Your new PUROX outfit contains the following pieces of equipment:

- Welding Blowpipe with 5 welding heads
- Oxygen Regulator
- Acetylene Regulator
- Oxygen Hose with connections
- Acetylene Hose with connections
- Goggles
- Friction Lighter

If you have a combination welding and cutting outfit, it also includes a Cutting Attachment with 2 nozzles.

These are the basic equipment items that make up a complete welding and cutting setup. Because you will select welding rods and fluxes according to the type and amount of work you expect to do, they are not included in this outfit. Your PUROX jobber will be glad to help you choose the high-quality OXWELD rods and fluxes you need.

If this Booklet is Lost or Destroyed, You Can Get Another Copy on Request to Any LINDE Office.
This booklet is intended only to supplement the individual instructions packed with the blowpipe and with each regulator in this outfit. We suggest you follow the instructions in this booklet all the way through, to assemble, test, and adjust your outfit for welding and cutting. For replacement parts lists, parts drawings, and repair and maintenance instructions, use the booklets packed with the blowpipe and regulators.

If your outfit will be used with a portable acetylene generator, be sure to follow the instructions on, or supplied with, the generator.

To remind you daily of some of the more important safety precautions to observe in using oxy-acetylene equipment, you will find a list of "Do's and Don'ts" on page 9. More detailed information is included in LINDE'S booklet "Precautions and Safe Practices." You can get a copy of "Precautions and Safe Practices" (F-2035) without charge from any LINDE office.

You will find "The Oxy-Acetylene Handbook," a basic handbook on welding and cutting, especially helpful for self-instruction or for classroom work. This handbook of more than 500 pages, bound in hard covers, contains many valuable chapters on uses of the oxy-acetylene process. The "Welding and Cutting Manual," another hard-cover book of 200 pages, shows you how to get the most out of your outfit. It is crammed with suggestions and ideas to increase your skill and save you money. Both of these books may be purchased from any LINDE office, from any LINDE distributor, or from your PUROX jobber.

A FINAL REMINDER before you start to use this equipment: DO NOT USE OIL OR GREASE ON OXY-ACETYlene EQUIP-MENT—it will never need oiling. Keep all forms of oil and grease away. Oil and grease may catch fire and burn violently in or near concentrations of pure oxygen.

The terms "Linde," "Oxweld" and "Purox" are registered trade-marks of Union Carbide and Carbon Corporation.
To Set Up the Outfit for Welding and Cutting

1. **SECURE CYLINDERS IN UPRIGHT POSITION**

   GOOD—Chained to post or workbench

   BETTER—Secured on cylinder truck

2. **UNSCREW OXYGEN CYLINDER CAP**

   If it sticks

   **DO**

   **NEVER**

3. **BLOW OUT CYLINDER VALVES**

   **OXYGEN**

   Quickly (with a twist of the wrist) open and close each cylinder valve to blow out dirt and dust. Stand to the side of the valve when you open it.

4. **ATTACH THE REGULATORS**

   **ACETYLENE**

   Turn the pressure-adjusting screws to the left until they turn freely.
7. ATTACH WELDING HEAD TO BLOWPIPE HANDLE

Head size depends on the thickness of the steel to be welded. See Table I on page 10.

Remove the connection nut from the blowpipe handle. Slide the nut over the welding head. Push the head all the way into the handle. Tighten the nut by hand — never use a wrench.

8. TO ADJUST GAS PRESSURES FOR WELDING

a. Check packing nuts to be sure they are snug.
b. Open blowpipe valves one full turn.
c. Open the oxygen regulator until the delivery pressure gauge shows the correct pressure. Close the blowpipe oxygen valve.
d. Open the acetylene regulator until the delivery pressure gauge shows the correct pressure. Close the blowpipe acetylene valve.

Ordinarily, pressures will be 5 to 7 lb. per sq. in. for head sizes up to 40, and 6 to 8 lb. per sq. in. for larger welding heads.
9. TEST FOR LEAKS

Paint all these points generously with an Ivory soap solution, using a clean brush. Bubbling indicates leakage. Fix it before you start to work. Leakage at connections usually can be eliminated by tightening the connections more.

10. TO LIGHT THE BLOWPIPE

Put your goggles on before you light the blowpipe. Keep them on while you weld.

a. Open valves

b. Light the gases with a lighter—NEVER use a match.

11. TO ADJUST THE FLAME TO NEUTRAL

Slowly open the blowpipe oxygen valve until the blue flame, or "feather," around the inner cone just disappears. This is the flame adjustment most commonly used. If the flame pops out when you light it: (1) increase the acetylene valve opening and immediately relight the blowpipe, (2) adjust the oxygen valve to obtain a neutral flame.

How Long Should the Inner Cone Be?

The length of the inner cone to use is something you will learn only with experience. The inner cone may be long (a harsh flame) or short (soft flame) depending on the amount of the balanced gas mixture being burned. A harsh flame usually will put too much heat into the weld, making it hard to control. A soft flame usually will not be hot enough.

Make a few practice welds using first a soft flame and then a harsh flame. Notice what happens. Then adjust the flame until, somewhere in between, you get a flame that is easiest for you to handle. Make this test on several thicknesses of steel until you are familiar with the effects of different flame lengths.

12. TO SHUT OFF

For a short time

For long periods (such as overnight):

a. Close both cylinder valves.
b. Open both blowpipe valves to release the gases in the apparatus; close the valves.
13. **TO ATTACH THE CUTTING ATTACHMENT**

   a. Remove the welding head and the connection nut. Put the connection nut where it will not get lost.

   b. Screw the connection nut (a part of the attachment) onto the blowpipe handle. Tighten the nut by hand — DO NOT USE A WRENCH.

14. **TO ADJUST GAS PRESSURES FOR CUTTING**

   (Refer to the Cutting Table II on page 11 for correct pressures to use.)

   a. Open the blowpipe oxygen valve wide. KEEP IT OPEN FULLY when the cutting-attachment is being used.

   b. Open (press down) the cutting oxygen valve.

   c. Open the oxygen regulator until the correct pressure shows on the delivery-pressure gauge. Release the cutting-oxygen valve.

   d. Open the blowpipe acetylene valve one full turn.

   e. Open the acetylene regulator until the correct pressure shows on the delivery-pressure gauge.

   f. Immediately close the acetylene valve.
15. **TEST FOR LEAKS**
Follow the directions in step 9, on page 5.

16. **TO LIGHT THE CUTTING ATTACHMENT**

a. Open preheat oxygen valve just a little.

b. Open blowpipe acetylene valve one full turn.

c. Light the gas. Use a lighter -- NEVER a match.**

d. Open cutting oxygen valve wide.

e. Adjust flames to neutral with preheat oxygen valve. Open the valve until the acetylene "feather" just disappears. See step 11.

f. Release cutting oxygen valve. Put your goggles on—you are ready to start cutting.

*NOTE: If the flames burn away from the end of the nozzle or blow off, decrease the acetylene valve opening and immediately relight the gases at the tip.

17. **TO SHUT OFF THE CUTTING ATTACHMENT**

\[A\] RELEASE

\[C\] CLOSE

\[B\] CLOSE
Operating Precautions

BACKFIRE
Bad handling of your blowpipe may make the flame backfire—go out with a snap. When this happens the blowpipe may be relighted as soon as the trouble has been corrected. A backfire may be caused by touching the work with the tip, by over-heating the tip, by operating the blowpipe at incorrect pressures, by a loose welding head or cutting nozzle, or by dirt on the head or nozzle seats.

FLASHBACK
A flashback means that there is a fire inside the blowpipe. You can always tell when this happens because there will be a loud whistling noise coming from the blowpipe.

If you are cutting, IMMEDIATELY:

1. CLOSE
2. CLOSE

If you are welding, IMMEDIATELY:

1. CLOSE
2. CLOSE

After a minute or so relight the blowpipe in the usual way. Flashbacks can be avoided by using the correct gas pressures for each welding head or cutting nozzle. If you get a lot of flashbacks, the blowpipe or cutting attachment should be sent to the nearest apparatus repair station of Linde Air Products Company for a complete factory checkup. You may send it either directly, or through the PUROX jobber from whom you purchased the outfit.
PRECAUTIONS AND SAFE PRACTICES

ALWAYS DO THESE THINGS
1. Always keep cylinder valves closed unless you are using them. Keep the cap on the oxygen cylinder unless you are using it.
2. If an acetylene cylinder valve should be frozen shut, heat it with warm water or warm wet cloths. The fusible metal safety plug in the cylinder will melt and release all the acetylene in the cylinder if boiling water is poured on it. NEVER USE A FLAME.
3. Examine your hose for leaks often. Dipping it in a bucket of clean water, with the working pressure on, is the quickest and easiest way.
4. If a flashback goes as far as the hose, throw away the charred section and replace it with new hose.
5. If you are working with the oxy-acetylene equipment on a wooden floor, either wet the floor down or cover it with asbestos or tin.
6. When welding brass, bronze, or galvanized iron indoors or outdoors, be very sure you have good ventilation. When cutting metal coated with lead, or paint containing lead, always wear a suitable air-line mask.
7. Use goggles and gauntlet gloves when welding or cutting.

DON'T DO THESE THINGS
8. DON'T use oxygen as a substitute for compressed air.
9. All cylinders containing gas under pressure are built to withstand a lot of hard usage. However, DON'T abuse, drop, or handle cylinders roughly.
10. DON'T let the cylinders get too hot or too cold. Keep them out of the sun in the summer and under cover in the winter. DON'T let ice or snow accumulate on the cylinders. Keep cylinders where it is dry and where a fire can't start.
11. DON'T use an air or water-hose in place of the hoses supplied with the outfit.
12. DON'T make any repairs to an oxygen cylinder valve. DON'T make any repairs to an acetylene cylinder valve, except to tighten the gland nut.

NEVER DO THESE THINGS
13. NEVER lay a torch down unless both gases are shut off.
14. NEVER use cylinders as rollers.
15. NEVER use a cylinder with a leaking valve.
16. NEVER attempt to mix gases in a cylinder, or fill one cylinder from another.
17. NEVER repair hose with makeshift material, tape, etc. Always cut the hose and splice it.
18. NEVER connect an oxygen regulator to an acetylene cylinder, or vice versa.
19. NEVER weld any container unless it is vented and, if possible, filled with water.

NEVER! NEVER! NEVER! weld or cut any container which has held combustible material (oil, gasoline, kerosene, anti-freeze, etc.) unless it has been correctly cleaned and prepared. THIS IS VERY IMPORTANT. Space does not permit detailed instructions here. If you wish to do such work, write to: American Welding Society, 29 West 39th Street, New York, N. Y. for their Pamphlet No. A-6.0.40, titled "American Welding Society - Recommendations Describing Procedure to be Followed in Preparing for Welding or Cutting Containers Which Have Held Combustibles."
# TABLE I

## WELDING HEAD SIZES AND GAS Pressures

**THIS TABLE SHOWS YOU THE RECOMMENDED WELDING HEAD SIZE, ROD SIZE, AND GAS PRESSURE**

<table>
<thead>
<tr>
<th>THICKNESS OF METAL</th>
<th>STEEL</th>
<th>CAST IRON</th>
<th>Oxygen and Acetylene Pressure (lb. per sq. in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches Gage</td>
<td>Welding Head Size</td>
<td>Rod Size</td>
<td>Welding Head Size</td>
</tr>
<tr>
<td>28</td>
<td>2</td>
<td>1/16</td>
<td>12-15</td>
</tr>
<tr>
<td>26</td>
<td>4</td>
<td>1/16</td>
<td>15-20</td>
</tr>
<tr>
<td>24</td>
<td>4</td>
<td>1/16</td>
<td>20-30</td>
</tr>
<tr>
<td>1/32</td>
<td>22</td>
<td>1/16</td>
<td>20-30</td>
</tr>
<tr>
<td>1/16</td>
<td>16</td>
<td>1/16</td>
<td>20-30</td>
</tr>
<tr>
<td>3/32</td>
<td>13</td>
<td>3/32</td>
<td>30-40</td>
</tr>
<tr>
<td>1/8</td>
<td>11</td>
<td>3/32</td>
<td>30-40</td>
</tr>
<tr>
<td>3/16</td>
<td>11</td>
<td>3/32</td>
<td>30-40</td>
</tr>
<tr>
<td>1/4</td>
<td>22</td>
<td>1/8</td>
<td>15-20</td>
</tr>
<tr>
<td>5/16</td>
<td>20-30</td>
<td>1/8</td>
<td>20-30</td>
</tr>
<tr>
<td>7/16</td>
<td>20-30</td>
<td>3/16</td>
<td>20-30</td>
</tr>
<tr>
<td>1/2</td>
<td>40</td>
<td>1/4</td>
<td>20-30</td>
</tr>
<tr>
<td>3/8</td>
<td>55</td>
<td>1/4</td>
<td>30-40</td>
</tr>
<tr>
<td>5/8</td>
<td>55</td>
<td>1/4</td>
<td>30-40</td>
</tr>
<tr>
<td>3/4</td>
<td>70</td>
<td>1/4</td>
<td>30-40</td>
</tr>
<tr>
<td>1</td>
<td>100*</td>
<td>1/4</td>
<td>30-40</td>
</tr>
</tbody>
</table>

*Only for use with #202 Blowpipe.*

## THIS TABLE SHOWS YOU THE RECOMMENDED WELDING HEAD SIZE, ROD SIZE, AND GAS PRESSURE

<table>
<thead>
<tr>
<th>THICKNESS OF METAL</th>
<th>ALUMINUM</th>
<th>BRONZE</th>
<th>WELDING Pressures in lb. per sq. in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches Gage</td>
<td>Fusion Welding of #23 Aluminum Rod</td>
<td>Bronze-Welding or Brazing #25M Bronze Rod</td>
<td>Oxygen and Acetylene</td>
</tr>
<tr>
<td>28</td>
<td>2</td>
<td>1/16</td>
<td>1/16</td>
</tr>
<tr>
<td>24</td>
<td>4</td>
<td>1/16</td>
<td>1/16</td>
</tr>
<tr>
<td>1/32</td>
<td>22</td>
<td>1/8</td>
<td>1/8</td>
</tr>
<tr>
<td>1/16</td>
<td>16</td>
<td>9 or 12</td>
<td>1/8</td>
</tr>
<tr>
<td>3/32</td>
<td>11</td>
<td>12-15</td>
<td>1/8</td>
</tr>
<tr>
<td>1/8</td>
<td>1/8</td>
<td>12-15</td>
<td>1/8</td>
</tr>
<tr>
<td>3/16</td>
<td>20-30</td>
<td>3/16</td>
<td>20-30</td>
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<tr>
<td>1/4</td>
<td>20-30</td>
<td>3/16</td>
<td>20-30</td>
</tr>
<tr>
<td>5/16</td>
<td>30-40</td>
<td>3/16</td>
<td>30-40</td>
</tr>
<tr>
<td>3/8</td>
<td>30-40</td>
<td>1/4</td>
<td>30-40</td>
</tr>
<tr>
<td>7/16</td>
<td>40-55</td>
<td>1/4</td>
<td>40</td>
</tr>
<tr>
<td>1/2</td>
<td>55</td>
<td>1/4</td>
<td>55</td>
</tr>
<tr>
<td>9/16</td>
<td>55</td>
<td>1/4</td>
<td>55</td>
</tr>
<tr>
<td>5/8</td>
<td>70</td>
<td>1/4</td>
<td>70</td>
</tr>
<tr>
<td>3/4</td>
<td>70</td>
<td>1/4</td>
<td>70</td>
</tr>
</tbody>
</table>

## CLEANING DRILLS

<table>
<thead>
<tr>
<th>Welding Head Size</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>15</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>55</th>
<th>70</th>
<th>85</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tip Drill Size</td>
<td>74</td>
<td>64</td>
<td>58</td>
<td>55</td>
<td>54</td>
<td>53</td>
<td>50</td>
<td>45</td>
<td>40</td>
<td>33</td>
<td>30</td>
<td>28</td>
<td>24</td>
</tr>
</tbody>
</table>
### TABLE II
**HAND-CUTTING OPERATING DATA**

<table>
<thead>
<tr>
<th>Steel Thickness, In.</th>
<th>Nozzle Data</th>
<th>Oxygen Pressure lb. per sq. in.*</th>
<th>Acetylene Pressure lb. per sq. in.*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nozzle Size</td>
<td>1/4-in. Hose</td>
<td>1/4-in. Hose</td>
</tr>
<tr>
<td></td>
<td>Cleaning</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drill Size</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preheat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cutting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/8</td>
<td>1</td>
<td>10-13</td>
<td>5</td>
</tr>
<tr>
<td>1/4</td>
<td>1</td>
<td>17-24</td>
<td>5</td>
</tr>
<tr>
<td>3/8</td>
<td>1</td>
<td>24-34</td>
<td>5</td>
</tr>
<tr>
<td>1/2</td>
<td>2</td>
<td>18-23</td>
<td>5</td>
</tr>
<tr>
<td>3/4</td>
<td>2</td>
<td>46-61</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>61-68</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>44-57</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>44-59</td>
<td>5</td>
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<td>4</td>
<td>4</td>
<td>47-63</td>
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</tr>
<tr>
<td>5</td>
<td>5</td>
<td>54-67</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>72-89</td>
<td>5-6</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
<td>102-120</td>
<td>7-9</td>
</tr>
</tbody>
</table>

**NOTE**: In normal cutting, choose a point midway in the oxygen pressure range indicated for the particular thickness of steel being cut. When cutting clean steel, a lower point in the range may be used. When cutting dirty or heavily scaled steel, a higher point in the range should be used.

*These pressures are based on a 25-ft. length of hose; longer lengths will require somewhat higher pressures.*
LINDE Supplies These Quality Products to the Nation's Industries

INDUSTRIAL GASES
LINDE Oxygen, Nitrogen, Argon, Neon, Helium, Krypton, Xenon, Hydrogen
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CALCIUM CARBIDE
UNION Carboide
CARBIC Processed Carboide

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Manifolds, Regulators, and Valves
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Purox Welding and Cutting Apparatus
PREST-O-LITE Air-Acetylene Apparatus and Small Tanks
CARBIC Acetylene Flood Lights
Acetylene Generators

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HELIMELT Welding Torches
LINDE Sigma Welding Equipment

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Plate-Edge Preparation Equipment
Polyethylene Powder and Flame-Spraying Equipment
Steel-Conditioning Machines
Sub-Zero Cold Treatment Equipment
OXWELD Oxy-Acetylene Cutting Machines
Pressure-Welding Machines

OXYGEN THERAPY SUPPLIES
LINDE Oxygen U.S.P.
Oxygen Therapy Regulators
Oxygen Therapy Manifolds and Valves

SYNTHETIC CRYSTALS
LINDE Synthetic Sapphire, Ruby, Spinel, and Titania
Synthetic Calcium- and Cadmium Tungstates
Fine Alumina Abrasive

ORGANOSILICONES
LINDE Silane Monomers
Poly-siloxane Polymers and Resins


LINDE AIR PRODUCTS COMPANY
A DIVISION OF UNION CARBIDE AND CARBON CORPORATION

In Canada
DOMINION OXYGEN COMPANY, LIMITED, TORONTO

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BALTIMORE 18, MD.
532 East 25th Street
BOSTON 16, MASS.
441 Stuart Street
BUFFALO 2, N.Y.
250 Delaware Ave.
CHARLESTON 1, W. VA.
2 Virginia Street
NEW YORK 17, N.Y.
205 East 42nd Street
PHILADELPHIA 22, PA.
1421 North Broad Street
PITTSBURGH 19, PA.
511 Ross Street

Central States
CHICAGO 1, ILL.
230 North Michigan Avenue
CINCINNATI 29, OHIO
709 Melisch Avenue
CLEVELAND 14, OHIO
1333-13 Superior Avenue
DETROIT 2, MICH.
6-240 General Motors Building
INDIANAPOLIS 4, IND.
729 North Pennsylvania Street
MILWAUKEE 46, WIS.
1623 South 35th Street
MINNEAPOLIS 2, MINN.
357 Second Avenue, South
ST. LOUIS 8, MO.
4228 Forest Park Boulevard

Southern States
ATLANTA 1, GA.
310 Peachtree Street, N. E.
BIRMINGHAM 5, ALA.
1001-13 South 22nd Street
JACKSONVILLE 3, FLA.
2410 Dennis Street
MEMPHIS 5, TENN.
48 West McLennan Avenue
NEW ORLEANS 13, LA.
528-52 Howard Avenue

Southwestern States
DALLAS 1, TEXAS
2026 Commerce Street
DENVER 9, COLO.
695 South Broadway
HOUSTON 11, TEXAS
6119 Harrisburg Boulevard
KANSAS CITY 6, MO.
910 Baltimore Avenue
TULSA 3, OKLA.
64 Union National Bank of Tulsa Bldg.

Western States
EL PASO, TEXAS
810 Texas Street
LOS ANGELES 58, CALIF.
2724 Levis Boulevard
PHOENIX, ARIZ.
403 East Buchanan Street
PORTLAND 9, ORE.
1205 Northwest Marshall Street
SALT LAKE CITY 1, UTAH
362 Pierpoint Avenue
SAN FRANCISCO 6, CALIF.
22 Battery Street
SEATTLE 4, WASH.
2901 First Avenue, South
SPOKANE 12, WASH.
2023 West Maxwell Avenue

In Canada
Dominion Oxygen Company, Limited
TORONTO  •  MONTREAL
WINNIPEG  •  VANCOUVER