



## LOW HEATING VALUE AND AMMONIA (NH<sub>3</sub>) FLARE TIPS

An endothermic (fuel gas assisted) flare tip has been developed by TCD Italia when flaring low heating value waste streams.

The endothermic flare tip is used for the smokeless burning of waste gases.

The flare burner utilizes high pressure fuel gas to inspirate air and it creates the proper turbulence and mixing for a very efficient combustion.

This flare tip is usually used when:

- the LHV of the waste stream is below 7.450kJ/Nm<sup>3</sup> (200 BTU/scF)
- as required to be in compliance with environmental regulations.

Flame stability over the entire operating range is achieved by incorporating a special heat shield located at the top exit of the waste stream.

The heat shield has a conical design and it is internally refractory lined.

High combustion efficiency and high smokeless degree are achieved through an upper fuel gas manifold (inside and/or outside the flare tip body) and a series of fuel gas nozzles located around the flare tip circumference.

Nozzles are used to inject high pressure fuel gas into the waste gas exit with a degree of swirl, thus creating turbulence and inducing air into the flame.

The basic tip is of robust construction, fabricated from heat resistant stainless steel (AISI310S) and it is subject to rigorous inspection during fabrication.

Each flare burner is equipped with very efficient pilot burners that provide a constant and reliable source of ignition. In some cases for these types of flare tip pilots are required with a high output release.

Pilot flame monitoring is achieved using thermocouples installed in the pilot nozzles.

## AMMONIA (NH<sub>3</sub>) FLARE BURNER

Ammonia will burn at technically good combustion (>95%) if the exit velocity is kept quite low. From experimental data a velocity in the range of 30 m/s will combust successfully.

To guarantee greater destruction efficiency a supplemental fuel is required. Adding supplemental fuel there is a potential for an increased NOX due to the higher combustion temperature.

TCD - Italia has designed a special NH<sub>3</sub> flare tip in which the root of the ammonia flame is stabilized by the support gas flame generated by a ring of support gas nozzles.

This technique together with a low ammonia exit velocity creates a combustion efficiency greater than 99,5%.