B, C, D, AND E LP-GAS CYLINDERS

CONTENTS

1. GENERAL

1.01 This section describes the B, C, D, and E LP-Gas Cylinders, and outlines the precautions that should be followed to ensure the safe storage and handling of liquefied petroleum gas referred to as LP-Gas.

1.02 This section is reissued to include information on the dual valves (Bastian-Blessing No. 8556W, which replace the No. 8556B provided on the early D and E LP-Gas Cylinders for withdrawing the fuel as either liquid or vapor.

1.03 ***The information contained in this section conforms to the minimum standards of the National Board of Fire Underwriters as recommended by the National Fire Protection Association (NEPA No. 58—1967: ANSI Z106.1—1965: UDC 621.6.036). The recommendations contained herein should be followed when not exceeded by more stringent regulations of federal or local authorities having jurisdiction.***

1.04 Although this section covers the B, C, D, and E LP-Gas Cylinders, much of the information will prove useful even if other cylinders are used to store LP-Gas fuel. It will, however, be necessary to determine locally which parts of this section apply, depending on the design of the container.

2. DESCRIPTION

2.01 The B, C, D, and E LP-Gas Cylinders (Fig. 1) are refillable steel containers for transporting and storing LP-Gas. They are constructed in accordance with the ◗Department of Transportation (DOT)◖ regulations to afford a safe method of transporting, storing, and handling liquefied petroleum gas. The B and C Cylinders are equipped with the standard vapor release valve, and the D and E Cylinders are equipped with a dual valve for releasing liquid or vaper fuel.

2.02 The weights, measurements, and component parts of these cylinders are as shown in Fig. 1.

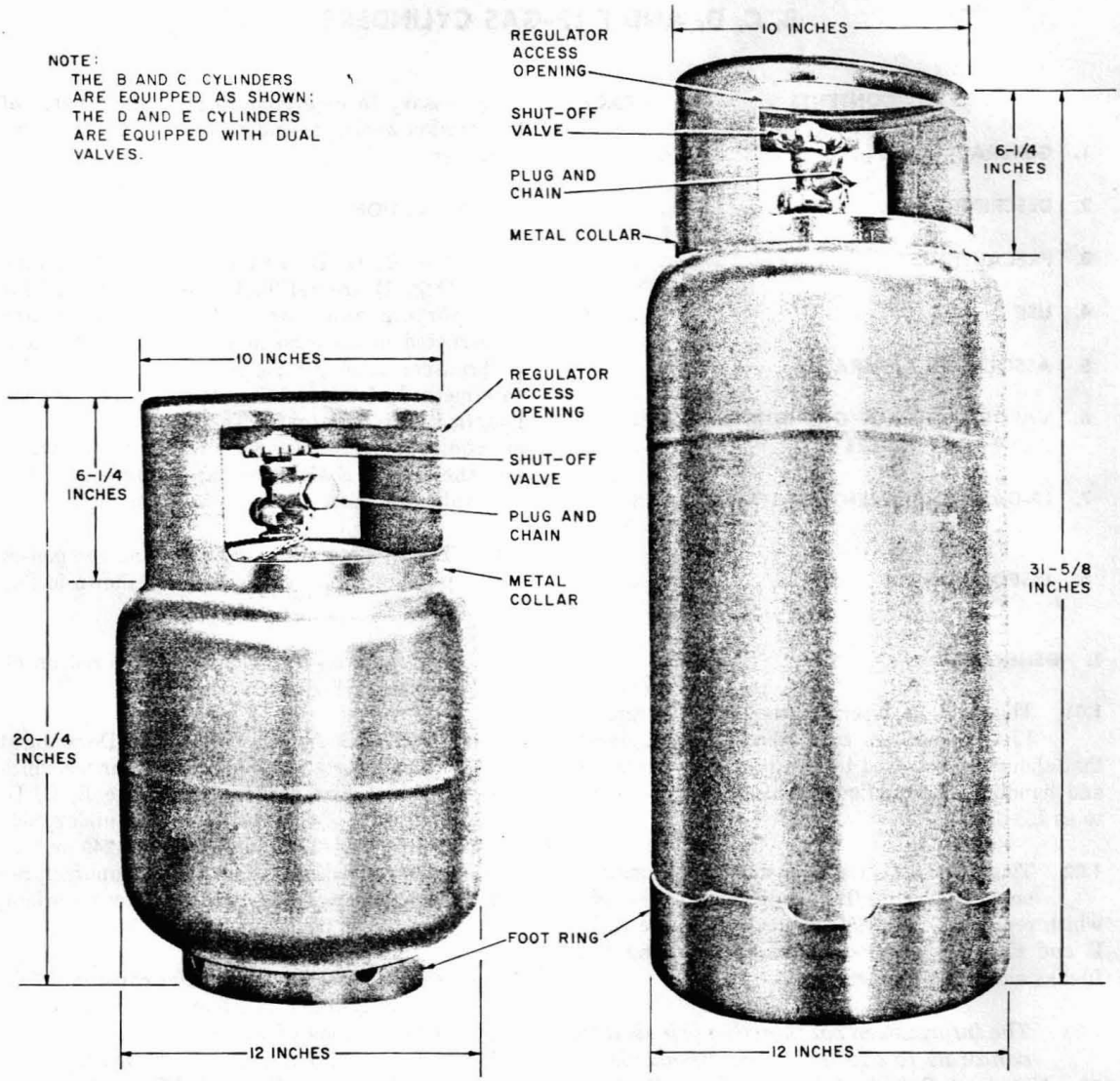
2.03 The following markings are required on all LP-Gas Cylinders:

(a) ◗***DOT Code Number:*** This is the Department of Transportation◖ Specification under which the cylinder was constructed. The B, C, D, and E LP-Gas Cylinders are made under code 4B or 4BA. For example, ◗**DOT**◖ **-4BA240** marked on a cylinder indicates that it was manufactured under ◗**DOT**◖ **code 4BA and** designed for a working pressure of 240 pounds per square inch.

(b) ***Water Capacity:*** The water capacity (W.C.) of the cylinder is given in terms of the number of pounds of water it will hold, eg, the B and D LP-Gas Cylinders will be marked W.C. 47 or W.C. 48; the C and E LP-Gas Cylinders will be marked W.C. 95 or W.C. 96.

(c) ***Date of Initial Inspection:*** This date is stamped on each cylinder. Twelve years after this date the cylinder should be returned for disposition as indicated in 8.02.

(d) ***Ownership:*** The name, initials, or other marks signifying ownership must be shown on the cylinder. Ownership is registered with the Bureau of Explosives and changes in title must be recorded.



B AND D CYLINDERS

CAPACITY–20 LBS

APPROXIMATE TARE WEIGHT–25 LBS.

APPROXIMATE FULL WEIGHT–45 LBS

C AND E CYLINDERS

CAPACITY–40 LBS

APPROXIMATE TARE WEIGHT–39 LBS

APPROXIMATE FULL WEIGHT–79 LBS

Fig. 1—LP-Gas Cylinders

(e) ***Serial Number:*** The serial number is required for the proper identification of a cylinder.

(f) ***Tare Weight:*** The tare weight (T.W.) or empty weight of the cylinder with valve is an essential marking. Without this marking the cylinder would be difficult to fill properly. The amount of fuel in a cylinder (net weight) may be determined easily by the gross weight of the cylinder less its tare weight. For example, the B and D LP-Gas Cylinders (20-pound capacity) are stamped T.W. 25 and should weigh 45 pounds when properly filled.

2.04 The B, C, D, and E LP-Gas Cylinders are equipped with a shut-off valve which contains a pressure relief device and an excess flow check valve. In addition, the valve is equipped with an outlet check valve which prevents the escape of fuel due to tampering with the valve handle. The valve is equipped with a plug and attachment chain for sealing and protecting the outlet connection.

2.05 ◗The early D and E Cylinders are equipped with a dual valve, Bastian-Blessing No. 8556B, which permits withdrawing fuel in either liquid or vapor form through the same outlet. This valve should be replaced by a dual valve, Bastian-Blessing No. 8556WD for D Cylinders and No. 8556WE for E Cylinders, supplied with all new cylinders. The "W" series valves (Fig. 2) are designed having excess flow control for both vapor and liquid sides, whereas the "B" valve provided the excess flow check valve only on the liquid side. The new valves are marked with two circumferential rings cut into the cylindrical portion of the valve near the outlet to distinguish them from the early type valve.◖

2.06 The pressure relief valve (Fig. 2) is a device designed to protect the cylinder from dangerously high pressures. Fuel is retained at normal pressures but the valve opens in the event of excessive pressure. Excessive pressures may occur as a result of either overheating or overfilling. Measures must be taken to ensure the proper functioning of relief valves. They are mounted to come in contact with the vapor space of the cylinders when the cylinders are in a vertical position. ***When these cylinders are not in a vertical position, the proper functioning of the pressure relief valve may be prevented. It is therefore necessary that these cylinders be maintained in a vertical position at all times.***

Warning: ◗***The pressure relief valve shall not be removed, altered, or defaced.***◖

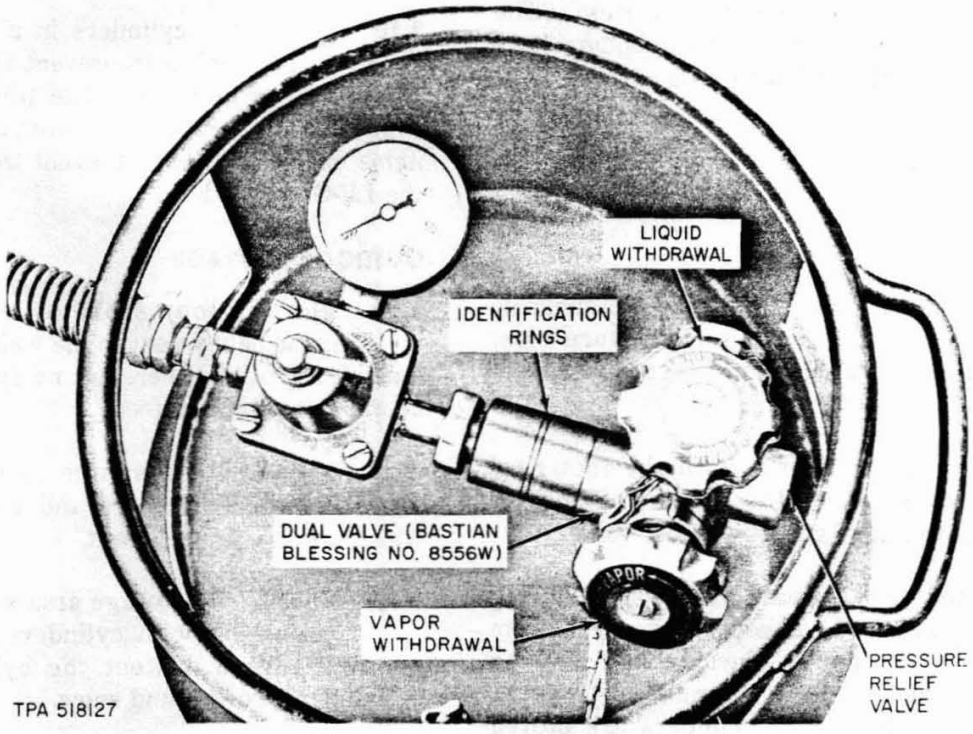


Fig. 2—◗D or E LP-Gas Cylinder◖

2.07 The excess flow check valve in the B and C Cylinders is provided in the base of the shut-off valve; essentially, it is a steel ball resting in a short pipe nipple inside the stem of the valve housing. Its purpose is to close off the flow of fuel resulting from broken fittings or severed hose when connections are made through the high pressure regulator. In the event of accidental operation of the check valve, close the shut-off valve and after a few seconds reopen the valve slowly to restore proper operation.

2.08 ▶The excess flow check on the liquid side of the D and E Cylinders consists of a steel ball resting at the bottom of a 12-inch long tube in the 8556WD valve, and at the bottom of a 23.5-inch long tube in the 8556WE valve. The excess flow check valve on the vapor side of the D and E Cylinders consists of a spring loaded disk fitted into the outlet check section of these valves.◀

2.09 A metal collar, 10 inches in diameter and 6-1/4 inches high, is provided to protect the shut-off valve. On newer models the regulator access opening in the collar has been enlarged and made rectangular as shown in Fig. 1. The regulator access opening on the older models is circular.

2.10 A foot ring (Fig. 1) is provided to support the cylinder in the vertical position. The foot rings of the C and E LP-Gas Cylinders have been enlarged and strengthened with a rolled edge base.

3. PRECAUTIONS

GENERAL

3.01 Store cylinders at locations that will minimize exposure to excessive temperature rise, physical damage, or tampering. Keep away from fire and heat.

3.02 Do not stack cylinders with the foot ring of one cylinder inside the collar of another cylinder. This will damage the cylinder valve.

3.03 Close and plug cylinder outlet valves during storage and when transporting to and from job locations even though the cylinder may be considered empty. The plug must be wrench tightened. ▶In addition, if cylinders are stored temporarily at work locations, they should be securely chained in place.◀

3.04 Store all cylinders, including empty ones, in a vertical position with the valve end up so that the lower end of the valve is in the vapor section of the cylinder.

3.05 Store cylinders not less than 25 feet from flammable liquids such as oil, gasoline, etc, and not less than 10 feet from readily ignitable material, such as weeds, long dry grass, newspapers, etc.

3.06 Do not store cylinders in any enclosure unless louvers or other suitable openings have been provided to permit any escaping gas to diffuse into the outside atmosphere.

3.07 Never store cylinders below ground level, eg, in manholes, basements, cable vaults, etc.

3.08 Post suitable signs warning personnel to keep open flames, lighted cigarettes, etc, away from storage area.

STORAGE ON VEHICLES

3.09 Ventilate the storage area on the vehicle to permit any escaping gas to diffuse into the outside atmosphere.

3.10 Secure the cylinders in a vertical position on the vehicle to prevent the cylinders from tipping over and place the plug in the outlet connection to protect its threads. Locate other items on the vehicle to prevent them from striking the LP-Gas cylinders.

OUTDOOR STORAGE

3.11 The outdoor storage location may be immediately next to the walls of fire-resistant buildings provided there are no openings (windows, doors, etc) within 10 feet.

3.12 Maintain a minimum distance of 10 feet between cylinders and walls of buildings which are not fire-resistant.

3.13 Enclose the storage area suitably to prevent tampering with cylinders by unauthorized persons and to protect the cylinders from an accumulation of ice and snow.

3.14 Do not store the cylinders adjoining the line of property occupied by schools, churches,

hospitals, athletic fields, or other public gathering places.

3.15 Do not store cylinders within 25 feet of catch basins, pits, or building openings that are located on a level below that of the storage area.

BUILDING STORAGE

3.16 Do not store empty or full cylinders overnight inside public buildings (schools, courthouses, etc), places of business, or customer's premises.

3.17 Limit cylinders stored inside industrial or commercial buildings frequented by the public to a total capacity of 200 pounds of LP-Gas (10 B or D Cylinders).

3.18 Limit cylinders stored inside industrial buildings not frequented by the public to a total capacity of 300 pounds of LP-Gas.

Note: Consider empty cylinders as full cylinders for determining the maximum quantity of LP-Gas stored as described in 3.17 and 3.18.

3.19 Do not consider cylinders carried on telephone trucks in the total amount of LP-Gas stored in 3.17 and 3.18 when such vehicles are stored in a garage solely occupied by the telephone company. Limit each vehicle to cylinders with a total maximum capacity of 80 pounds (four 20-pound cylinders or two 40-pound cylinders). These cylinders shall be properly secured in the vehicle. (See 3.10)

3.20 Do not store cylinders near exits, stairways, or in areas normally used or intended for the safe exit of people.

STORAGE IN SPECIAL BUILDINGS OR ROOMS

3.21 The number of cylinders stored in special buildings or rooms constructed in accordance with NFPA No. 58, Section 5.4, shall not exceed a total capacity of 1000 pounds of LP-gas (50 B or D Cylinders).

3.22 Do not store cylinders in rooms or buildings adjoining the line of property occupied by schools, churches, hospitals, athletic fields, or other places of public gathering.

FIRE PROTECTION

3.23 Provide storage locations with at least one approved portable fire extinguisher having a minimum rating of 8-B, C (25 lb CO_2).

3.24 Tag leaky or otherwise defective cylinders and return in accordance with local instructions.

3.25 Keep the cylinder valve closed when the cylinder is not being used.

3.26 Do not allow LP-gas to escape in large quantities. It may mix with air, form a blanket of explosive mixture, and drift for a considerable distance before becoming too diluted to burn.

3.27 Do not force connections that do not fit or make any attempt to repair or alter cylinders, valves, gauges, or fittings.

3.28 When working aloft, leave the cylinder on the ground and locate it so that workmen will not accidentally step on it when descending. In addition, position it so it will not be in the path of objects that may fall from aloft.

3.29 Do not drop, strike, or otherwise mishandle a cylinder.

3.30 Maintain cylinders in a vertical position with the valve end up and in contact with the vapor section of the cylinder.

3.31 Open the shut-off valve slowly. Rapid opening of the valve may rupture the diaphragm in the pressure regulator or may cause the excess flow check valve to operate and close off the flow of gas.

3.32 Coat connections of cylinders and associated equipment with a pressure testing or soap suds solution to detect the escape of gas. ***Never test for leaks with an open flame.***

3.33 ***If a detected leak cannot be controlled by closing the shut-off valve, immediately move the cylinder out of doors to a spot as remote as possible, promptly call a local gas distributor, or notify the local Fire or Police Station for assistance in the safe disposal of***

the leaking cylinder. DO NOT TAMPER WITH THE RELIEF VALVE. Return defective cylinders to the manufacturer for repair. Do not attempt local repairs.

TRANSPORTING

3.34 Secure cylinders to be transported in vehicles in a vertical position to prevent movement, tipping, or physical damage and to ensure proper operation of the pressure relief valve. Safeguard valves against physical damage due to collision or overturning.

3.35 Check with the local authorities before entering tunnels (under rivers, etc) for restrictions in carrying LP-gas cylinders.

4. USE

4.01 The B, C, D, and E LP-Gas Cylinders, when filled with liquid fuel, are used to supply LP-Gas to a variety of tools used in the Bell System, such as tent heaters, furnaces, engine-generators, etc.

4.02 Use only the E Pressure Hose when connecting LP-Gas cylinders.

4.03 ▮The shut-off valve shall be closed and the lines bled before disconnecting any tools, lines, or associated apparatus.▮

5. ASSOCIATED APPARATUS

C PROPANE MANIFOLD

5.01 The C Propane Manifold provides a means of connecting combinations of LP-Gas cylinders, regulators, connectors, and tools, such as furnaces, heaters, engines, etc.

5.02 The C Propane Manifold (Fig. 3) consists of a cylinder connection fitting joined by brass pipe to a T-fitting having two internally threaded outlets which accommodate the fittings of the items to be connected.

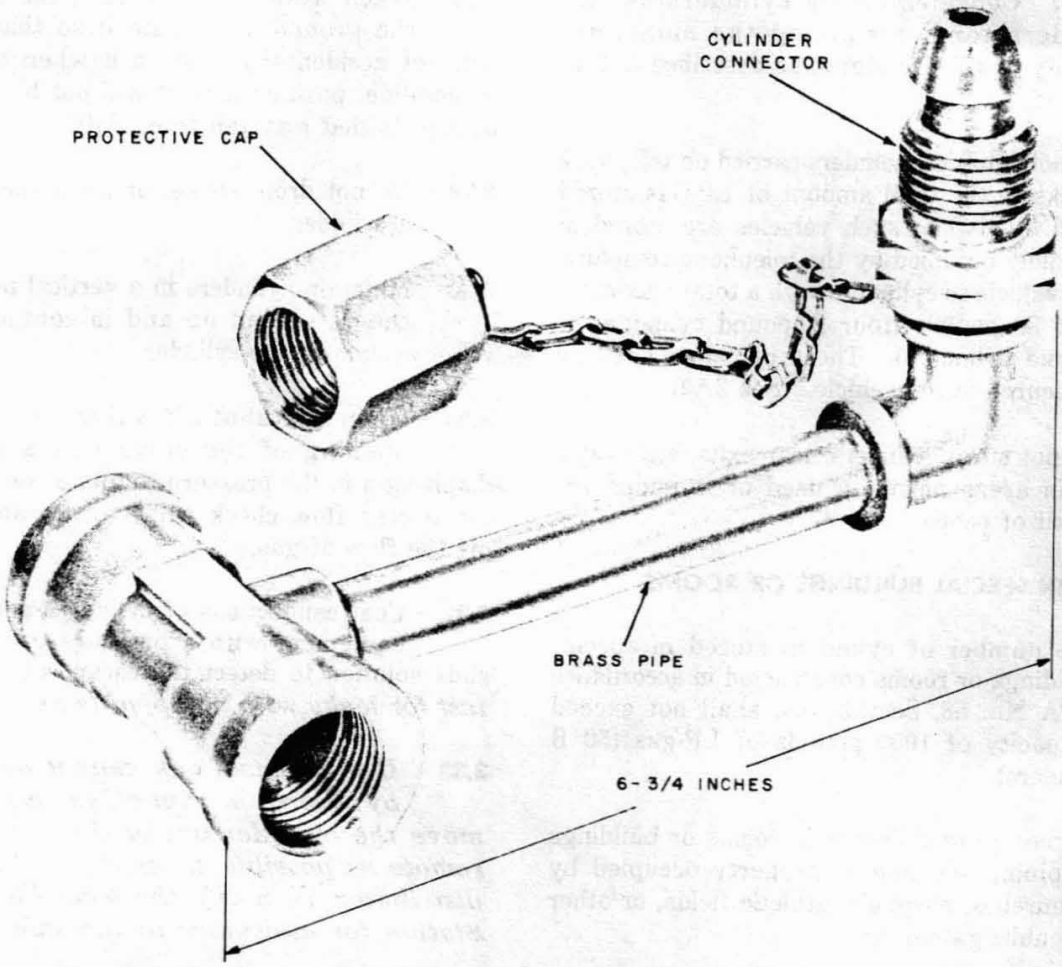


Fig. 3—C Propane Manifold

5.03 The cylinder connection fitting connects to the outlet of the cylinder valve.

5.04 The T-fitting can either be used to connect two pressure regulators or one pressure regulator and one B Propane Connector to one cylinder.

5.05 When the C Propane Manifold is not in use, replace the cap for protection to the nipple and threaded nut of the cylinder connection.

E PRESSURE HOSE

5.06 The E Pressure Hose is used for connecting the outlet of an LP-Gas pressure regulator to the inlet of the tool.

5.07 The E Pressure Hose is available in lengths of 10 and 30 feet and is equipped at each end with a spring guard and coupling as shown in Fig. 4.

5.08 The hose is listed under the Label Service of the Underwriters Laboratories and is so marked at least every 10 feet.

B PROPANE CONNECTOR

5.09 The B Propane Connector is used in conjunction with a C Propane Manifold for connecting two cylinders to one tool.

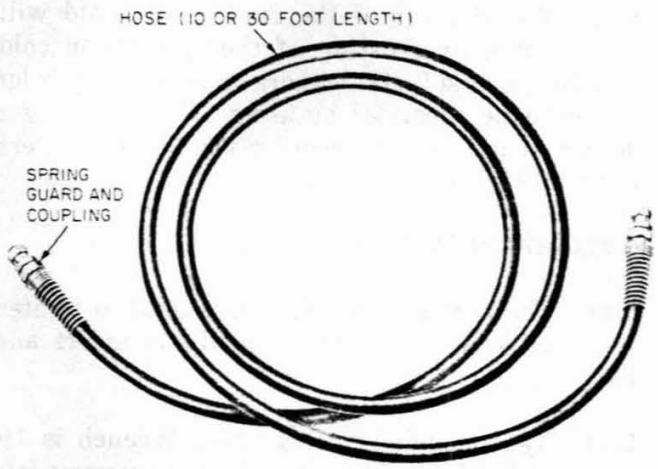


Fig. 4—E Pressure Hose

5.10 The B Propane Connector consists of a 20-inch length of copper tubing with a fitting for cylinder valve outlet on each end as shown in Fig. 5.

DUAL VALVE

5.11 ◗The D and E LP-Gas Cylinders are provided with dual valves which permits fuel to be withdrawn as either a liquid or vapor. If desired, the B and C LP-Gas Cylinders may be converted to the dual valve sytem by having your local propane dealer replace the shut-off valve with the Bastian-Blessing No. 8556WD for the B Cylinders and No. 8556WE for the C Cylinders.◖

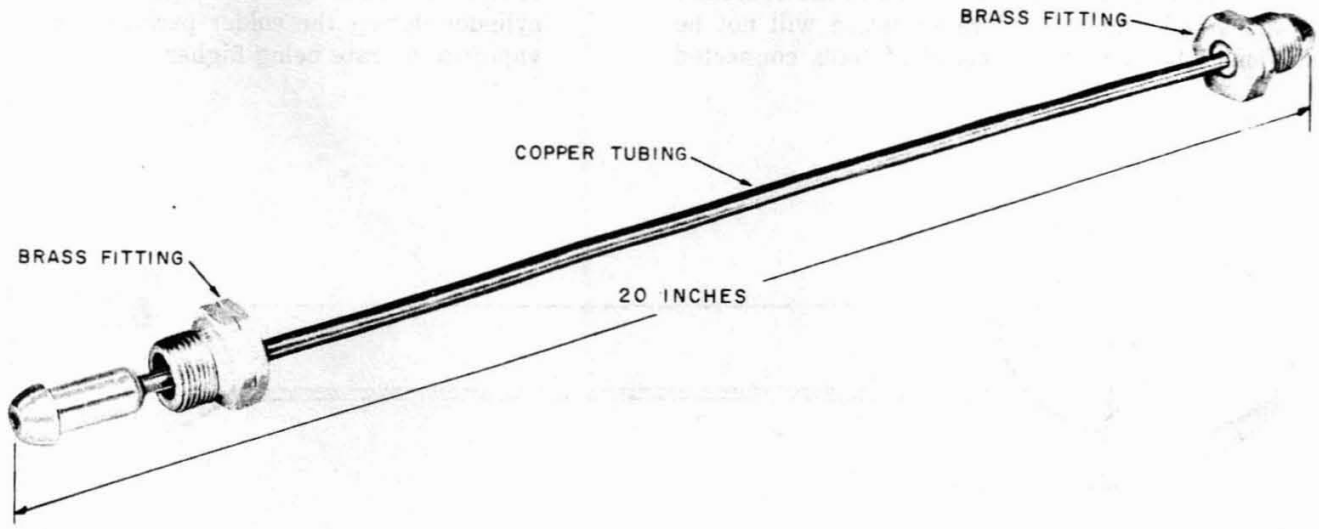


Fig. 5—B Propane Connector

5.12 Withdrawal of the fuel as a liquid will eliminate frosting of the cylinder in cold weather. Liquid fuel is withdrawn from the cylinder and must be vaporized by using a heat exchanger described in sections covering ventilating heaters in the 649 Division of the Bell System Practices.

C REGULATOR WRENCH

5.13 The C Regulator Wrench is used to tighten or loosen connections on the cylinders and tools.

5.14 The open-end C Regulator Wrench is 10 inches long and has openings to accommodate 11/16, 1-3/16, and 1-1/8 inch fittings as shown in Fig. 6.

6. VAPORIZATION OF GAS IN LP-GAS CYLINDERS

6.01 For handling ease and convenience the LP-gas is compressed to a liquid in the LP-Gas Cylinders.

6.02 The LP-Gas changes from a liquid to a vapor inside the container so that it can be supplied to the furnace, tent heater, etc. A considerable amount of heat is required from the surrounding air to convert the liquid fuel to a vapor. The amount of heat that is transferred to the liquid is proportional to the amount of liquid in the container, the outside temperature, humidity, etc.

6.03 If the heat supplied to the container and/or the amount of liquid LP-Gas in the container is too small, the rate of vaporization will not be sufficient to meet the demand of tools connected to the cylinder. Even with an ample supply of liquid fuel in the cylinder, the temperature and humidity may prevent the container from supplying enough vapor for proper operation of the tools.

6.04 The approximate vaporization rate of LP-Gas Cylinders (each cylinder one-third full of LP-Gas at various temperatures) is shown in Fig. 7.

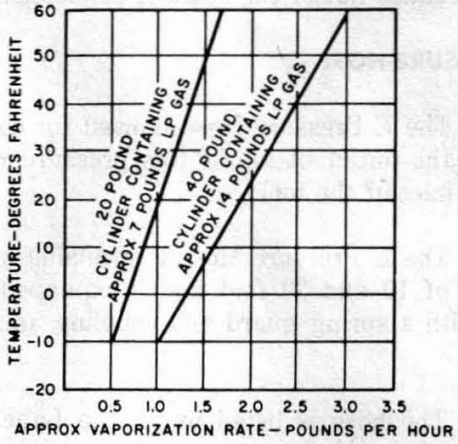


Fig. 7—Vaporization Rate—One-Third Full

6.05 The approximate vaporization rate of LP-Gas Cylinders (each cylinder two-thirds full of LP-Gas at various temperatures) is shown in Fig. 8.

Note: It will be desirable to utilize the larger cylinder during the colder periods due to the vaporization rate being higher.

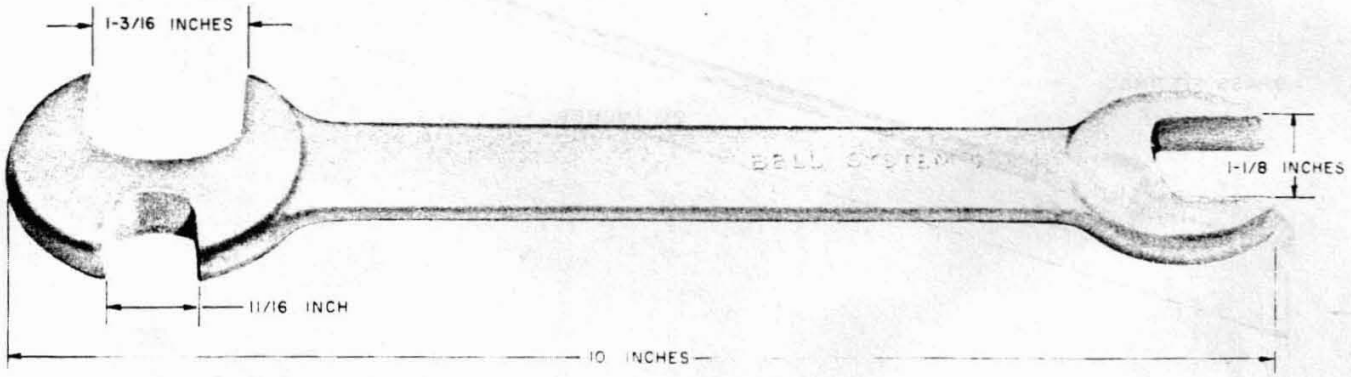


Fig. 6—C Regulator Wrench

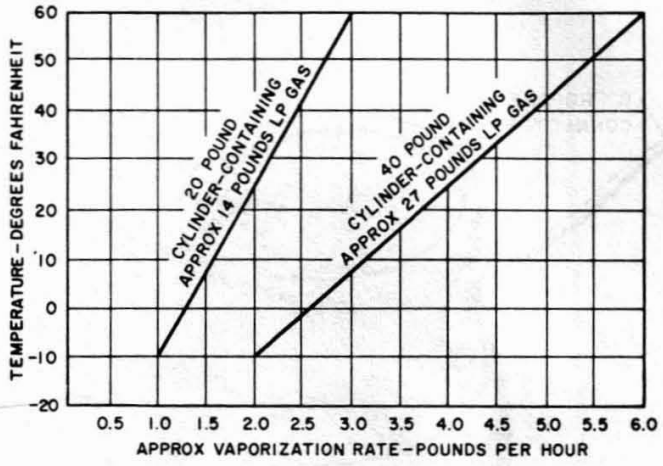


Fig. 8—Vaporization Rate—Two Thirds Full

6.06 The amount of vapor that can be withdrawn from a cylinder varies depending on the temperature, humidity, amount of liquid in the container, etc. When frost forms on the outside of the container, the container has lost its capacity to supply the requirements of the system it is serving (tools, etc). If this happens, proceed as outlined in 6.07, 6.08, 6.09, 6.10, or 6.11.

6.07 If more than one tool is being supplied from a cylinder as shown in Fig. 9, and the cylinder loses its capacity to supply fuel to the tools as outlined in 6.06, use a separate cylinder to supply fuel to each tool.

6.08 If only one tool is being supplied with fuel from one cylinder, and the cylinder loses its capacity for supplying fuel to the tool, as outlined in 6.06, use two or more cylinders as shown in Fig. 10.

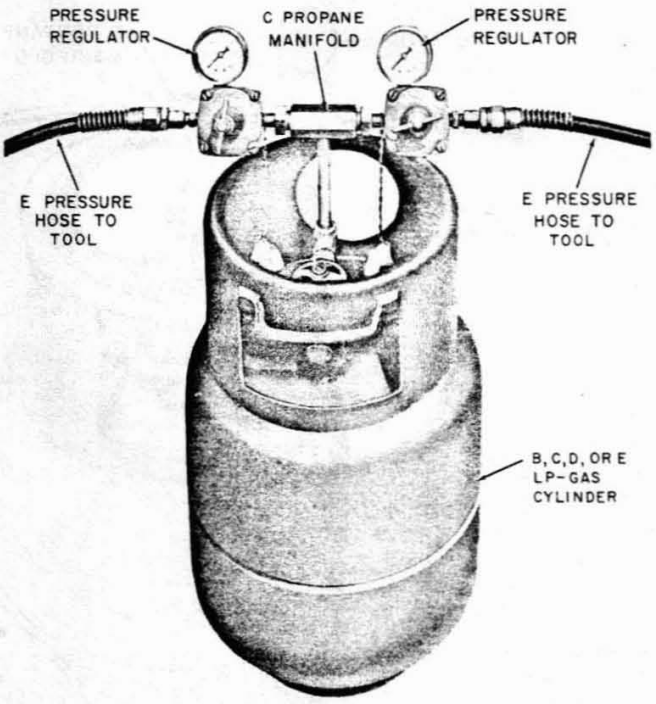


Fig. 9—Two Tools Being Supplied From One Cylinder

6.09 Place the cylinder in the sun or in a windy location. This will result in a higher vaporization rate.

6.10 Direct a heat lamp at the cylinder. Very little heat is needed to increase the vaporization rate. ***Under no circumstances should any part of the cylinder become warm to the touch. Do not apply heat when the ambient temperature is above freezing.***

6.11 Where a heat exchanger (5.12) can be utilized on the tool, it may be desirable to withdraw the fuel in the liquid state.

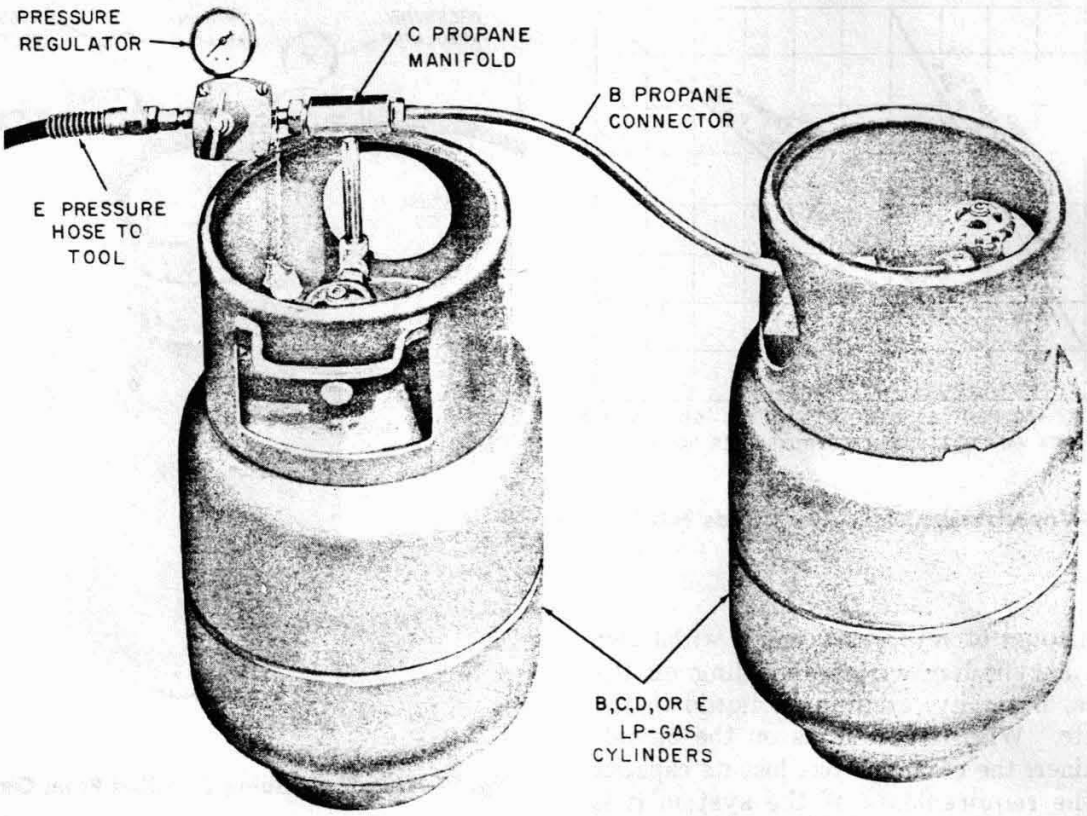


Fig. 10—One Tool Being Supplied From Two Cylinders

7. LP-GAS REQUIREMENTS OF SYSTEM TOOLS

7.01 The approximate fuel requirements of frequently used LP-Gas powered tools are shown in Table A.

8. DISPOSITION

8.01 Regulations of the ♦Department of Transportation♦ require that a cylinder be condemned when it leaks, or when internal or external corrosion, denting, bulging, or evidence of rough usage exists to the extent that the cylinder is likely to be weakened appreciably.

8.02 Twelve years after the initial inspection date stamped on all cylinders, they should be removed from service and returned for disposition in accordance with local instructions.

♦ TABLE A ♦

LP-GAS TOOLS	
TOOLS	**APPROXIMATE CONSUMPTION RATE (POUNDS PER HOUR)**
B Propane Tent Heater	
4,000 BTU	0.2
8,000 BTU	0.4
12,000 BTU	0.6
D Propane Furnace	
Regulator set at 45 psi	1.6
Regulator set at 4 psi	0.5
C Blower	0.8
Ventilating Heaters	
Blower only	0.8
Heater and Blower	3.0
B Generator	1.5
C Generator	2.5
B Manhole Pump	1.5