



*Burners, Controls, Parts....  
to Complete Units*

# NAO

## High-Intensity Direct-Fired Air Heaters

- oil, gas or combination-fuel fired
- gas/electric pilot ■ high turndown
- 100-thousand to 100-million Btu/hr

Designed to ASME  
Code for high-pressure  
applications. For firing  
in any position...  
vertical or horizontal.  
Outlet temperatures:  
200° to 2800°F.

NAO's direct-fired air heaters are custom-engineered to match the requirements of a wide range of research and process applications:

- atmospheric control
- catalytic cracking
- coal driers
- coal gasification
- crop driers
- dehydration units
- food-process driers
- fluidized beds
- furnace drying and preheating
- heat exchangers
- malt kilns
- paper driers
- rotary driers
- stress relieving
- and other applications

Each of these high-intensity air heaters employs an NAO high-turndown, center-fired burner to insure complete combustion with all types of gaseous and liquid fuels. The combustion-air to tempering-air ratio is accomplished with a splitter damper.

### PACKAGED CONTROLS

Every NAO direct-fired air heater incorporates a rugged, reliable control system with all necessary safety interlocks. Weatherproof and/or explosion-proof enclosures for electrical controls are provided. (See illustration on opposite side of this bulletin for an example of a weatherproof enclosure.)

A gas/electric pilot system is also standard equipment with all NAO direct-fired air heaters.

### CHOICE OF FUELS

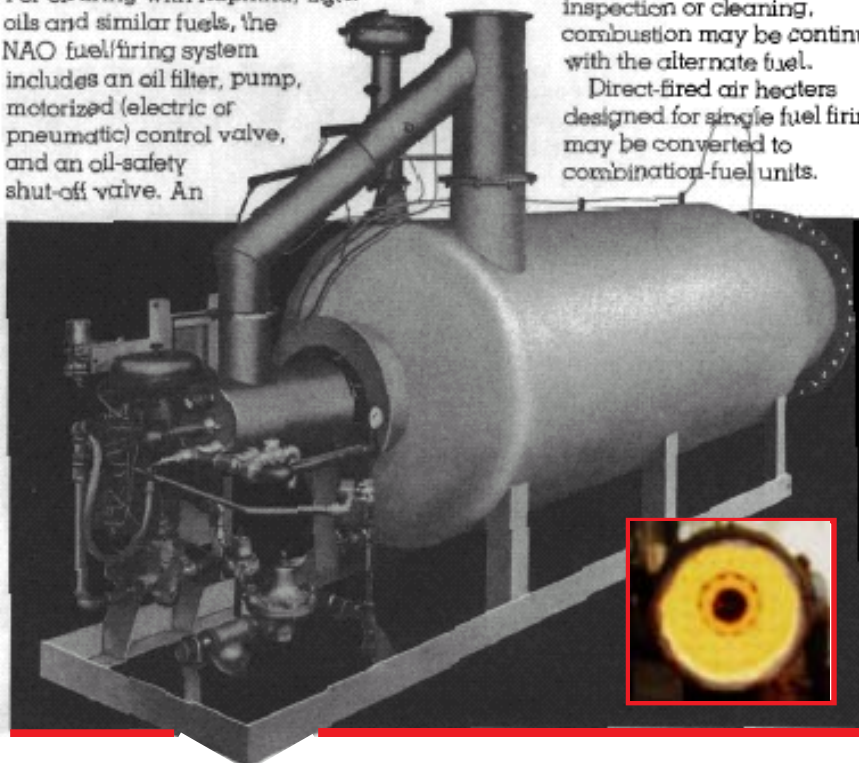
For oil firing with naphtha, light oils and similar fuels, the NAO fuel/firing system includes an oil filter, pump, motorized (electric or pneumatic) control valve, and an oil-safety shut-off valve. An

oil heater is provided when heavy oils are used.

Gas-fired units have a motorized gas-control valve and safety shut-off valves. The gas burner may be fueled with any natural, mixed, manufactured or LP gas.

Combination-fuel-fired units incorporate NAO's centrally-positioned oil atomizer plus removable split gas manifolds and tips. The oil gun and the Hexad<sup>®</sup> gas manifold assemblies are easy to remove. Whenever either fuel burner is removed for inspection or cleaning, combustion may be continued with the alternate fuel.

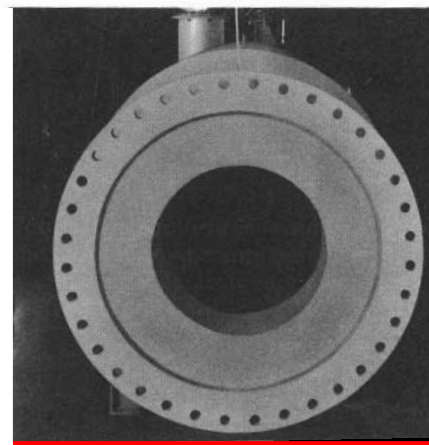
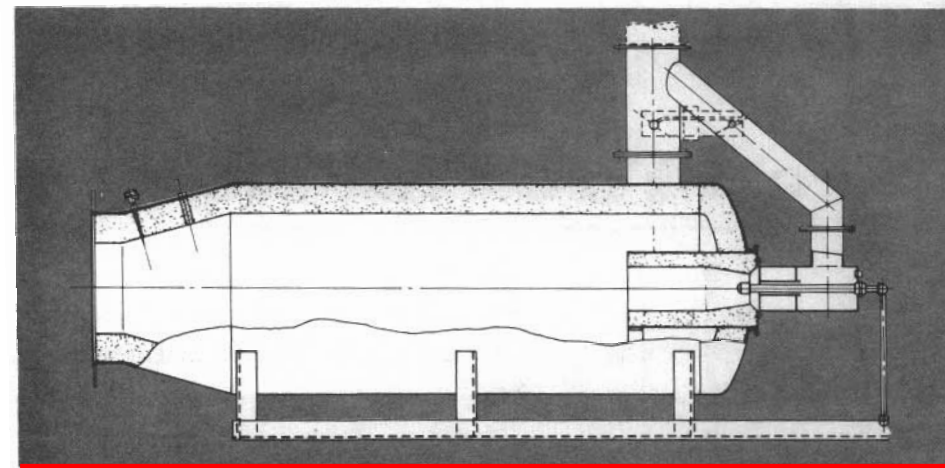
Direct-fired air heaters designed for single fuel firing may be converted to combination-fuel units.



# NAO High-Intensity, Direct-Fired Air Heaters

**CUSTOM-BUILT TO YOUR SPECIFICATIONS**

**Vertical or horizontal... 200° to 2800°F outlet temperature... up to 100-million Btu/hr**



## **TO MEET YOUR SPECIFICATIONS:**

The following information is required to design an NAO high-intensity, direct-fired air heater to meet your specifications:

1. firing position of air heater
2. required outlet temperature
3. air inlet temperature
4. air inlet pressure
5. maximum allowable pressure drop through air heater
6. fuel or fuels available
7. fuel conditions: heating value, pressure, viscosity, etc.
8. electrical code requirements

Every NAO direct-fired air heater is a custom-engineered unit, complete with blower and motor, burner and vessel.

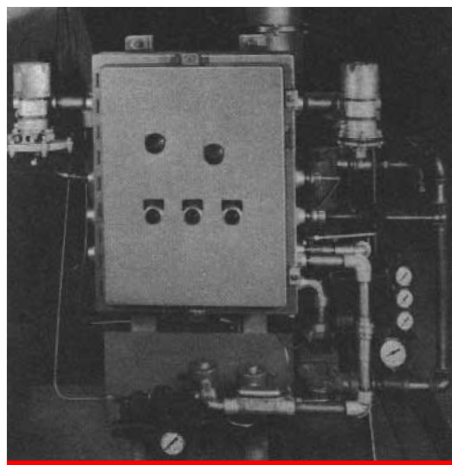
All units are test-fired before they leave the factory to assure successful operation of the unit and its control system.

Smaller air heaters are supplied fully-packaged. These skid-mounted units are ready for use after off-loading, positioning, and connection of electrical and fuel lines.

Larger units are fully assembled prior to shipment — to complete NAO's system tests — then stripped down to only the largest sections for shipment.

## **PRINCIPAL FEATURES:**

- Long life with minimal maintenance; very little downtime — combination-fuel-fired heaters may be kept in operation with either fuel if energy-shortage problems affect fuel supplies.
- Required heat load can be met with oil, gas or combination-fuel-fired units.
- Simple, rugged control package.



**Control system includes safety interlocks and other rugged components. Weatherproof enclosure for electrical controls is standard.**