



Selas Fluid Reformers

Global Experience in Steam Reforming

Many processes throughout the petrochemical industry are based on the use of hydrogen produced by the reforming process, where a hydrocarbon-steam mixture is converted into a hydrogen rich gas in the presence of a catalyst at elevated temperatures and pressures. The recent increases in the demand for hydrogen as a synthesis gas in the production of low cost bulk chemicals for the specialty chemical and pharmaceutical industries, and the need to meet clean fuel requirements, have increased the demand for hydrogen production.

Since our first reformer installation in 1948, Selas Fluid has completed over 250 hydrogen reformer contracts worldwide. Our reformer designs are in operation throughout the world on virtually all types of feed stocks, from natural gas through naphtha, and offer conversion to hydrogen; mixtures of hydrogen and carbon monoxide synthesis gas for methanol or oxo-chemical production; mixtures of hydrogen and nitrogen for ammonia production; and production of natural gas substitutes.

The Technology

Selas Fluid's process design is performed with a proprietary incremental kinetic model that was developed in-house, and refined with the data from over fifty years of operating experience. This model predicts the reforming process for a variety of feed stocks, and reformer configurations (such as top fired, wall fired, or floor fired). Our top fired design combines both process and physical arrangement benefits to minimize the total cost of ownership. **Advantages of the top fired design include:**

- Allowance for either modularized or stick-built construction to take advantage of the relative differences in shop assembly vs. field construction costs.
- Compact firebox with fewer burners relative to the number of tubes. The smaller surface area per unit volume when compared with wall fired reformers minimizes heat loss, and also reduces construction time.
- Single operating level of burners allows easy access and simplified combustion control.
- Allows the use of horizontal or vertical heat recovery section to match plot space requirements.
- Maximum reforming efficiency by achieving the highest heat flux at the location of the highest endothermic reaction (the upper one-third length of the catalyst tube).

The optimization of the reformer with the waste heat recovery section can be tailored to suit multiple design cases for varying feed stock, fuels, and steam requirements. The use of computation fluid dynamic (CFD) modeling and 3-dimensional design programs integrates process design with physical layout.



Did you know...

Selas Fluid Processing has provided over 1 Billion SCFD of installed capacity in the last four years.

SFPC was the first independent heater supplier to design, construct, and offer process guarantees for reforming furnaces in the United States.

In 1959, we received our first patent for our reforming furnace technology, based on the Selas Gradation® concept, which provided a uniform temperature profile around catalyst tubes through multiple rows of wall fired burners.

We have integrated the latest in low NO_x burner design with post combustion emission reduction technologies (such as selective catalytic reduction) to meet single digit NO_x, CO, and NH₃ emission standards.

Our reformer capacities range from approximately 3 MM SCFD to over 120 MM SCFD.

SFPC also offers:

- Concept Studies
- Detail Engineering, Procurement, Fabrication
- Field Construction
- Commissioning and Operator Training
- Upgrades for Increased Performance
- Replacement of Tubes, Manifolds, Burners, and other parts

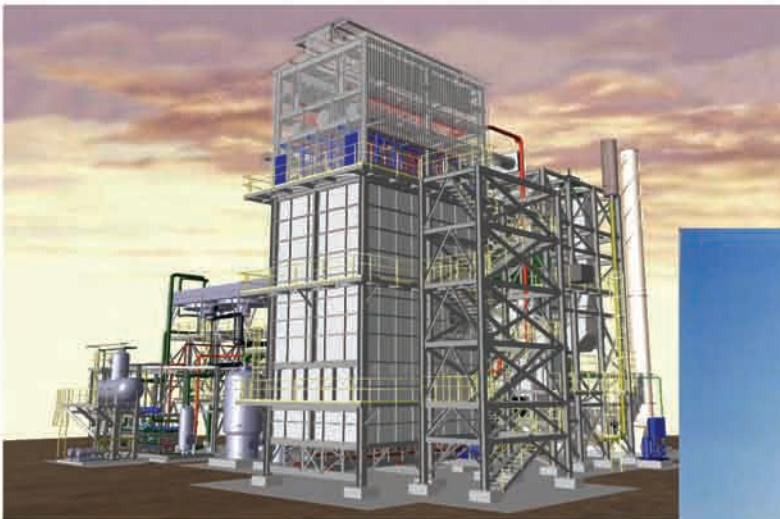


Energy Efficient Designs

Waste heat recovery from flue gas and process gas is an important aspect of Selas Fluid's overall reformer design. Our technology encompasses a complete range of heat recovery concepts and equipment choices. In each case, we will select the type of heat recovery system that best suits the needs of our customers. This may take the form of combustion air preheat systems, steam generation, and gas turbine integration. Selas Fluid is prepared to offer complete overall systems responsibility, based on customer requirements, including interconnecting piping and installation.

State of the Art Design Tools

Selas Fluid employs Intergraph's Plant Design System (PDS®) three-dimensional modeling software to create equipment, structural, and piping drawings. Computational Fluid Dynamic (CFD) modeling helps enable our engineers and designers to simulate fluid flow and heat and mass transfer. This tool is used in concert with our Technical Center pilot plant to provide insight into design issues, leading to improved functionality, return on investment, and savings in capital and operating costs for end-users.



From initial 3-dimensional design model to the finished product: The design tools utilized by SFPC allow clients to progressively visualize the reformer as it is being designed.



Selas Fluid Processing Corporation is a wholly-owned subsidiary of the Linde Group. Since 1946, we have provided timely and innovative solutions to meet customer needs.

"H₂H_Q - Your hydrogen headquarters."

Call us today to learn more about our reformer technologies, or visit us online at www.selasfluid.com

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