

BICO LABORATORY #40 FURNACE

The Bico Laboratory Furnace is designed to perform with great efficiency and give many years of service. In order to get the best results and full life from your Furnace, proper care must be exercised in its installation and upkeep. Read these instructions completely before attempting to set up your Furnace.

INSTALLATION

An iron stand is recommended for mounting the Furnace. When this is not available, a wooden table covered on top with brick or cement makes an acceptable substitute. Where such a table is used the Furnace should be raised above the surface by placing four bricks or irons under the corners. This precaution allows free circulation of air beneath the furnace to prevent the table from scorching or catching fire.

INSTRUCTIONS

Before using a new Furnace start with a **SLOW FIRE**. Allow the new furnace to heat slowly for several hours in order to dry out all fire clay thoroughly, If a new furnace is heated too rapidly the moisture in the fire clay will be generated into steam and cause check cracks. In localities where excessive moisture prevails this same procedure should be followed with old furnaces.

The continual heating and cooling of fire bricks will eventually cause check cracks. By regularly sealing these cracks with a fire clay mixture, in the form of a thin paste, their spread may be prevented and the furnace kept in good working condition.

LUTING MATERIAL

Luting is the process of cementing the various fire clay accessories, such as the muffle, draft boss and burner boss, to the fire clay walls of the furnace. The material used is either fire clay or one of various special luting cements. A package of cement is supplied with each furnace. This material is premixed. Add a small quantity of water to make a thinner mixture if required. **NOTE: ALL PARTS TO BE LUTED SHOULD FIRST BE MOISTENED WITH WATER.**

INSTRUCTIONS

These furnaces do not require a draft boss. Place a ring of luting material around the end hole of the muffle. Set the muffle in position so that the hole makes a tight connection with the draft opening in the rear of the furnace. Lute the front end of the muffle to the furnace walls.

When luting is completed properly, place the hood in position.

In furnaces where a draft boss is issued, make connections to it with the small pipe provided for this purpose. If desired, connect the chimney of the hood with flue of building or outer air, being careful not to contact in any way the pipe leading from the hood. (THIS PRECAUTION IS PARTICULARLY NECESSARY WHEN YOU ARE USING THE CARY HYDROCARBON BURNER AS A SOURCE OF HEAT). If the openings through which the exhaust gasses pass are not large enough to carry off the fumes freely, combustion will be retarded and heat reduced. This particularly affects the muffle by retarding both the heat and draft, thereby interfering with proper cupellation. Any difficulty in heating the muffle in this furnace will likely arise from the openings being too small to carry off the fumes of combustion.

The draft for cupellation in the furnaces is obtained through the end hole of the muffle. A slide fitted to the rear of the jacket, permits control of the air flow. An opening in the front, larger than the inlet, is provided just inside the jacket and directly over the open end of the muffle. This outlet is opened and closed by withdrawing or inserting the fire clay muffle plug. The heat issuing from the crucible chamber creates a draft through the full length of the muffle when the inlet and outlet apertures are open, thus ensuring rapid cupellation.

BURNER INSTALLATION

Special fire clay burner bosses are furnished with Bico Cary Hydrocarbon and Propane Burners. This burner boss is used either to prevent air from entering the furnace around the burner face or to control the amount of air entering, depending upon the type of burner used. (This boss also exposes the largest possible amount of surface to the heat of the interior so that perfect generation will be obtained in the case of gasoline burners. A burner boss must be used with all types of gasoline burners.

Lute the burner boss into the burner hole opening in accordance with directions furnished with the burner.

No burner boss is used with Gas fired furnaces, as air should be allowed to enter the furnace around the burner tube to insure combustion efficiency. Directions included with burners should be followed for installation.

IMPORTANT NOTE: WEEKLY EXAMINATIONS OF FURNACE WALLS AND PROMPT ATTENTION TO FILLING THE CRACKS WILL PROLONG THE LIFE OF YOUR FURNACE. GIVE YOUR FURNACE THE ATTENTION IT REQUIRES AND IT WILL REPAY YOU BY GIVING THE SERVICE IT IS DESIGNED TO DELIVER.

**RECOMMENDED SPARE PARTS FOR
NORMAL ONE (1) YEAR OPERATION FOR #40 FURNACE**

4/set 309-05B Covers/Left and Right
4/set 309-05E Side Bricks #D,E,F & G
3/set 309-05F End Bricks #H, J & K
1/ea. 309-05G Deflecting Brick #L
1/ea. 309-05MT Tamax Muffle 4 X 6 X 10"
1/lb. 309-05T Cement (1# Can)

NOTE: BRICKS MAY BE BOUGHT SEPARATELY

OPERATING INSTRUCTIONS FOR THE BICO NATURAL GAS BURNER

This low pressure gas burner was designed primarily for firing assay furnaces. The construction is such that air and gas are mixed in the correct proportions after the recognized principles of Bunsen.

To obtain a sufficient amount of air for this burner, 30 to 130 cubic feet per minute, it is necessary to use a blower which may be operated by electricity or other available means. The gas consumption is about 180 cubic feet per hour.

The gas from the main burner is ignited by means of a pilot flame at the side. The gas inlet is controlled by a valve fitted with indicating dial and pointer. A 3/4 inch gas supply line is recommended.

FURNACE CHECK CRACKS

Any cracks in the fire clay lining of the furnace should be well luted with a mixture of fire clay bond cement, in the form of a thin paste, before installing burners. Sufficient time should be allowed for luting to become thoroughly dried before firing the furnace.

EXPENDABLE PARTS

The parts listed are the only expendable parts on your Bico Natural Gas Burner. If the replacement of other parts is necessary, we would be glad to quote the prices upon request.

CATALOG #	DESCRIPTION	PRICE F.O.B. FACTORY
11-2	Burner Tube (Nozzle) Short	For 185-25 Burner
11-2	Burner Tube (Nozzle) Long	For 185-26 Burner

BICO #40 FURNACE SPARE PARTS

CATALOG #	DESCRIPTION	LBS/KG
309-05A	Furnace Hood	2/1
309-05L	Cover - Left Hand	7/3
309-05R	Cover - Right Hand	7/3
309-05B	Muffle Plug "B"	3/1
309-05C	Dome "C" Complete with Bushing	35/16
309-05D	Side Brick "D"	7/3
309-05E	Side Brick "E" (Set of 4)	7/3
309-05F	Side Brick "F" (Set of 4)	7/3
309-05G	Side Brick "G"	7/3
309-05H	End Brick "H"	10/5
309-05J	End Brick "J" Set of 3	1/4
309-05K	End Brick "K"	6/3
309-05DL	Deflecting Brick "L"	5/2
309-05M	Bottom Brick "M"	16/7
309-05FJ	Furnace Jacket Assembly	15/7

309-05P Stove Pipe (2' Length)	2/1
309-05MT Tamax Muffle 4 X 6 X 10"	10/5
309-05TCement (1# Can)	2/1
309-08 Cast Iron Furnace Table	119/54

***** BURNERS AND ACCESSORIES *****

185-15 Propane Burner W/Fittings	7/3
185-17 Propane Burner W/Out Fittings	7/3
185-18 Pressure Regulator	5/2
185-10 Burner Boss 2 3/4"	1/4
185-26 Natural Gas Burner	14/6
11-14 Pressure Blower, 1/3 HP, 115/230 Volt, 1 Phase, 60 Hz.	15/7
185-12 Burner Boss 3 3/8"	1/4



185-00-2 2" Cary Hydro-Carbon Burner	6/3
185-12-2 Burner Boss 3 1/8" for 2" Burner	1/4
185-00-214 2 1/4" Cary Hydro-Carbon Burner	6/3
185-12-0 Burner Boss 3 3/8" for 2 1/4" Burner	1/4