

# Oxy Forehearth Burner Installation

### SAFETY

These instructions pertain only to the Oxy Forehearth Burner and should only be used for its intended purpose. Only qualified personnel should work on the Oxy Forehearth Burner to ensure proper installation, especially when installing gas piping or electrical wiring. All regulations MUST follow/meet region requirements; if unsure about this information, contact your local gas or electric provider. This product can cause serious injury/harm if misused; any person working with the Oxy Forehearth should be equipped with proper protective equipment, such as safety glasses, close-toed shoes, and adequate clothing attire. Contact the factory if you have questions or concerns regarding the Oxy Forehearth.

**Warning:** *This guide does not provide every eventuality; the information provided should be considered when working with the Oxy Forehearth Burner.*

### Description

The S-Glass Oxy Forehearth is a nozzle-mix burner, intended to be used in a forehearth application. These burners provide temperature uniformity throughout the glass and come ready to fire at 30,000 to 250,000 Btu/hr. Available in five models, the Oxy Forehearth has a high 10 to 1 turndown ratio, allowing the burner to have a simplistic design and layout.

### Applications

The Oxy Forehearth Burner is ideal for application in the glass industry such as:

- Forehearth applications

### Handling and Storage

*Follow all oxygen safety procedures.*

- The oxy-clean components are cleaned and bagged for oxygen use.
- Check the area and all components are clean/protected from:
  - > Dirt
  - > Dust
  - > Moisture
  - > Grease
  - > Weather
  - > Damage
- Do not drop/damage components.
- Keep components in their original packaging to the furthest extent when in storage.
- Ideal to store components in a cool, clean, dry room.



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### Block Installation

*Block installation should be done prior to burner installation.*

*Assuming the block above the burner block area does not fall in, try to hold up if possible.*

1. First, install throat-side shim/fill blocks.
  - Blocks with a large angle on the hot face.
  - Blocks with a small angle on cold face.
2. Next, install the main burner block.
  - In the burner, the block opening should be fiber wool, not too tight, so gases don't stack out the block.
3. Then, install an injector block with fiber wool on the outside counterbore of the block.
4. Install opposite side filler brick and brick on top of blocks.
5. Seal up with mortar and set jack bolt and support from furnace steel to mounting section.
6. After completing the following steps, inspect the complete setup once confirming the block installation preceded with the burner installation.

*Before installation of the Oxy Forehearth burner, check all control and safety systems are operational. Also, be sure to follow all plant and system start-up procedures.*

1. Close all burner isolation valves.
2. Open the oxy/gas to the zone controls.
3. Next, pressurize oxygen/gas to all zones; this will ensure oxygen/gas lines are purged.
4. Switch to oxy burners at an auto-ignition of 850C (1562C) for an oxy burner start.
5. When installing the burners, install half the burners in a zone.
  - Install the burners in an area away from the heat-up burner.
6. After installing the burners, connect the oxygen/gas hoses and check the burner for proper position/clamping.
  - Open the oxy ball valves once positioned.
7. For the burners installed, set the oxygen flow to light off the flow; see the table below.
  - The oxygen ratio shown is 2.0; adjust as needed.

Model	Light off N. Gas Flow Nm3/hr		Light off Oxygen Flow Nm3/hr	
SOGF 030	0.24	0.35	0.48	0.70
SOGF 050	0.40	0.54	0.80	1.07

Model	Light off N. Gas Flow SCFH		Light off Oxygen Flow SCFH	
SOGF 030	9	13	18	26
SOGF 050	15	20	30	40



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8. Open the N gas ball valve to the burners, start the N gas flow, and bring the N gas flow up to the light-off flow for the total burners being used.
9. By looking in the Forehearth burner, check to see if the burner is lit.
10. It's recommended to run the flame a little rich/lower ratio during light off/heat-up.
11. Ensure the heat-up burner is not pushing the flame into the side of the block bore.
12. Add/reduce gas/oxygen as needed to keep the heat-up curve.
13. The burner should always be above minimum/below maximum flow.
  - Important: If the flow is within 10% of the maximum/minimum, remove/add burners to bring the flow away from the maximum/minimum for each burner.
14. Heat-up burner turndown/removal:
  - Burners should be away from the heat-up burner.
  - Lower the heat-up burners firing when turning on the oxy burners, then remove them.
  - Carefully watch the forehearth pressure and close off the stack if necessary.
  - After removing the heat-up burner, the exhaust stack needs to be almost completely closed due to the total exhaust gases with the very low firing of oxygen.
  - Be aware the pressure inside the Forehearth may go negative till glass fills the channels.
  - Important: Monitor/control pressure in the Forehearth.
  - During this time, hold the temperature, increase fuel/oxy, then add burners.
15. Repeat steps 2-14 for each zone.
16. If needed, remove burners, but keep above the minimum flow and below the maximum.

*Follow all plant and zone control operational procedures. Before installation, ensure all systems are ready for operation.*

1. Close burner isolation valve.
2. Remove any seal from the forehearth block and check the block is clear.
3. Connect gas/oxy supply lines to burner fittings.
4. Install the burner into the forehearth block.
5. Using the clamp arrangement, lock the burner into position.
6. Open the oxygen valve to the burner, then slowly open the gas valve to ignite, if temperature is above 850°C (1562°F).

## Removing Burners in Hot Operational Forehearth

*Follow all plant and zone control operational procedures. Before installation, ensure all systems are ready for operation.*

1. Close the N. gas/oxygen isolation valve.
2. Remove the burner from the forehearth.
3. Ensure the block opening is clean and clear.



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# Oxy Forehearth Burner Installation

## Burner Operation

Use the following to check the burners and operations. The information provided below only includes some requirements for operating the Forehearth.

1. It's advised to number all the burner positions for maintenance and operational purposes.
  - Ex: "Zone 1, Burner 1-30"
2. Important: Qualified personnel should perform operational checks to confirm systems are working in normal operating conditions. Use the list below for typical operational inspections:
  - Number of burners in operation per zone.
  - Gas/Oxygen flow per zone/burner to verify the burner is in operating range.
  - Gas/Oxygen valve position
  - Oxy/gas ratio per zone
  - Zone header oxygen/gas pressure
3. Alarms should be set for all monitored operational control points to alert the operator if a process variable is not in the normal operating range.
4. There is a wide operational range from min to max firing. Because of this, the systems operating on the edge of the operating range should be inspected, aiming to bring the burner back to regular operation.
  - One reason this occurs is because there are too many or not enough burners for operation.
5. The Oxy Forehearth burner was designed to operate with little maintenance/operational changes.

## Weekly, Monthly, or Semi-Annual Checks

1. The Oxy Forehearth burner is designed for easy operation and maintenance; there should be regular checks on the burner's operation.
  - Each plant should determine how often burner checks should be performed.
  - While the furnace starts, more checks are made to determine what is expected during operation.
  - Checks can occur monthly, quarterly, or semiannually.
2. Before the operation, a routine visual check should be performed; examples are listed below.
  - Valves opened or closed.
  - Burner clamps are tight or secure.
  - The burner is tight to the assembly.
  - No unusual hot spots
  - Check for any loose hoses, fittings, or leaks of gas/oxygen.
3. Visual inspection of firing inside is recommended.
  - Since it is not possible to see every Oxy Forehearth burner, this check allows operator to physically verify what is seen as normal compared to previous checks.
  - The use of photo/video during the visual check is highly recommended.



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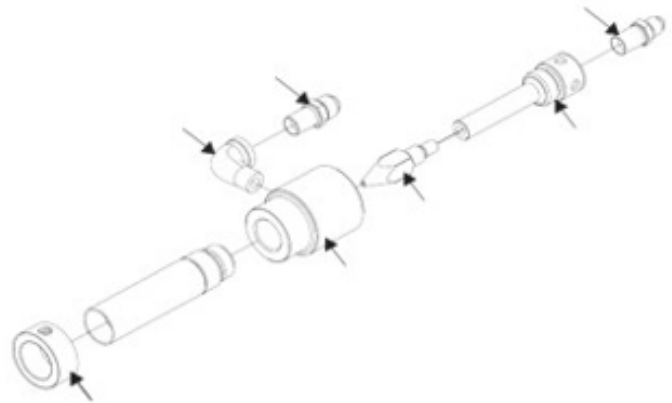
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### Long Term Checks

1. If there are any apparent changes to the burner, it is recommended the burner be removed and examined.
  - Once the burner is removed, check the following:
    - > Oxygen/gas tip
    - > Burner body
    - > Hoses to burner
    - > Burner block
2. During these routine checks, take photos/videos and record all information collected, allowing for a long-term record of operation.
  - Ex: 10% of 30-burners zone (3 burners) can be checked after 6 months, then 6 months later another set of 3 burners. Be sure to take photo/video for a long-term record of operation.
  - Note: The factory recommends after the first month of the initial start-up some burners should be checked.
3. After performing all checks, qualified personnel can schedule the next routine inspection as necessary.

### Maintenance

- Important: Each plant should have equipment that allows for easy removal of the Oxy Forehearth burner if necessary.
- There are four main parts and burner fittings (see drawing below), these parts can be removed/exchanged between burners and with new spare burners/parts.
- Listed are the main parts of the burner seen below:
  - > Oxygen tip
  - > Gas tip
  - > Gas tube
  - > Burner body
  - > Fitting for connection to supply lines.
- Reminder: Follow the list below when working on the Oxy Forehearth burner.
  - > Ensure oxygen cleanliness.
  - > Use clean non-greasy tools.
  - > Use oxygen compatible sealant on threads.
  - > Ideal to store parts in a clean/dust-free environment with plastic bag covering.



#### SCAN FOR MORE INFORMATION

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