

## **Process Heaters**

Thermal Oxidisers



## Vaporisers



## Firefighting Training Systems

## Instrumentation and Control & Skid Systems

Combustion Heat Transfer and Energy Specialists





## **Process** Company Profile

#### INTRODUCTION

Process Combustion Ltd provide a complete range of combustion and heat transfer equipment used by a wide range of processes and industries.

Located in Harrogate, UK, we offer a wealth of experience in specialist combustion engineering, heat transfer and energy services and provide a complete service from conceptual studies through detailed design, fabrication, installation, commissioning and a comprehensive aftersales service.

Since our formation in 1985, we have gained a reputation for technical innovation and reliability, together with excellent quality and service.



#### **EXPERIENCE**

Process Combustion has considerable experience of supplying equipment and services to many industries including oil & gas, petrochemicals, chemicals, pharmaceutical, nuclear, food, tobacco, automotive, paper & pulp, printing, glass, and the defence, civilian and industrial firefighting services.

Our clients include leading international oil and gas operators, multinational engineering companies, government and defence organisations and an extensive list of major manufacturers with installations throughout the UK, Europe and worldwide.

Our team of engineers and project managers includes chemical, mechanical, electrical, instrumentation and control engineers. service engineers and commissioning and construction personnel.



#### PRODUCT RANGE

Our product range includes the following:

- · Indirect and direct fired process heaters
- Thermal oxidisers
- Vaporisers
- Firefighting training systems
- Control systems
- · Fuel skid packages including pipework & instrumentation
- Space and make-up air heating systems



## Company Profile

#### **DESIGN & PROJECT MANAGEMENT**

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Process Combustion identifies, executes and delivers bespoke technical solutions. Our in-house design expertise includes process, mechanical, structural, electrical, controls and material selection.

All our equipment can be custom designed to suit customers specific process requirements, and our experience of clients processes ensures we supply the most efficient system available, whilst meeting stringent emission limits, and a seamless integration of our equipment into the customers process.

Our project management experience ensures projects are completed to meet the technical and documentation requirements, and are on time and within budget through excellent interfaces with clients, our suppliers and sub-contractors.





## INSTALLATION, COMMISSIONING, SERVICE & SPARES

Process Combustion also offers a comprehensive installation, commissioning and after sales service. Depending on the client requirements we can either provide a full construction service or an expert supervisor to work with the client's construction team.

Our engineers are experienced with commissioning activities including operation, maintenance and training. After sales service includes providing spare parts and service engineers to support on-going site activities.

#### MANUFACTURING CAPABILITY

Our purpose built production facilities includes a two-bay covered 2500 m<sup>2</sup> production area with 16 tonnes & 5 tonnes capacity overhead cranes. There is a separate workshop for control system build and test.

We design and build to the latest international codes and standards including European Pressure Equipment Directive, ASME, API, AWS, NFPA, EN, ATEX etc.

Process Combustion Ltd quality assurance procedures are BS EN ISO 9001 : 2000 Quality Management System approved.



# **Process** Process Heaters

Process Combustion provide process fluid heaters for many industrial processes that demand a heating system that is efficient, safe and accurately controllable.



#### PROCESS HEATERS

Our process heaters serve the manufacturing, production, finishing, transportation and storage sectors.

We have successfully handled many forms of process fluid streams including hot air, hot water, steam, water/glycol mixture, thermal fluid, regeneration gas, and nitrogen.

In many applications the process stream can be heated directly without the need for an interposing heat transfer medium. Process Combustion can always supply a compact solution to such heating needs.

#### PCL CABIN HEATER

Process Combustion can supply a range of process heaters which are typically skid-mounted, cabin-style heaters. These are convective heaters using either a forced draught 'oncethrough' flow regime, or with additional hot flue gas re-circulation. This is a reliable, highly efficient, low cost solution to process heating requirements. Typical applications have included regeneration gas heaters in the gas processing and air separation industries.



#### APPLICATIONS

Process Combustion have supplied process heaters to many industries for various applications.

- General Industry
- Regeneration heaters for gas drying Oil & Gas, Air Separation
- Indirect air heaters Tobacco & Food
- Air heater for drying Polymers
- Plume supression Oil & Gas
- Sea water heaters Oil & Gas

#### **PROCESS & MECHANICAL DESIGN**

Each enquiry is individually assessed and our equipment is custom designed to meet the unique characteristics of each application including:



- The process heating duty
- Properties and characteristics of the process fluid stream
- The type of fuel to be used
- The anticipated number of running hours and operating cycle
- Capital, operating and through-life costs
- Project Design Codes
- 'Site-specific' requirements (Hazardous area electrical classification, Earthquake zone etc.



## Vaporisers

Process Combustion has many years' experience in the design and supply of a range of vaporisation equipment to convert cryogenic or fully refrigerated gases to their gaseous state.

Such equipment will process LNG, liquid nitrogen or oxygen, and fully refrigerated petroleum gases (propane, ethylene and butane).

#### SUBMERGED COMBUSTION VAPORISERS

Over the last decade Process Combustion has provided over 50 submerged combustion vaporiser units to the gas industry. These have been single and multiple burner format, for peak shaving and base load duty applications at many of the large UK refineries and other similar gas terminals, refineries and similar sites throughout Europe and the world.

Process Combustion vaporiser design can offer heat transfer efficiencies in the tube bundle of 99% or greater providing highly efficient vaporisation.

All the vaporiser units Process Combustion supply are fully site commissioned to ensure they reach their load requirements and offer total reliability.



#### **PROCESS COMBUSTION DESIGN**

Our design skills ensure that safety and reliability are at the forefront of our vaporiser technology. The all-metal burner technology has been developed by Process Combustion over many years and we continue to improve the design to achieve lower NOx levels and for cogeneration applications. We have also carried out multiple to single burner conversion work for clients.



#### **STATIC & SKID MOUNTED UNITS**

Process Combustion vaporisers can be permanent or mobile. Clients may be major gas utilities or engineering companies wishing to test 'process critical' equipment destined for offshore applications, before it is shipped.



## Process Thermal Oxidsiers

Process Combustion Ltd. has extensive experience in the design, manufacture and supply of gaseous and liquid stream thermal oxidisers, which safely and effectively destroy volatile organic compounds, process odours and other waste types from a diverse range of industrial processes throughout the world.

Our project references include experience with vent gases and waste streams from the production and processing of chemicals, food, glass, pharmaceuticals and the motor industry.

#### THERMAL OXIDISERS

Combustic

- Direct Fired Thermal Oxidisers
- Regenerative Thermal Oxidisers (RTO)
- Catalytic Thermal Oxidisers (CTO)
- Recuperative Thermal Oxidisers





#### **PROCESS COMBUSTION APPROACH**

The Process Combustion service includes initial assessment and characterisation of the vent or waste stream, followed by advice on the most cost-effective, environmentally safe and energy efficient thermal oxidation system.

Our approach is specific to each enquiry, so that every application is considered on its own merits, and with the optimum approach to achieve the desired emission control.

#### WASTE TYPES

- Liquid & Gaseous Hydrocarbons
- Solvent Fumes
- Smoke Fumes
- Inorganic Salts
- Bound Nitrogen
- Halogens
- Suphur
- Acid Gases



## **Process Thermal** Oxidisers

#### SYSTEM DESIGN

Process Combustion have a range of thermal oxidation technology at hand to enable the selection of the correct system to suit the application.

This means that every system we design, build and install exactly matches the clients requirements.

This could mean the offer of a recuperative thermal oxidation system, with integral recovery to minimise support fuel, or the use of catalytic oxidation to reduce fuel consumption further, or additional recovery of heat for use elsewhere in the customers own process.

#### **Direct Fired Thermal Oxidisers**

These consist of a refractory or ceramic fibre lined chamber into which the waste, air and fuel are introduced. The operating temperature and residence time are selected to give the optimum destruction efficiency.

#### **Recuperative Thermal Oxidisers**

Thermal oxidisers are often supplied with heat recovery systems to reduce operational cost and maximise thermal efficiency. Systems can be supplied with heat recovery to generate hot water, steam, hot oil or to preheat the air or waste stream. This system can also be used in conjunction with an oven or dryer.



PCL can supply complete turnkey thermal oxidation systems together with after sales support.

#### **Catalytic Thermal Oxidisers**

Catalytic thermal oxidisers are suitable for certain types of waste streams and flowrates. The main advantage of catalytic oxidisers is that the use of a catalyst allows the unit to operate at lower temperatures therefore reducing operating costs.

#### **Regenerative Thermal Oxidisers (RTO)**

Some vent gas streams are most economically handled utilising a regenerative thermal oxidiser (RTO). The main advantage of the RTO is its ability to operate with little or no auxiliary fuel due to the high degree of heat recovery possible. This allows very high thermal efficiency to be achieved. The units can also be installed in compact spaces.





## **Process** Combustion Firefighting Training Systems

Process Combustion has achieved market prominence in the design and development and supply of gas-fired firefighting and rescue simulators.

The fire training systems offer a wide spectrum of LPG-fuelled simulators of varying fire scenario types and sizes. These include a range of fire situations from a waste paper bin fire to an engine room fire on a warship. All fires are fully modulating, from minimum to maximum, under instructor control.

#### FIREFIGHTING TRAINING SYSTEMS

Process Combustion can supply a range of Firefighting Training Systems from small mobile units to large, multi scenario installations. Our systems are custom designed so that we can the supply training and system features our customers require.

The fires can be safely controlled during the exercise and we have a reputation for supplying reliable systems with fires that can be easily restarted. We can also supply systems so that there is no pollution hazard from smoke.

Each fire scenario can be set, controlled and shut down by a remote control system. This facility allows the training officer to fully control the fire and regulate its development according to the competency of the firefighters being trained.

After shutdown, the fire scenario is available for re-ignition, or can be re-configured by the Operator to simulate a new fire situation.

Systems can be designed with multiple fires, together with burner management systems, heating, ventilation, smoke, exhaust cleanup, emergency shutdown, lighting, gas detection and audio systems.







#### **FIRE SCENARIOS**

Aircraft - Interior, Engines, Wheel & Brakes

- Ships Interior, Engines, Sumps, Electric Motors, Generators, Bunks
- Houses Beds, Armchairs, Sofas, Cookers, Televisions
- Offices Computers, Waste Bins, Shelves
- Oil & Gas, Petrochemical Pipes/Flanges, Fuel Spills, Tanks, Storage

Cars and Motorcycles

## **Process Combustion** Firefighting Training Systems

#### **MODULAR CONSTRUCTION**

Process Combustion have developed a range of modular firefighting training systems which can be built from basic construction elements to provide a low-cost training solution. All controls and safety equipment can be included within the unit.

Each module is a conventional beam and column steel structure with a design life of 25 years. The basic 'building blocks' are 3m wide x 4, 8 or 12m long with an internal height of 2.8m.

The design can be arranged to include multi-floor levels, pitched roofs and inbuilt platforms for 13.5 metre ladder drills and 'working at height' training.

Modules can be customised to enhance training realism and can include domestic doors and windows, platforms, loft access hatches, rooflights, ship's hatches, ladders and caged ladders, removable stair treads and removable chimneys as well as many other features.

#### **REALISTIC TRAINING FEATURES**

Process Combustion systems are designed to simulate conditions encountered by firefighters in real situations. We have developed designs to simulate conditions such as flashover and rollover to enhance the realism of training. Also training can be enhanced by the use of additional systems such as variable lighting, artificial smoke to obscure the unit, local heating and humidity control, sound systems and strobe lights to add to realism levels. All systems are available as options to add to the basic system and are proven and reliable.



#### SYSTEM DESIGN

Process Combustion systems are designed with several systems to improve safety. LPG fuelled systems include forced ventilation, gas detection and temperature monitoring to enhance the safety of the system.







Pan Fire With Increasing Levels of Artificial Smoke

## **Process** Control & Skid Packages

All combustion or heat transfer equipment must be controlled by a system that ensures safety and reliability. Process Combustion has in-house expertise to design, build, test and commission fully integrated control panel and flow control skid packages.

#### **CONTROL SYSTEMS**

Process Combustion are able to offer an extensive range of bespoke control systems ranging from remote touch-screen, highly integrated control systems to functional push button start/stop local panels. We can supply PLC systems based on most of the major suppliers including Allan Bradley, Siemens and others.

Our combustion control systems can be designed to BS EN 746-2, NFPA and other recognised standards. Our control panels are regularly built to meet stringent Hazardous Area electrical classifications and ATEX requirements.

Control panels can be integrated with flow control skid systems so that they are trial assembled and functionally tested in the workshop prior to delivery. Such tests may be witnessed in the presence of the client or a third party quality inspector on request.

Our level of expertise ensures that the control system is totally integrated into the main equipment package, and that it is correctly specified for the equipment.

The in-house design and manufacture of control systems and skid-mounted equipment ensures that, in every case, equipment is delivered to the customer properly assembled and ready for simple site installation.

#### **PIPEWORK SKID SYSTEMS**

We have extensive experience in design, manufacture and supply of pipework skid systems. Systems can be designed to PED, ATEX, ASME B31.3 and other standards.

The skids are custom designed to suit the layout and orientation of equipment on site. Typical skid designs incorporate flow control valves, shut-off valves, pressure regulators, filters and flow, pressure and temperature monitoring equipment.

The skids are fully assembled and tested at our works which includes pressure testing of pipework and testing of automatic valves and instruments. The skids can be fully wired to local junction boxes on the skid.







## Process Combustion Installation, Commissioning, Training & Servicing

Our installation, commissioning and after-sales support team provide a back up service to our clients throughout the UK, Europe and worldwide

#### **INSTALLATION & COMMISSIONING**

Process Combustion can provide a full installation service or provide expert supervisors to work with the client staff and sub-contractors. All our systems and equipment are commissioned by our own permanent team of fully qualified and trained engineers, experienced in Process Combustion Ltd technology. During commissioning the system is proven in start-up, shutdown and emergency situations as well as normal running.

## OPERATION AND MAINTENANCE TRAINING

During commissioning, our engineers instruct the client "Hands On" in the correct and safe operation of the equipment. and demonstrate the performance of routine and preventative maintenance tasks that may be undertaken by the client in order to ensure the safe and efficient operation of the equipment, and continued applicable compliance with environmental legislation.

Formal lecture room based training can also be arranged, if required.







#### SPARES AND SERVICE SUPPORT

A comprehensive back up capability is available for all future equipment servicing and spares requirements.

When emergency assistance is required, a fast and effective response can be provided by our trained personnel, and stock of spares.

Planned Preventative Maintenance contracts can be arranged to occur at appropriate intervals in order to minimise long term equipment operating costs and ensure reliability of the equipment.



Process Combustion offer a comprehensive range of combustion equipment including process heaters, vaporisers, thermal oxidisers and fire training systems. We operate on a worldwide basis For details of your nearest agent please contact our office below.

- Fired Process Heaters
- Submerged Combustion Systems
- LNG Vaporisers
- Cryogenic Vaporisers
- Thermal Fluid Heaters
- Fired Steam Superheaters
- Hot Water Heaters
- Regeneration Gas Heaters
- Nitrogen Heaters
- Gaseous and Liquid Thermal Oxidisers
- Fire Fighting Training Systems
- Combustion Control Systems
- Burners and Combustion Spares
- · Fuel Gas supply skids
- Servicing



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