



AIR SMOKELESS FLARE TIP

The TCD Italia range of air flare tips is designed to provide for the smokeless combustion of subsonic flaring gases where no steam is available.

The flare utilizes a secondary energy source such as low pressure air to provide a percentage of smokeless combustion. Air and waste gas are mixed at the tip outlet achieving an efficient combustion process.

Smokeless combustion is achieved through the injection of combustion air (primary air) often supplied via axial or centrifugal blower located at the grade. The quantity of primary air can vary from 20 to 50% of stoichiometric (it depends on gas composition).

Secondary air to complete the combustion of the flaring gases is entrained by the turbulent discharge from the tip.

The blower speed can be staged so that efficient use of power is achieved.

The fan speed can be automatically controlled.

Smokeless combustion is promoted by incorporating a series of flow vanes or special swirlers within the flare tip, designed to maximize the mixing of waste gas and primary air at the point of exit. This mixing also ensures the stability of the main flame under extreme wind conditions and reduces thermal radiation at grade.

The swirling action of the flame guarantees an upright flame shape with low luminosity.



Example of Air Assisted Smokeless Flare Tip

The gas riser and the air riser can be run separately or co-axially.

The blower can be part of the stack structure, mounted separately at the base or remotely with ducting.

Controls and ignition panel can also be at the stack base or remote from the stack as may be required.

Liquid and/or gas seals can be accommodated into the flare system if required.

The flare tip burner is fabricated from high heat resistant stainless steel (usually AISI 310 S) and it comprises two concentric pipe sections, which channel primary air and waste gas into the mixing head at the tip exit. The flare burner is equipped with pilots that provide a constant and reliable source of ignition.



The TCD Italia Air Flare is individually designed for each installation. The blower rating is relative to the gas being flared and to the flow rate of flaring.

In order to improve the smokeless capacity, the destruction efficiency, the flame stability and the swirling action of the flame a CFD modelling activity is performed using Fluent.

Fluent is a commercially licensed computer program for the prediction of fluid flows.

Fluent solves the governing equations of fluid flow, combustion and heat transfer for a user-specified input geometry.

In the definition of the geometry of interest, a 3-dimensional mesh is created. The mesh, established in body fitted coordinates, consists of blocks of cells to represent the geometry of the flare and the external computational domain.

At each cell, the code solves linearized forms of the governing equations for the transport of mass, momentum, energy and chemical species.

