Prest-O-Lite
TRADE MARK

AIR-ACETYLENE AND LP-GAS APPLIANCES
how and where to use them

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"B" and "MC" Small Tanks -- PREST-O-LITE gas, which is pure acetylene ready for instant use in your PREST-O-LITE appliances, comes in two sizes of strong steel tanks, containing 40 and 10 cu. ft. of gas respectively. They are built to quality standards exceeding Government requirements by the most experienced manufacturer and user of compressed gas cylinders. PREST-O-LITE gas tanks are the best and safest small tanks that can be made. When you exchange your empty tank for a full one at a PREST-O-LITE Exchange Service distributor, you are assured of receiving a thoroughly tested and serviced container.

Recharging PREST-O-LITE Small Tanks -- PREST-O-LITE gas tanks have a porous packing which is saturated with acetone -- a liquid that has the property of dissolving many times its own volume of acetylene. When a tank is recharged, the acetone is replaced in proper quantity so that an exchange tank will hold the same full measure of gas as a new one.

Before acetylene is charged into PREST-O-LITE small tanks, it is dried, cleaned, and purified. Thus, moisture and impurities are prevented from contaminating the liquid chemical and porous filler to a point where the tanks cannot hold their rated capacity of gas. This careful attention to every detail of charging is a benefit to PREST-O-LITE users in longer life for their tanks, as well as in the high quality of the gas they contain.

Tank Pressure -- The pressure in a fully charged PREST-O-LITE Gas Tank is approximately 250 lb. per sq. in. at a temperature of 70 deg. F. The pressure in a full or partly full tank will vary with temperature changes. At higher temperatures, the pressure will be higher; at lower temperatures, it will be lower. Note, however, that these pressure variations due to changes in temperature have no effect on the quantity of gas in the tank. You always receive 40 cu. ft. of acetylene in a new or exchange B tank; a full MC tank contains 10 cu. ft. of acetylene.

The table below shows the relationship between temperature and tank pressure based on full tank contents and on decreasing contents, as the gas is used.

<table>
<thead>
<tr>
<th>Tank Contents (Regulator Gauge Reading)</th>
<th>Tank Contents (Cubic Feet)</th>
<th>Change in Pressure for a Change of 1 deg. F.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>3/4 Full</td>
<td>30</td>
<td>7 - 1/2</td>
</tr>
<tr>
<td>1/2 Full</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>1/4 Full</td>
<td>10</td>
<td>2 - 1/2</td>
</tr>
</tbody>
</table>

### I. "PREST-O-LITE" AIR-ACETYLENE APPLIANCES

#### A. The Air-Acetylene Flame

The flame produced when you light a PREST-O-LITE appliance results from the burning of acetylene and free air from the atmosphere. The air is mixed with acetylene in the appliance in much the same way as air is mixed with city gas in your kitchen gas range. No cylinder oxygen is required to support combustion. The correct flame, produced by the proper mixture of acetylene and air, is pale blue, with a bright sharp inner cone.

The flame temperature obtainable with PREST-O-LITE torches, when operated at rated capacity, is approximately 4,000 deg. F. This is the highest flame temperature obtainable with any air-acetylene appliance that does not use compressed air. It is hot enough for light silver soldering (brazing), for most soft soldering, and for hundreds of heating jobs.

#### B. Advantages

Users of PREST-O-LITE gas and appliances gain other advantages besides high flame temperature. Here are some of these advantages:

1. PREST-O-LITE torches "handle" better than other kinds of equipment used for the same type of work. They are smaller, lighter, precisely balanced. You can do more work with them without getting tired.
2. On and off control of the flame is instant, without pumping, priming, or waiting for warm-up. You are ready for the actual heating job as soon as the outfit is connected to the tank and the torch is lighted.

3. Wide range of PREST-O-LITE stems, all interchangeable on all PREST-O-LITE torch handles makes your equipment economical. Even a one-stem outfit permits you to do many soldering, heating, and brazing jobs.

4. PREST-O-LITE tanks and outfits are completely portable. A snap-on or clamp-on handle makes a PREST-O-LITE tank as easy to carry or lift as a suitcase—see Fig. 5.

5. The air-acetylene flame has no objectionable fumes. It can be used indoors or out. PREST-O-LITE torches operate efficiently in drafts, wind, and weather conditions that usually cause interruptions of work with other types of equipment. There is no smoke or soot to increase the cleanup time for a job.

6. PREST-O-LITE soldering irons are faster-heating, lighter, and easier to use than electric irons of equivalent capacities. They permit constant work quality and speed, unlike old-fashioned soldering irons, which must be frequently reheated.

C. Making Up a PREST-O-LITE Outfit

A complete outfit can be as simple as that shown in Fig. 1. Even this one-stem outfit equips you to do many types of work. You can add additional stems as you require them (see Page 4) and "tailor-make" your own outfit. Some users prefer to buy a multi-purpose outfit including an assortment of stems, such as the 3-in-1 Outfit illustrated on page 2. Consult your PREST-O-LITE jobber and get his help in selecting the equipment for your particular work.

The purchase of a regulator (see Fig. 3) for use with any PREST-O-LITE outfit is well worth the investment; it saves time on every job and assures gas economy. Without a regulator, flame adjustment must be made with the tank valve. The use of a regulator on the tank assures uniform delivery of gas at the desired pressure as long as there is usable gas in the tank. The pressure is easily adjusted by means of the pressure-adjusting screw on the front of the regulator. Also available is the R-415 Preset Regulator which is preset at the factory to deliver a constant pressure of 10 psi. The regulator gauge shows you exactly how much gas you have in the tank. If the torch or other appliance you are using is equipped with a needle valve or a built-in shut-off valve, be sure to use a regulator. If you don't, full tank pressure—up to 250 lb. per sq. in.—may be placed on the hose and hose connections when the torch is shut off with the torch needle valve. Subjected to full tank pressure, old or worn hose may rupture or burst, or the hose may become disconnected from the tank or torch handle, with resultant release of flammable gas.

A special halide leak detector stem (not illustrated) is used by air conditioning and refrigeration service men for detecting leaks of certain refrigerant gases. See F-2113 "The PREST-O-LITE Halide Leak Detector Outfit" for details on this stem. Your PREST-O-LITE jobber will gladly give you a copy.

OTHER "PREST-O-LITE" APPLIANCES

Other appliances in the PREST-O-LITE line include Regulator delivery pressure gauges, and a medium and a heavy duty soldering iron. Your PREST-O-LITE distributor will give you full information about them.
"PREST-O-LITE" TORCH STEMS

PREST-O-LITE Torch Stems in all styles and sizes fit interchangeably on the three Torch Handles described and shown on page 5.

No. 6 EXTRA HEAVY
For installing solder-type fittings in large diameter copper pipe (3 in. and up).

No. 5 HEAVY
For loosening rusted nuts, studs, bolts and for thawing out frozen water pipes.

No. 4 MEDIUM
For "sweating" solder-type joints in 3/4 to 1 1/2 in. copper pipe, for automobile body and fender work.

No. 3 LIGHT
For light sheet metal work, telephone maintenance, wire splicing, and for marking soldered joints in 3/8 to 1/2 in. piping.

No. 3 MF MULTIFLAME
For preheating, melting, and "sweating" operations. An ideal means for applying a "soaking" heat over a relatively broad surface.

No. 2 FINE
For soldering instruments, automobile radiator fins, and manufacturing toys.

No. 1 SUPERFINE
For telephone switchboard, radio amp television work and jewelry soldering.

No. 7 FINE
Same stem as the No. 2, but with a straight tip instead of a curved one.

No. 8 and 8C SOLDERING IRON
For most light soldering in locations where use of an open flame is not practical. Stainless steel tube prevents overheating and keeps heat of enclosed flame at Pointed Head where it belongs—away from the Torch Handle. The No. 8C Soldering Iron is the same as the No. 8 but has a Chisel-Type head instead of a Pointed Head.

No. 9 PAINT BURNER
Converts any PREST-O-LITE Torch Handle into a special Torch for softening paint for easy removal by scraping. Works equally well on wood, canvas, "Masonite" and similar surfaces. Floorlayers use this Stem to soften asphalt tiles before cutting them.

Nos. 10MF and 11MF MULTIFLAME (Staghorn)
The No. 10MF Stem is ideal for quick and even heating of "sweat" fittings or brazing cylindrical parts from 1/2 to 1 1/2 in. diameter. Outside diameter of circular arms is 4 inches, inside diameter is 2 5/8 inches. The 11MF is similar to the No. 10MF but is for use on larger work. Outside diameter of arms is 7 1/4 inches, inside diameter is 4 1/2 inches.

Approximate Acetylene Consumption

<table>
<thead>
<tr>
<th>Stem Size (No.)</th>
<th>(cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Superfine</td>
<td>1/10</td>
</tr>
<tr>
<td>2 Fine</td>
<td>1/4</td>
</tr>
<tr>
<td>3 Light</td>
<td>1 to 4 1/4</td>
</tr>
<tr>
<td>3MF Multiflame</td>
<td>2 to 4 1/4</td>
</tr>
<tr>
<td>4 Medium</td>
<td>1 1/2 to 5 1/2</td>
</tr>
<tr>
<td>5 Heavy</td>
<td>3 1/4 to 8 1/2</td>
</tr>
<tr>
<td>6 Extra Heavy</td>
<td>8 1/4 to 20</td>
</tr>
<tr>
<td>7 Fine (Straight Tip)</td>
<td>1/4 to 1 1/4</td>
</tr>
<tr>
<td>8 Light Soldering Iron</td>
<td>3/10 to 4 1/2</td>
</tr>
<tr>
<td>9 Paint Burner</td>
<td>2 to 5 1/2</td>
</tr>
<tr>
<td>10 Multiflame (Staghorn)</td>
<td>1 to 4 1/2</td>
</tr>
<tr>
<td>11 Multiflame (Staghorn)</td>
<td>8 1/4 to 20</td>
</tr>
</tbody>
</table>

The maximum consumption figures shown at the right are based on an operating pressure of 10 lb. per sq. in. for all stems. The minimum consumption figures are based on an operating pressure of 1 lb. per sq. in. for all stems except as follows: Nos. 6 and 8 stems require a minimum operating pressure of 2 lb. per sq. inch; and No. 3 MF and No. 9 stems must not be operated at pressures below 5 lb. per sq. inch.
"PREST-O-LITE" TORCH HANDLES
(For use with PREST-O-LITE Air-Acetylene and L.P. Gas Torch Stems.)

401 Handle has a shutoff valve for on-off control of the working flame, and a needle valve for control of the pilot flame. This handle is used in the instructions, Section II, below. Use an R-411 or R-415 Regulator with this handle, when using acetylene stems. Use the R-416 Regulator with L.P.-Gas Stems.

402 Handle has no valves. All flame adjustments are made with the tank valve (or regulator, if one is used). To convert a 402 to a 403 handle, simply attach a Needle Valve (19X39).

403 Handle has a needle valve which enables you to adjust the flame size at the handle. Use an R-411 or R-415 Regulator with this handle when using acetylene. Use the R-416 Regulator with L.P.-Gas.

II. HOW TO SET UP AND OPERATE YOUR "PREST-O-LITE" OUTFIT

A. To Connect the Outfit

1. ATTACH REGULATOR TO TANK. TIGHTEN NUT WITH WRENCH.

2. ATTACH HOSE ASSEMBLY TO REGULATOR AND HANDLE. TIGHTEN NUTS WITH WRENCH.

3. ATTACH STEM TO HANDLE. TIGHTEN THE CONNECTION NUT WITH YOUR FINGERS.

B. To Light the Torch

1. Make sure both the main valve and pilot valve on the torch handle are closed. Open the tank valve one turn. (Always use a PREST-O-LITE tank key — not pliers — and leave the key on the valve.)

2. Set the pressure-adjusting screw for the approximate pressure desired.

3. Open the torch handle shutoff valve. Light the flame, using a friction lighter. Then readjust the regulator pressure-adjusting screw to get the desired flame size.

C. To Maintain a Pilot Flame

It may be convenient to maintain a pilot flame when you interrupt work for short intervals. (IMPORTANT: Don't use the pilot flame unless you provide a rest or holder for the torch which will keep the flame away from all combustible materials.) To set the pilot flame, do this:

1. With the torch lit and regulator properly adjusted (as instructed above) open the pilot needle valve (mounted in the main shutoff valve) one full turn.

2. Close the torch shutoff valve. The flame will get smaller, but will not go out. Then slowly close down the pilot needle valve until only a very small, but smokeless, flame remains. Now all you need do to resume work is to open the main shutoff valve.

DO NOT LEAVE THE TORCH UNATTENDED WHILE THE PILOT FLAME IS LIT

D. To Shut Off the Torch

1. First close the tank valve. Then close the shutoff valve on the torch handle.

NOTE: The shutoff valve on the torch handle may be used to shut off the torch for short intervals — up to half an hour.
E. PREST-O-LITE Tanks

When your tank of PREST-O-LITE acetylene is empty, take it to an authorized PREST-O-LITE dealer or distributor for an exchange tank. He always has genuine PREST-O-LITE acetylene because he gets it from a PREST-O-LITE filling station.

NOTE: Each PREST-O-LITE tank is equipped with one or more fusible inserts — devices designed to relieve excessive tank pressure caused by fire or heat.

KEEP TANKS AWAY FROM FIRE AND HEAT. PROTECT THEM FROM EXTREMES IN TEMPERATURE. HANDLE THEM WITH CARE.

III. PRECAUTIONS AND SAFE PRACTICES

A. DON'T let acetylene or LP-Gas escape near any possible source of ignition. Accumulations of either in certain proportions may explode if ignited.

B. NEVER store acetylene or LP-Gas tanks in a closed or confined space, such as a closet.

C. NEVER solder a container that contains or has contained flammable liquids or vapors (including gasoline, benzene, solvents, and other similar or dissimilar materials) unless the container has been thoroughly purged of all traces of flammable material and vapors. If you are in doubt as to the previous contents of the container, it should be thoroughly purged. Be sure that any container you work on is vented. We strongly urge that before you do any work of this kind, you get booklet No. A-6.0.40 from the American Welding Society, 29 W. 39th Street, New York, N.Y.

D. Before starting work always test for leaks around all joints with a soapy water solution.

E. NEVER use a flame to test for leaks of flammable gases.

F. NEVER use a tank with a leaking valve.

G. DON'T make any repairs to an acetylene or LP-Gas tank, except to tighten the packing gland nut on the valve.

H. DON'T abuse or drop tanks or handle them roughly.

I. NEVER use a tank as a roller. Never use a wrench or pliers on the tank valve. Always use a PREST-O-LITE valve key.

J. NEVER allow full tank pressure to enter the hose. Always use a regulator when there is a needle valve on the torch handle.

K. NEVER lay a torch down unless the gas flow has been shut off. If you want to maintain a pilot flame when you stop work for short intervals, provide a rack or stand for the torch, away from combustible materials. Do not leave it unattended unless you are sure there is no danger of its being disturbed by unauthorized persons.

L. Examine your hose for leaks frequently. Dipping it in a bucket of clean water, with the pressure in the hose, is the quickest and easiest way.

M. DON'T use hose that is worn, or any equipment that is in need of repair.

N. DON'T start fires. Be very careful when working near combustible material.

IV. SOLDERING

(See Section V for detailed instructions on soldering sweat-type fittings.)

THE GREATEST SINGLE CAUSE OF POOR SOLDERING IS DIRT. BEFORE YOU START, MAKE SURE THE WORK IS CLEAN.

A. Helpful Hints

1. Metal surfaces to be soldered must be clean. Scour the surfaces thoroughly with a fine grade of emery cloth or paper, fine (No. 00) steel wool (the best paste), or some other mild abrasive. Rough sandpaper or a file may cut into the metal surface and cause a weak joint.

2. There are two general types of solder: roll solder with or without a flux (acid or rosin) core and bar solder. With the unfluxed roll and bar solder you have to pre-flux the joint with a paste or liquid flux. The type of solder and flux used depends on the work to be done. The flux used must always melt at a temperature below that of the solder. Otherwise the flux will be trapped and cause a poor finished joint. (See solder and flux charts on pages 11 and 12.)

3. Tinning — the initial spreading of a very thin film of solder on the work — is the key to a well-soldered joint. Always tin the joint or seam before filling with the necessary amount of solder.

4. Overheating should be avoided as this causes oxidation and results in a poor joint.

5. All traces of flux must be removed with particular care when the joint or seam is finished. Use a wire brush (not too stiff), a bristle brush or wash it off with hot water.
B. Choice of Methods

When using PREST-O-LITE appliances, you have a choice of two soldering methods:

1. The open (direct) flame method. The flame heats the workpiece, and the workpiece melts the solder in conjunction with the flame. The advantages of the open (direct) flame method include:
   (a) Speed (no copper intermediary to be heated).
   (b) Greater diversity in the uses to which the flame can be put.
   (c) Greater efficiency in the use of fuel (the gas goes further because it is applied directly to the workpiece).
   (d) More heat because of direct application of the flame.

2. The enclosed (indirect) flame method. The flame is applied to the soldering copper. The copper in turn heats the workpiece. The workpiece in conjunction with the soldering copper, melts the solder where it is needed. The advantages of the enclosed (indirect) flame method includes:
   (a) Better control of the heat.
   (b) Less experience needed on the operator's part.
   (c) More delicate work is possible, especially where damage to the adjacent materials might result from the use of an open flame.

C. Sheet Metal

Sheet metal soldering can be done with either the enclosed (indirect) flame method or the open (direct) flame method depending on the choice of the operator. There are many types of joints that can be made in sheet metal, but, in our experience, we have found the ones described below best cover the vast majority of situations.

1. THE LAP JOINT (See Figure 6.)
   (a) Thoroughly clean the edges to be joined.
   (b) Flux the edges by dipping them in a bath of hydrochloric (muriatic) acid or, using a brush, paint them with it.
   (c) If you are using a soldering iron, tin the iron first, and then tin the edges. If you are using a soldering torch tin the edges. The edges should be tinned along their entire length, and then placed so that the tinned edges overlap. Use “C” clamps to hold them together, if you have them.
   (d) Next, pressing down on the soldering iron, run it up and down over the seam until a fillet of solder is visible. If you are using a soldering torch, run it back and forth with the flame touching the work until the fillet appears. In both cases, where no fillet appears, add more solder.
   (e) When making a long seam with a plain lap joint, it is best to "tack" the seam first. Tacking means applying drops or spots of solder at intervals along a seam to hold it in place. Clean, flux, and tin the entire job. Heat the seam and apply solder spot by spot as shown in Fig. 6-D. Then do the regular soldering job on the whole seam. If the "tacks" tend to melt, or the seams to pull apart when you near them with the torch, proceed as follows:
   (i) Press the pieces of metal together at the "trouble-spot" with a stick.
   (ii) Reheat the "tacks" and the solder that has been previously applied as tinning. Keep pressing the heated area together with the stick until the solder has cooled and formed a bond. Proceed with the soldering job.
   (f) When the joint is finished, wipe off all excess solder with a stiff bristle brush and wash off the excess flux with hot water.

2. LOCK JOINT (See Figure 7.)
   (a) Thoroughly clean surfaces that will form the joint.
C. SHEET METAL

2. LOCK JOINT (Continued)

(b) Form the lock joint between the two sheets.

(c) Pound the joint tight with a composition mallet, or use a block of wood between the sheets and a steel hammer. Try to get the joint as flat and tight as possible.

(d) Apply acid flux along the seam, and heat the seam.

(e) Apply just enough solder to seal the seam. (You have already made the seam mechanically strong by hammering and forming the lock joint.)

(f) If the seam is fairly long, you can run the flame a few inches ahead of the solder, instead of heating and soldering a section at a time.

(g) Remove all excess solder with a stiff bristle brush and wash off excess flux with hot water.

3. FLANGE JOINT (See Figure 8.)

(a) A flange joint is usually used in conjunction with rivets or spot welds. The solder is used to make the seam tight to air, gas, or water.

(b) Before the joint is formed, the area to which the solder will be applied must be thoroughly cleaned and must remain clean until the seam is finished.

(c) A tinning coat of solder can be applied to the seam before it is riveted or spot welded.

(d) Use either acid core solder or flux the joint with hydrochloric (muriatic) acid.

(e) Heat the joint with either a torch or soldering iron. Capillary attraction will draw the solder into the seam. Fill the joint with the desired amount of solder.

(f) Remove all excess solder with a stiff bristle brush; wash off excess flux with hot water.

D. Auto Body and Fender

Auto body soldering is done to fill in dents that cannot be hammered out completely, rough spots, and welded seams. Either soldering method can be used, direct (open) flame or indirect (closed) flame. Where the deposits of solder to be made are considerable, or in places where an open flame would not damage chrome finishes or glass, we recommend the open (direct) flame method because of its speed and the rapidity with which the solder can be deposited. For the places adjacent to glass or chrome finishes, use the enclosed (indirect) flame method. When you have decided which method to use, proceed as follows:

Follow the "Helpful Hints" (see "A" on page 6), and also the instructions under "Sheet Metal" that apply (see "C" on page 7). The usual procedure is:

1. Grind away the paint from the dented area, and polish with steel wool or emery cloth.

2. Flux thoroughly and, after heating, apply enough solder to tin the dent.

3. Fill in the dent by adding solder from a bar and smoothing with a maple paddle. Take care not to
melt the solder until it runs. Melt it just enough to make it pasty, then smooth with the paddle.

4. When the dent is filled in, heat the solder slightly and smooth it again before letting it cool.

5. Finish the job with rasps, body files and emery cloth; clean, prime, and paint.

E. Electrical Connections (See Figure 10.)

For soldering electrical connections, the enclosed (indirect) flame method is preferred. Prepare the electrical connections the way you usually do, and proceed as follows:

1. Thoroughly clean the connections.
2. Apply a non-corrosive flux paste.
3. Tin the soldering iron with a thin coat of solder.
4. Tin the wires and melt enough solder on to them to be sure you have a good electrical connection.

NOTE: Where very large connections are to be made a PREST-O-LITE open-flame stem can be used if great care is exercised.

V. INSTALLING SWEAT-TYPE FITTINGS

A. Soft Soldering

NOTE: The following is the most efficient and readily usable method for making sweat-type joints. It is the method recommended by two of the leading copper tube manufacturers.

Sweat-type fittings are a means of making joints and connections in copper tubing (elbows, tees, crosses, etc.). They are used widely in the plumbing systems of homes and in industrial plants. They are a quick, inexpensive, and sure means of making a joint. The PREST-O-LITE torch with a direct (open) flame is used by literally thousands of plumbers and is universally recognized as the best means of making these joints. The torch saves time and money, and a relatively inexperienced workman can do a good job with very little training and practice.

There are two basic types of sweat-type fitting: The "plain type" and "cast type." With the "plain type" the solder is fed at the point where the fitting and the tube join. (See Figure 11.) With the "cast type" the solder is fed in through pre-cast holes in the fitting itself. (See Figure 12.) The instructions below will work equally well with both types, if you remember to feed the solder through the holes in the "cast type" fitting.

1. Cut the tube to the length required with a hack-saw (32 teeth to the inch), or a disk cutter.

Make certain that the tube ends are cut square. Special vises which hold the tube securely and guide the saw blade are furnished by a number of manufacturers.

2. Ream the tube and remove burrs on the outside. Use a sizing tool if necessary to correct any possible distortion of the tube from handling. The point of a sizing tool is inserted in the end of the tube and is hammered until the tube is again round. Connections should be carefully inspected before applying solder.

3. Clean the outside surface of the tube and the inside surface of the fitting until the metal is bright. All traces of discoloration must be removed. This must be done even though the tube may appear to be perfectly clean, and it is particularly important when soldering larger size joints. No other material is as satisfactory.

FIG. 10 — Soldering Electrical Connection

FIG. 11 — Where to Solder Sweat-Type Fittings

FIG. 12 — Soldering 1-in. Copper Tubing and Fitting with Pre-cast Holes
for cleaning tubes as a fine (No. 00) steel wool, which can be bought at any retail hardware store. Do not use files or rough sandpaper, etc., as they score the surface and may result in a poor joint.

4. Apply a thin, uniform, and complete coating of a reliable brand of soldering flux or paste to the cleaned portion of both tube and fitting. Do not apply the flux too thickly as excess flux may form bubbles when heated and prevent the solder from creeping into the joint. After the tube has been inserted into the fitting as far as it will go, revolve the fitting once or twice to spread the flux evenly.

5. Apply the flame evenly all around the circumference of the fitting; and as it becomes heated set the flame back and forth to prevent overheating. Occasionally test the heat by touching the fitting with solder where the tube and fitting join. Do not let the flame touch the solder while testing the temperature of the joint.

It is important that the joint not be overheated. If the connection is heated too much, the flux may be burned out from inside the joint and the solder will not spread properly. An overheated joint causes the solder to seep through the joint and run away.

During the heating operation, adjacent wood surfaces should be protected from the heat by means of sheets of asbestos. Because of its narrow, concentrated flame a PREST-O-LITE torch can be used very close to wood surfaces without scorching them.

6. Remove the flame and apply solder to the edge of the fitting where it comes in contact with the tube as soon as the fitting has reached the correct temperature to melt the solder. Be sure that enough solder is used. In general, this can be determined by making a bend or kink in the solder wire at a distance from the end, corresponding to the diameter of the tube — 1/2-in. solder for the 1/2-in. tube, etc. (based on 1/8-in. solder wire).

Enough solder to make an efficient joint will be automatically sucked in by capillary attraction. When a line of solder shows completely around the fitting, that is, a fillet of solder appears in the chamfer at the end of the fitting, the joint has all the solder it will take. Wipe off any excess solder or flux.

7. Slightly reheat the connection in order to help the solder permeate the metal. Remove the flame and continue to feed solder to make certain the joint is filled. The joint is then complete.

8. Permit the connection to cool for a fraction of a minute. A rag or web of waste, saturated with water, will hasten the cooling. Remove all surplus solder from around the edges with a brush. This operation will show whether or not the solder has filled the joint.

9. When disconnecting a soldered tube from a fitting on which other soldered connections are to be left intact, the application of wet cloths to the parts which are not to be disconnected will prevent melting of the solder at such connections.

10. More than ordinary care should be exercised in soldering fittings 2-1/2 in. in diameter and larger. It is essential that the heat should be uniformly distributed around the entire circumference of the fitting and not concentrated in one spot.

When making large diameter joints, a tip producing a large flame should be used. The flame should be directed on the fitting to avoid any unnecessary annealing of the tube.

For assembling lines 3 in. in diameter or over, it may be advisable to use two or three torches. Solder should then be applied simultaneously at two or more points.

There are a few other things about soldering sweat-type fittings that we want to point out. These are some of the things that do not occur in the normal course of events, but still are important, such as:

1. In applying solder to a tee, feed solder from both ends of the fitting.
2. Solder, when confined between two surfaces, will run up hill (by capillary attraction) and joints can be made in almost any position.
3. In sweating male and female adaptors, care should be taken to allow more time for the solder to set as these heavier fittings hold heat longer and do not cool as quickly.

B. Silver Soldering (Brazing)

More and more occasions are occurring where a low melting point silver solder (800-1500 degrees F.) is used for soldering sweat-type fittings. If you have only a few to do, the air-acetylene torch is fine. If you have many to do or if the fittings are larger than 1-1/2 in. in diameter, an oxy-acetylene blowpipe is recommended because its greater flame temperature speeds the work.

If you are doing silver soldering (brazing) with a PREST-O-LITE torch, keep the following in mind:

1. Follow the "Helpful Hints" for soldering on page 6 and the general procedure for installing sweat-type fittings given in Sec. V-A on page 9.
2. Never use a silver solder with a melting point over 1500 deg. F. Actually all but a few silver solders sold for special applications melt well below this figure.
3. Use Table 2 on page 11 for recommended PREST-O-LITE Stem sizes.
4. You can silver solder most commercial metals if they have a wall thickness of less than 1/32 in. We recommend an oxy-acetylene blowpipe for silver brazing (soldering) production work because its higher flame temperature greatly speeds the operation.

NOTE: Silver soldering requires a special rod and a special flux — usually in paste form. Care should be taken to follow the flux manufacturer's directions. The fumes from some silver solders are toxic; therefore, special ventilating precautions are necessary.
COPPER-TO-ALUMINUM AND ALUMINUM-TO-ALUMINUM

Several new fluxes have appeared on the market in recent years for soldering copper to aluminum and aluminum to aluminum. Some require special solders and others, ordinary soft solder. The soldered joints should be painted or coated with a special compound to protect them against electrolytic action, especially when exposed to dampness or moisture. These fluxes and solders are available from most welding, plumbing, refrigeration and automotive supply shops.

### TABLE 1. DATA FOR SOFT SOLDERING SWEAT-TYPE FITTINGS♦
(Couplings, Elbows, and Tees)

<table>
<thead>
<tr>
<th>POL Stem No.</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fitting diam. (in.)</td>
<td>3/8</td>
<td>1/2</td>
<td>3/4</td>
<td>1</td>
</tr>
<tr>
<td>TIME Copper (sec.)</td>
<td>13-23</td>
<td>17-31</td>
<td>23-36</td>
<td>30-50</td>
</tr>
<tr>
<td>TIME Brass (sec.)</td>
<td>---</td>
<td>19-34</td>
<td>21-35</td>
<td>30-50</td>
</tr>
<tr>
<td>50-50 Type Solder (50% lead, 50% tin)</td>
<td>38-53</td>
<td>40-63</td>
<td>52-81</td>
<td>75-115</td>
</tr>
<tr>
<td>TIME Copper (sec.)</td>
<td>59-90</td>
<td>80-140</td>
<td>110-190</td>
<td>170-320</td>
</tr>
<tr>
<td>TIME Brass (sec.)</td>
<td>63-110</td>
<td>94-165</td>
<td>130-225</td>
<td>210-340</td>
</tr>
</tbody>
</table>

♦ On these sizes of fittings, use the next larger stem than the size indicated in the table.

### TABLE 2. DATA FOR SILVER-SOLDERING SWEAT-TYPE FITTINGS♦
(Couplings, Elbows, and Tees)

<table>
<thead>
<tr>
<th>POL Stem No.</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fitting diam. (in.)</td>
<td>3/8</td>
<td>1/2</td>
<td>3/4</td>
<td>1</td>
</tr>
<tr>
<td>TIME Copper (sec.)</td>
<td>57-140</td>
<td>65-135</td>
<td>80-145</td>
<td>95-165</td>
</tr>
<tr>
<td>TIME Brass (sec.)</td>
<td>---</td>
<td>60-105</td>
<td>90-150</td>
<td>105-175</td>
</tr>
</tbody>
</table>

♦ On these sizes of fittings, use the next larger stem than the size indicated in the table.

### TABLE 3. SOLDERING FLUXES

<table>
<thead>
<tr>
<th>METAL</th>
<th>FLUX TO USE</th>
<th>METAL</th>
<th>FLUX TO USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>Usually none required. Sometimes paraaffin helps after surfaces have been tinned.</td>
<td>Iron (galvanized)</td>
<td>Maratitic acid.</td>
</tr>
<tr>
<td>Block Tin</td>
<td>Rosin or zinc chloride.</td>
<td>Iron (tin-coated)</td>
<td>Zinc chloride or rosin.</td>
</tr>
<tr>
<td>Brass</td>
<td>Zinc chloride, rosin, or sal ammoniac.</td>
<td>Inconel</td>
<td>Strong zinc chloride.</td>
</tr>
<tr>
<td>Cast Iron</td>
<td>Zinc chloride or sal ammoniac. Also zinc chloride added to melted tallow and heated until it foams and turns reddish brown.</td>
<td>Lead</td>
<td>Tallow, rosin, or zinc chloride.</td>
</tr>
<tr>
<td>Copper</td>
<td>Zinc chloride, rosin, or sal ammoniac.</td>
<td>Monel</td>
<td>Zinc chloride.</td>
</tr>
<tr>
<td>Gun Metal</td>
<td>Zinc chloride, rosin, or sal ammoniac.</td>
<td>Nickel</td>
<td>Zinc chloride.</td>
</tr>
</tbody>
</table>

**NOTE:** Maratitic acid is a mild form of hydrochloric acid.

♦ Nearly all of these fluxes are available commercially in paste form. Pastes are usually preferred because they give excellent results on most jobs and are easy to use.
TABLE 4. COMMONLY USED SOFT SOLDERS

<table>
<thead>
<tr>
<th>Composition</th>
<th>Melting Point Degrees Fahrenheit</th>
<th>Flowing Point Degrees Fahrenheit</th>
<th>Gives Best Results When Used For:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin, 38-40% Lead, 62-60%</td>
<td>360</td>
<td>460</td>
<td>Auto radiator cores, roofing seams and wiped joints in lead pipe.</td>
</tr>
<tr>
<td>Tin, 50% Lead, 50%</td>
<td>360</td>
<td>420</td>
<td>General Purposes</td>
</tr>
<tr>
<td>Tin, 50% Lead, 32% Cadmium, 18%</td>
<td>293</td>
<td>293</td>
<td>Pewter and similar alloys that are readily fusible. Not good for lap joints.</td>
</tr>
<tr>
<td>Tin, 95% Antimony, 5%</td>
<td>450</td>
<td>464</td>
<td>Electrical work and copper tubing joints. Do not use on zinc or galvanized iron.</td>
</tr>
<tr>
<td>Tin, 5% Lead, 95%</td>
<td>540</td>
<td>600</td>
<td>Where the higher melting point solder is required or desirable.</td>
</tr>
</tbody>
</table>

VI. PAINT BURNING

(See "Miscellaneous Heating Applications" on page 14 for additional uses for the PREST-O-LITE point burner.)

A PREST-O-LITE torch with a paint burning stem is a quick, easy and economical means for removing old, cracked, and checked paint from a surface that can stand a moderate amount of heat. The number of coats of paint is not important; it just takes a little more time to remove them. PREST-O-LITE Paint Burning Stem (No. 9) gives the broad even heat that is needed (from 1/2 in. to 3 in.), depending upon the position in which you hold it. The flame length (inner-cone) is from 1/16 in. to 1/2 in. again depending on the wants of the operator. There are no hot spots to scorch the surface. The paint burner will remove paint from wood, canvas, brick, stone or metal.

Avoid inhaling any dust or fumes that may be given off in the paint burning operation. Such dust and fumes may be toxic, particularly if the paint being removed contains lead or cadmium compounds.

There are two methods of removing paint. They are listed below as Method "A" and Method "B". We suggest you try both methods. You can then use the one that suits your particular type of work. Once the old paint is removed and rough spots smoothed, the surface is ready for a new coat of paint.

A. Method "A"

1. Attach a No. 9 Stem (paint burning) to a No. 401 PREST-O-LITE handle. Hook up the rest of the outfit in the usual manner, and light the torch.

2. Hold the paint burner in your left hand. Hold the putty knife (with a stiff blade about 3 in. wide) in your right hand.

3. Move the torch backward and forward 1 in. from the painted surface; about 6 inches at a stroke. Follow the movements of the torch with a steady forward movement of the putty knife, keeping the putty knife hot with the flame.

NOTE: You will find it advisable to wear asbestos, or other heavy flame-resistant gloves when burning paint. The putty knife gets pretty hot after a while, so you should protect your right hand. Cloth (cotton) gloves are not satisfactory.

4. Moving the torch back and forth changes the paint to a plastic state and keeps the putty knife blade hot. A hot blade reduces the tendency of the paint to stick to it.

B. Method "B"

1. Follow the steps 1 and 2 given in Method "A" above. See Figure 14.

2. Move the torch more or less steadily from right to left over the painted surface. Bring the paint to a bubbly plastic state. Scrape off the paint as soon as it bubbles. Do not let the flame touch the blade of the putty knife.

3. The putty knife should have a back and forth motion which will intermittently expose the scraped area to the flame. This method is recommended for particularly heavy or stubborn paint.

FIG. 14 - Point Burning (Method "A")

FIG. 15 - Point Burning (Method "B")
VII. OTHER METAL HEATING APPLICATIONS

There are many repair and maintenance jobs aside from soldering and brazing, around plants, garages, farms, and homes, which can be performed most efficiently by the PREST-O-LITE torch. Many everyday repairs involve the heating of metal, before bonding or straightening it, and localized heating is often the speediest way to free “frozen” parts to permit replacement. The air-acetylene flame is an ideal source of heat for any application requiring flame temperatures up to 4,000 deg. F., a range lower than the intensely hot temperatures provided by the oxy-acetylene blowpipe. It is non-oxidizing and non-carbonizing, and can be precisely controlled. A little experience and practice will soon show its possibilities. Here are a few typical jobs that may suggest uses for your PREST-O-LITE torch that you have overlooked.

A. Loosening Nuts and Bolts

Frequently you come across a bolt that resists all attempts to loosen it with a wrench. Heat the nut for several minutes and let it cool; then try the wrench again. Generally, you’ll now find the nut ready to turn.

B. Freeing Frozen Shafts

A frozen shaft of small diameter can be freed by heating the collar that holds it. Heat the collar, not the shaft. You will find that you can separate the parts quite quickly no matter how tightly they are frozen together.

C. Freeing Exhaust Pipes, Mufflers, and Manifolds

The PREST-O-LITE torch is indispensable for other heating jobs in garages and auto repair shops. It is being used to free exhaust pipes from manifolds and mufflers when replacement of one or the other is necessary. When the parts are frozen together by rust and dirt, it is a troublesome job to separate them. Heating by the air-acetylene flame makes the work easy and requires only a few minutes.

D. Separating Frozen Body Springs

The same method is the ideal way to separate the leaves of auto body springs that are frozen firmly together. You can free them easily after applying the flame of your PREST-O-LITE torch. It will melt away any accumulation of dried-out lubricating grease and dirt, and heat the metal slightly, permitting you to pull the leaves apart readily.

E. Lead Working

The PREST-O-LITE torch can be used to build up lead battery terminals. Any of the standard stems can be used depending on the amount of work to be done and the speed with which you want to do it.

It is recommended that you use a form where possible to keep the lead in the shape of a battery terminal and to prevent it from running on the battery.

Put the form over the old terminal and keep adding melted lead until the desired height and shape of the terminal is attained.

The PREST-O-LITE torch can be used to repair lead lined vats; wipe joints in lead pipe and lead covered cable; and solder battery cable lugs.

NOTE: When working with lead in a confined space be very sure of your ventilation, and if possible, use a suitable air-line mask.

F. Anchoring Bolts in Concrete or Stone

Firmly anchoring a large bolt in concrete or stone for the purpose of putting up a fence or railing around a porch, putting shelves in the cellar, or putting an automatic washing machine on the cellar floor can be a big problem.

A good way to solve it is as follows:

1. Drill a hole in the concrete or stone with a star or other type drill. It is best to dish or widen the bottom of the hole slightly to increase the stability of the bolt after the solder sets. Make certain all free moisture or water is removed from the cavity.

2. Heat the solder (bar solder is best) in a ladle with a PREST-O-LITE torch until the solder is molten.

3. Place the bolt in the hole thread end up, and pour molten solder around it until the solder is level with the floor.

4. Then place the upright over the bolt and screw down the hold-down nut. This type of mounting will give years of satisfactory service; if it should become loose, just reheat the solder with the torch and it will be as tight as ever.

G. Rebabbitting Bearings

When rebabbitting operations are carried on, there are several uses for the PREST-O-LITE torch:

1. The old babbit metal can easily be removed with a large PREST-O-LITE stem and a scraper.

2. The largest PREST-O-LITE stem (No. 6) can be used to tin the bearing housing before the babbit metal is cast.

(a) Swab the inside of the housing with acid.

(b) Heat the inner surface and flow soldering rod into it.
3. The PREST-O-LITE torch is then used to melt the babbitt metal. The babbitt metal is usually melted in a small ladle or solder pot.

H. Die Heating

In the manufacture of "legal-seals" a PREST-O-LITE torch with a No. 3 stem is ideal for heating the brass die that casts the counter die. It is necessary to preheat the brass die before the casting operation to prevent it from cooling the counter die or master casting too quickly. The clean hot flame of the PREST-O-LITE torch is perfectly suited to this work.

VIII. MISCELLANEOUS HEATING APPLICATIONS

A. Removing Plastic Bonding—On Worn Brake Linings

The PREST-O-LITE paint burner is used by garages and brake lining specialty shops for a specialized heating application. The brake linings in cars of recent manufacture are bonded to the brake shoes with a plastic glue. To remove the linings when they become worn, and chisel off the bonding material, sometimes requires an hour for a single shoe. By using the paint burner to soften the glue, a whole set of shoes can be cleaned in a few minutes. The procedure is simple. The shoe, mounted in a vise, is heated from the underside just enough to melt the glue. The paint burner is the best choice for this job. It spreads the flame in a thin sheet that can be directed to soften the glue instantly, yet can be controlled so precisely that overheating of the shoe is easily avoided. The old lining can be peeled off and the melted plastic scraped away with a putty knife. Heating from the underside keeps the shoe clean, so that a new lining can be applied immediately.

B. Cutting Asphalt Tile

A PREST-O-LITE torch with a No. 3, 4 or 9 (paint-burning) stem has been used with good success by asphalt tile contractors for heating tiles that have to be bent, formed, or cut. After a few seconds of heating, the tile can be shaped or cut with great ease and facility. The PREST-O-LITE torch saves much time and money, with none of the aggravations encountered with kerosene or gasoline blowtorches.

C. Putty Removal

1. Use either a paint-burning stem (No. 9) or a No. 7 stem for removing putty.

2. Point the flame toward the wood—not the glass—to keep from cracking the glass. The flame will not char the wood or crack the glass if the operation is done rapidly.

3. Heat the putty until it crumbles (new putty will get soft) and scrape it out with a three-cornered scraper or a standard putty knife.

D. Cutting Safety Glass

1. Use a PREST-O-LITE torch with a medium stem.

2. Score both sides of the glass with a glass cutter and break the glass.

3. Soften the plastic filler by running the PREST-O-LITE torch back-and-forth along the line of the cut.

4. Wobble the glass from side to side several times. Then hold the glass to one side while you cut the heat-softened plastic filler with a razor blade.

E. Sealing Cut Flower Stems

Wholesale florists customarily seal the ends of cut flowers prior to shipment to retailers. Usually the flame of a gasoline blowtorch is used. Recently it has been found that the PREST-O-LITE torch can be used to advantage in this work.

1. Any PREST-O-LITE handle can be used with a small stem (No. 1, 2, or 3).

2. The torch is lit, the flame is brushed over the cut ends, and a perfect seal is effected quickly and easily.

F. Flashing Ravelings From Cloth Bolts

1. Use a No. 401 PREST-O-LITE handle with a No. 9 paint-burning stem.

2. This outfit burns the ravelings and filling ends off the bolts as they come off the looms in a cotton mill. It is faster and less hazardous than other means in use at the present.

G. Singeing Hogs and Chickens

It has been found that a PREST-O-LITE torch with a No. 6 or No. 9 (paint-burning) stem is excellent for singeing hogs and chickens after the major portion of bristles or feathers have been removed by mechanical means. One pass with the flame is usually all that is needed. There is no longer a need for a lot of tedious and costly hand work. Pin feathers on chickens are still somewhat of a problem.

H. Cleaning Animal Cages

This is another one of the thousands of uses for the PREST-O-LITE torch. Cleaning the hutch of chinchillas with a flame is something that has to be done about every 60 days to keep the little fur-bearing rodents happy and healthy. Most growers use gasoline blowtorches (with hazardous possibilities), some use steam jennies. Several growers have bought a PREST-O-LITE torch and have found how valuable it is.
it much superior to other cleaning means. So much so, in fact, that they highly recommend it to all growers and breeders of chinchillas.

Several large poultry farmers have found that the clean hot flame of the PREST-O-LITE torch, coupled with the portability of the outfit as a unit, is an effective and economical means of controlling vermin in hatcheries, brooder houses, and henneries.

I. Decorative Furniture Finishing

The paint burner is being used by professional finishers and home craftsmen for obtaining unusual finishes on wood furniture. Charring of the wood with the flame produces various types of effects, both on new and refinished pieces. This method can be used on oak, walnut, chestnut, and other open-grain woods, as well as on pine. Pleasing results can be obtained without the laborious and expensive procedures required, by conventional methods of finishing.

New furniture requires no preparation. Pass the flame evenly back and forth, about 4 to 6 inches away from the wood, keeping it always at the same distance to obtain even charring. Withdraw the flame instantly should a burned spot occur and use steel wool on the spot and adjacent area. If this is not done, such spots will show up as indentations after the ash is removed in cleaning up the job. Work carefully wherever joints occur to avoid softening or burning the glue in the joints or the thinner wood in these parts. It is a good idea to practice on scrap lumber to get the feel of the proper spacing and timing for wood charring before attempting completed furniture.

As the flame scorches the wood, changes in color and texture occur, caused largely by chemical changes in the resins, or in the case of furniture being refinished, in the pigments of the old finish. Usually the old finish need not be scraped off. The flame will burn it off and at the same time scorch the surface sufficiently. If there are many layers of old paint and varnish, you may prefer to apply the flame to soften the finish and then scrape off some of it with a putty knife before charring the surface.

After the charring is completed, clean the surface with a stiff-bristled brush to remove the ash and even up the color. The wood will have a dark brown or black appearance. A coat or two of paste wax can be rubbed in to produce a satin finish. The furniture is now ready for immediate use, and repeated waxing will improve the grain contrast still further. For a brilliant modern finish, apply white or light-color casein paint directly to the charred surface after cleaning off the ash. When the paint is dry, use fine sandpaper to remove the paint from the higher portions, leaving some of it in the deeper wood cells to accentuate the grain pattern. Waxing with paste wax will assure a tough, long-lasting finish.

NOTE: Wood charring should be done away from combustible material, outdoors if possible. If performed inside, clear the area of combustible materials. Have sand and buckets of water available for immediate use in case of fire.

The PREST-O-LITE paint burner can also be used to bring out the natural grain of knotty pine. When you have gone over the surface of the wood with the PREST-O-LITE torch it looks as if it has been varnished. The results vary with the speed you move the torch, the distance the burner is held from the wood, and the flame adjustment. This treatment also seals the wood pores and all that is needed is one coat of varnish to finish the job.

J. Marble Waxing

There are several operations in the finishing of marble for decorative uses that require a clean, moderate heat. Users have found that the PREST-O-LITE torch is useful in many of these operations.

Many small seams and crevices are found after marble has been polished. These flaws have to be filled with a wax-like material. The PREST-O-LITE torch, because of its hot, easily controlled flame, is handy for melting the marble wax. Heat the marble; melt and add the wax; with great care, scrape off the excess wax with a putty knife.

When a thin piece of marble breaks along a seam, heat is applied to the broken edges to make the pieces "stick" together. Many times it is necessary to reinforce fragile marble with steel rods about 1/4 in. square. After a groove is cut in the back of the marble, the groove is filled with a sulphur mixture which acts as a binder or cement. The rod then is heated with the PREST-O-LITE torch and pressed into the sulphur. When the rod cools it will be securely cemented to the marble.
All PREST-O-LITE LP-Gas Torch Stems fit interchangeably on the three standard air-acetylene Torch Handles shown on page 5.

**No. 6-P EXTRA HEAVY**
Bushy flame; 1½-in. diameter flame cup. For soldering fittings in copper and brass pipe with diameters of 3 in. and up. For preheating compound-filled and lead-coupled joints; also useful for preheating metals prior to welding.

**No. 5-P HEAVY**
Bushy flame; 15/16-in. diameter flame cup. For loosening rusted studs, nuts, and bolts. For thawing frozen pipes. For "sweating" fittings up to 2½ in. in diameter. Ideal for melting compounds from junction boxes and pot heads.

**No. 4-P MEDIUM**
Bushy flame; 13/16-in. flame cup. For "sweating" joints in ¼- to 1½-in. pipe. For automobile body soldering.

**No. 3-P LIGHT**
Bushy flame; ¾-in. flame cup. For sheet metal; telephone maintenance; electrical work. For soldering 3/8- to ½-in. piping.

**No. 2-P FINE**
Pencil flame; 21/32-in. flame cup. For soldering instruments, radiator fins, and toys. For work where it is impractical to use a bushy flame.

**No. 1-P SUPERFINE**
Pencil flame; 15/32-in. diameter flame cup. For telephone switchboard, radio and television work, jewelry soldering, and extra close work.

**No. 8-P SOLDERING IRON**
Enclosed flame. For light soldering where an open flame is not practical. Stainless steel tube prevents overheating and keeps heat away from handle. Work capacity at 10 lb. per sq. in. is equal to that of a 375-watt electric iron; at higher pressures, is equivalent to 550 watts and higher.

The PREST-O-LITE R-416 Regulator is used to reduce LP-Gas cylinder pressure and hold it constant for delivery to the torch.