



FLARE PURGING AND MOLECULAR SEAL

It can readily be undesirable to have a flare system filled with a mixture of gas and air, or oxygen, within the flammable limits.

The danger of flash back and/or explosion is obvious. TCD Italia recommends the provision of a continuous positive hydrocarbon or inert gas (nitrogen) purge dedicated to the flare under all conditions.

Extensive research work by TCD Italia has resulted to include in the flare system a device which assisted in keeping air from the flare stack, whilst reducing the amount of purge needed to accomplish this.

The use of such a device is also advantageous if it is necessary to keep a flare in stand-by but not operating for a long period, saving purge gas.

Without the special device fitted, the purge gas rate would need to have a velocity varying between 0,3 to 0,6 m/s in order to be effective.

For large diameter stacks, this can represent a significant amount of gas. To minimize this requirement, it is necessary to use a proper seal device located within, or close to, the flare tip burner.

There are two main types of gas seal device currently available:

- 1) the labyrinth type (molecular seal)
- 2) the dynamic type (velocity seal)

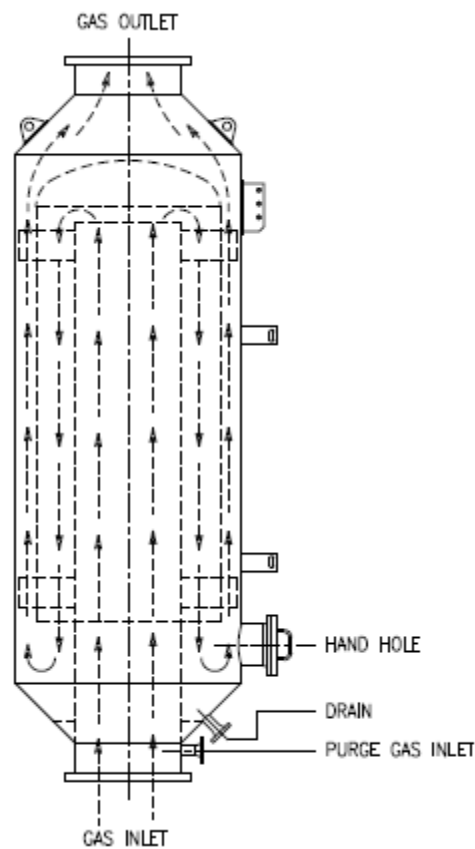
Both will prevent air ingress into the flare system providing a continuous purge gas is always present. Any gas can be used for purge which does not contain oxygen and will not go to the dew point.



Molecular Seal

The molecular seal is designed to be installed just below the flare tip. The seal device is flanged to the flare burner and stack. The molecular seal works by relying on a column of air being supported by a column of gas in the same way as two immiscible liquid behave in a “U” tube. When the purge gas is lighter than air, it forms a gas rich zone at the top of the seal that air cannot penetrate; conversely when the purge gas is heavier than air, the seal is formed at the base of the device.

The molecular seal will maintain safe conditions in the upstream flare stack for several hours (3÷5 hours) in the event of a loss of purge gas flow due to its buoyancy effect.



Example of Molecular Seal