BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

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PRESSURE TESTING
FREON 12 GAS

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1. GENERAL

1.01 This section contains information about Freon 12 gas and the precautions that must be taken in its use. The section also describes the cylinder in which the gas is supplied and the adapter required to permit using the standard nitrogen regulator on Freon cylinders.

2. DESCRIPTION AND USE

2.01 **Freon 12 Gas:** Under normal conditions of temperature and pressure the cylinders contain Freon in both liquid and gaseous form. The vapor is a non-toxic and practically odorless gas, about four times as heavy as air.

2.02 This gas is used in connection with the B Leak Locator or equivalent apparatus to find sheath breaks in aerial cables. Freon 12 **must not be used in coaxial cable** since the power voltages involved may result in low insulation due to formation of carbon through partial decomposition of the Freon gas.

3. CYLINDERS

3.01 Freon 12 gas is supplied in steel cylinders of two sizes having a gross weight of 220 pounds and 50 pounds of which 145 pounds and 25 pounds, respectively, is the weight of the gas. The following table indicates the volume of gas in the cylinders based on the total weight:

TABLE I

145-Pound Cylinder		25-Pound Cylinder	
Total Weight* Pounds	**Available Freon Cu. Ft. (Approx.)**	**Total Weight* Pounds**	**Available Freon Cu. Ft. (Approx.)**
220 (Full)	435	50	75
200	405	45	60
180	345	40	45
160	285	35	30
140	215	30	15
120	125	25 (Empty)	0
100	55		
90	25		
75 (Empty)	0		

* Weight includes cylinder cap weighing 3 pounds.

3.02 The gas pressure in the cylinder varies depending on the temperature, as indicated below:

TABLE II

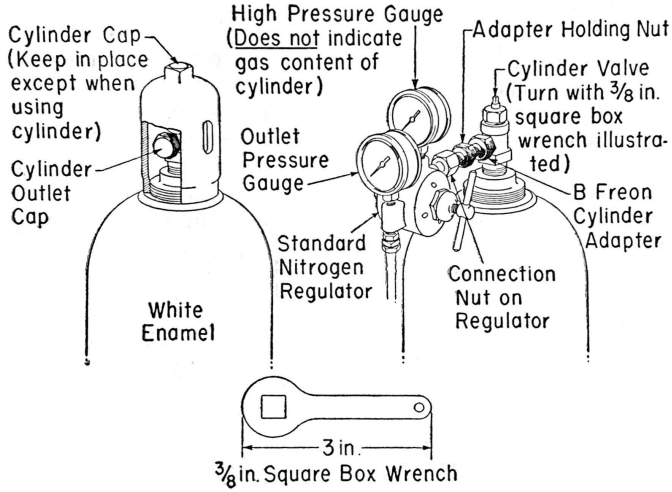
Temperature	Approximate Cylinder Pressure
100° F.	115 p.s.i.
70° F.	70 p.s.i.
0° F.	9 p.s.i.
—20° F.	0 p.s.i.

3.03 The valve assembly on all Freon cylinders is equipped with a fusible metal device which melts to relieve the gas pressure, in case the temperature of the cylinder rises above 157° F. In addition, the base of cylinders containing 145 pounds of Freon has a fusible metal plug which likewise melts at 157° F.

3.04 **The cylinder must be in a vertical position before opening the valve and whenever gas is to be supplied,** otherwise the liquid Freon which is normally present may be forced out of the cylinder.

4. PRESSURE REGULATOR

4.01 The standard Pressure Testing Regulator is used on the Freon 12 cylinder. The regulator is connected to the outlet of the cylinder by means of the B Freon Cylinder Adapter as illustrated below:



4.02 The volume scale on the high pressure gauge of the regulator does not apply to Freon gas. The volume of gas remaining in the cylinder is determined by the weight of the cylinder as indicated in Table I.

4.03 Except for the effect of temperature, the gas pressure in the cylinder remains constant as long as there is liquid Freon in the cylinder. (Refer to Table II.)

5. PRECAUTIONS

5.01 Freon 12 gas is used primarily to detect sheath breaks in aerial cable and exposed parts of associated short underground dips. It is not intended for testing cable in man-

holes. This gas is four times as heavy as air and if Freon leaks into a manhole, it may tend to displace the air causing a deficiency of oxygen.

5.02 If the cable to be tested has branches entering subscriber buildings, check to see that the branches are plugged.

5.03 Freon cylinders must not be stored in boiler rooms, adjacent to steam pipes, nor in other places where the temperature is likely to rise above 120° to 130° F.

5.04 **Do not** make sheath repairs with an acetylene torch until the Freon gas is forced out of the cable by flushing with nitrogen gas. An open flame, such as from an acetylene torch, converts Freon into a toxic gas.

5.05 Soldering operations with a furnace-heated copper, or the usual joint wiping operations can be done safely in the presence of Freon 12 gas.

5.06 Eye protection should be worn in handling Freon 12 gas cylinders. If liquid Freon accidentally is in contact with the skin for a sufficient length of time to cause irritation, treat the area in the same manner as frostbite.

5.07 Always close the cylinder valve before removing the regulator, to avoid the flow of moist air into the cylinder when the supply of Freon gas is depleted.

5.08 Freon is an expensive gas and care should, therefore, be taken to avoid loss. It should be used only for its intended purpose.

6. MATERIAL AND TOOL LIST

6.01 The following is a list of the materials and tools required.

Adapter, Freon, B	(One required for each regulator)
Gas, Freon, 25 lb. Cylinder	
Gas, Freon, 145 lb. Cylinder	
Regulator, Testing, Pressure	(These are the standard nitrogen regulators)
Wrench, Box, Square, 3/8"	(For operating cylinder valve. Matheson Chemical Co., Inc., or equivalent square box wrench. To be obtained locally.)
Wrench, Regulator, B	(Two required, one for holding adapter and one for regulator nut.)