



Carlisle Machine Works, Inc.

Lucio Series Burner Instruction Sheet

The Lucio series Burners uses natural gas or propane¹ with oxygen to create a wide range of flame characteristics for flameworking application. This instruction sheet is designed to provide the user with a working knowledge of the burner to allow for safe and educated use. This instruction sheet is not intended to be a guide for flameworking, but rather a guide for use of the Lucio Burner. Please take the time to thoroughly read through this instruction sheet to help ensure the proper use and maintenance of the burner.

¹Natural gas is the optimal fuel for use with the Lucio Burner and will provide the best working results.

Lucio Burner

For the broadest range of flame types, and the ability to work with a wide range of applications, the Lucio Burner offers a unique flame extremely well suited for soft glass sculptural work of all sizes. The Lucio Burners base features a stainless steel plate with drilled ports for mounting. The burner head can be pivoted via a ball joint connection to achieve several angles of adjustment. The base does not incorporate a height adjustment and does not include a marver (available separately as an optional accessory)

Options and Accessories:

The Lucio Burner has several options and accessories that are available. This section is intended to provide any pertinent information for the options that may be applicable.

- **Marver:** A 2 inch by 4 inch Graphite Marver designed to mount to the top of the torch. The marver adjustment is independent from the burner adjustment. (Installed by operator).
- **In-Line Disposable Filters Option:** This is a highly recommended option to filter the fuel gas and oxygen gases prior to the burner to reduce the possibility of containments from the feed piping.
- **Hose Options:** There are three types of hosing recommended for CC Series burners, Welding hose, Tygon hose, and Stainless Steel Braided hose. Please refer to Bulletin 24D for more information regarding these products.

The Lucio Burner is a Surface Mixed Burner:

Surface mixed burners deliver the gas and oxygen to the face separately so that the mixing of gases happens as they exit the burner face. This produces a safe flame for working with any application. Surface mixed burners do not have the possibility for combustion to take place inside of the burner (this is commonly known as Flashback) since the gas and oxygen are not mixed until they exit the burner. However, certain conditions (such as an internal leak) could cause a Flashback to occur.

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Control Valves:

Standard models require two valves which are, located on the back of the Lucio Burner. One control valve has a red handle and is used for metering the fuel gas flow to the burner. One control valve has a green handle and is used for metering the oxygen flow to of the burner.

These control valves are finely threaded and thus require several full turns to become fully open or fully closed. When using these valves to control the flames, it is best to make small incremental adjustments rather than full turns. Quick or large adjustments could cause the flame to become unstable and even blow off of the face of the burner. In time, the user will learn the best way to control the burner for their application.

The valve stems are threaded and secured into the valve body via a nut. This nut is threaded onto the valve body and the stainless steel stem extends through this nut. Depending on how tightly this nut is threaded down onto the valve body, the stainless steel stem will be harder or easier to turn. If the nut is tightly threaded down onto the valve body, the stem will have more resistance to movement. By loosening this nut, the stem will become easier to adjust. Loosening the nut can also cause a leak to form around the stem from the nut sealing area. Be sure to check for leaks (see "Checking for Leaks") anytime that this nut is adjusted.

When closing the control valve, the valve should be adjusted only until it seats and stops turning. The valve should not be forced or "torqued" down any further. By turning the valve handle with force, beyond its seal positioning, once it has seated, great pressure may be placed on the seat. This will cause the seat or valve stem to become deformed and will result in a leak that can not be

Checking for Leaks:

Before operating the Lucio Burner for the first time and once a month (see "Maintenance") the burner should have the control valves and all connections checked for leaks. Follow the procedure below to check for leaks.

1. Connect air at 25 PSI to the burner.
2. Dip the head of the burner into a bucket of water.
3. Cycle through the control valves turning each one on and then shutting it off. When the control valve is opened there should be a rush of bubbles in the water. After shutting the control valve off, wait about 30 seconds to watch for any new bubbles. If bubbles appear at any rate, this would indicate a leak in the control valve.
4. Remove the head from the water and use the air pressure to blow out any residual water.
5. Mix soap (liquid soap is best for this) and water to form a bubbly mixture for leak detection.
6. Turn on both control valves.
7. Apply the soapy mixture to all threaded connections, valve stems and between the barrel and manifold at the back of the burner. If any of these areas produces bubbles after applying the soapy mixture, the connection may have a leak.
8. Close all control valves and disconnect the air.

If a leak is detected, contact a Carlisle Representative for assistance.

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Startup and Shutdown:

To startup the Lucio Burner, follow the procedure below.

1. First open the gas control valve and ignite the gas with either an open flame or a striker. Be sure that your hands, clothing, and other flammable objects are not near the face of the burner while igniting the flame.
2. Then open the oxygen control valve to produce a blue focused flame.

To shutdown the Lucio Burner, follow the procedure below.

1. Reduce flow of all gases to burner
2. First close off the oxygen control valve.
3. Then close off the gas control valve.

Heat Build-up and Carbon Build-up:

Some inappropriate working conditions can cause heat build-up in the burner. This heat build-up will cause damage to the burner and also present a danger to the user if a heated area of the burner is touched by the user.

Heat build-up is the cause for carbon build-up. Carbon build-up is the formation of carbon inside of the burner (natural byproduct of fuel gas). This often results in degraded performance of the burner and possibly may cause carbon to expel out of the burner. Carbon that is present in the fuel gas (except hydrogen) effectively causes the flame to have more heat potential. If the stainless steel in the burner becomes heated to a significant level, the carbon from the fuel gas will bond to the walls of the stainless steel. When this occurs, the burner must be cleaned (see "*Maintenance*"). Propane has a very high carbon content and will almost certainly cause carbon build-up.

Some of the things the user can do to help retard heat build-up are:

- Flames that have higher oxygen content run cooler. Use this type of flame whenever possible.
- Do not run the burner without some oxygen flowing through the burner.
- Do not use short flames that burn close to the face of the burner and can cause the end of tubes to glow red.
- Do not use lazy flames that are not directed outward from the face of the burner.
- Do not work too close to a piece that would cause flame backwash

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Maintenance:

Before any maintenance is performed, the user should be sure to use appropriate safety measures such as wearing safety goggles.

- If the Lucio Burner experiences carbon build-up (see "*Heat Build-up and Carbon Build-up*"), then the burner should be cleaned regularly. The tubes can be cleaned using a torch tip cleaning set, piano wire, or K file (these must be significantly smaller than the orifice). When cleaning the tubes, it is important to be very careful while gingerly poking at the carbon. It is very possible to have the cleaning tool get stuck inside the burner. Also, a light amount of air flow through the torch will cause the dislodged carbon to come out of the face of the burner rather than falling back into the body.
- The Lucio Burner should be checked for leaks in the valves and all threaded connections once a month (see "*Checking for Leaks*").

Flame Settings:

The Lucio Burner has a very unique flame. Please note that based on the operator's prior burner experience, the flame settings may not look or sound as expected. The unique flame properties of the torch demonstrate superior performance. Below are a few things to note about the flame settings of the Lucio Burner:

- ***It looks reducing.*** The flame of the Lucio Burner is often mistaken as being very reducing in nature. As such, the operator may feel the need to use a heavy amount of oxygen in the flame. When getting used to the Lucio Burner, perform reduction tests on your glass to see for sure what flames are reducing and what is not. You should be pleasantly surprised with the results.
- ***The candles are bright yellow.*** The tips of the candles (aka focal points) may be brighter than the operator is used to seeing on other burners. This is normal, and is part of the softness that the Lucio Burner provides. Please note that propane creates especially bright candles, as the torch is optimally setup for use with Natural Gas.

How should the flame look: For a standard working flame, Carlisle recommends a candle or focal length of 1/2". This will present a flame that is very hot and provides radiant heat around the flame, great for working with medium sized sculpture. This radiant heat lessens the frequency of glass fractures due to temperature changes while moving in and out of the flame.

Achieving a pinpoint flame: By adding oxygen to the flame or by lowering the fuel gas, the flame will narrow to a fine point. This flame is usually quite a bit cooler than the standard working flame.

There are several more settings that you will work for a wide range of applications. Experiment with the size of the flame and the ratio of oxygen to discover the best settings for your needs.

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Safety Requirements:

Below are the safety requirements for use of the Lucio Burner. These measures will help to ensure the safety of the user.

- Flashback Arrestors should be used with the Lucio Burner. These devices stop a Flashback from traveling upstream through the lines.
- Didymium Glasses should be worn at all times, when working with the Lucio Burner. Darker shades of glasses may be necessary when working with propane, due to the increased intensity of the brightness of the candles.
- Long hair should be tied back and loose non-flammable/flame retardant clothing should not be worn when working with the Lucio Burner.
- The integrity of the burner casing should never be broken. This will cause an internal leak (until repair) that could potentially be very dangerous.

| <i>LUCIO</i> | Natural Gas | Propane |
|---|-----------------------------------|-----------------------------------|
| Recommended Pressures for Fuel Gas | .25 PSI | .25-3 PSI |
| Recommended Pressures for Oxygen with use of listed gases | 4-6 PSI | 5-7 PSI |
| <i>LUCIO GRANDE</i> | Natural Gas | Propane |
| Recommended Pressures for Fuel Gas | .25 PSI | .25-7 PSI |
| Recommended Pressures for Oxygen with use of listed gases | 10 PSI (18.88 LPM) MINIMUM | 10 PSI (18.88 LPM) MINIMUM |

This unit is under warranty for 12 months as per the terms and conditions located on the Carlisle Machine Works, Inc. website: www.carlislemachine.com.

The manufacturer strongly objects to anyone but authorized Carlisle personnel breaking the integrity of the burner casing. The manufacturer will declare all warranties null and void and user will be liable for all injuries or damages occurring as a result of the user attempting or succeeding to disassemble, repair, or replace internal parts of the burner .

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