, second and third injections to distribute the dry ice more evenly before starting break up.

3. Always allow sufficient waiting time between injections as indicated in the Freezing Table,

PIPE JACKET SIZE	QF 101 8 INCHES		QF 102 12 INCHES		QF 103 14 INCHES		QF 104 20 INCHES		QF 106 28 INCHES		QF 108 33 INCHES	
PIPE SIZE	1/2"	3/4"	1"	1-1/2"	2"	3"	3"	4"	5"	6"	7"	8"
NO. OF INJECTIONS	2	2	3	4	3	6	6	7	9	11	15	17
INJECTION TIME	1 min	1 min	1 min	1 min	5 min	5 min	6 min	8 min	12 min	12 min	12 min	12 min
WAITING TIME	3 min	3 min	5 min	5 min	5 min	5 min	8 min	10 min	8 min	8 min	8 min	8 min
TOTAL TIME REQUIRE	8 min	8 min	18 min	24 min	30 min	60 min	84 min	126 min	190 min	220 min	310 min	340 min
APPROX. CO2 REQUIRE	1 lbs	2 lbs	3 lbs	6 lbs	18 lbs	36 lbs	42 lbs	65 lbs	243 lbs	297 lbs	405 lbs	475 lbs

Note: the above tables are for typical freezing of static water at 68 f in Schedule 40 steel pipe. Higher temperatures will require additional injection and waiting periods. Plastic pipe will take up to 3 time longer. For freezing applications on pipes larger than 8" (200mm.) I.D., please contact COB Customer Service, 1-800-431-1311 ext. 100

### STEP 3: PROCEEDING WITH THE REPAIR

1. Following completion of all injections and waiting periods as indicated in the FREEZING TABLE a wide band of frost should have formed on the outside of the pipe near the edges of the jacket. The band must cover the full circumference of the pipe. The frost band alone is not a guarantee of a completed ice plug. Before proceeding with the repair, check at a valve, flange or vent to be sure that the plug has fully formed. Plug test procedure, call 1-800-431-1311 ext 100.
2. The ice plug will easily withstand normal water pressure up to 300 PSI.
3. To maintain the ice plug, make an additional injection every 10 to 15 minutes. (check freeze every 5 minutes.)
4. For welding or cutting near the freeze refer to Step 1, Paragraph 8.
5. Upon finishing the repair remove the jacket and allow pipe to thaw naturally. Do not use a torch as this could damage the pipe. If possible back fill pipe with water to speed the thawing process.

### SAFETY PRECAUTIONS

1. Qwik-Freezer® equipment should be used only to freeze stationary water in a selected sections of pipe or tubing. It should not be used on pipes larger than specified in freezing table or pipe containing anything but water. For other sizes and applications, contact customer service at 1-800-431-1311 ext 100.
2. CO<sub>2</sub> is heavier than air and will collect in confined and low lying work areas. To prevent the danger of suffocation, make sure there is always good ventilation. Ventilation fans must be used in confined and low lying spaces.

3. Wear gloves and safety glasses at all times when working with Qwik-Freezer®. Do not hold dry ice, frostbite could result.

### TROUBLE SHOOTING

1. If dry ice does not form, check the following:
  - A) Qwik-Freezer® cylinders are equipped with a siphon tube which may have broken. Have a proper carbonic gas dealer check the cylinders siphon tube.
  - B) If you are not using a Qwik Freezer® cylinder it is possible that your cylinder is not equipped with a siphon tube or the tube is too short. (a minimum 1/4" from the cylinder base.)
  - C) Was the cylinder full when you started the Freeze?
  - D) Was the cylinder warmer than 77° F? (see Step 1, paragraph 2)
2. If there flow in the line? Flowing water will not freeze. All steps must be taken to bring water to a static condition.
3. Pipes must be completely full of water. If unsure vent air from pipe.
4. Hot water lines should be allowed to cool to room temperature before attempting a freeze .
5. If there is glycol (antifreeze) in the pipe do not attempt a freeze

COB's "FREEZING LINE" for trouble shooting 1-800-431-1311 ext. 100 or in Florida 321-723-3200 ext 100 is available to answer your questions. We are your partners in pipe freezing.

COB INDUSTRIES, INC.

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