Steam methane reformers.

Many processes throughout the refining, petrochemical, synthesis gas and ammonia/ fertilizer industries 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.

Global experience in steam reforming

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
- Production of natural gas substitutes

We were 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 Gradiation® concept, which provided a uniform temperature profile around catalyst tubes through multiple rows of wall fired burners.

We have integrated the latest in low NOx burner design with post combustion emission reduction technologies (such as selective catalytic reduction) to meet single digit NOx, CO, and NH_3 emission standards.

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

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The technology

The reformer process design is performed with a proprietary incremental kinetic model, and refined with data from 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:

- → 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).

Energy efficient designs

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 computational fluid dynamic (CFD) modeling and three-dimensional design programs integrates process design with physical layout.

Waste heat recovery from flue gas and process gas is an important aspect of the 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.

Services

- → Revamps & rebuilds - we supply, upgrade and service fired equipment - our own Selas brand or that of other OEMs. Our customer service team in Houston, TX, positions us to provide prompt support to our clients globally.
- → Worldwide procurement maximizes value to our clients and ensures timely project delivery. Our location in Tulsa, Oklahoma USA houses one of Linde's strategically located procurement centers.

Selas Linde Engineering North America Inc.
A division of Linde Engineering North America Inc.
Five Sentry Parkway East, Suite 300, Blue Bell, PA 19422 USA
Phone +1 610-834-0300, sales@leamericas.com, www.leamericas.com