

Our Three Vital Commitments

CARE - Customers Are Really Everything
COIN - COntinuous Improvements are Needed
TRAC - TRaining Accomplishes Competence

YOUR EXPERTS FOR COMBUSTION ENGINEERING

DIVISION OFFICE

110, Thacker Tower,
Plot No 86, Sector 17, Vashi,
Navi Mumbai - 400 705,
Maharashtra, India.
Tel: +91-22-42136300 / 400

CORPORATE HEAD OFFICE

26, Maker Chamber VI, Floor II,
Nariman Point,
Mumbai - 400 021
Maharashtra, India
Tel: +91-22-40373737

INTERNATIONAL OFFICE

Jasubhai International FZCO
FZS2 AC01,
P O Box: 18403, Jebel Ali,
Dubai, UAE.
Tel: +97-148860704 / 8862991

REGIONAL OFFICES

New Delhi

803, Chiranjiv Tower,
Nehru Place,
New Delhi - 110 019, India.

Vadodara

202, Concorde, R. C. Dutt Road,
Alkapuri, Vadodara - 390 005,
Gujarat, India.

Pune

Suite No 210, White House,
Sadashiv Peth,
Tilak Road, Pune - 411 030,
Maharashtra, India.

Chennai

Jhaver Plaza, 1st floor, 1-A,
Nungambakkam High Road
Chennai - 600 034,
Tamil Nadu, India.

Oman

Jasubhai Engineering Muscat LLC
Shed No 4B, Building No 1176
Plot No 1156, Way No 5222
GHALA Industrial Area
Muscat, Oman.

Qatar

Jasubhai EngineeringWLL
P.O. Box-5583, Doha, Qatar

REGISTERED OFFICE AND MANUFACTURING FACILITIES

64/a, GIDC Industrial Estate,
Phase-1, Vatwa,
Ahmedabad - 382445,
Gujarat, India.
Tel.: +91-79-49003636/3737

Email: sales_ces@jasubhai.com | Website: www.jasubhaiengineering.com

Energy Efficiency • Environmental compliance • Safety Stewardship • Quality • Productivity



Jasubhai
ENGINEERING

JEPL/CES/17/Rev B



- Waste to energy
- Process heating applications
- Fuel conversion
- Hot air generators
- Incineration solutions

Our Technology Partner


**COMBUSTION
SOLUTIONS**
CS - Combustion Solutions
Austria



Jasubhai
ENGINEERING

www.jasubhaiengineering.com



ENERGY & ENVIRONMENTAL SOLUTION

We provide turnkey solutions for energy optimisation & environmental protection.

Our offerings include complete customised solutions for meeting environmental norms in addition to saving energy costs.

Our experience while working with global Engineering consultants as well as various Original Equipment Manufacturers, and renowned inspection agencies, gives us an added edge.

End-to-End Process Solutions

- Conceptual Design
- Pre-bid analysis including site visit
- Detail customised engineering
- Equipment Manufacturing
- Buyouts Procurement
- Testing & Inspection
- Site Erection & Commissioning
- Performance Guarantee Test
- Operation training /education
- After sales service
- Annual Maintenance Contracts
- Retrofit & Modernisation

Design Codes and Standard

- ASME Sec – II
- ASME Sec – IX
- TEMA
- National Fire Protection Association (NFPA) 85/86

Key Equipment

- Burners
- Valve Racks & Fuel Control Station
- Heating, Pumping and Filtering Units
- Fuel Storage Equipment
- Safety System [SIL2/SIL3]
- SCADA System & Connectivity to the main plant
- Control System
- Hazard Detection System
- Combustion Chamber
- Interconnecting Piping
- Stack Emission Monitoring Online System
- Waste Heat Recovery System [WHRB/ Heat Exchangers]
- Pollution abatement system [Scrubbers, Bag Filters, ESP]
- Site Installation & Commissioning

Targetted Key Improvement Areas

- Safety
- Energy Efficiency
- Productivity
- Environmental Compliance
- Quality

Types of Fuel Fired

Liquid

- LDO
- HSD
- FO
- LSHS

Gases

- Natural Gas / LPG
- Hydrogen Gas
- Biogas
- Producer Gas / Syngas
- Coke Oven Gas / Corex
- Blast Furnace Gas / Submerged Arc Furnace Gas
- Coal Bed Methane

Various other low Calorific value waste liquids and gases coming from your chemical processes. Pulverised Coal for Klin Firing.

Served Industry Verticals

Power Boiler / Process Boilers

- Main Load Combustion System
- Start Up & Lance Combustion System
- Overbed Inclined Combustion System (CFBC & AFBC)
- Waste Heat Recovery Systems
- Hot Air Generators for Coal Mills

Process (Fertilisers, Chemicals, Paper, Refinery, Pharma)

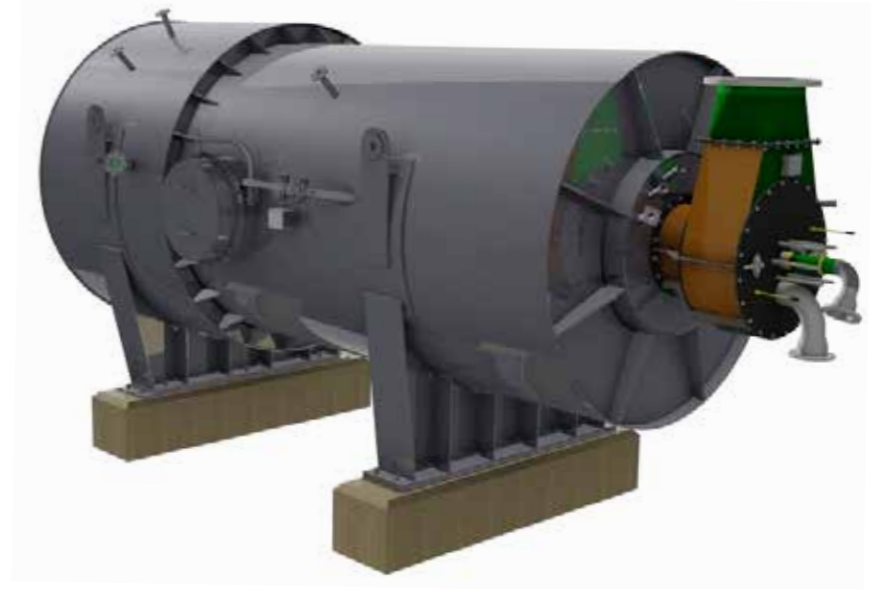
- Dryers
- Calciners
- Heaters
- Hot Air generators
- Combustors
- Lime Kilns
- Sulphur Burners
- Incinerators
- Rotary Kilns
- Thermax Oxidisers
- Thermal Combusters
- Process Heating Applications

Metal

- Rotary Kilns & Travel grate Burners for Pelletisation Plants.
- Air Preheaters for Sulphuric acid Plants

Cement

- Start Up Kiln Burners
- Hot Air generators



▲ Hot Air Generators



ENERGY OPTIMISATION

WASTE TO ENERGY

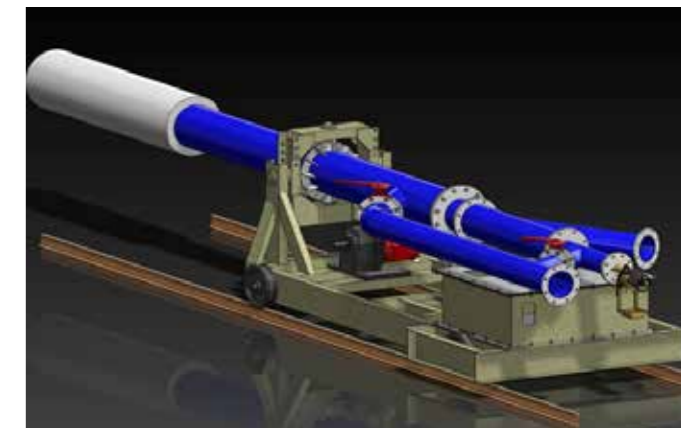
Lean Fuel Boiler Application

- Low NOx solutions for NOx and CO emissions control
- Upto 50 MW Heat Duty Capacity for each burner
- Integrates reliability of conventional combustion with advantages of staged combustion
- Designed to comply with emission guidelines
- Low Optimum consumption of atomizing media (5-7%)
- Turnkey solutions suitable for Hazardous Area applications



Lean Fuel Firing Solutions

- Custom Built design
- Suitable for Combustion firing with minimum amount of Primary Air in Kiln Burner
- Multi-channel for separate air flow control through burner for better flame stability
- Swirler designed for proper mixing of air & fuel necessary for efficient combustion
- Concentric & Steady Flame
- Single / Dual / Triple fuel firing i.e. any combination
- Adjustable Electrically operated / Manual burner trolley
- Axial & Swirl air velocities
- Variable nozzle tip for adjustable flame shapes
- Rugged and well designed burner components to ensure longer life
- Higher turn down ratios



Fuels fired in burner are:

- Solid Fuels: Pulverized coals
- Gas Fuels: Propane / LPG gas & Natural gas, Low BTU gases like Producer gas, Coke Oven Gas, Blast furnace gas, refinery gas, etc
- Liquid fuels: FO, LDO, HSD, LSHS, and all grades of liquid fuel

Main Load Combustion System (Oil & Gas Fired)

- Safe startup and shut down operation
- Comply to NFPA 86 standards
- Continuous emission monitoring & control solutions for Hazardous Area Classification
- Variable Frequency Drive (VFD) control of combustion air for reducing emissions of combustion products



Solution for Biogas Fired System

- Sugar Industry
- Co-generation Boiler
- Combination fuel firing system
- Gas control station
- Instrumentation and automation
- Increasing superheater temperature
- Uniform heat distribution
- Precise control
- Proven technology



↑ Flame



↑ AFBC/CFBC Boiler



↑ Wall firing



ENERGY OPTIMISATION

WASTE TO ENERGY

Start-Up solutions for Power Boilers

Large boilers of capacity 150MW-1000MW are usually Pulverised Coal Fired. Start-up of such power boilers requires LDO/HSD/HFO fired burner for the heating up of the boiler. Start-up burners are in operation during the initial 2-3 days for each start-up cycle. These start-up burners are also required to meet the part load requirements of the boiler during boiler upset conditions.

The Power Boilers are described with following fuel firing system:

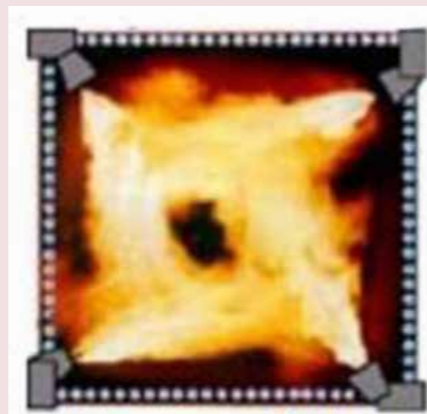
- Tangential fired
- Wall fired
- Mounting on boiler for uniform heat distribution throughout the furnace
- Equipment design to avoid flame impingement on furnace walls
- Installation to suit Pulverized coal fired Combustion System from various boiler manufacturers
- Start-up burners shall consist of a central tubular jacket for accommodating the adjustable burner gun
- The start-up burner gun is connected to the oil and atomizing medium (air/steam) by flexible hose with detachable connection at the cold ends of oil guns



▲ Start-Up Oil Gun Lance for Power Boiler

Solutions for Boiler Startup Combustion System

- Start-up combustion systems are designed to ensure flame stability during start-up procedure
- Complete Solution for hazardous applications
- Improved efficiency and reduced emissions
- Customized design of fuel firing system for Fluidized Bed combustor
- Mounting arrangement for inclined and overbed start-up Position
- Start-up Solution for crushed coal fired boiler



▲ Tangential firing

Fuel conversion Boiler Application

Features:

- Full load operation with LPG as main fuel
- Eliminates need for external sourcing of fuel
- Establish plant for continuous operation
- Minimum modification needed for the existing plant
- Increase the capacity of the plant for regasification of liquefied gas

Advantages:

- Multi Fuel Operation
- Substitution of fossil fuels
- Industrial by product as fuel
- Automation by product as fuel
- Stepless Modulation
- Low firing of different fuels
- Energy from flared gas



▲ Plant: HSD / LPG fired solutions





ENERGY OPTIMISATION

WASTE TO ENERGY

Fuel Conversion

Project Detail:

- To provide solutions for Hydrogen gas firing
- Low cost fuel firing option
- Modernization and automation

Advantages:

- Multi Fuel Firing solutions
- Utilizing excess H₂ gas available
- Step less modulation
- Co-firing of different fuel with control
- Safety and reliability



Solution for Fuel Conversion

- Conversion of Fuel Firing system from single fuel to Dual / Triple Fuel
- Combination of different fuels possible
- Low Calorific Value fuel Firing
- Retrofitting and modernization solution with Concept study and evaluation
- Heat & Mass balance calculation with equipment sizing
- Producer Gas, Blast Furnace Gas, Natural Gas also suitable for gaseous fuel like Coal Bed Methane, Coke Oven Gas, Syngas, Biogas & liquid fuels like Furnace oil, Light diesel oil, High speed diesel or any other by product with low calorific value
- Any type of process of gas
- Automation with Instrument for loop control
- Complete Turnkey solutions

Solutions for Retrofitting & Modernisation

- Concept, Study & Evaluation
- Heat & Mass balance calculation with equipment sizing
- Evaluation of measuring & control Instrumentation
- Design for closed loop control operations
- Ease of operation and maintenance
- Design to optimize operating costs



^ Tri fuel Fired Solution for Calciner Klin Hydrogen Gas + Producer Gas + HFO



^ Fuel Conditioning and Control Station



INDUSTRIAL PROCESS HEATING APPLICATIONS

Hot Air Generator - Direct

Solutions for Hot Air Requirements:

Hot Air Generators are typically required in Pulverizer mill, CFBC Boiler Start up, Air Preheater for Sulphuric Acid Plants, Drier application, Heat Exchangers etc.

Typical features of Hot Air Generators:

- Both vertical as well as horizontal orientation
- Single or Double Shell Design as per process requirements
- Refractory design to achieve ambient skin temperature
- Instrumentation including safety interlocks
- Automation for safe and reliable operation of the system



▲ Direct fired HGG



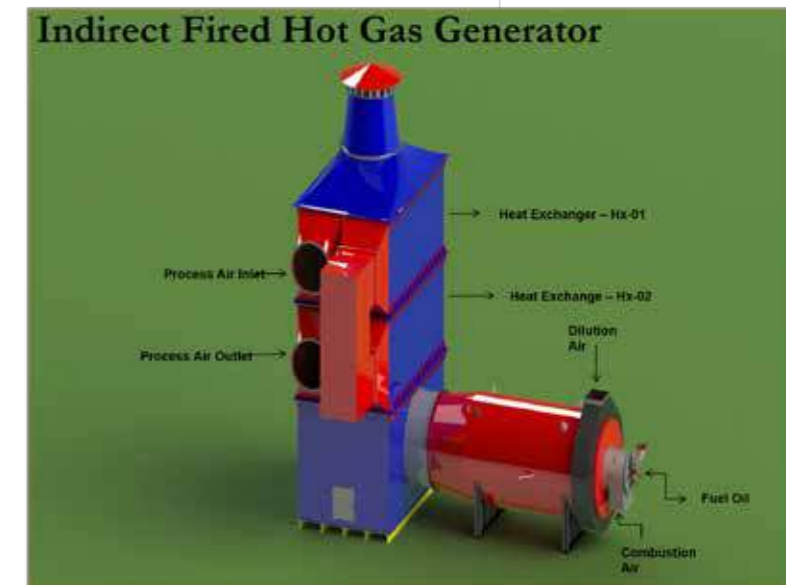
▲ Pyrobloc Insulation



▲ HGG System Assembly

Air Preheater Indirect Type

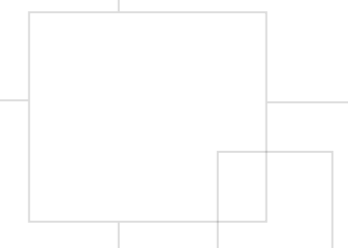
- Heat input as per process requirement
- Design to meet efficient heat exchange at process end
- Multi fuel firing system as per availability of fuel
- Refractory design to achieve ambient skin temp
- Max heat duty capacity up to 50 MW
- Design of mounting & downstream equipment
- Seamless modulation as per process requirement
- Adjusting to the process upset condition by closed loop control
- To handle large volume of Hot Air Generator
- High Thermal Efficiency
- Safety & Reliability



Solution for Dryer Systems

Solution for Dryers for Fertilizers and Process Industries for removing the moisture from the final product.

- Heat input as per process requirement
- Real time modulation with automation
- Adjusting to feed flow rate
- Refractory design to achieve ambient skin temperature
- Instrumentation including all the safety interlocks
- Automation for safe operation of the system





INDUSTRIAL PROCESS HEATING APPLICATIONS

Spent Acid Recovery Solution

- Regeneration of contaminated sulfuric acid by injecting with ultrafine atomizing technology
- Supporting fuels to include coke oven gas and vaporized waste liquids containing hydro-carbon combinations and carbon disulfide
- Complete vaporization of the sulfuric acid without droplet formation
- Space reduction with the heat recovery boiler axially and the combustion chamber on the same horizontal axis.
- Protection of components located inside the WHB with a special checker wall located in the combustion chamber exit and directly in front of the boiler tubes
- Combuster for Spent Acid Recovery
- Natural Gas as main Fuel
- Acid Gas (H₂S) firing
- Sulphuric acid plant for wet Sulphuric acid process



^ Spent sulphuric Acid Regeneration

Solutions for Sulphur Combustion

Characteristics:

- High turbulence combustion
- SO₂- Concentration up to 19% Volume
- Stable and reliable ultrasonic nozzle
- High Turn down range for Sulphur feed
- Lance for Sulphur Injection
- Optimum SO₂ generation
- Acid gas as co-firing with molten sulphur
- Steam Jacketed control station for molten sulphur



^ SO₂ generation plant



^ Molten Sulphur Combuster



^ Steam Jacketed Instrument Rack



ENVIRONMENTAL SOLUTIONS

Incineration Solutions for Industrial Waste

- Combustion of industrial waste (Hazardous and Non Hazardous)
- Design to suit heavy duty operations to guarantee good availability in extreme process conditions
- Customised Combustion Chambers to ensure complete combustion of the Lean Fuel
- Capability to burn various lean fuels like Styrene, Blast Furnace Gas, Coal Gas, etc

Burners suitable for:

- Waste water combustion
- Sulfur, spent acid and H₂S gas combustion
- Hazardous waste combustion
- Solvents
- Residues from pharmaceutical and chemical industries
- Waste gas, coke oven gas, tail gas
- Chlorinated and halogenated fluids (waste gas and waste liquid)
- Bromine, Liquor, Nitrogenous Waste
- Dust (grinded solid) from the chemical industries.

Scrubbing Unit to remove harmful effluents like Sox, CO etc



↑ Industrial waste Incineration Solution

Thermal Oxidation Solution

Thermal oxidation of liquids, gases and powdered solids derived from by products in the refinery, petrochemical, chemical and pharmaceutical industries.

The high-turbulence burner ensures excellent mixing while the ultrasonic nozzles realize the proper vaporization. Thus the residence time of the flue gas inside the combustion chamber can be reduced. The retention during the oxidation process and the combustion chamber physical dimensions are both greatly reduced.



↑ Acid gas & Sour water stipper gas Incineration Solution



ENVIRONMENTAL SOLUTIONS

Waste Streams from Industry

- Gas Processing
- Petroleum Refining
- Petro-chemical
- Industrial Process Waste Stream



Salt containing waste streams

Waste Type

Inorganic Salt:

- NaCl
- Na₂SO₄
- Na₂S

Acetate & Oxylate of Alkali Metals:

- Lithium
- Sodium
- Potassium
- Rubidium
- Caesium

Industry Application:

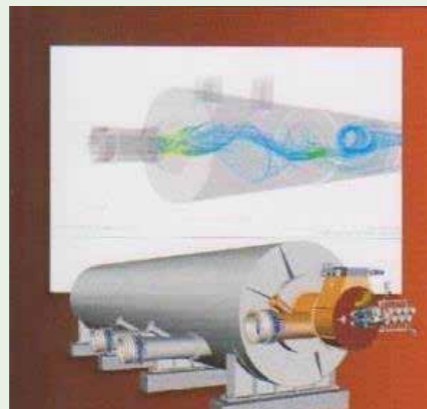
- Spent Caustic Waste Streams
- Organic / Inorganic Salt Solutions
- Catalyst Application
- Petro-Chemical Plant

Key Features

To freeze molten salts prior to contact with downstream heat recovery equipment. Low Porosity refractory to minimum salt attack

Halogenated HC Incineration

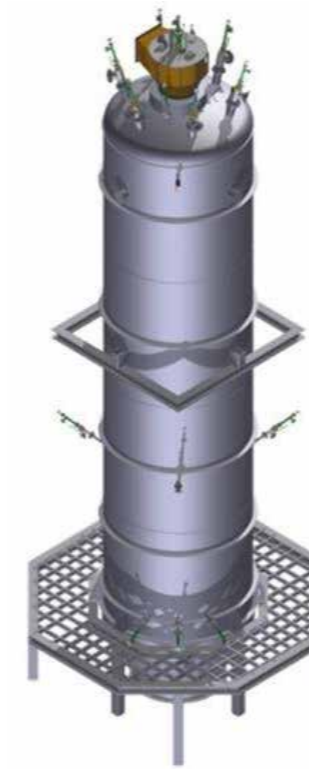
- Vinyl Chloride Monomer (VCM)
- Ethylene Dichloride (EDC)
- Carbon Tetrachloride (CCl₄)
- Polyvinyl Chloride Biphenyl (PCB)
- Brominated Waste Streams



↑ Halogenated Hydrocarbon Thermal Oxidizer



↑ Vertical Top down arrangement



↑ Thermal Oxidizer Package



ACCESSORIES FOR INCREASED & EFFICIENT COMBUSTION

Accessories for Combustion Solutions & Package Equipment

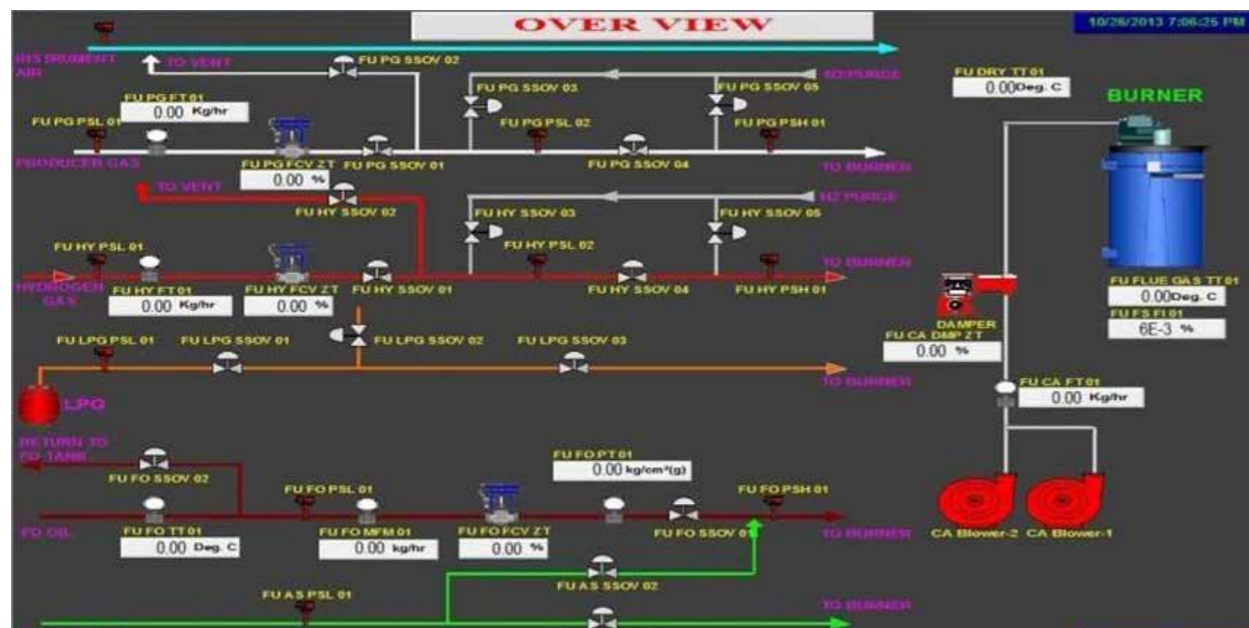
Package Equipment for Continuous Emission Monitoring System:

- Cost effective, pre-engineered CEMS Solution to monitor stack gases like CO, SOx, NOx, O2, total hydrocarbons, hydrogen sulphide, particulate matter.
- We help you meet data reporting requirements, maintain emissions compliance, and ensure certification and compliance with your local and international regulatory agencies.
- We offer either extractive type or dilution based CEMS with sample handling or in-situ analyzers depending on the site requirements.



Supervisory control and data acquisition (SCADA)

SCADA Systems allow real time calculations to be made on the received data and make the results available as a "virtual" value. The real time values can then be used by the SCADA software for Real Time Display and Operator Interactions (Supervisory Control) and Recording (Data Acquisition). A good automation has several advantages. Need for less manpower, and accurate processes are the features of a good automation.



- Provide demonstrable reductions in energy consumption and contribute to a reduction in carbon dioxide (CO2) emissions by ensuring complete combustion
- Contribute towards compliance with mandatory legislation
- Monitor & Control the process
- Continuous modulation for energy efficiency
- Compliance to mandatory emission levels
- Trend monitoring of process parameters for analysers
- Multi variable set point programming and charges in process requirement

Combustion Solutions - Instrumentation and Automation

Ensures a complete secured Automation Package with real time control loops.

Control Loops Include:

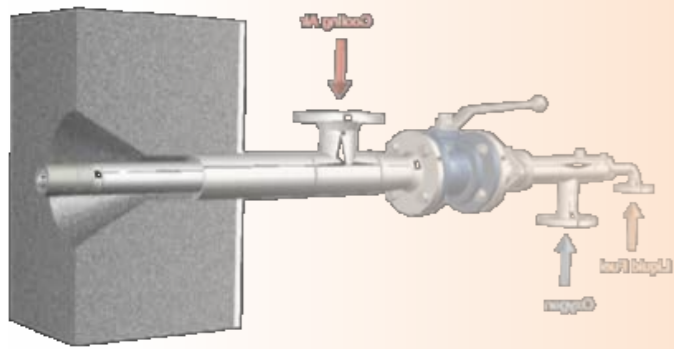
- Temperature Control Loop
- Air to Fuel Ratio Control
- Flow Control Loop
- Dedicated PLC based BMS Panel with SIL1, SIL2 and emergency shut down (ESD) SIL3 compliant system
- Automation including mandatory safety interlocks
- Customized SCADA Interface, HMI Screen and Local
- Service Panel for field operation
- Instrumentation suitable for Hazardous area (Zone1, Zone2) application
- Customized SCADA Interface and HMI Screen
- Local Service Panel for field operation
- Instrumentation suitable for Hazardous area (Zone 1, Zone 2) area classification



Fuel Control Station - Package



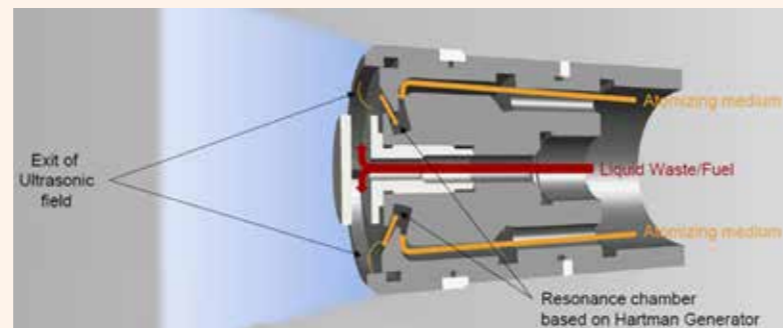
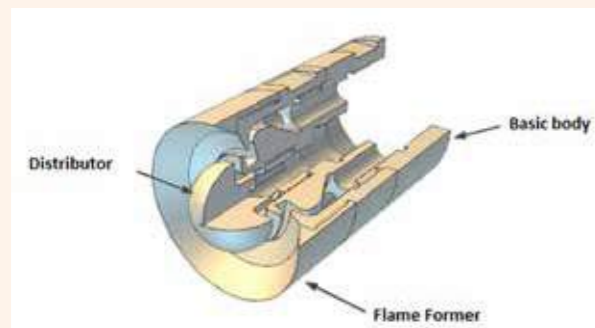
- Control system application design & review
- Comply to designs STD
- Manufacturing as per quality plan
- Optimum Design of auxiliary equipment's
- Instrument selection for measuring & Control



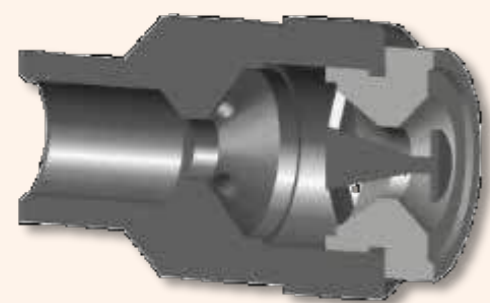
ACCESSORIES FOR INCREASED & EFFICIENT COMBUSTION

Advantages of the ultrasonic nozzle

- Stable and calm spray pattern, smooth atomizing
- Non moving parts, manufacturing in different materials, less abrasion
- Increased control range
- Use of different distributors to match the atomizing for the individual case
- Tulip and jet atomization with only 1 base body
- Easy changeover from tulip nozzle o jet nozzle on commissioning
- Economically use of atomizing medium, reduced costs

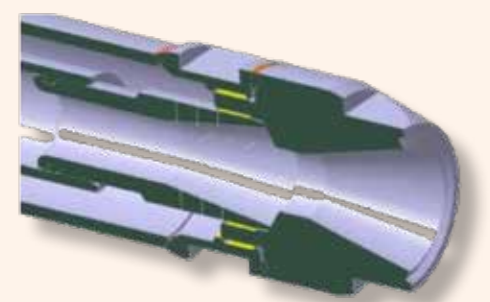


▲ Ultrasonic Nozzle 1



Premixing nozzle SL

- For clean and moderate polluted media
- Low requirement of atomizing media
- Mass flow up to 10.000kg/h

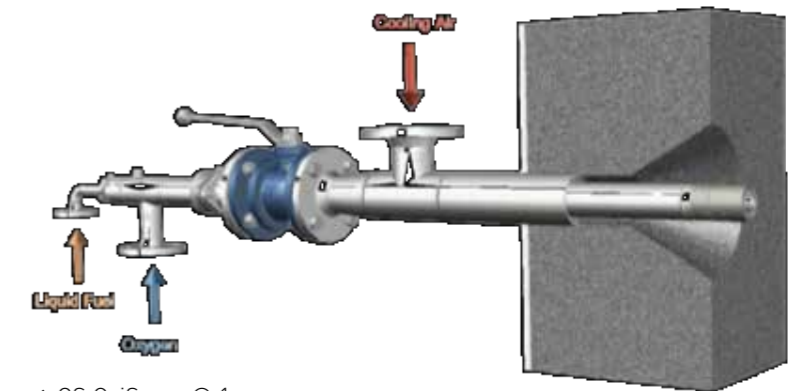


Waste Nozzle DDM - X

- For highly viscose and polluted liquids
- No built in components
- Mass flow up to 10.000kg/h

Combustion with Oxygen

- Used for liquid fuels
- Atomization with Oxygen instead of air or steam
- Increasing of capacity
- Used for gaseous fuels
- Operation with Oxygen instead of air
- Possible retrofitting of plants without changing therefractory lining of existing combustor
- Increasing capacity



▲ CS OxiSpray © 1

Fuel Handling System Package

- Customized design for fuel handling system as per type of fuel
- Complete solution for highly viscous and other nonspecified fuels
- Fuel storage solutions incorporating, heating, and transfer pumping systems
- Fuel valve trains designed for start/stop operation in compliance with NFPA standard
- Fuel valve train designed for all types of fuels



CONSULTANCY & SERVICES THAT KEEP YOU OPERATING SAFELY & EFFICIENTLY

Your Single Source for Combustion Engineering Solutions & Services

For more than 30 years, Jasubhai Engineering has been supporting the process industries with energy optimization, environmental solutions, and much more. Some of our key competencies include:

- Safety & Environmental Compliance Programs
- Emergency Service & Preventive Maintenance Programs
- Retrofitting, modernisation and fuel conversions
- Spare & Replacement Parts Programs
- Installations & Startups
- Consulting (Energy and efficiency audits and more)
- Training (Combustion seminars and customer sessions)

Our comprehensive custom engineering solutions and intelligent support of industrial combustion processes, including burners & burner management systems, controls and refractory products, optimize the efficiency and safety of clients' operations worldwide.

Our Services

At Jasubhai Engineering, we understand that running a safe operation is good business, and we are committed to helping you achieve excellence in all aspects of your production activities by offering an ideal combination of engineering expertise and field support.

Safety & Environmental Compliance

Jasubhai Engineering ensure compliance and safety checks related to the following regulations and codes:

- National Fire Protection Association (NFPA) 85/86
- Operational Support (Training, Work Procedures, Documentation)
- Upgradation & Modernization to Improve Safety & Environmental Protection

Emergency Service & Preventive Maintenance

Jasubhai Engineering provides a full range of onsite and remote support for many types and makes of industrial combustion systems. Our ability to help you prevent down time and troubleshoot problems includes:

- Commissioning & condition monitoring – consultancy
- Troubleshooting on site support
- Extended Warranty Programs

Our installation supervision and commissioning teams work seamlessly with customers and OEMs pre-installation, during and after installation to ensure that combustion processes are running on time, as specified, and within budget.

Combustion Studies & Consulting

As the experts in Combustion Engineering & Burner Control systems & corresponding instrumentation, we will help you get the most out of your processes with safety and sustainability.

Whether you need assistance with answering technical questions or achieving strategic objectives, we have the knowledge and expertise to help you make informed choices and deliver measurable results.

Modernizations & Upgrades

Industrial combustion systems have working lives that can span decades. As the demand for new products, tighter tolerances and more robustness, safety and environmental protection increases, Jasubhai engineering can breathe new life into your old equipment and make your facility state-of-the-art.

Benefits includes:

- Improved Production Capabilities
- Improved Safety & Environmental Protection
- Ability to Broaden Your Customer Base
- Lower Energy Costs

Training that works

We have great assets, in the form of combustion experts who can impart practical knowledge based on many years of training and experience.

We arrange trainings for customer personnel at their preferred location so that they can address responsibility of the operation of their equipment better.

Jasubhai Engineering has been providing custom engineering & intelligent support of combustion, comprehensive support for all major makes of industrial burners, burner management systems & related equipment.