METHANE FROM FLARING TOOLKIT



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

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- 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

Go Deeper

- Vendor website: Zeeco
- Vendor website: GBA
- Vendor website: Heroflare

Case study

Different designs of sonic flare tip – courtesy of GBA systems

Limitations

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Requires greater upfront knowledge of flare conditions that will be encountered across the lifetime of the facility

Maintenance of flare tips





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

