METHANE FROM FLARING TOOLKIT

# Flare Design: On-demand Flare Ignition System





## Summary

On-demand ignition systems are designed to provide an alternative to continuously burning flare pilots. When combined with flare gas recovery (so that the flare is not permanently required), an on-demand ignition system can lead to substantial emissions reductions.

## How it Works

An on-demand system deploys an ignition source to the gas mixture when required. This is achieved through the use of a guide tube and pellet discharge system (compressed air or mechanical device).

A range of pellet technologies have been developed, using either an explosive charge (ballistic type) or material that when it connects with a striker plate produces a shower of sparks. A pellet collector recovers spent pellets so they do not become a dropped-object hazard.

The delivery system uses a compressed gas or mechanical device launch system to propel a pellet through a guide tube until it strikes a specifically designed plate. As plate is affixed close to the flare tip, sparks produced during pellet impact shower the flare tip exit and ignite the gas stream.

Pellets with explosive load has a fuse released at the exit of the guide tube and provide a shower of sparks upon explosion without a need for a striker plate.

It has applications where flare demand is low or flare gas recovery is installed.

The feature image shows the shower of sparks produced when the pellet engages with a strike plate located close to the flare tip (Image courtesy of Zeeco, Inc.® – all rights reserved).

Advantages

- Provides the ignition upon demand and eliminates the need for flare pilots
- When used with flare gas recovery, it allows significant emission reductions and enables zero flaring approach
- Can be installed on most flare tip types
- Allows for simpler maintenance as all moving parts and electronics can be mounted at grade, not by the flare tip
- Can achieve SIL-2 rating with 99.8% reliability
- Works effectively under challenging weather conditions
- Simple installation – requires power connection, in some cases - instrument air supply

Can be retrofitted to existing flares

Limitations

- Requires flare gas recovery unit and  in the flare system to work effectively
- Pellets containing explosive load introduce safety and logistics challenges
- System is not 100% reliable, there is a risk of unignited release

Go Deeper

- Vendor website: Lifetime
- Vendor website: Zeeco
- Vendor website: Wartsila
- Vendor website: Argo
- Video of ignition system in action

Case study

Oil processing FPSO has commissioned a flare gas recovery unit with a low-pressure ballistic ignition system, which provides the sparks for ignition once the pellet detonates after exiting the guide tube.

Measures were taken to ensure high reliability of the system – it was configured to launch two pellets in sequence and start pilot gas supply prior to launch to ensure the flare was lit. Less than 50 pellets were launched since commissioning the system, however, no reliability issues were encountered thus far. It was considered to change the mode of operation to a single pellet operation due to higher than expected performance.

The installation of a ballistic ignition package enabled the commissioning of flare gas recovery unit, which was estimated to reduce the carbon footprint of the facility by 2kg $CO_2$e/boe.

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## 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 fixed exit slot

Flare Design: Sonic tips with variable exit area