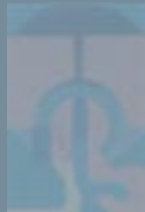


Register Burners

Advanced Low NOx Burners

P O W E R I N D U S T R I A L P R O C E S S M A R I N E



INTRODUCTION

The Register Burner Range

Hamworthy Combustion Engineering (incorporating Airoil-Flaregas, Peabody Engineering and Chentronics) is one of the world's leading suppliers of burners, flares, incinerators and combustion systems to the power generation, industrial and process industries.

With over ninety years experience in burner design, a multi-national project management team and a worldwide support network covering over eighty countries, we provide the highest levels of product performance and customer care available on the market today.

With increasingly strict legislation being introduced throughout the world, Hamworthy Combustion Engineering has developed an advance range of industrial burners and control systems which significantly reduce the emission of atmospheric pollutants such as NOx and unburnt particles.

Through dedicated test rigs and dynamic modelling techniques, burners are produced with operating characteristics which continually push the boundaries of emission reduction technology. Products and systems are designed to fire a wide range of liquid and gaseous fuels, or multiple fuel combinations.

Totally integrated engineering packages can be produced from a comprehensive portfolio of:

- Windboxes
- Atomisers
- Flame detectors
- Ignitor systems
- Burner control systems
- Boiler control systems
- Auxiliary equipment such as fuel oil pumping and heating sets, valve and instrument assemblies for liquid and gaseous fuels

Compliance with international emission standards can be guaranteed prior to installation by assessing individual site requirements, carefully incorporating parameters like furnace heat release rates, combustion air pre-heat and fuel quality such as nitrogen and residue values.

With installations throughout the world ranging from 5 MWth to 700 MWth, Hamworthy Combustion Engineering has a commitment to maintain its reputation for market leading burners, associated systems and equipment

Hamworthy's range of Register Burners are focused into four designs, offering wide application flexibility and performance.

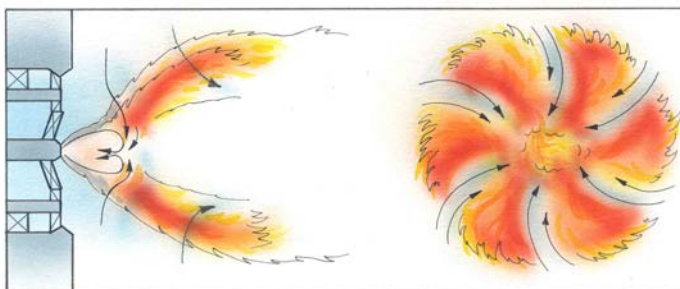
To assess the correct burner for your application please refer to the table on opposite page



Flame Configuration



Standard Burner Geometry



Low NOx Burner Geometry

HAMWORTHY COMBUSTION ENGINEERING

Total Combustion Solutions

Project Management

- A team of dedicated project engineers work closely with the customer to ensure the best possible results are achieved in all applications

Quality

- ISO 9001:2000 Accreditation

Worldwide Network

- Offices in fifteen countries over five continents
- Representation in over eighty countries worldwide

This network ensures that wherever you are in the world, you will have easy access to fully qualified personnel to provide assistance and advise on the most cost effective burner product for our application.

Total Customer Care

Hamworthy Combustion Engineering is dedicated to providing comprehensive customer care through:

- Product training at our extensive training centre in Poole or on site
- Global after-sales support through our worldwide network of service engineers
- Continual product development and enhancement through our Advanced Research & Technology Centre, the largest of its kind in the world

Additional Certification

- Russian Certification (Gosgortekhnadzor)
- Polish Certification UDT



Selection Guide

	DFL	DF	LNOG	M TYPE
Geometry	Fixed	Fixed	Variable	Variable
Low Emission Burners	●		●	
Packaged Type	●	●		
Rotatable Gas Lances			●	●
Low Excess Air	●	●	●	●
High Turn-down Capacity	●	●	●	●
Insulated Front Plate	●	●	●	●
Fixed Geometry Setup – no site adjustment required	●	●		

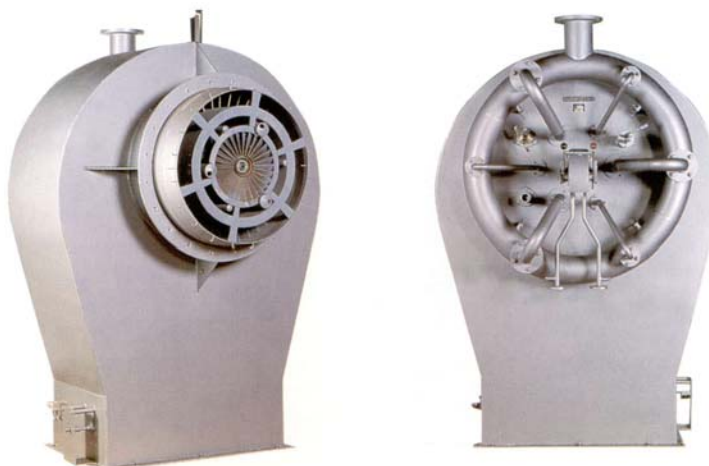
DFL RANGE

Fixed Geometry Burners

The DFL range of low emission burners incorporate unique divided flow technology to reduce NO_x and CO emissions.

The burners are internally staged and operate in low excess air conditions compared to traditional burners.

The DFL burner will typically reduce thermal and fuel NO_x by up to 60% and up to 80% by utilising recirculated flue gas.



Environmental Performance

Advanced design considerations from proven technology ensures full control of air/fuel mixing is maintained. Single source combustion air is divided into two streams. Primary air passes through the centre of a flow divider and is swirled via the diffuser. Secondary air flows in an annular section, over swirl vanes and discharges through a convergent / divergent throat.

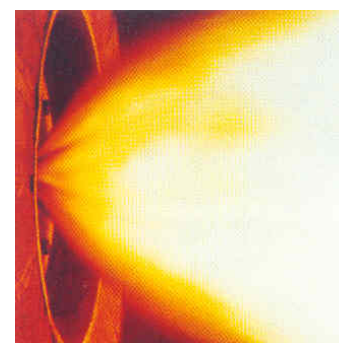
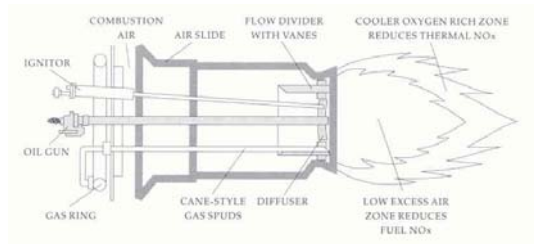
The internally staged burner utilises low excess air operation in the primary combustion zone limiting the oxygen available to combine with nitrogen in the fuel.

In the second combustion stage, additional air is added downstream, forming cool oxygen rich zone where combustion is completed and the formation of thermal NO_x is limited. The blending of these two techniques results in a unique combination of reduced NO_x formation and increased efficiency.

Most existing boiler furnace designs can be easily retrofitted with Hamworthy DFL burners to provide cost-effective fuel-efficient installations which meet the most demanding emissions standards.

Features

- Up to 60% thermal and fuel NO_x reduction. Further reductions may be achieved by utilising recirculating flue gas
- Low excess air operation and reduced particulate formation
- Meets NO_x reduction requirements while maintaining CO levels
- Firing capacities from 5 MW to 90 MW
- Low draught loss
- Low maintenance due to no moving parts
- Predetermined flame shape
- Low atomising medium consumption
- High turn-down capacity
- Wide flame stability over the whole range of operating conditions
- Suitable for ambient or pre-heated combustion air
- Combustion air pre-heat up to approximately 450°C can be handled by the standard burner, beyond this heat-resistant materials are used to ensure reliable operation in high temperature environments
- Automatic or manual operation
- Ability to fire liquid or gaseous fuels including crude oil and heaviest residue oils
- Designed to burn oil or gas individually or in combination
- Enhanced safety features including interlocking oil and steam valve block
- Suitable for vertical, horizontal or angled firing applications
- Designed for use on single or multiple burner applications



DF RANGE

Fixed Geometry Burners

The DF register burner is ideal for firing natural gas, liquid petroleum gas, liquid fuels and waste fuels. These can be fired in isolation or in combination.

Controlled Performance

Wide flame stability limits, over the whole range of operating conditions are achieved aerodynamically, eliminating the need for the large refractory quarls traditionally associated with this type of burner installation. Combination air pre-heat up to approximately 450°C can be handled by the standard burner, beyond this heat-resistant materials are used to ensure reliable operation in high temperature environments.

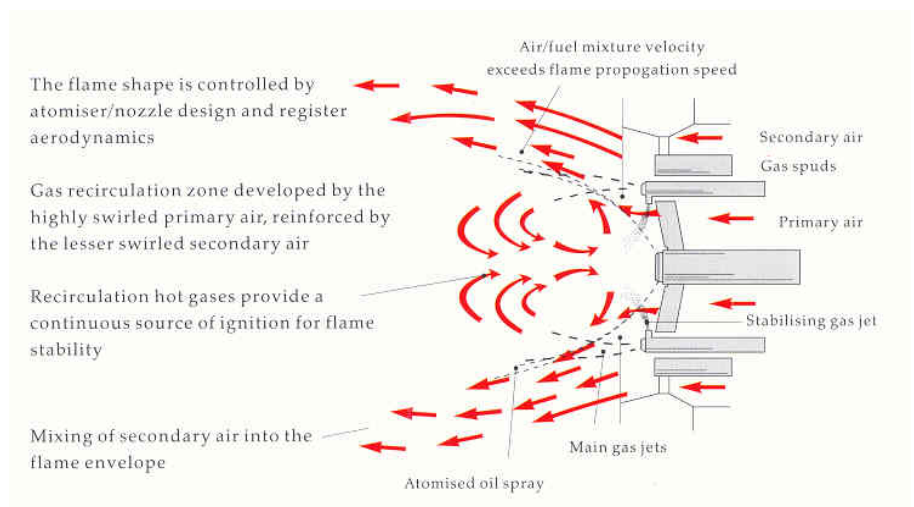
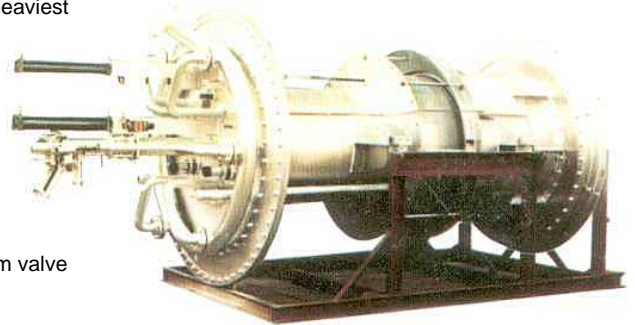
The range incorporates design considerations which allow it to be used in a variety of industries including:

- Petrochemical
- Pulp & Paper
- Steel manufacture
- Power Generation
- Distilleries

Integral design enhancements include low excess air operation, low atomising medium consumption, wide turn-down with wide stability limits and heat recovery using pre-heated combustion air.

Features

- Predetermined flame shape
- Low excess air operation
- Low atomising medium consumption
- High turn-down capability
- Wide flame stability over the whole range of operating conditions
- Suitable for ambient or pre-heated air
- Automatic or manual operation
- Ability to fire liquid or gaseous fuels including crude oil and heaviest residue oils
- Designed to burn oil or gas individually or in combination
- Enhanced safety features including interlocking oil and steam valve block
- Suitable for vertical, horizontal or angled firing applications
- Designed for use on single or multiple burner applications
- Firing capacities from 5 MW to 90 MW
- Low draught loss
- Y-jet oil tip



LNOG RANGE

Variable Configuration, Low Emission Burners

The LNOG Range of low emission burners has been designed to provide optimum flexibility in meeting emission requirements.

Performance & Versatility

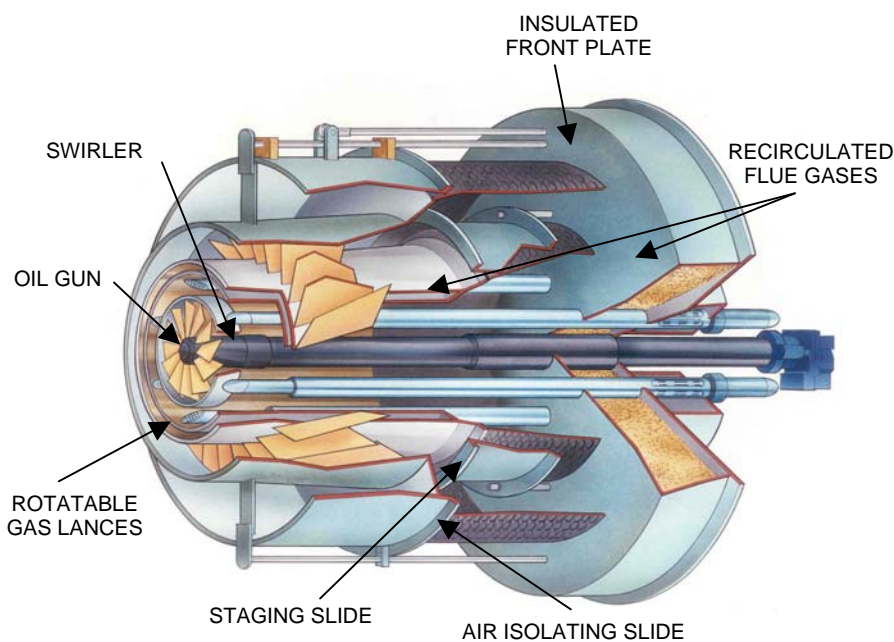
An adjustable air-staging slide and rotatable gas lances ensure that the burner performance meets individual site requirements. In addition, fine tuning of the burner whilst it is being commissioned enables the best possible emission performance.

In comparison with traditional burners the LNOG will typically reduce thermal and fuel NOx by up to 60% and up to 80% by utilising recirculated flue gas.

Dual fuel models allow the most competitively priced fuel to be exploited with instant fuel change over.

Features

- Air and fuel staging for NOx reduction
- Compliance with NOx and particulate emission levels when firing gas by utilising a sophisticated internal mix staged atomiser
- Reduced emission levels when firing gas by employing adjustable gas lances allowing dissimilar gas nozzle configuration
- Optimised primary and secondary air flows
- Ease of maintenance through all components being accessible from the burner front plate
- Short stable flame.
- Design allows for fine tuning during commissioning for optimised performance,
- Firing capacities from 6 MW to 90 MW
- Turbulent chamber oil tip



M RANGE

Variable Geometry Burners

The M Register Burner is an established product with a worldwide reputation for performance and reliability.



Wide Application

Flexibility

The variable geometry of the burner allows many different fuels to be burnt from low calorific gaseous fuels to heavy oils.

The burner has flexible flame dimensions which allow it to be used in many different applications from water tube boilers to hot gas generators.

Available in the range
5 MW - 90 MW

Features

- Flame control through curved air vanes
- Low draught loss
- High turn-down capability
- Suitable for ambient or preheated combustion air
- Suitable for positive or negative pressure furnaces
- Liquid fuels
- Choice of atomisation including pressure jet, air or steam
- For gaseous fuels, a centre gun, gas ring with lances or scrolls can be supplied
- Designed to fire single fuels or a combination
- Front plate can accommodate ignition systems, flame detectors and sight glasses
- Turbulent chamber oil tip

