A world designed to last

Large Scale Vortex Burner (LSV®)

Our hydrogen-ready, ultra-low NOx combustion solution



TECHNIP ENERGIES

Technip Energies' burner technology

Delivering low emissions and carbon-free combustion solutions

Clients and regulators are placing more stringent demands on combustion systems than at any time in the past. On the one hand, plant owners target a lower carbon footprint, higher capacity, greater reliability and lower costs. On the other, regulators mandate higher efficiency and tighter emission tolerances on pollutants like carbon monoxide (CO) and nitrogen oxides (NOx).

In response to changing market conditions and the evolving legislative framework, Technip Energies' experts in fired heaters developed proven combustion solutions, including our LSV® burner technology.

The LSV was pioneered by Air Products, a company with substantial experience in fired heater operation. For more than 20 years, the LSV burner has been in service in steam-methane reformers and ethylene cracking furnaces. The LSV burner offers fuel flexibility and can be operated over a wide range of conventional fuels and up to 100% hydrogen fuel.

Features	Benefits
Unique nozzle design to rapidly dilute fuel	Flameless combustion Low NOx
Very flexible fluidic flame stabilizer	Ultra-lean and cool primary flame
Robust design	Reliable
Multi-fuel flexibility	Burner can be used for a wide range of processes
Shielded fuel lances	No coking or plugging Clean tips Suitable for hydrogen fuel firing
Adjustable and uniform flame heat release profile	Heat release matching process requirements Lower radiant tube wall temperature High firebox efficiency
Manufactured by Technip Energies	State-of-the-art manufacturing practices
The burner flame is not in contact with any metal or refractory parts	Low NOx emission 100% hydrogen-fuel ready

In certain applications and regions, the LSV burner can be used to avoid much more capital intensive DeNOx systems based on selective catalytic reduction (SCR).

Why choose the LSV burner?

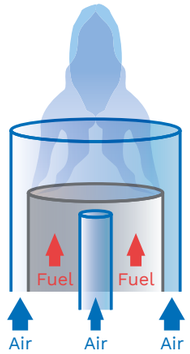


The LSV burner is a cost-effective, ultra-low NOx burner solution representing Technip Energies' know-how and successful track record in combustion system design. It can be applied to a wide range of fired heater applications and will accommodate all combustion air supply modes (natural draft, induced draft, forced draft, balanced draft and/or gas turbine exhaust).

Combustion air may be at ambient temperature or preheated to above 500°C. The burner is suitable for a wide range of fuel gas compositions, including hydrogen and ammonia, and is further suitable in many firing configurations, e.g. roof (top down-shot firing) and floor (bottom upshot firing) in the firebox.

Field results confirm our best-in-class burner technology:

- Ultra-low NOx emissions
- Tunable flame heat release profile
- Compact flame for longer lasting radiant tubes
- Trouble-free plant operations
- Selective catalytic reduction (SCR) avoidance in certain applications and regions
- Smooth burner light-off
- Fuel flexibility



The burners can be, and have successfully been, applied to retrofit projects. Replacement of existing burners with LSV technology can result in higher capacity and run length.

The high quality of the LSV burner arises from its:

- Simple, single burner block design
- High-grade, standard tip materials
- Robust design
- Ability to avoid overheating and tip-fouling
- Versatility for retrofit projects
- Supply chain management by Technip Energies





Research and development

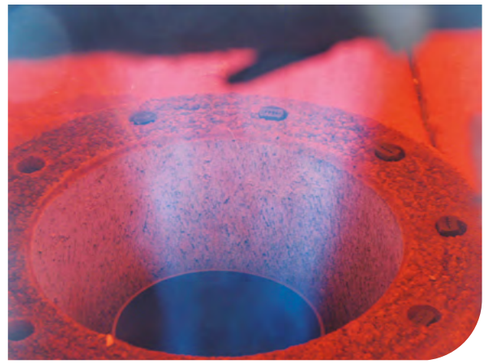
Technip Energies continuously improves and develops the LSV technology in a radiant firebox environment.

Our combustion experts continue to develop the burner technology at T.EN's own burner test facility in The Netherlands to improve performance, flexibility and achieve even lower emissions. Please see our Technip Energies flysheet "Technip Energies Burner Test Facility."

Technip Energies applies its LSV for 100% firing of hydrogen. Substituting methane (or other carbon-containing fuels) with 100% hydrogen avoids direct CO_2 emissions from the furnace. Replacing hydrocarbon-based fuel with clean-burning hydrogen is an important way to advance the energy transition across many industries.



Test furnace



Bottom-mounted LSV burner in operation



Top-mounted LSV burner in operation



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