

# STEAMFORCE HC™



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



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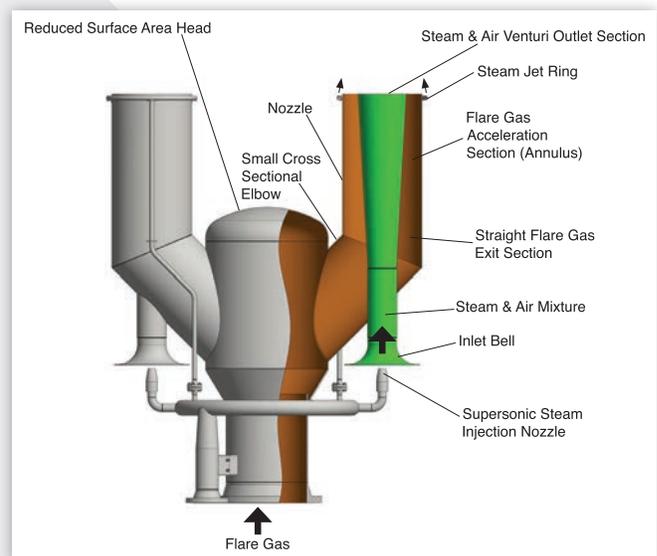
## Smokeless flaring with dramatically less steam.

Zeeco's SteamForce HC™ straight tube uses a true venturi design, significantly increasing efficiency and decreasing dependence on fuel gas and steam pressure to achieve smokeless combustion. SteamForce HC achieves smokeless flaring with dramatically less steam and no pre-mixing of air and fuel gas. Less steam saves money and reduces emissions generated from the production of steam.

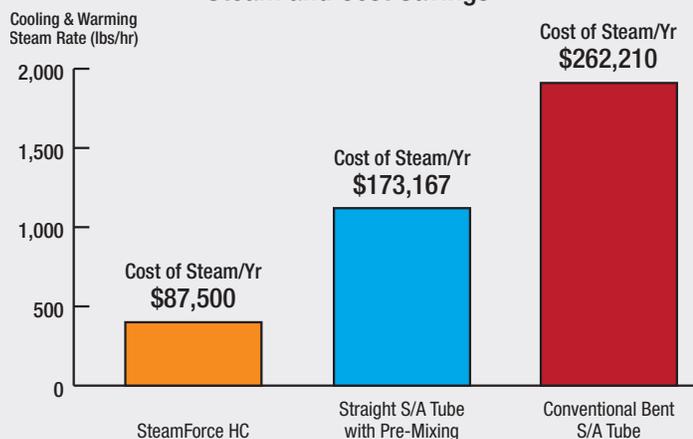
SteamForce HC solves the most challenging aspects of steam flaring today: Longer Flare Tip Life - Reduces capping, decreases mechanical susceptibility to radiation, and maximizes the upward momentum of the flame even at lower flow rates. No Pre-Mixing - Complies with EPA Code of Federal Regulations, Chapter 1, Subchapter C, Part 63, Subpart CC requirements without pre-mixing air with flare gas, meaning EPA NHVcz calculations are not negatively impacted – not true of competitor designs that use pre-mixing. Reduced Emissions - Emissions savings directly correlate to the reduced demand for steam. Lowest Cost of Operation - The SteamForce HC meets requirements and efficiency targets at lower minimum steam and purge enrichment rates than any other competitive offering.

## Smokeless operation at lower flow rates.

The ZEECO® SteamForce HC is significantly less dependent upon fuel gas pressure. The development case was based on a maximum flare gas pressure of 3 psig at maximum flare gas flow with smokeless operation at 20% of maximum flow. The resulting pressure at the smokeless flare gas flow rate was a mere 0.12 psig — versus other designs which require higher flare gas pressures of up to 5 psig to achieve smokeless operation as promised.



## Steam and Cost Savings



*Cost of steam on annual basis for a 24" SteamForce HC flare tip compared to cost of steam for a straight steam/air flare tip using pre-mixing and a conventional bent steam/air tube flare tip.*

## Revolutionary SteamForce HC Technology

The air and steam mixture leave the flare at the same elevation as the flare tip exit. Because other industry designs pre-mix the air and steam with the flare gas prior to exiting the flare tip, they are forced to operate at higher enriching rates to compensate. The SteamForce HC maximizes the amount of air entrained by a given amount of steam. With more air flow, less purge steam is required to protect the equipment during low flow scenarios.

## SteamForce HC Key Design Features

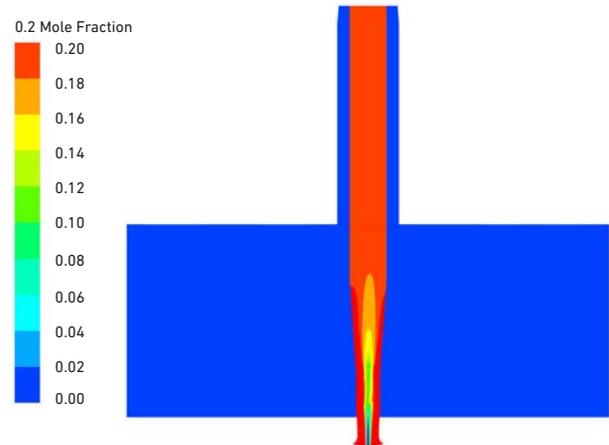
- Flare gas flows through the flare gas connection into the reduced surface area head to reduce the amount of area exposed to radiation.
- A single steam supply connection simplifies control, protects against improper operation, and reduces capital costs.
- From the head, the flare gas flows into multiple nozzles depending on the amount of flare gas flow required and the desired steam consumption at the designed smokeless rate.
- Each nozzle is comprised of a small cross-sectional elbow connected to a straight flare gas exit section.
- No pre-mixing of air and flare gas occurs, ensuring the combustion zone has a rich net heating value at the flare gas tip exit.
- Further improves flaring efficiency and reduces steam consumption while meeting the EPA Code of Federal Regulations, Chapter 1, Subchapter C, Part 63, Subpart CC requirements.

Zeeco's SteamForce HC makes a dramatic difference for companies who want a lower cost of ownership, lower emissions, and a flexible design in a flare tip that will operate smokelessly with less steam at lower flow and purge rates than competitor offerings.

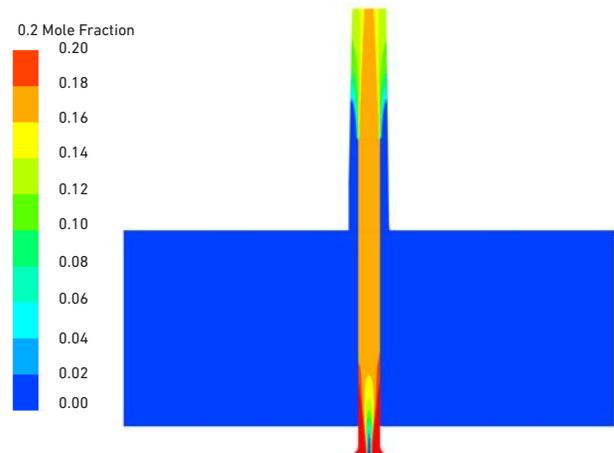
## Get to Know Zeeco

Zeeco is a privately held company that attracts the best and brightest engineers around the world. For over 40 years, we've demonstrated the positive difference working with us can make on complex projects—and our customers are quick to agree. Find out for yourself why Zeeco is the preferred choice for advanced combustion and environmental solutions.

SteamForce Venturi Design  
No Pre-Mixing



Straight Tube Design  
Mixing Flare Gas, Steam & Air Before Exit



**Side-by-Side Comparison:** For a steam flow rate of 3,427 lbs./hr, the SteamForce HC venturi design with no pre-mixing can pull in 49,572 lbs./hr of air compared to 27,468 lbs./hr of air for a straight steam/air tube device with pre-mixing of flare gas, steam, and air. Furthermore, the venturi device achieves a mass ratio of 14.47 lbs. air / lbs. of steam as compared to 8.06 lbs. of air / lbs. of steam for the straight steam/air tube device. Based upon these CFD results, the venturi flows approximately 80% more air versus a pre-mix straight steam/air tube device using the same amount of steam.



## 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](https://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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