

FLARE SYSTEM COMPONENTS



INTRODUCTION

ITAS, one of the world's largest manufacturers of flare systems, offers complete flare control packages. ITAS experience with hundreds of flare systems ensures well-designed and proven controls technology.

IGNITION SYSTEM

The most important piece of flare control equipment is the pilot ignition system. ITAS ignition systems offer the following benefits:

- Easily accessible control components.
- Proven and reliable ignition.
- Complete shop testing prior to shipment.
- Meets all required electrical classifications.

ITAS provides ignition systems of the following types: Manual or Automatic Flame Front Generator (FFG), Self-inspiring FFG, electronic High Energy Ignition, and Pilot monitoring.

In addition to ignition systems, ITAS provides other controls necessary for proper flare operations.

PURGE CONTROLS

For molecular and velocity seals, purge controls ensure proper flow of purge gas to the flare system and prevent air entering into the flare header.

PILOT MONITOR

Pilots are monitored via Dual Thermocouples and/or Infrared Pilot Monitor, with relevant control panel and remote alarms.

STEAM CONTROL

ITAS offers a complete steam control package, including restriction orifices, mass-flow controls, valves, gauges and controllers, coordinated around and designed for use with the ITAS Optical System.

SPECIAL FLARE CONTROLS

ITAS can provide special flare controls, featuring:

- Patented staging controls.
- Knockout and liquid seal drum controls.
- Blower controls for air induced flares.
- Flame extinguishing systems.
- Skidded, assembled, completely pre-piped and pre-wired control packages.

FLARE SYSTEM COMPONENTS

VERTICAL/HORIZONTAL WATER SEAL



The water seal drum is utilised to provide positive pressure on the flare header and to be a flame arrestor in the event a flashback occurs in the flare riser.

The internals of the water seal have a special design to insure a steady flow of gases and minimise pulsations to the flare burner. Consequently, with the minimum amount of supplementary energy, it is possible to optimise the smokeless capacity of the flare, and to reduce the noise.

The water seal can be either horizontal or vertical and may be incorporated into the flare stack base.



FLARE SYSTEM COMPONENTS
**VERTICAL/HORIZONTAL
K.O. DRUM**


ITAS Knock-out Drums are designed to remove entrained liquid droplets from the waste gas.

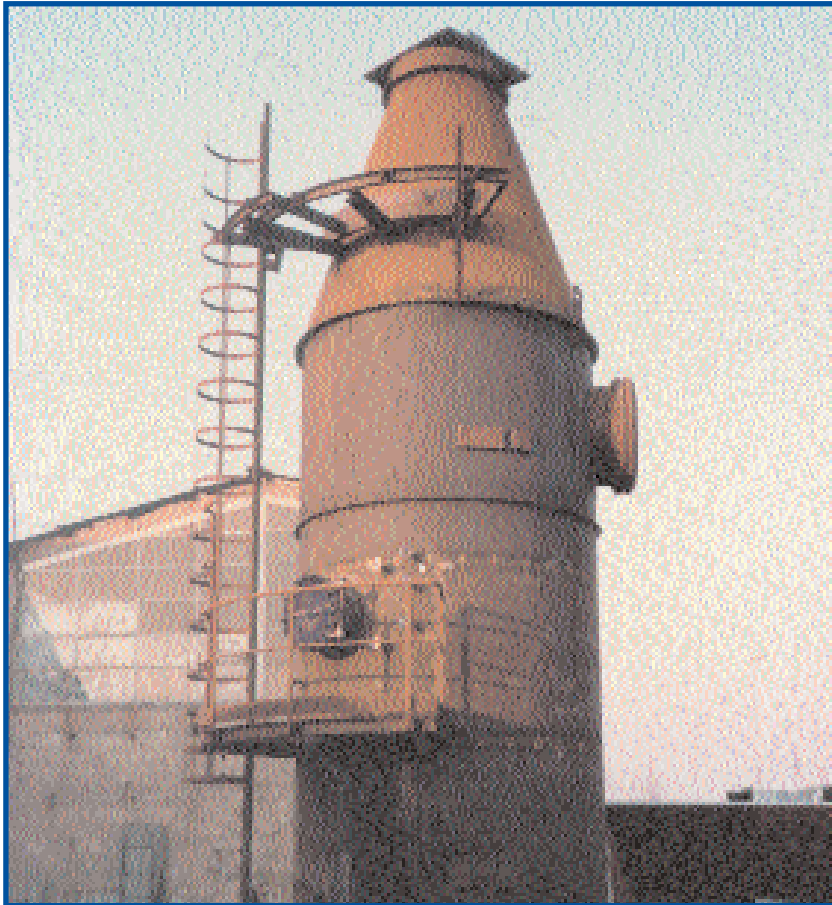
Removal of the entrained liquid from a waste gas stream is important for two reasons. Primarily, the presence of hydrocarbon liquid in the gases promotes intense smoking during flaring. Also, if the liquid particles pass through the flame envelope at the flare tip, they may bring about a safety problem by being ignited and rain fire into the terrain below.



The K.O. drum can be either horizontal or vertical and may be incorporated into the flare stack base.



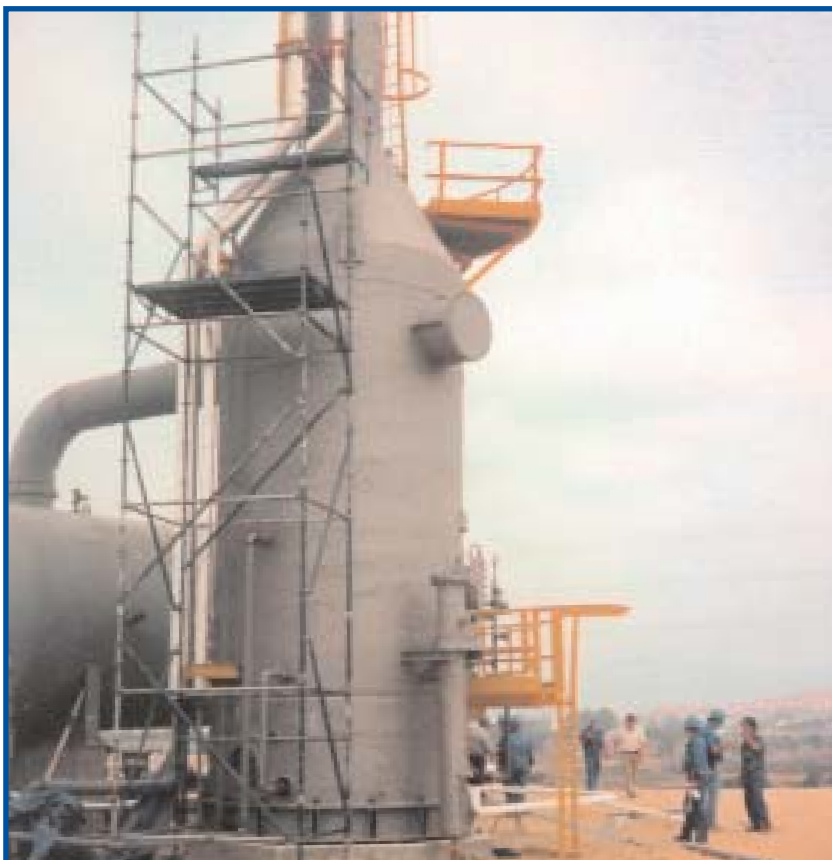
FLARE SYSTEM COMPONENTS

COMBINED WATER SEAL/K.O. DRUM


When it is possible to combine a Water Seal and K.O. drum there is a significant saving in costs due to less foundations, interconnecting piping and installation.

The water seal drum is utilised to provide positive pressure on the flare header and to be a flame arrestor in the event a flashback occurs in the flare riser. The internals of the water seal have a design to insure a steady flow of gases and minimise the pulsations to the flare burner. Consequently, with the minimum amount of supplementary energy, it is possible to optimise the smokeless capacity of the flare, and to reduce the noise.

ITAS Knock-out Drums are designed to remove entrained liquid droplets from the waste gas. Removal of the entrained liquid from a waste gas stream is important for two reasons. Primarily, the presence of hydrocarbon liquid in the gases promotes intense smoking during flaring. Also, if the liquid particles pass through the flame envelope at the flare tip, they may bring about a safety problem by being ignited and rain fire into the terrain below.



FLARE SYSTEM COMPONENTS

AIR INFILTRATION PREVENTION DEVICE DYNAMIC AND LABYRINTH SEALS

DYNAMIC SEAL

The ITAS dynamic seal is of a Venturi type, designed as an integral part of the flare tip. The Venturi is designed to minimise air infiltration into the flare stack with significant purge gas savings. The seal relies on a momentary increase in the gas velocity, creating a turbulent flow condition and preventing the ingress of air into the stack.

MOLECULAR SEAL

The molecular seal is installed just below the flare tip. The seal is flanged between the flare tip and stack. The molecular seal is designed to prevent air from infiltrating into the flare system. Even when the purge gas is interrupted, the molecular seal provides protection for an extended period of time.

The ITAS MS is of a labyrinth type. The device can be used with seal gas lighter or heavier than air. Either in the top or in the bottom section of the seal the purge gas forms a barrier to prevent the penetration of the air into the flare stack. There are many factors influencing air entrainment into the stack: wind, temperature, molecular diffusion of gases, and so on. In order to counteract this phenomenon a permanent flow of purge gas is required to maintain the effect of the seal.



FLARE SYSTEM COMPONENTS

PILOTS



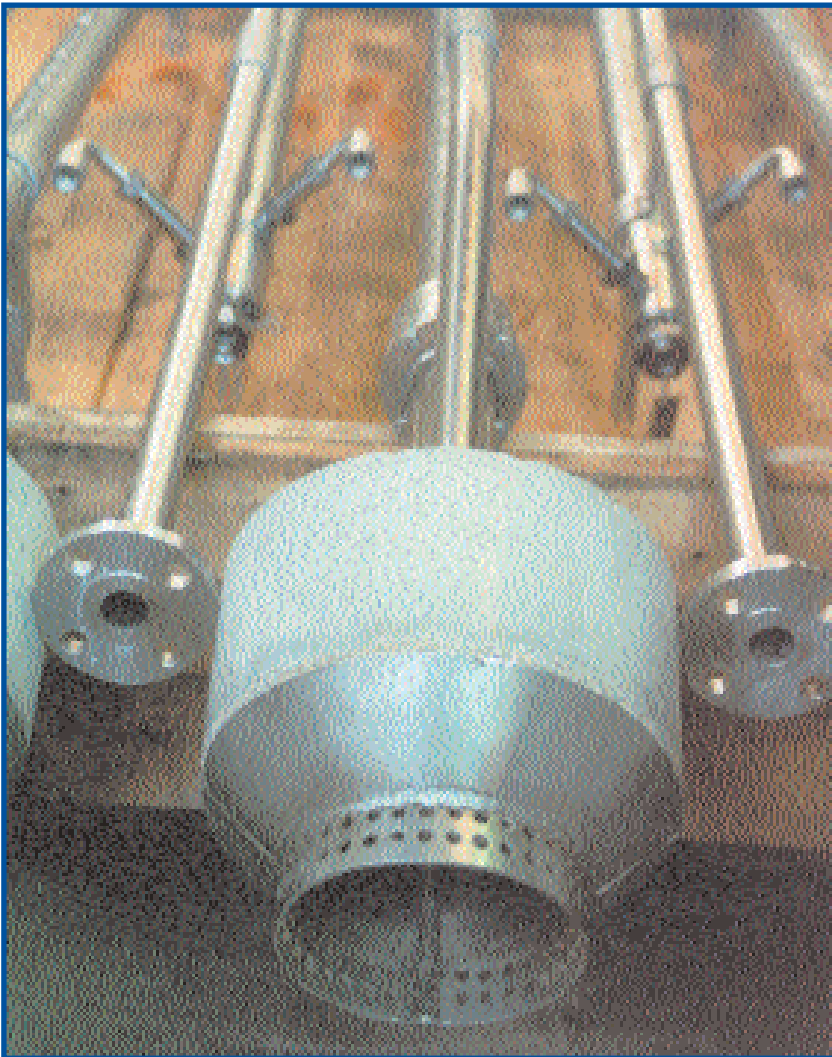
ITAS pilot and ignition systems are compatible with the complete flare range. Reliability and stability is ensured by careful selection at the flare design stage.

The specially shielded nozzle ensures a stable flame and reignition in wind velocity as high as 200 km/hr. A traditional ITAS pilot assembly consists of an inspiring pilot burner with a forced draught ignition section. Each pilot is nominally rated at 30.000 Kcal/hr, but on request low consumption pilot can be provided.

If pilot flame failure indication is required, a thermocouple is fitted internally to the pilot nozzle to protect it from exposure to the main flame.

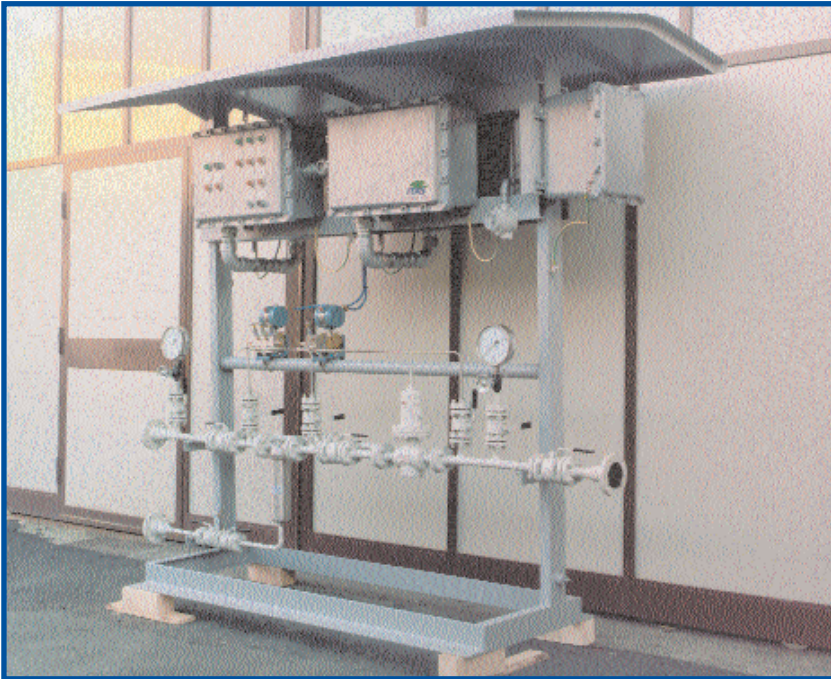
ITAS also supplies High Energy Ignition Systems. To guarantee reliable ignition the H.E. plugs are integrated into the burner head. The ignition is based upon the principle of capacitor discharge over a special discharge surface.

ITAS pilots can be self-inspiring or forced air supply and are suitable for natural gas, propane, butane, bio-gas, Hydrogen, mix-hydrocarbons, off-gas mixture.



FLARE SYSTEM COMPONENTS

IGNITION AND CONTROL SYSTEMS



The principle of flame front ignition is fairly simple. A pipe is filled with a gas air mixture and an ignition source is applied on the mixing chamber. The resulting flame travels until it reaches the end of the pipe, where it may itself act as ignition source for a gas stream or pilot burner.

The ITAS pilot ignition systems are suitable for use on all types of elevated flares, ground flares and burn pits.

Reliable operation is guaranteed in extreme weather conditions.

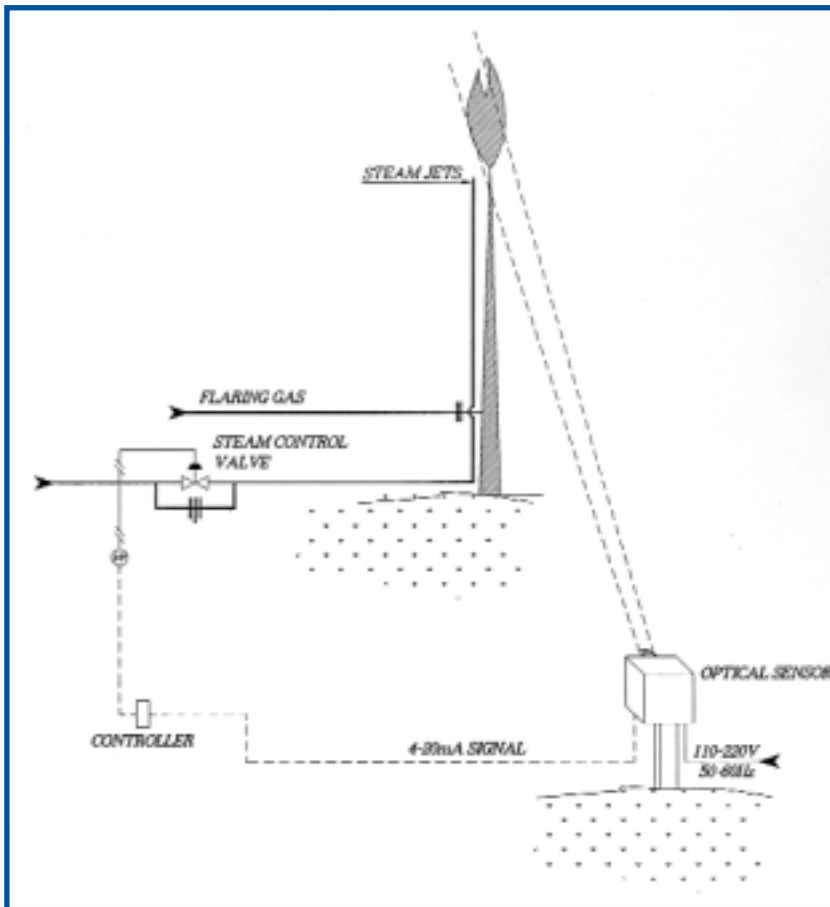
Pilot flame monitoring is usually by thermocouple.

Those systems include:

- AUTO/MANUAL IGNITION PANEL
- NO-ELECTRICAL IGNITION PANEL
- HIGH ENERGY IGNITION PANEL
- FLAME FRONT IGNITION PANEL
- SPLIT - IGNITION PANEL



FLARE SYSTEM COMPONENTS



OPTICAL INFRARED PILOT DETECTOR

Unlike costly thermocouple systems, the ITAS Pilot Monitoring System uses an infrared optical unit to determine pilot flame status. Flame status is then continuously transmitted as a linear signal. This versatile signal can function as an alarm for flame-out, as a trigger for auto ignition system, as a regulator of fuel gas usage, and for recording/reporting purposes.

Infrared optical technology enables the Pilot Monitoring System to operate in remote plant location, safely away from flarestacks. Installation is simple and quick.

Expensive installation equipment is not needed. Unlike thermocouples, plant/flarestacks shutdown is unnecessary for installation and subsequent maintenance, resulting in both immediate and long-term savings.

The optical sensing unit of the Pilot Monitoring System is in full compliance with EPA recommendations for pilot flame monitoring and control. Developed from the successful ITAS Flare Stack Monitoring System, the Pilot Monitoring System is field-tested and backed with ITAS proven reputation.

SMOKELESS CONTROLS

OPTICAL SMOKELESS DETECTOR

ITAS flare stack monitoring system contains a unique infrared optical unit. It detects flux density changes in the hydrocarbon flames of flares. ITAS systems work day and night, unaffected by fog, rain or clouds.

ITAS systems generate a continuous process variable signal for control purposes. The signal is proportional to the amount of unburned carbon in the flare. Flare gas composition, density, or flow rate does not hinder the accuracy of the system's signal.

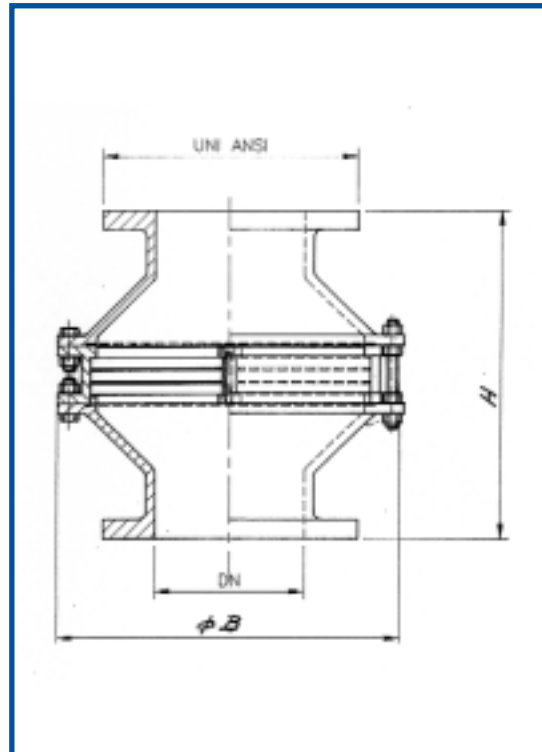
The ITAS monitor provides the process variable signal for steam control, allowing only the steam necessary for complete and smokeless combustion. No more, no less. Steam is used efficiently and economically. Noise from excess steam is eliminated.

MASS FLOW METERS

ITAS provides a unique design to control the steam for smokeless combustion utilising thermal mass flow meter or ultrasonic flow meter backed up with optical smokeless detector.



FLARE SYSTEM COMPONENTS



WATER SEAL CONTROLS

Level gauge, level transmitter, temperature transmitter, control valves.

K.O. DRUM CONTROLS

Level gauge, level transmitter, Hydrocarbon condensate pumps

PLC STAGING SYSTEM

Flow transmitter, pressure transmitter, control valves, rupture disk.

AIRCRAFT WARNING LIGHTS

Fixed and removable lights in accordance with all international codes.

FLAME ARRESTORS

Inline, end of line, detonation flame arrestors, designed and supplied in accordance to EN12874 or PTB, B.S., U.S. Coast Guard.



VENT AND SNUFFING SYSTEM



ELEVATED VENT

In many situations, pressure-relief vapour streams may be safely discharged directly to the atmosphere if environmental regulations permit such discharges.

The decision to discharge hydrocarbons or other flammable or hazardous vapours to the atmosphere requires careful attention to ensure that disposal can be accomplished without creating a potential hazard or causing other problems, such as the formation of flammable mixtures at grade level or on elevated structures, exposure of personnel to toxic vapours or corrosive chemicals, ignition of relief streams at the point of emission, excessive noise level, and air pollution.

High vent stacks are sized for an high exit velocity at the maximum relief rate to provide excellent dispersion.

AUTOMATIC INERTS SNUFFING SYSTEM

A remote controlled snuffing system should be installed on all cold vent stacks in order to avoid continuous burning in the case of accidental ignition of the vented gases.

The snuffing medium may be nitrogen, carbon dioxide or steam (if available); halon or other CFCs is not be used due to their adverse effects on the environment.

The snuffing system is operated from an auto/manual station. Once the flame is extinguished, the control system ensures that metal temperatures at the tip of the vent fall sufficiently to prevent spontaneous ignition of gas and the danger of flash-back.

The snuffing facilities is sized to extinguish the stack at least three times in succession when it is burning and discharging at a rate corresponding to one percent of the maximum vent rate.

OFF-SHORE EQUIPMENT



MAIN EQUIPMENT

Many different equipment may be provided for gas and liquid waste disposal on the off-shore platforms or rigs.

LIQUID/GAS MUD BURNER

The ITAS versatile burner is available in different versions, using the same type of combustion head and standard swivel. Several atomizer nozzles are also available to suit specific conditions.

The burner is suitable for disposal of:

- crude oil
- oil-base mud and workover fluids.

The ITAS Mud Burner comprises several combustion heads fitted on the same supporting frame. The mud burner is supplied with individual pilot and water ignition device. A supporting frame with two pivots and swivel joints allows rotation of 75° on each side of the boom center line.

The special atomizing device ensures a perfect smokeless combustion by direct water ignition into the flame, thus resulting in no pollution and reduced heat radiation.

SPECIAL FLARE TIPS

H.P./L.P. COMBINED FLARE

SONIC FLARE

MULTI NOZZLE FLARE

SPECIAL ENCLOSED FLARE

