

# SULFUR RECOVERY UNIT

Combustion Equipment



BURNERS | FLARES | THERMAL OXIDIZERS  
VAPOR CONTROL | RENTALS | AFTERMARKET



# SULFUR RECOVERY UNIT

## Combustion Equipment

### Custom-designed SRU equipment.

The Sulfur Recovery Unit (SRU) is often referred to as the Claus Process. This process recovers elemental sulfur from petroleum and natural gas refining processes and reduces the hazardous sulfur emissions to limits permitted by national and local air quality requirements. Zeeco supplies all of the combustion equipment used in the Claus process, including high intensity style burners, reaction furnaces, inline heaters/reducing gas generators, tail gas incinerators, and waste heat boilers.



*World's largest SRU tail gas incinerator — one of nine similar incineration systems supplied by Zeeco*

### World-class engineering and reliability.

Zeeco is a world leader in the development of combustion solutions for the refining, petrochemical, chemical, and power generation industries. Our staff members have extensive experience in design, fabrication, and operation of SRU combustion equipment.

Zeeco has a proven track record of producing the world's largest and most advanced combustion equipment for the sulfur recovery process. Our combustion equipment is always custom engineered to meet our clients' specific needs, whatever the situation requires.

Equipment reliability is essential for profitable plant operations. For this reason, Zeeco chooses quality components and materials for all of our products to maximize service life and eliminate unnecessary shutdowns.



*High Capacity Low NOx SRU Thermal Oxidizer Burners*



*SRU reaction furnace with firetube waste heat boiler*

## Ultra-low NOx technology.

Zeeco's tail gas incinerators can provide Ultra-Low NOx performance via the use of Zeeco's patented Free-Jet burner technology. ZEECO Free-Jet burner technology uses the jet momentum of the fuel gas injection system to entrain relatively inert tail gases in a manner that significantly lowers core flame temperatures, resulting in dramatically reduced thermal NOx production. Independent third party tests prove Zeeco's Ultra-Low NOx incineration technology provides as low as 5 ppm(vd) NOx performance under actual field conditions.



Natural draft SRU tail gas incinerator

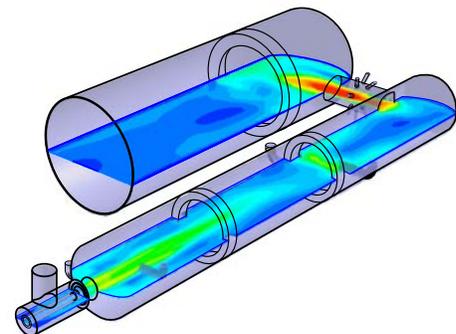
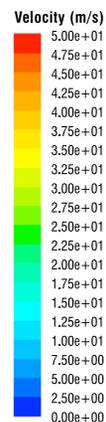


ZEECO pilot burners are fully tested to ensure reliable long term operation in severe service

## CFD.

The chemical and hydrocarbon industries employ Computational Fluid Dynamics (CFD) modeling tools to aid in equipment design. Zeeco combines CFD technology with our extensive experience in the design, fabrication, and operation of combustion equipment to ensure optimal performance.

Case 1 normal - Velocity Profile (m/s)  
(horizontal cut through incinerator center)



ZEECO CFD Model

## Trust Zeeco with your sulfur recovery equipment.

Zeeco has provided combustion and environmental solutions around the world for more than 35 years. Let us put our experience to work for you. Call us today for more information on Zeeco's full line of combustion products and replacement parts.



ZEECO GLSF Ultra-Low NOx Free-Jet Burner

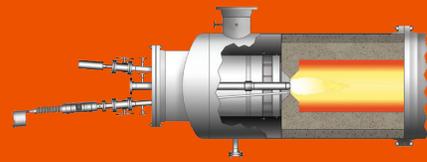
## Reaction Furnaces

The reaction furnace is the most important component of the SRU, initiating the conversion of H<sub>2</sub>S and other sulfur-bearing compounds to elemental sulfur. The overall reaction furnace dimensions are often specified by the process licensor. In the absence of licensor input, Zeeco can design the reaction furnace to meet your desired processing needs.



## Reaction Furnace Waste Heat Boilers

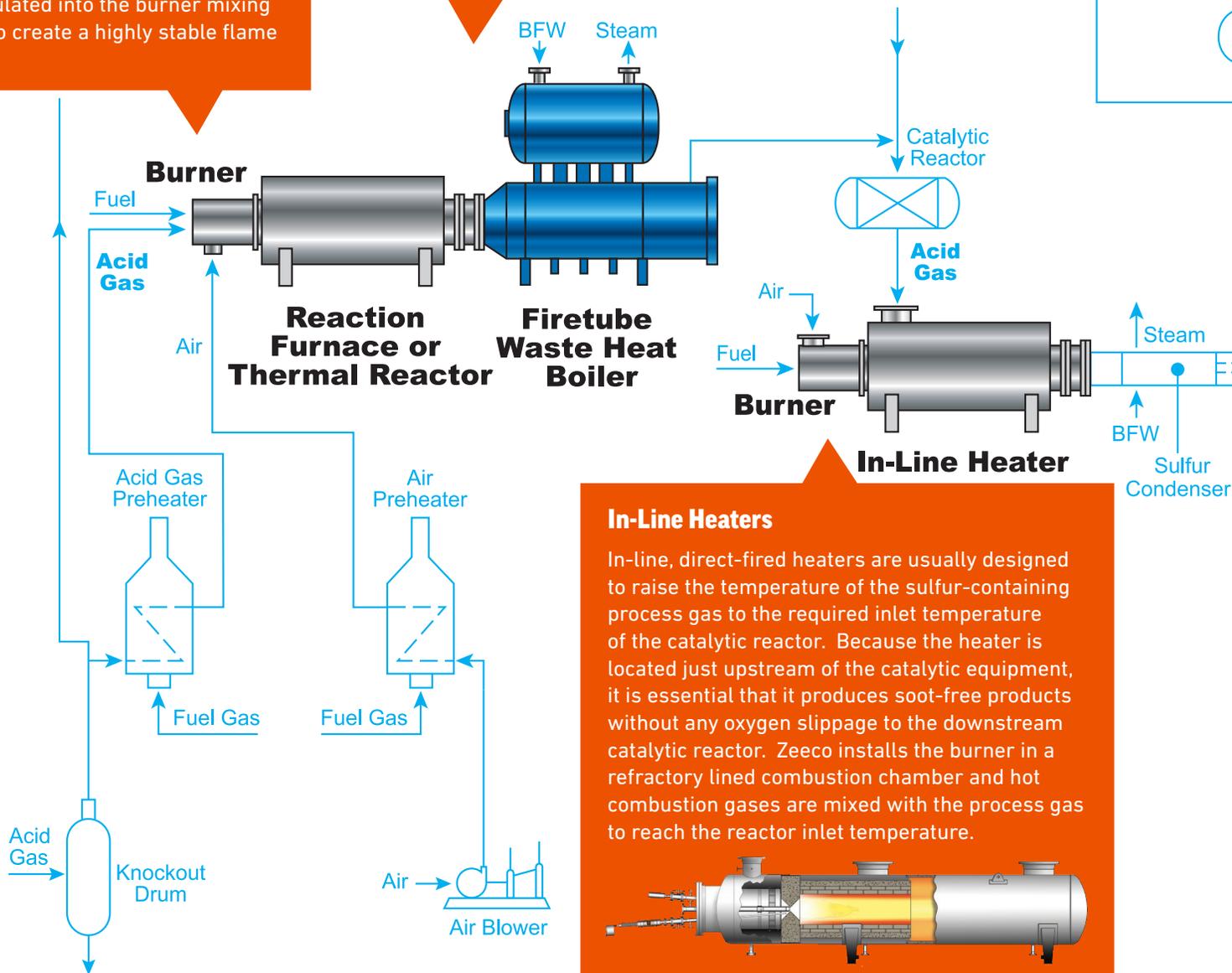
A firetube waste heat boiler is typically located directly downstream of the reaction furnace. This waste heat boiler generates waste heat steam while cooling the reaction furnace effluent. The inlet tube sheet of the reaction furnace waste heat boiler is typically refractory lined with ceramic ferrules located on the inlet of each tube to prevent damage to the tube sheet and the tube sheet welds.



## High Intensity Style Burners

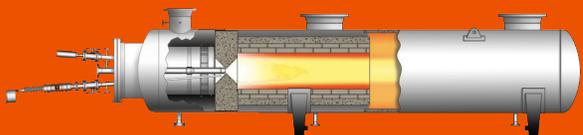
Zeeco's high intensity style burners achieve rapid combustion in very small volumes in a wide range of conditions. This allows the burner to operate under reducing (oxygen-deficient) environments without smoke, soot, or oxygen slippage that otherwise could damage downstream catalytic reactors.

Zeeco employs proprietary spin vanes to create a vortex recirculation zone upstream of the burner discharge. Hot flue gas is recirculated into the burner mixing zone to create a highly stable flame front.

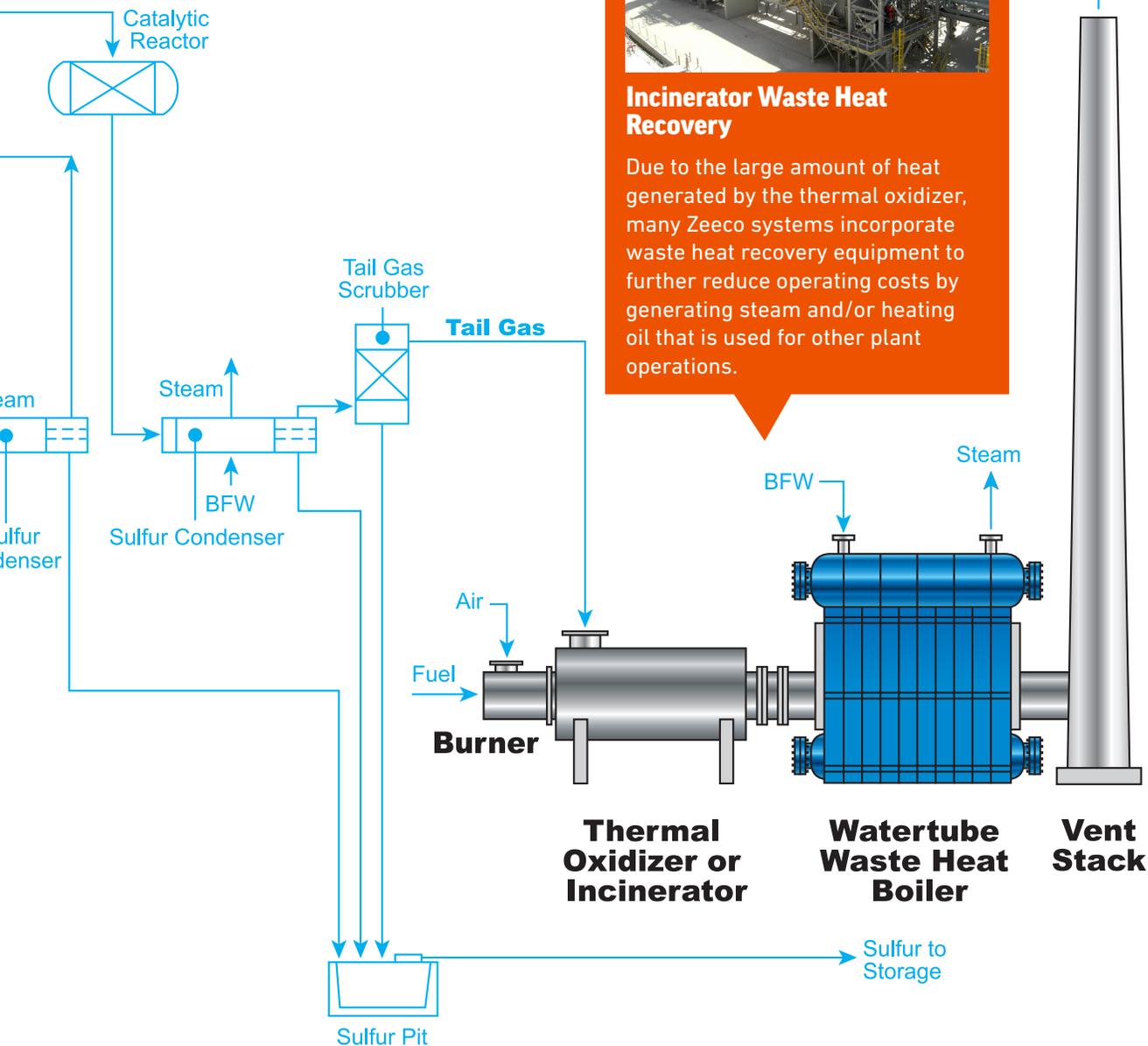


## In-Line Heaters

In-line, direct-fired heaters are usually designed to raise the temperature of the sulfur-containing process gas to the required inlet temperature of the catalytic reactor. Because the heater is located just upstream of the catalytic equipment, it is essential that it produces soot-free products without any oxygen slippage to the downstream catalytic reactor. Zeeco installs the burner in a refractory lined combustion chamber and hot combustion gases are mixed with the process gas to reach the reactor inlet temperature.



# Typical Claus Sulfur Recovery Process



## Tail Gas Incinerators

The tail gas resulting from the upstream Claus unit contains sulfur-bearing compounds that must be incinerated in order to oxidize the various compounds to sulfur dioxide and sulfur trioxide. The incineration process typically occurs between 1200-16000F (650-8700C) in the presence of excess oxygen with a residence time between 0.7 and 2.0 seconds. The relatively inert tail gas must be carefully mixed with the flue gas products to achieve satisfactory oxidation of the sulfur-containing compounds without destabilizing the burner flame.



## Incinerator Waste Heat Recovery

Due to the large amount of heat generated by the thermal oxidizer, many Zeeco systems incorporate waste heat recovery equipment to further reduce operating costs by generating steam and/or heating oil that is used for other plant operations.

Flue Gas to Atmosphere



Burner

Thermal Oxidizer or Incinerator

Watertube Waste Heat Boiler

Vent Stack

Sulfur Pit

Sulfur to Storage



## The Zeeco Difference

By concentrating on what we do best, Zeeco has grown into a worldwide leader in combustion and environmental solutions. We are a privately held company whose ownership stays highly involved in daily operations, with upper management comprised of the world's leading combustion experts.

When you call Zeeco, we answer. When you make a request, you get a quick, efficient response. We are lean and efficient, able to make decisions quickly, without bureaucracy and red tape. Our sales, engineering, and purchasing groups work hand-in-hand to deliver highly competitive quotes and heroic turnaround times. We stand ready and willing to travel anywhere in the world to discuss upcoming projects firsthand, and to ensure that every existing project runs seamlessly.



Visit [zeeco.com/contact](http://zeeco.com/contact) for additional Global Location contact information



Choose to work with our dedicated, flexible, and innovative team, and you won't be disappointed. Call or email us today to request a quote or to learn more about our proprietary combustion systems.

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