

**ADOR WELDING LIMITED**



## **FLARES & PROCESS EQUIPMENT DIVISION**

Guaranteed, One-stop, End-to-end Product



## **ADOR WELDING LIMITED**

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## Flares & Process Equipment Division

Guaranteed, One-stop, End-to-end Product

Flares & Process Equipment Division (FPE) is a multi-disciplined SBU with over 25 years of rich experience in successfully executing various projects in domestic and international markets. We offer services across design, supply, erection, process, mechanical, electrical and instrumentation for process packages, process equipment, flare systems. FPE offers end-to-end solutions with product and process guarantees, making it a one-stop solution. The FPE division exemplifies innovation, consistent hard work, customer centricity and sets a benchmark for welding expertise.

We are justifiably proud of consistently ensuring customer satisfaction for the successful completion of projects undertaken, maintaining quality standards and meeting/beating delivery deadlines. Among the list of our satisfied customers, we count the Indian Government's Bharat Nirman Program, with projects in combustion and thermal engineering technologies.





## Factors for Designing Flare

**A flare designer needs to consider the following major factors to arrive at a suitable design.**

- Characteristics of flare gas, i.e. quantity, composition and pressure level
- Location of the flare considering other equipment and population around the nit
- Availability of space
- Cost i.e. initial investment as well as operating cost
- Effect on environment / local pollution regulations

Our In house highly qualified and experienced design team is designing customized flare system for our customers from over two decades. We have latest software for ensuring the accuracy of design of the system.

### Components of Flare Systems

- Flare Tip
- Riser stack
- Fluidic type flare seal (DPCS)
- Molecular seal
- Water seal Drum
- Knock out Drum
- Ignition System
- FFG / HE Panel

### A. Utility Flares / Non Assisted Flares

Utility flares are one of the most common and basic flare designs. Utility flares are employed in applications which do not require smokeless burning or in applications where smokeless flaring can be achieved without the use of an additional assist medium. Utility flares therefore, do not require auxiliary gas streams such as steam or air; two fluids normally used to improve smokeless capacity. These flares are typically accompanied by a Dynamic Seal in the base of the tip to reduce purge gas costs and prevent flashback.

### Utility Flares/ Non Assisted Flares

- High alloy material construction in the heat affected zone
- Extremely stable, fuel efficient pilots
- Flame retention ring to stabilize combustion
- Dynamic / Velocity seal to reduce purge gas expense & prevent flashback
- Molecular seal to prevent flash back for higher tip diameter

### Advantages

- Cost effective (capital as well as operating costs)
- Low maintenance costs due to simplicity of design
- Stable, reliable combustion



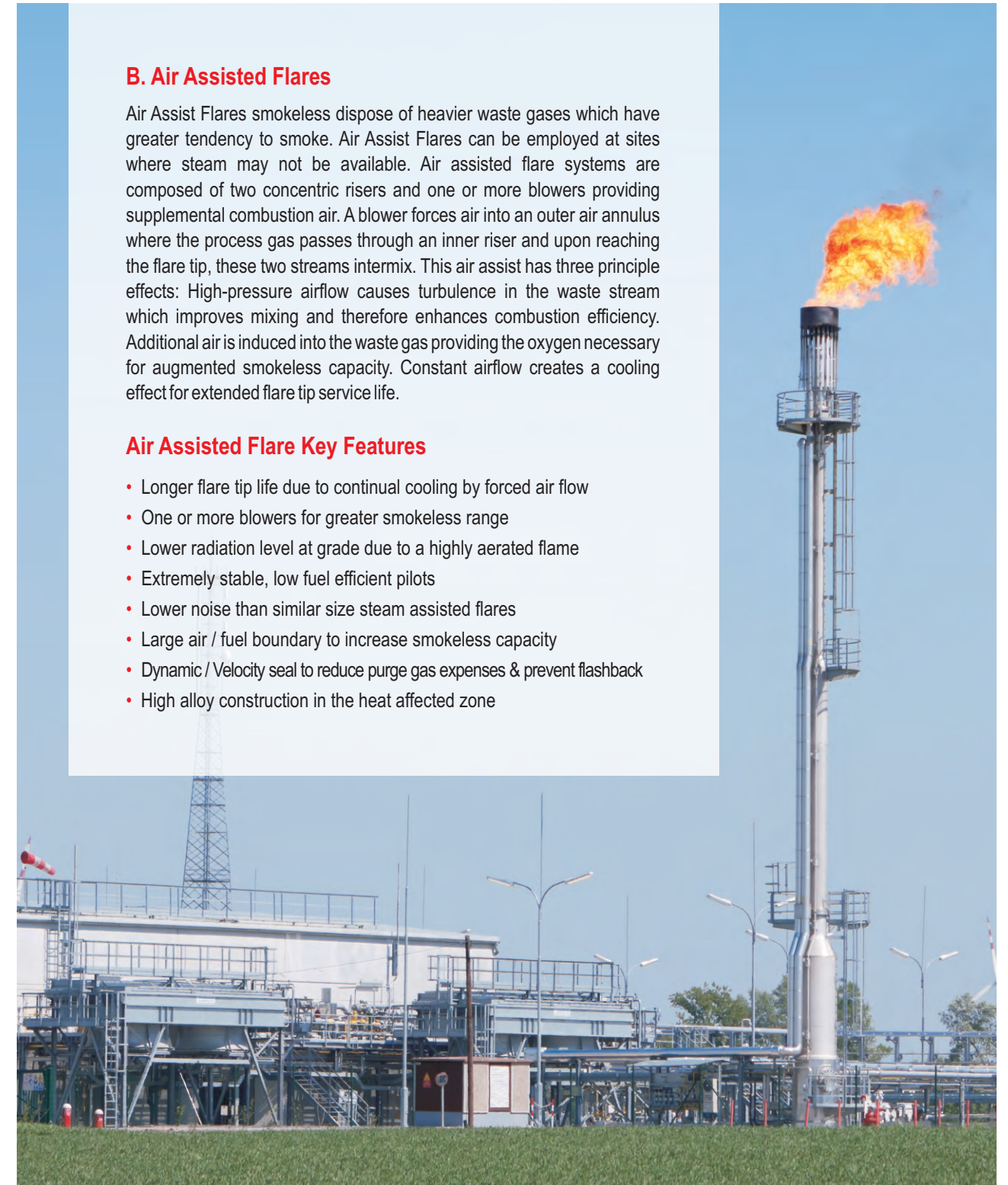
## Elevated Flares

### B. Air Assisted Flares

Air Assist Flares smokeless dispose of heavier waste gases which have greater tendency to smoke. Air Assist Flares can be employed at sites where steam may not be available. Air assisted flare systems are composed of two concentric risers and one or more blowers providing supplemental combustion air. A blower forces air into an outer air annulus where the process gas passes through an inner riser and upon reaching the flare tip, these two streams intermix. This air assist has three principle effects: High-pressure airflow causes turbulence in the waste stream which improves mixing and therefore enhances combustion efficiency. Additional air is induced into the waste gas providing the oxygen necessary for augmented smokeless capacity. Constant airflow creates a cooling effect for extended flare tip service life.

### Air Assisted Flare Key Features

- Longer flare tip life due to continual cooling by forced air flow
- One or more blowers for greater smokeless range
- Lower radiation level at grade due to a highly aerated flame
- Extremely stable, low fuel efficient pilots
- Lower noise than similar size steam assisted flares
- Large air / fuel boundary to increase smokeless capacity
- Dynamic / Velocity seal to reduce purge gas expenses & prevent flashback
- High alloy construction in the heat affected zone





## Elevated Flares

### Advantages of Air Assisted Flares

- Very low operating cost for smokeless operation
- High stability, low fuel consumption pilots are standard with flare tips
- 98.5% or higher hydrocarbon destruction efficiency
- Superior materials and construction
- Lower blower horsepower requirements than competing designs
- High smokeless rates due to superior mixing
- Capable of burning heavier hydrocarbons smokeless
- Extended service life
- Lower operating costs at a given smokeless rate
- Lower radiant heat at a given capacity Stable, reliable combustion
- Wide range of flow capacities



### C. Steam Assisted

Steam assisted flares are designed to dispose of heavier waste gases which have a greater tendency to smoke. In order to prevent incomplete combustion, steam is injected into the waste stream using peripheral steam rings (Primary steam) at top of tip and at center of flare tip (Secondary steam). High-pressure steam flow causes turbulence in the waste stream which improves mixing and therefore improves combustion efficiency. Additional air is induced into the waste gas providing the oxygen necessary for augmented smokeless capacity. Steam flares are typically used in applications where the customer has high-pressure steam available on site.

## Elevated Flares

### Steam Assisted Flare Key Features

- Low noise steam ring
- Extremely stable, low fuel efficient pilots
- Most economical steam assisted flare
- Superior manifold connection
- Smokeless burner with lower noise
- Mechanically superior design
- High stability flame retention ring
- Lower pressure drop or higher flow at a given pressure

### Advantages

- Low maintenance costs
- High smokeless capacity due to steam injection
- Stable, reliable combustion due to flame retention ring
- High smokeless flow rate
- Longer tip life due to steam cooling effect



## Types of Elevated Flares



1



2



3

### Guy Rope Supported

1 Guy rope supported flare system is used when toxic gases are burned at medium height. (Approximately 150 meters)

### Derrick Supported

2 Derrick supported flare system is optimum installation for higher heights where high radiation is exerted.

### Self Supported

3 Self supported flare system is used for lower heights when radiation exerted is low. It uses less space for installation.



## Enclosed Ground Flare

Enclosed Ground flares (EGF) conform to the general requirement that flaring and disposal may take place at low level. In populated areas, in close proximity to other processing equipment ground flares are now used to burn gas without smoke and with no visible flame. The EGF system consists of a refractory lined cylindrical flare structure designed to have combustion take place within the cylinder. This type of enclosed flare system was originally designed to eliminate the light and noise from the flaring of waste gases. This flare has been used extensively in the combustion of waste gases from chemical plants, hydrocarbon loading terminals, FPSO floating production vessels, refineries and any other application where low emission, efficient combustion is required. EGF can be designed for unlimited air control or for specific air and temperature control to combust very clean gases at minimum required temperatures. The refractory lining is designed to protect the carbon steel support shell of the unit. The flare system has burners that fire at the bottom of the cylinder where premix pilots fire continuously to ensure ignition of the waste gases.



### Enclosed Ground Flare Key Features

- Safe design with low maintenance and long service life
- Fuel efficient pilot burners
- Sole source systems including installation
- Smokeless combustion
- Very low noise levels
- Proven designs
- No radiation outside the combustion chamber
- Quick and simple installation

### Advantages

- Reduced flame visibility due to enclosed burner shroud
- Minimal noise
- Minimal heat radiation due to ceramic insulation
- Ease of emissions sampling and testing
- Extremely high destruction efficiencies
- Smokeless combustion
- Simplified control system
- Reduced stack visibility

## Mobile Flares

Mobile flare systems are often a viable alternative when temporary applications require a flare system for a short duration. Plant shutdowns, emergency repair work, one time flaring needs and tip replacements are just some of the possible motives for employing a mobile flare.

Mobile flare systems are used for multiple purposes and for multiple applications. If a section of a pipeline needs to be repaired or inspected, mobile flare system can be used to dispose of the contents of the pipeline. Mobile flare mounted on a trailer or skids and can be easily move from one place to other. Mobile flares can be Utility, Air Assist and SteamAssist flares.

### Mobile Flare Key Feature

- Skid or trailer mounted for ease of movement around site
- A range of optional instrumentation including flow rate & gas concentration measurement
- Power back up for the ignition panel
- Safe design with low maintenance and long service life
- Fuel efficient pilot burners
- Gas manifold for cylinders for pilot burners
- Can be operated though Central PLC Panel on site
- Safe design ensuring noise and radiation levels



### Advantages

- Suitable for remote operations
- Easy for transportations

## Burn Pit Flares

The main use of a burn pit is to dispose of liquid or mixed liquid/vapour reliefs generally as emergency flows or an intermittent basis when blowing down pipelines or vessels. Pit is made up of concrete material & is partially constructed in ground. The system shall be provided with circular type manifold for fuel gas & liquid condensate which is to burnt. Two ring type manifolds for pilot gas & liquid condensate are mounted at the center of pit. Pit consists of refractory lining on two vertical faces.



### Burn Pit Flare Key Features

- Safe design with low maintenance and long service life
- Fuel efficient pilot burners
- Very low noise levels
- Proven designs
- Quick and simple installation

### Advantages

- Minimal noise
- Minimal heat radiation due to ceramic insulation
- Suitable where liquid contents are more in a flare gas
- Ease of emissions sampling and testing
- Extremely high destruction efficiency



## Off shore Flare

Ador designs the flare system for the offshore applications. Offshore flares consist of HP and LP Flare System.

### Key Features

- Safe design with low maintenance and long service life
- Very low noise levels
- Proven designs
- Quick and simple installation





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