

## North American Small FIRE•ALL™ Gas Burners

Bulletin 4423/4424

### The General Purpose Burner for Low or High Temperature Applications 60,000 to 430,000 Btu/hr

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.

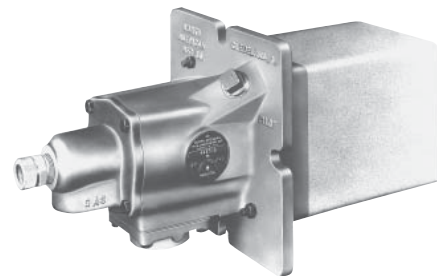
More economical gas utilization can be realized by using a 7216 Variable Ratio Regulator, which allows correct air/fuel ratio at high fire but reduces gas faster than air on turndown.

#### 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 Fives 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.

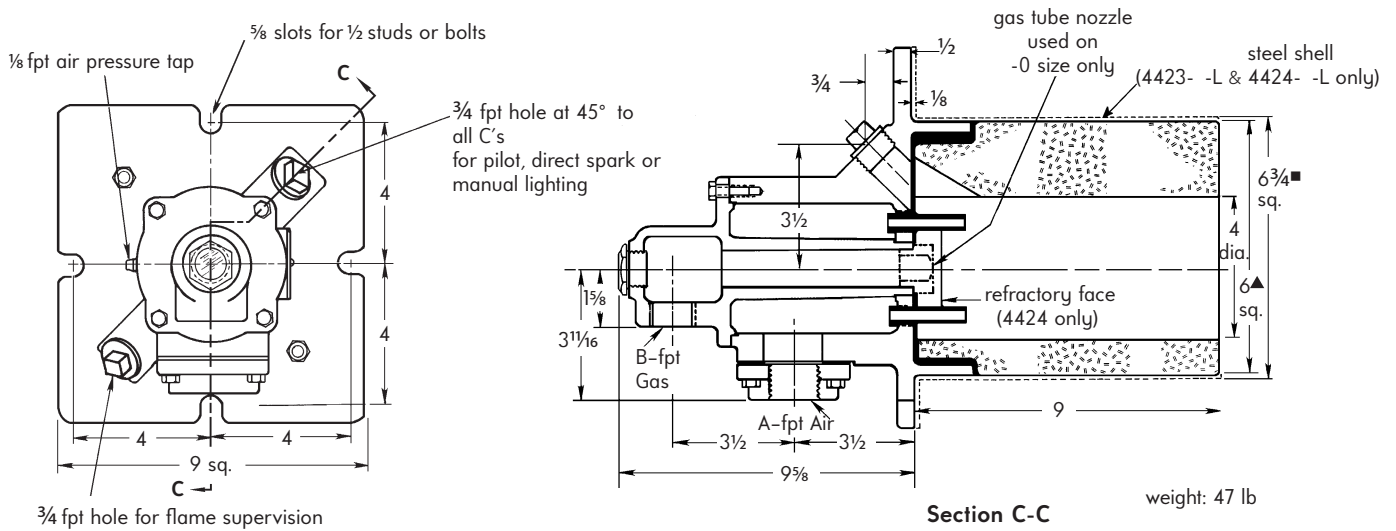
#### DIRECT SPARK

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/hr, multiply by 100)							flame length stoichiometric ratio 8 osi	max. excess air, %*		
	air pressure at burner in osi								1 osi	9 osi	16 osi
	0.2	1	5	6	8	12	16				
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 in inches

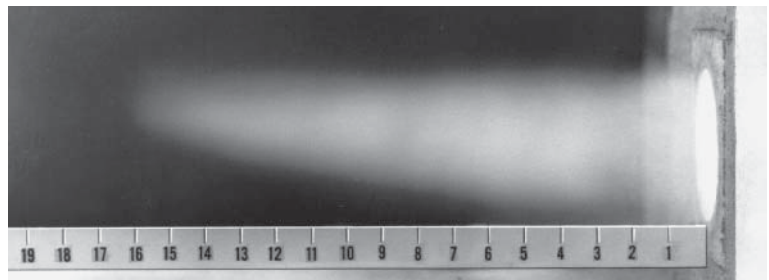


For most reliable ignition and flame signals, operate pilot at no less than 4"wc mixture pressure.

- ▲ 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).



**CONTACT US:**  
**Fives North American Combustion, Inc.**  
 4455 East 71st Street - Cleveland, OH 44105 - USA  
 Tel: +1 216 271 6000 - Fax: +1 216 373 4237  
 Email: [fna.sales@fivesgroup.com](mailto:fna.sales@fivesgroup.com)

[www.fivesgroup.com](http://www.fivesgroup.com)