



## North American Small Fire•All™ Gas Burners



### 4423 and 4424 Small Fire•All™ Gas Burners

- General purpose burner for low or high temperature applications
- Provides medium velocity flames with a wide air/fuel ratio
- Used on almost any kind of industrial furnace
- Smaller version of the famous 4422 series

# Product Overview | Small Fire•All™ Gas Burners

Fire•All™ Burners are used on almost any kind of industrial furnace from low temperature air heaters to kilns and forge furnaces that operate in 2000-2400°F ranges.

4423 nozzle-mix burners are the small version of North American's famous 4422 series. They provide medium velocity flames with wide air/fuel ratio and turndown flexibility.

For applications above 1900°F, the 4424 modification is recommended.

## CONTROL

The most common control scheme uses a cross connected atmospheric regulator (zero governor).

On lower temperature installations, fuel-only control is frequently used to take advantage of superior convection heat transfer and uniformity afforded by excess air operation.

More economical gas utilization can be realized by using a 7216 Variable Ratio Regulator, which allows correct air/fuel ratio at high fire but reduces gas faster than air on turndown.

## CONSTRUCTION

Cast iron bodies and gas connections. Prefired refractory tiles suitable for 2950°F maximum tile temperature. 4423 air tubes are stainless steel. 4424 tubes are Inconel, with a refractory biscuit around them.

Carbon steel tile jackets are used where there is no supporting refractory adjacent to the tile: Specify an "LC" suffix. Maximum jacket temperature 800°F. For higher temperature alloy jackets, consult North American.

All burners have an observation port in the back of the gas connection, and provision for pilot and flame detector.

## FLAME SUPERVISION and LIGHTING

**Flame Supervision.** Use a UV detector with an adapter from Bulletin 8832. *Flame rod supervision is not recommended.*

Flame supervision is strongly recommended for any application that will be below 1400°F during any part of its cycle. When flame supervision is used, pilots **must be interrupted**: Pilot is automatically turned off within 10 seconds of main flame ignition so detector monitors main flame only.

A 4011-12 pilot set is recommended for individual burner ignition. When multiple burners share a single pilot pre-mix header, a 4021-12 pilot tip per burner with an appropriately sized air/gas mixer is recommended.

## DIRECT SPARK

The burner can be direct spark ignited with either the 4055 Direct Spark Igniter (4055-D for -0 burner sizes, and 4055-C for -1 thru -3 burner sizes), or the 4051 Air Assisted Igniter (4051-D for -0 burner sizes, and 4051-C for -1 thru -3 burner sizes). The 4051 Air Assisted Igniter is recommended because it ignites the burners over a wider operating range. If using direct spark ignition of main flame, use standard 6000 volt transformer. Half-wave ignition transformer can be used only with the 4055.

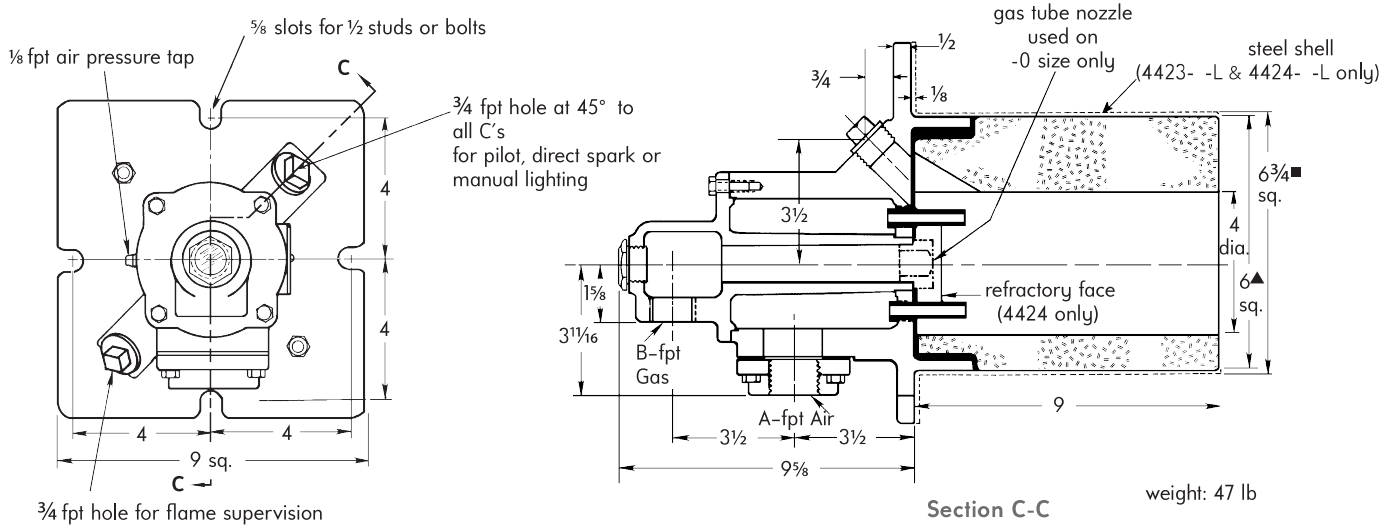
Burner designation	Combustion Air Capacities in scfh (for Btu/h HHV, multiply by 100) air pressure at burner in osi							flame length stoichiometric ratio 8 osi	max. excess air, %*		
	0.2	1	5	6	8	12	16		1 osi	9 osi	16 osi
4423- & 4424-0	70	155	350	380	440	540	630	6"	170	120	100
4423- & 4424-1	140	315	705	770	890	1090	1260	9"	165	255	285
4423- & 4424-2	260	585	1300	1430	1650	2010	2340	14"	730	455	455
4423- & 4424-3-A	395	885	1980	2160	2500	3050	3540	20"	900	730	670
4423- & 4424-3-B	480	1080	2410	2640	3050	3720	4320	20"	900	900	730

\* XSA rates shown for 4423 Burners. They are somewhat less for the 4424 modification, used on high temperature applications that normally do not require high excess air rates.

# Dimensions | Small Fire•All™ Gas Burners

DIMENSIONS in inches

Bulletin 4423/4424  
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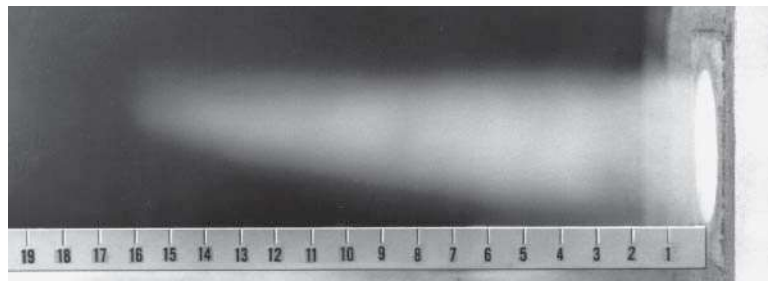


For most reliable ignition and flame signals, operate pilot at no less than 4" w.c. mixture pressure.

- ▲ Opening in furnace shell or outer wall must be 1/2" larger than dimension shown to allow for mounting plate fillet and draft.
- Opening in furnace shell or outer wall must be 1/4" larger than dimension shown.

DIMENSIONS SHOWN ARE SUBJECT TO CHANGE. PLEASE OBTAIN CERTIFIED PRINTS FROM FIVES NORTH AMERICAN COMBUSITON, INC. IF SPACE LIMITATIONS OR OTHER CONSIDERATIONS MAKE EXACT DIMENSION(S) CRITICAL.

Burner designation	dimensions in inches	
	A	B
4423 or 4424-0	3/4	1/2
4423 or 4424-1	1	3/4
4423 or 4424-2	1 1/4	1
4423 or 4424-3-A	1 1/2	1
4423 or 4424-3-B	1 1/2	1



4423-3-A flame with 8 osi air, correct air/gas ratio (the eye would see a somewhat longer flame).

**WARNING:** Situations dangerous to personnel and property may exist with the operation and maintenance of any combustion equipment. The presence of fuels, oxidants, hot and cold combustion products, hot surfaces, electrical power in control and ignition circuits, etc., are inherent with any combustion application. Components in combustion systems may exceed 160°F (71°C) surface temperatures and present hot surface contact hazard. Fives North American Combustion, Inc. suggests the use of combustion systems that are in compliance with all Safety Codes, Standards, Regulations and Directives; and care in operation.

## CONTACT

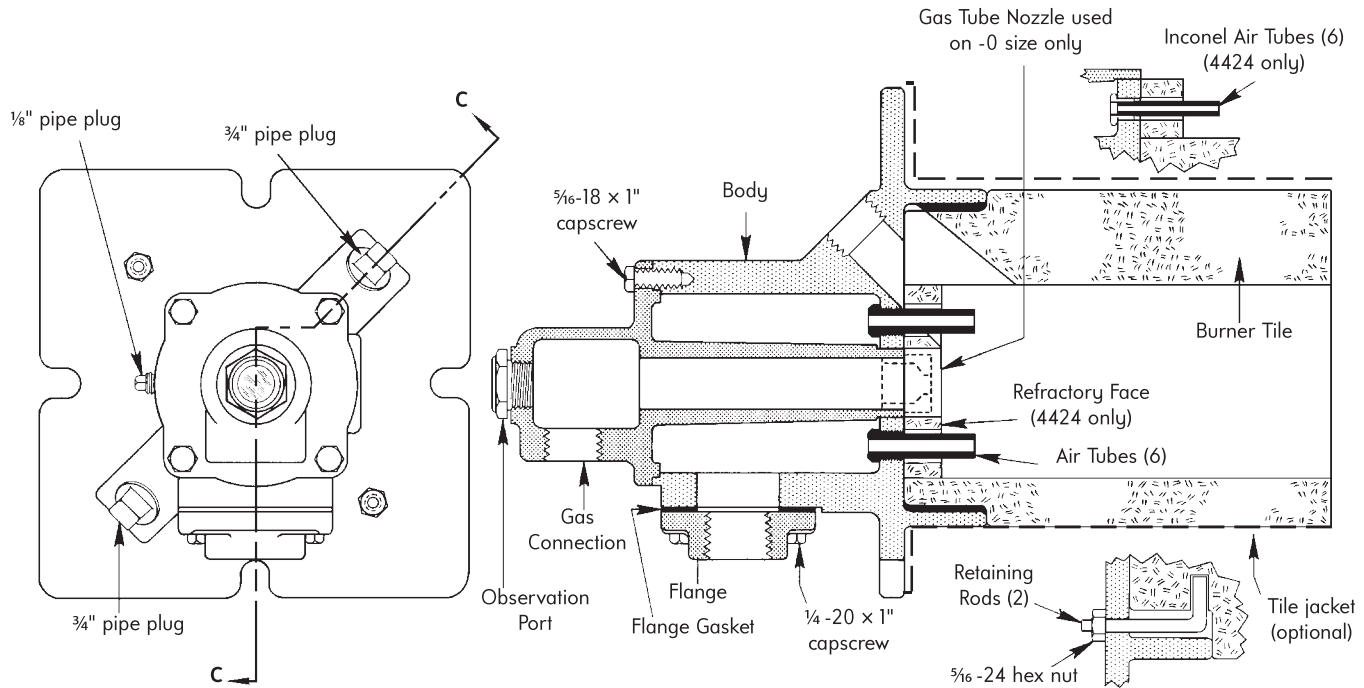
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# North American 4423 and 4424 Gas Burners

Parts List &amp; Instructions 4423/4424


**Section C-C**
**PARTS for 4423 and 4424 Burners**

part name	4423-0	4423-1	4423-2	4423-3-A	4423-3-B
Air Tubes (6)	4-3507-5	4-3507-1	4-3507-2	4-3507-3	4-3507-4
Body	4-3504-2	4-3504-2	4-3504-2	4-3504-2	4-3504-2
Burner Tile	4-2120-2	4-2120-2	4-2120-2	4-2120-2	4-2120-2
Flange	2-4212-1	2-4211-1	2-4170-1	8765-3-B	8765-3-B
Flange Gasket	4-5371-1	4-5371-1	4-5371-1	4-5371-1	4-5371-1
Gas Connection	4-7372-1	4-3503-1	4-3503-2	4-3503-2	4-3503-2
Observation Port	8790-0	8790-0	8790-0	8790-0	8790-0
Retaining Rods (2)	4-2118-2	4-2118-2	4-2118-2	4-2118-2	4-2118-2
Tile Jacket (HRS)*			OB4-0574-1		
Tile Jacket (304 SST)*			OB4-0574-3		
Tile Jacket (309 SST)*			OB4-0574-2		

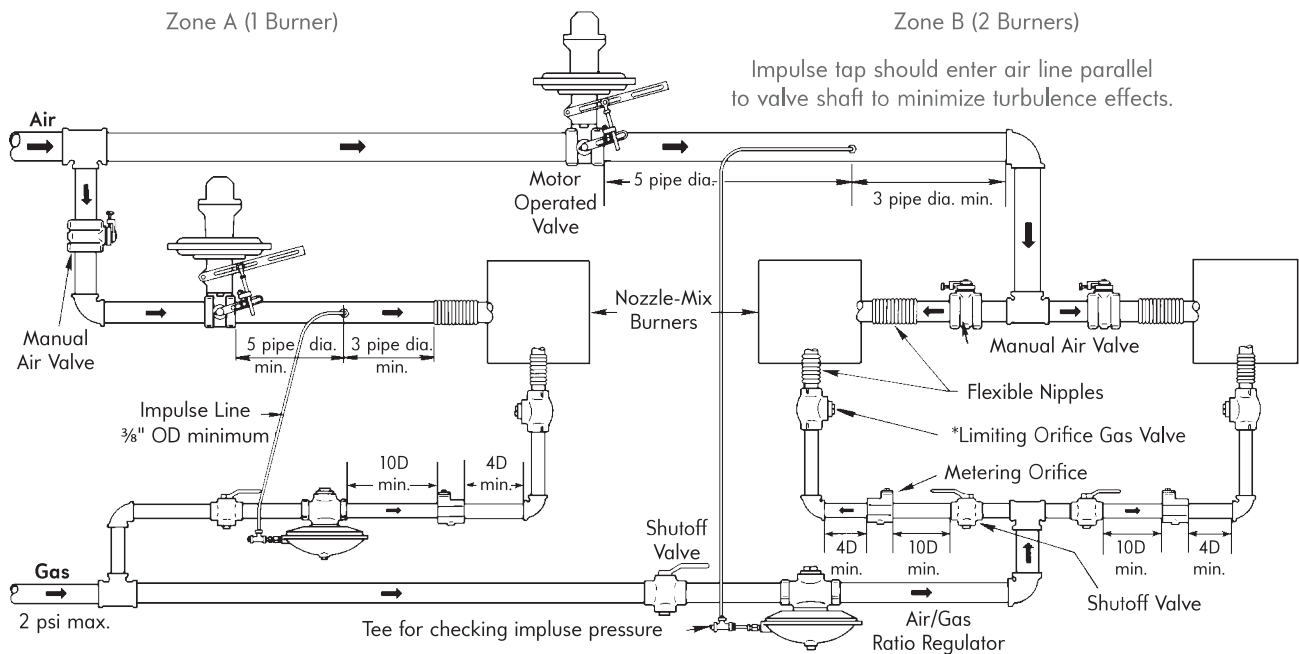
\* For 4423- -LC, 4424- -L4, and -L9 only.

**ADDITIONAL PARTS for 4424 Burners**

part name	4424-0	4424-1	4424-2	4424-3-A	4424-3-B
Inconel Air Tubes (6)	4-5188-1†	4-5189-1†	4-5189-2†	4-5185-4	4-5185-5
Refractory Face	4-5192-2	4-5192-2	4-5192-2	4-5192-2	4-5192-2

†includes 3-3638-1 Adapter

### suggested piping



\*Limiting orifice gas valves must be mounted as close to the burner as possible.

## INSTALLATION

To minimize leaks around tile and to prevent cracking of tile by thermal expansion in the wall, see Supplements DF-M1 (for hard refractory lined furnaces) and DF-M2 (for fiber lined furnaces) for installation recommendations.

## LIGHTING AND ADJUSTMENT

**WARNING:** Startup and adjustment of combustion equipment should only be done by trained personnel familiar with combustion technology, combustion equipment, and with the particular burner system, equipment, and controls.

1. Make sure all fuel shutoff valves are closed. Close limiting orifice gas valves on initial lighting. Open furnace doors and flue dampers.
2. Start blower and check direction of blower rotation. Monitor motor amperage during initial starting and adjustment periods.
3. Open manual and motorized combustion air valves wide to purge furnace.
4. Adjust motorized valve linkage for desired high and low fire.
5. When furnace is purged of all combustion gases and vapors, turn air control valves back to low fire position, leaving individual burner air valves wide open. Light pilots in accord with pilot instructions.
6. Use a screwdriver to open the limiting orifice valve 3-4 turns (counterclockwise). Open gas shutoff valve. If burner does not light within a few seconds, close shutoff valve. Open limiting orifice 1-2 more turns. Purge furnace again.

Open gas shutoff valve. Repeat procedure until flame lights. Adjust as needed while slowly turning motorized air valve to high fire.

7. Make final limiting orifice valve setting by reading high fire gas flow across metering orifice and comparing it to catalog air flow through burner at indicated inlet pressure. Replace cover on limiting orifice gas valve.
8. To adjust burner for low fire, return motorized air valve to low fire without changing limiting orifice gas valve setting; then adjust ratio regulator for desired flame (see Instructions 7218).
9. If other burners are supplied by the same ratio regulator, settings for their limiting orifice valves can be approximated by counting the number of turns the adjusting screw on the first valve (step 6) was opened.
10. Turn all burners to high fire and, if necessary, readjust limiting orifice gas valves.
11. Turn all burners back to low fire, and if necessary, readjust the regulator spring as in step 8.

If flame supervision is used, refer to Bulletin 8832 and Supplement 8832-1.

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