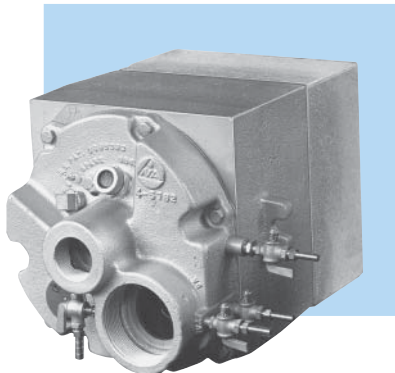
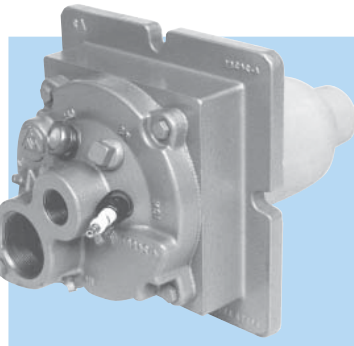


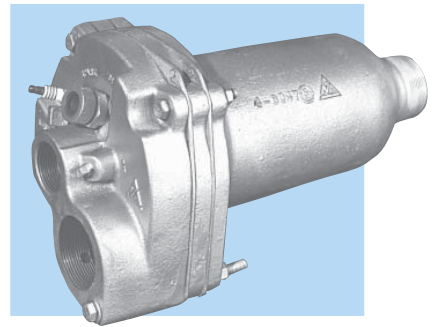
The Hallmark of High Velocity Burners



4442 Standard Tempest. Tempest shown with optional Petcock Kit 4442PK for hard-wall furnace installation.



4441- -A. Tempest with self-supporting tile for fiber furnace installation. (See Bulletin 4441.)



Aardvark 4442A. All metal for heating, warming, or drying.

- **Wide range of applications; from 600 F to 3000 F operating temperatures**
- **Inherently low emissions**
- **70,000 to 2,000,000 Btu/hr capacity range**
- **600 F preheated air; up to 800 F with -H model**
- **Durable construction, unique mounting and tile assembly**
- **Available with refractory and metal tiles**
- **Wide air/fuel ratio flexibility**

Applications

- Ceramic Tunnel and Periodic Kilns
- Heat Treat Furnaces
- Car Bottom Furnaces
- Scrap Preheaters
- Galvanizing Tanks
- Crucible Furnaces
- Air Heating and Drying

In most industrial furnaces, recirculation of products of combustion (poc) can contribute significantly to speed of heating and temperature uniformity. A fan usually provides recirculation in low temperature ovens and dryers. But fans are not practical for higher temperature furnaces and kilns.

Excess air systems can accomplish recirculation, but they are fuel wasteful; e.g., 30% excess air in a 2000 F furnace requires 24% more fuel than stoichiometric firing.

True high velocity gases entrain and recirculate seven or more times their own volume, eliminating need for fans or excess air.

Tempest burners achieve superior uniformity by increasing penetration into the center of multi-piece loads.

TABLE 1. Capacities/Characteristics

16 osi air, stoichiometric ratio

Burner designation	Btu/hr (divide by 100 for scfh air)	flame length (inches)	16 osi, not burning (use to size blower) scfh air
4442-0	71 600	6	1 000
4442-1	131 400	9	1 800
4442-2	230 000	10	2 800
4442-3	325 000	20	3 760
4442-4	540 000	20	6 200
4442-4-S	890 000	25	11 000
4442-5	960 000	30	11 600
4442-6	1 500 000	36	19 200
4442-7	2 175 000	42	25 000

IMPORTANT: Correct tile selection and burner installation are extremely important for maximum burner life. Please refer to **Supplement 4442, Tempest Burner Installation**, before making your final burner selection, or consult your nearest North American Sales Office.

Combustion air: 20 psi maximum pressure.

Gas: Natural or LP or LP-air mix.

Pressure must be 65% of air pressure at burner.
Low Btu gases (under 600 Btu/cf) may require special internals.
(For light oil, use 6435 Tempest® III Dual-Fuel™ Burner.)

Flame supervision: Required for any batch operation, and for continuous applications that are below 1400 F at any time.

UV detectors are preferred. Flame rod performance on other sizes are inconsistent, and while they can be made to work with trial and error, are not generally recommended. Flame rods should not be used on -0, and -4-S sizes

Use a half-wave ignition transformer to avoid UV sensing of spark during trial for ignition.

If a pilot is used, it **must be interrupted** within 10 seconds after main burner ignition.

Consult National Safety standards and insurance underwriters for specific requirements for flame controls.

Stability limits: 300% XSAir for -0, 1000% for -1, 250% for -4-S, 2000% or better for all other sizes.

30% excess fuel.

Control: Most preferred are individual cross-connected or bleed-impulse ratio regulators, which give maximum turndown flexibility and control.

A good alternative is individual 7216 Adjustable Ratio Regulators which offer a fuel efficiency compromise: stoichiometric at high fire, excess air on turndown.

Take maximum advantage of high velocity by keeping the burner on high fire most of the time. Use StepFire™ or high-low (two-position) firing control systems.

For best performance, a limiting orifice (LOV) gas valve should always be installed close to the burner (within 10" of gas inlet).

See Supplement 4442 for other control recommendations, particularly for high turndowns (up to 20:1).

Ignition: Direct spark ignition is normally supplied with a 10mm spark plug, which is furnished with the burner. 4051 and 4055 Direct Spark Igniters are also available. 4011 Premix or 4020 Nozzle-Mix Pilots can also be used.

However, both the pilot gas and pilot air must be shut off after lighting the burner. Leaving the pilot air on may reduce the operating and turndown limits of the burner.

Torch lighting of Tempest Burners is not recommended due to the high tile pressures, and will neither light nor relight from hot furnace refractory.

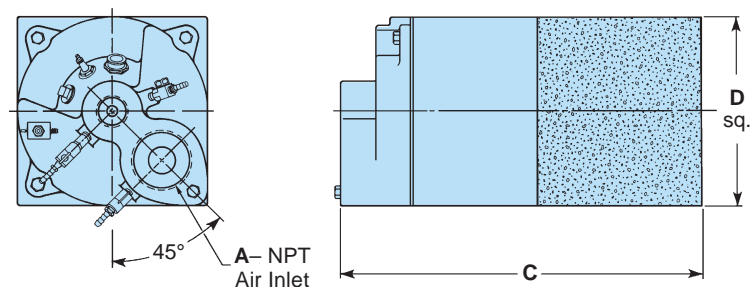
Aardvark model: Bulletin 4442A describes an all metal version of the Tempest. It is used as a stand-alone air heater. Its threaded metal snout can be installed in the end of a manifold to feed hot air to a number of heating, warming, or drying stations.

4442H model: For preheated air up to 800 F, built with flanged mounting only. Not available with the standard 'eared' mounting.

Installation Instructions and Ordering Information: See Supplement 4442.

CLEARANCE DIMENSIONS (for details, see Supplement 4442)

Burner designation	dimensions in inches		
	A	C	D
4442-0	3/4	14 1/4	7 1/2
4442-1	1	14 1/4	7 1/2
4442-2	1 1/4	14 1/4	7 1/2
4442-3	1 1/2	14 1/4	7 1/2
4442-4	2	14 1/4	7 1/2
4442-4-S	2	14 1/4	7 1/2
4442-5	2 1/2	15 5/16	10
4442-6	3	15 5/16	10
4442-7	4	25 1/2	10



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

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. Parts of this product may exceed 160F in operation and present a contact hazard. Fives North American urges compliance with National Safety Standards and insurance Underwriters recommendations, and care in operation.

Fives North American Combustion, Inc., 4455 East 71st Street, Cleveland, OH 44105 USA, Phone 216.271.6000
Fax 216.641.7852 email: fna.sales@fivesgroup.com • www.fivesgroup.com/fivesna