

## OPERATING INSTRUCTIONS

# BELCHFIRE<sup>®</sup> TUBE BURNER

The Belchfire tube burner is designed to operate with propane or natural gas plus air supplied by shop air compressor systems.

**WARNING:** Do not use acetylene or oxygen with these or any other Belchfire torches.

Maximum efficiency will be obtained if air and gas lines are at least 3/8" I.D.

Gas and air fittings are 1/2" NPT (Female). Gas line pressure can be 1-15 psi. If regulator is required, use one that is designed for type of fuel being used. Air pressure should be 50-120 psi.

As with all fuel-burning torches, there is a certain amount of hazard involved with the operator and his use of the torch. All normal safety precautions associated with this type of equipment should be observed.

When lighting the tube burner, each tip has to be lit individually. Open gas valve slowly 1/3 turn counter-clockwise. Light the tip closest to mixer first and proceed lighting the next one until all tips have a flame. Once all tips are lit, slowly open air valve counter-clockwise 1/3 turn.

The Belchfire tube burner has a completely flexible flame and can be adjusted to suit any purpose. The size and type of flame is controlled by adjusting the valves.

### SERVICE AND REPAIRS

Belchfire torches will eventually require servicing or replacement of part due to wear from normal use. All maintenance should be performed by authorized Belchfire service personnel. All repairs made by these personnel are fully guaranteed against defective material and workmanship. Repairs made or attempted by anyone other than these personnel cannot be guaranteed.

Should any questions arise about the Belchfire torch, feel free to write or call us at any time. In any communications, please give model number of the torch

### STAINLESS STEEL COMBUSTION CHAMBER REPLACEMENT

1. Replacement of the stainless steel combustion chamber is accomplished by loosening and removing the outside 1/4-20 holding nut (one each per mounting screw). After removing, pull chamber off torch and replace with new stainless steel combustion chamber.
2. The new stainless steel combustion chamber will have two new 1/4-20 nuts per mounting screw. Remove outside 1/4-20 nut. Adjust inside locating nuts to the same distance from the end of the chamber. Insert chamber screws into locating holes in triangle. Replace outside nuts and tighten.

### VALVES

1. Valve stem can be tightened or loosened by adjusting the stem nut under the handle. Clockwise tightens; counter-clockwise loosens.

**NOTE:** Any other repair requirements should be sent back to the factory for service.

### BELCHFIRE WARRANTY

Belchfire is proud of the quality of the torches that it sells. Because of our confidence in our quality, Belchfire agrees to repair or replace any part or parts which examination proves to be defective in workmanship or material. In order to take advantage of this guarantee, the complete torch must be returned, prepaid, to the factory for examination. This guarantee does not include repair or replacement required because of misuse, abuse, or normal wear and tear. Repairs made by other than authorized factory personnel relieve Belchfire Corporation of further liability under this guarantee.

THIS GUARANTEE IS MADE EXPRESSLY IN PLACE OF ALL OTHER GUARANTEES OR WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO QUALITY, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE.

## BELCHFIRE<sup>®</sup> SAFETY INSTRUCTIONS GASEOUS FUEL AND COMPRESSED AIR – MODEL 4F

### IMPORTANT

It is imperative that personnel responsible for the operation, and all operators of the Belchfire<sup>®</sup> equipment, read and understand these instructions prior to lighting and use of Belchfire<sup>®</sup> torches.

### SAFETY INSTRUCTIONS

1. Retain all safety and operational instructions for future reference.
2. Do not leave the torch unattended while in operation.
3. Do not stand or prop the torch on the burner end while in operation.
4. Do not use indoors unless adequate air for combustion and ventilation is available.
5. Do not use liquid-feed fuel with any Belchfire<sup>®</sup> torch.
6. Do not use acetylene or oxygen with any Belchfire<sup>®</sup> torch.
7. Inspect Belchfire<sup>®</sup> torch before each use. If it is evident there is excessive damage, it must be replaced prior to the torch being put into operation. The replacement torch shall be that specified by Belchfire Corporation.
8. Inspect all hoses before each use of the torch. If it is evident there is excessive abrasion or wear, or the hose is cut, it must be replaced prior to the torch being put into operation. The replacement hose assembly shall be that specified by Belchfire Corporation.
9. Do not exceed withdrawal rates of the fuel being used.
10. If the LP-gas cylinders are used, these cylinders must provide adequate capacity to insure vapor withdrawal.

## OPERATING INSTRUCTIONS

### IMPORTANT

It is imperative that personnel responsible for the operation, and all operators of the Belchfire<sup>®</sup> equipment, read and understand these instructions prior to lighting and use of Belchfire<sup>®</sup> torches and equipment.

All installation and operating shop procedures involving this equipment must comply with OSHA standards for Metal Fabricators, Section 1910 and American National Standards Institute ANSI Z229.1.

### INTRODUCTION

The Belchfire<sup>®</sup> Gas-Air series torches are designed to operate with natural gas or propane, propylene, or MAPP gas, plus air supplied by shop air compressor systems.

WARNING: DO NOT USE ACETYLENE OR OXYGEN WITH THESE OR ANY OTHER BELCHFIRE<sup>®</sup> TORCHES.

### HOOK-UP

Maximum efficiency will be obtained if air and gas lines are at least 1/2" I.D. for the Model 4F torch.

Air and fuel gas lines should be connected to torch fitting as shown on mounting bracket (Figure 1). Gas fittings are 1/2" NPT for Model 4F.

Gas line pressure can be 1-25 PSI, as long as the withdrawal rates of the fuel used are not exceeded. Gas connections should be made only to a regulator designed to operate with the fuel gas to be used. Air pressure should be 80-120 PSI.

### STARTING PROCEDURE FOR MODEL 4F WITH COMBUSTION CHAMBER

As with all fuel-burning torches, there is a certain amount of hazard involved with the operator and his use of the torch. All normal safety precautions associated with this type of equipment should be observed. In addition, the following starting procedures should be followed:

1. Use supplied striker and position at rear opening of Combustion Chamber (Point "A", Figure 1).
2. With striker positioned at Point A, open gas valve slowly until gas flows. Pull trigger on striker. Keep pulling trigger until gas ignites. If no gas ignites immediately, shut off gas by turning clockwise. Check for proper hook-up. If everything checks out, repeat starting procedure steps 1 and 2.

11. When torch is not in use, gas must be turned off at LP-gas supply.
12. When stored indoors, the connection between the LP-gas supply and the torch must be disconnected. If cylinder(s) is used, it must be removed from the torch and stored outdoors in accordance with Chapter 5 of the standard for the Storage and Handling of Liquefied Petroleum Gases, ANSI/NFPA 58.

All replacement parts should be obtained from BELCHFIRE CORPORATION, 4916 North 125th Street, Butler, WI 53007 U.S.A.

### CRITICAL SAFETY INFORMATION

FOR YOUR SAFETY: If you smell gas:

1. Shut off gas to the device.
2. Extinguish any open flame.
3. Check the device for leaks using soapy water.
4. Do not attempt to relight the device until all leaks are repaired and there is no gas smell.

FOR YOUR SAFETY: Do not use this device in areas where gasoline or other liquids having flammable vapors are stored or used.

FOR YOUR SAFETY: NEVER attempt to light torch that is pointed into a vessel where gas can accumulate. Point torch outside the vessel and reposition only when flame is established.

FOR YOUR SAFETY: Only use striker to light the torch that is capable of producing a spark similar to the SHOOT-A-LITE striker. Always light from rear of combustion chamber. **SEE FIGURE A**

3. Once fuel is ignited, slowly open air valve 1/3 turn counter-clockwise. This will give you a starting flame.

### FLAME ADJUSTMENT

The long, bright flame that appears when the torch is lit is fuel gas only, and to be useful, air must be added. This addition of air will cause the flame to start to turn blue and to shorten. As more air is added, the flame will become completely blue. This is a neutral flame and is the indication that the torch is burning all available fuel and operating at maximum efficiency. The addition of more air will cause orange feathers to appear, indicating excess air.

Belchfire<sup>®</sup> torches have a completely flexible flame which can be adjusted to suit any purpose. The size and type (lazy, long, neutral, oxidizing, etc.) of the flame is controlled by adjusting the valves (air and fuel) clockwise to decrease flame size and shut off, and counter-clockwise to increase flame size.

When operating properly, the combustion chamber will be cherry red forward of the ignition point.

### SHUT DOWN PROCEDURE

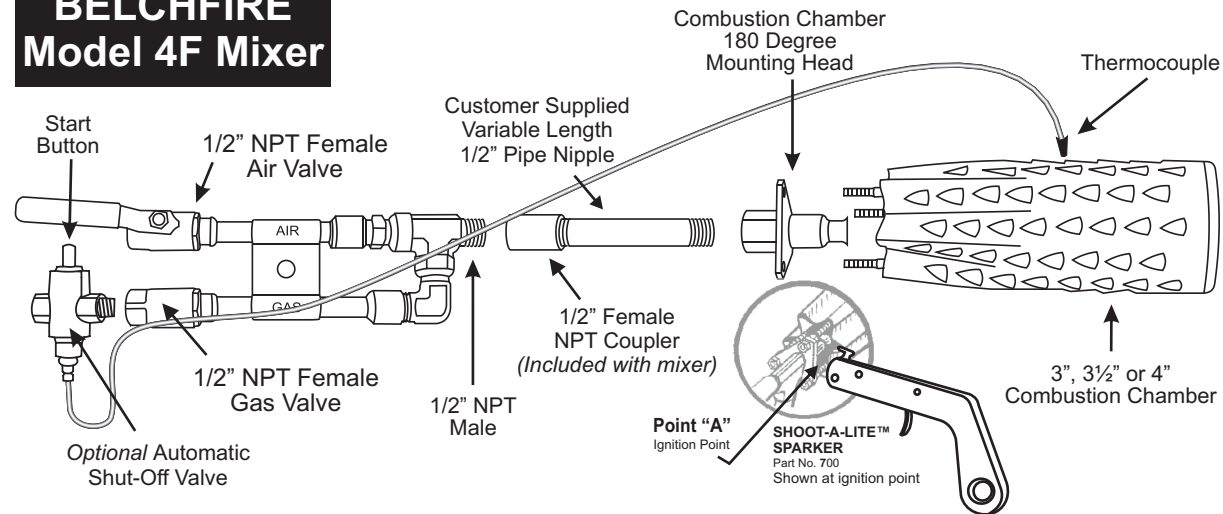
To insure long, trouble-free service from the torch, the following shut down procedure should be followed to allow the combustion chamber to cool down and prevent heat transfer to other portions of the torch.

1. Turn gas valve clockwise to stop.
2. Turn air valve clockwise until valve is 1/3 open. Allow air to flow for 15-20 seconds. Turn valve clockwise to stop.
3. Shut off fuel gas and air supply at the source and disconnect the torch.

### SERVICE AND REPAIRS

Belchfire<sup>®</sup> torches will eventually require servicing or replacement of parts due to wear from normal use. All maintenance should be performed by authorized Belchfire<sup>®</sup> service personnel. All repairs made by this personnel are fully guaranteed against defective material and workmanship. Repairs made or attempted by anyone other than this personnel cannot be guaranteed. Should any questions arise about the Belchfire<sup>®</sup> torch, feel free to write or call us at any time. In any communications, please give model number of the torch.

# BELCHFIRE Model 4F Mixer



## STARTING PROCEDURE WITH AUTOMATIC SHUTOFF VALVE INSTALLED

Once torch installation and system checkout is completed, make sure torch valves are in OFF position (handles turned all the way clockwise to valve stop).

1. Turn on main air and fuel supply
2. Open torch gas valve approximately 1/8 turn (counter-clockwise). No gas will flow until automatic button is pushed.
3. With the striker in position (point "A"), push in button on automatic shut-off valve. Pull trigger on striker and keep repeating until gas ignites.
4. Continue to hold in button and open air supply valve (on air & fuel models) until a blue flame appears.
5. Within 20-30 seconds the thermocouple will heat up and will signal the valve to remain open. Release button and adjust flame to meet your flame requirements.
6. If after releasing the automatic shutoff valve button the flame does not remain ignited, turn gas valve clockwise to stop. Repeat steps 1-5 and hold automatic shutoff valve in for 40-60 seconds. If flame still does not remain ignited, turn gas valve clockwise to stop. Contact factory for further instructions.

**NOTE:** When in operation, if flame is extinguished momentarily and does not reignite, the thermocouple will cool down and signal fuel shut-off valve to close (approximately 30 seconds). Air supply will have to shut off manually. If the above happens, a restarting procedure must be started to reignite torch.

## SPECS FOR TORCH MODEL 4F

Fuel Consumption - BTU .....	2,000,000
Fuel Consumption - CFH .....	800
Air Consumption - CFM .....	13
Torch Length - IN .....	10.5
Torch Weight - LBS .....	3
Fuel & Air Connection - NPT .....	1 / 2
Air Pressure - PSIG .....	50 - 150
Fuel Pressure - PSIG .....	5 - 25

## SHUT-DOWN PROCEDURE

1. Turn gas valve handle clockwise to valve stop-off.
2. On air & fuel models turn air valve handle clockwise until valve is approximately 1/3 or less open. Allow air to flow for 15-20 seconds. Turn valve handle clockwise to valve stop-off.
3. Shut off gas and air main supply and disconnect the torch.

## STAINLESS STEEL COMBUSTION CHAMBER REPLACEMENT

1. Replacement of the stainless steel combustion chamber is accomplished by loosening and removing the outside 1/4-20 holding nut (one each per mounting screw). After removing, pull chamber off torch and replace with new stainless steel combustion chamber.
2. The new stainless steel combustion chamber will have two new 1/4-20 nuts per mounting screw. Remove outside 1/4-20 nut. Adjust inside locating nuts to the same distance from the end of the chamber. Insert chamber screws into locating holes in triangle. Replace outside nuts and tighten.

## VALVES

1. Valve stem can be tightened or loosened by adjusting the stem nut under the handle. Clockwise tightens; counter-clockwise loosens.

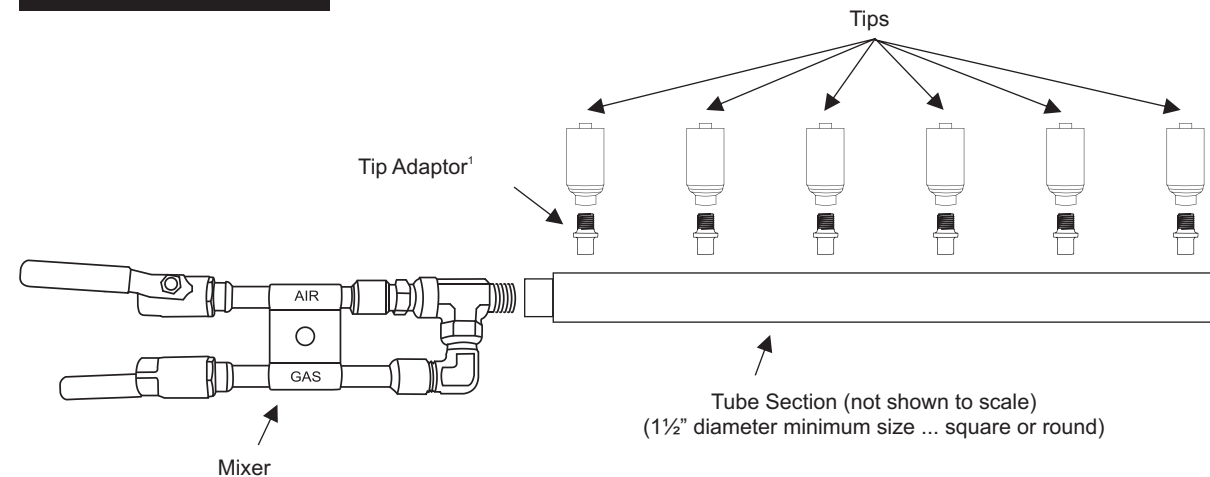
**NOTE:** Any other repair requirements should be sent back to the factory for service.

## 4F PARTS ORDERING INFORMATION

PART #	DESCRIPTION
BF4F .....	Mixer - 4F
BF3F180 .....	Head - 180 Degree - For 3" & 3 1/2" Chambers
BF4F180 .....	Head - 180 Degree - for 4" Chamber
BF3CC .....	3" Combustion Chamber
BF35CC .....	3 1/2" Combustion Chamber
BF4CC .....	4" Combustion Chamber
BFAUTVAL .....	Optional Auto Shutoff
BF THERM (+ LENGTH) .	Thermocouple 24", 36", 48", 60", 72"

**NOTE:** Add "TC" to combustion chamber part number when using the optional auto shutoff valve.

# BELCHFIRE Tube Burner



<sup>1</sup> Drill 1/2" hole for tip adaptor and then weld in place

<sup>2</sup> Mount coupler on end or middle of tube for best results

The Belchfire Tube Burner now allows a user to heat long sections of material with a single mixer. Belchfire supplies the mixer, tips and tip adaptors. The user supplies the tube section. The tube section, square or round, should have a minimum size of 1 1/2", and for welding the top adaptors to the tube, a minimum wall thickness of 1/8". Weight and ease of handling must be considered when deciding on the tube size. After the tube is cut to desired heating length, drill 1/2" holes at each tip location. Place the tip adaptors in the hole and weld them to the tube. The tip adaptors allow the tips to be threaded on to the tube. The mixer requires a 1/2" NPT female fitting. A hole must be drilled in the end cap or the middle of the tube section to accommodate the fitting. Place the fitting in the hole and weld. For longer tube sections the mixer can be mounted in the middle for a more even distribution of air-gas mixture. The mixer uses Belchfires unique technology to increase gas flow to maximize BTU output. End caps now can be welded to the tube. Once all parts are welded to the tube, the mixer and tips can be installed by threading them on. All normal safety precautions associated with this type of equipment should be observed. In addition, check all welding joints for leaks.

## ORDERING INFORMATION

PART #	DESCRIPTION
ACTIP6 .....	N-6 TIP
ACTIP4 .....	N-4 TIP
ACTIP2 .....	N-2 TIP
ACADAP6 .....	N-6 TIP ADAPTOR
ACADAP4 .....	N-4 TIP ADAPTOR
ACADAP2 .....	N-2 TIP ADAPTOR

# BELCHFIRE

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