



## Flare Design: Sonic tips with fixed exit slot

How is the flare designed to minimise methane? > [Flare Design: Sonic tips with fixed exit slot](#)

### Summary

Sonic tips are designed to discharge the flare gas at sonic velocities. The most conventional technology is the multi-arm design, with fixed or variable exit areas.

### How it Works

- The multi-arm design allows to route the gas to a number of smaller diameter burner nozzles in order to achieve high velocities, increase mixing with combustion air, improve combustion efficiency and reduce soot and smoke formation at high flow rates.

- A fixed slot design is configured around the anticipated range of flow that the flare is expected to encounter.

#### Advantages

- ✓ High combustion efficiency at high flowrates resulting in reduced smoke formation.
- ✓ Can result in lower stack heights and smaller flare header sizes
- ✓ Lower flame radiation and shorter flame length
- ✓ Low profile sonic flares built close to grade can have low visual impact because the short low radiation flame can be obscured using berms, fences or trees

#### Limitations

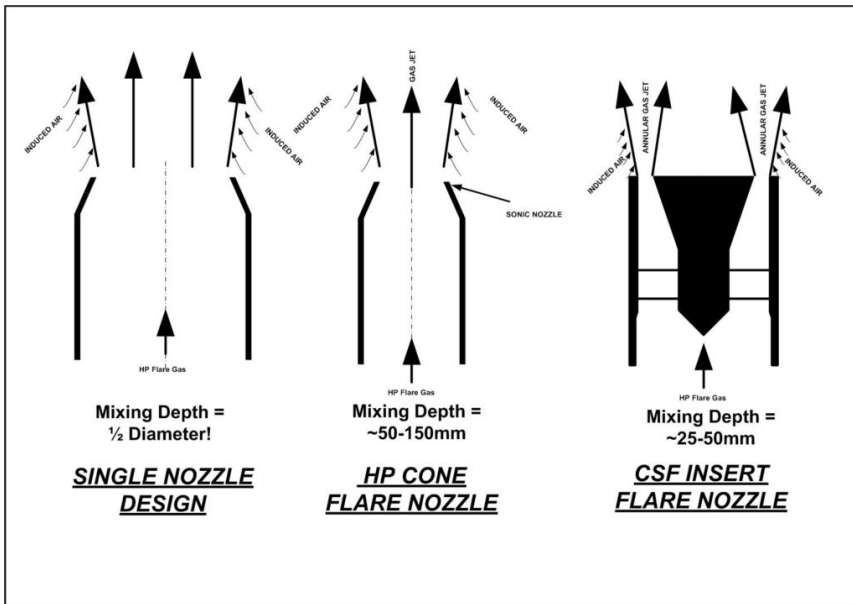
- ✗ Requires greater upfront knowledge of flare conditions that will be encountered across the lifetime of the facility
- ✗ Maintenance of flare tips

#### Go Deeper

- [Vendor website: Zeeco](#)
- [Vendor website: GBA](#)
- [Vendor website: Heroflare](#)

#### Case study

**Different designs of sonic flare tip – courtesy of GBA systems**



CSF-7-14 Flare Tip (on right)

[Gas plant Alaska]

Image contrasts appearance of a conventional flare design (left) to one operating with a sonic tip assembly (right). Image courtesy of GBA systems

## How is the flare designed to minimise methane?



Flare Design: Pilots



Flare Design: Air-assisted flare



Flare Design: Nitrogen Purge



Flare Design: Sonic tips with variable exit area



Flare Design: Flare seals – Molecular (buoyancy) and Velocity Seals