

# NATCO SHV Combustor

## Internal-burner emission control system

### APPLICATIONS

- Controlling gas from the glycol dehydration process
- Controlling emissions of volatile organic compounds (VOCs) from any oil and gas processing system, including amine tail gas, storage tank vapors, and casing gas

### BENEFITS

- >99.9% destruction efficiency for all VOCs
- Patented internal-burner venturi design that requires less fuel gas and reduces glycol reflux column backpressure for lower opex
- External superheater (stack heat exchanger) that reduces liquid accumulation and disposal, improves clean burn and water vaporization, and can operate in cold weather without freezing for lower opex
- Natural draft design with no blowers for reduction in utilities and both capex and opex
- Insulating air flow without requiring a refractory resulting in less maintenance and reduced capex and opex
- Adjustable air dampers supporting a wider operating range while eliminating the need for blowers, improving both capex and opex

### Destruction efficiency >99.9% for all VOCs

The NATCO SHV Combustor\* internal-burner emission control system meets the increasing demand for higher destruction efficiency for VOC emissions. Conventional flare systems typically have a destruction efficiency of 95%–98%. The NATCO SHV Combustor system achieves its significantly higher combustion efficiency by using a low flame and a wide-open external combustor area. As environmental regulations grow increasingly stringent, this system is the ideal solution because it burns off all the VOC emissions.

Either as a new installation or retrofitted to existing glycol dehydration systems, the NATCO SHV Combustor system flows waste gas, which is a combination of liquid and vapor, through an optional exchanger for heating by the reboiler stack flue gas. The superheated vapor is piped through an inline arrestor, which retards flame propagation. The vapor and condensate liquid flow into the liquid collection chamber (blowcase) and the superheated vapor accumulates in the low-pressure side of the eductor.

Natural gas is used as supplemental fuel, which increases the Btu level of the waste gas stream to the level required for complete combustion.

### Performance-driven design

The NATCO SHV Combustor system is designed in consideration of the factors that control the performance of thermal oxidizers: temperature, time, turbulence, and oxygen.

The temperature in the combustion zone is maintained above 1,600 degF [871 degC] and the enclosure chamber is sized to provide sufficient retention time for the hot gas. The premixed air at the primary stage and the uniquely configured air damper provide all the air for combustion through the secondary air dampers to enable the necessary turbulence and complete combustion.



*NATCO SHV Combustor system.*

# NATCO SHV Combustor

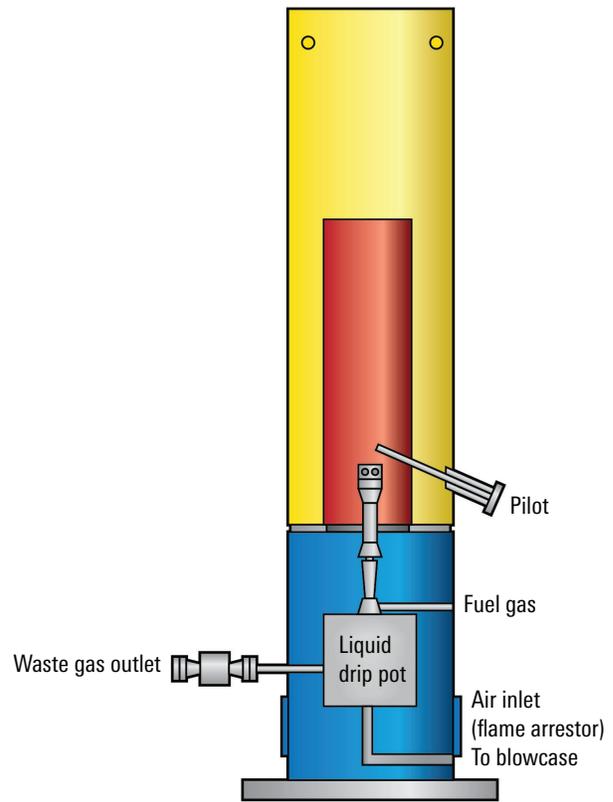
The primary differentiation of the NATCO SHV Combustor system from conventional thermal oxidizers is the enclosure and insulation mechanism. The system does not use an air refractory but instead draws in excess air at a tertiary stage to help control the heat radiating from the flame by moving it up the stack. This approach maintains a low external surface temperature.

## Sizing for flow rate and heating value

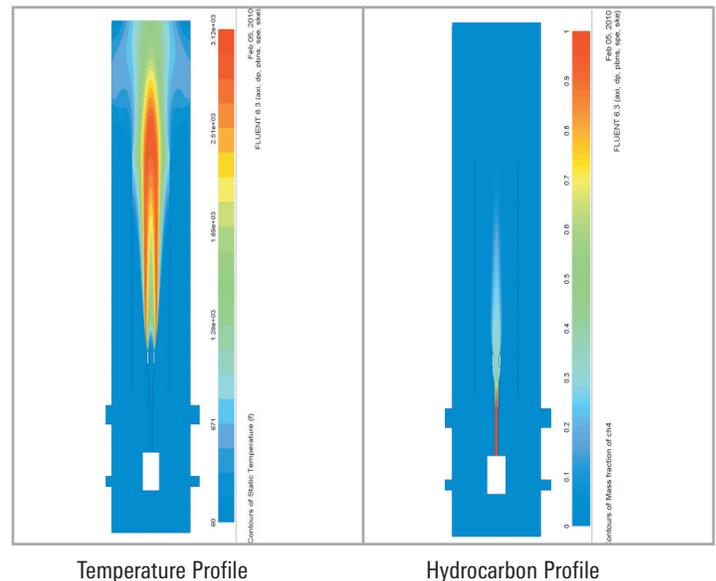
Size selection for the NATCO SHV Combustor system considers both the volumetric flow rate and the heating value of the waste gas. Because vapor emissions from the glycol dehydration process can vary significantly in heating value based on the operating conditions, emission control devices should not be sized solely for the volumetric flow rate. Access to air control through dampers at both the secondary and tertiary stages provides significant turndown capability, enabling the NATCO SHV Combustor system to easily manage fluctuations in both water vapor volume and heat content.

### NATCO SHV Combustor System Specifications

Model	Waste Gas Rate, ft <sup>3</sup> /h	Higher Heating Value (HHV) Range, Btu/ft <sup>3</sup>	External Chamber Size, Diameter, in × Height, ft
V1-H1	500–1,000	50–250	22 × 10
V1-H2	500–1,000	250–500	22 × 10
V1-H3	500–1,000	501–1,000	30 × 15
V2-H1	1,001–2,000	50–250	22 × 10
V2-H2	1,001–2,000	250–500	30 × 15
V2-H3	1,001–2,000	501–1,000	36 × 20
V3-H1	2,001–4,000	50–250	36 × 15
V3-H2	2,001–4,000	250–500	36 × 20
V3-H3	2,001–4,000	501–1,000	45 × 22.5
V4-H1	4,001–8,000	50–250	36 × 20
V4-H2	4,001–8,000	250–500	45 × 22.5
V4-H3	4,001–8,000	501–1,000	57 × 27.5



Internal configuration of the NATCO SHV Combustor system.



Temperature profile showing uniform flame (left). Complete hydrocarbon destruction in the NATCO SHV Combustor system (right).

[slb.com/gas-treatment](http://slb.com/gas-treatment)

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