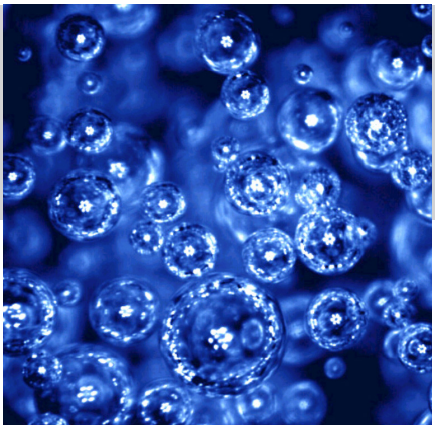
BUSS ChemTech

REACTION TECHNOLOGY



CATALYTIC GAS / LIQUID REACTIONS

Buss ChemTech is recognized as the world leading technology supplier for gas/liquid reactions.

For many gas/liquid reactions, the main challenge is overcoming mass transfer limitations. The Buss Loop® Reactor is the tool of choice to maximize gas surface area by vigorous and effective dispersion of the gas into the liquid phase.

This results in one or more of the following process advantages:
- **significantly shorter reaction time**
- **higher yield and/or selectivity**
- **reduced catalyst consumption**

We are a solution provider. Based on our proven technologies, Buss ChemTech delivers high level process design packages for your chemical plant with the relevant proprietary equipment. Together with our strategic partners, we can also supply our clients with expanded scopes of supply and services, up to and including a turnkey plant.

OPERATING PRINCIPLES OF BUSS LOOP® REACTOR TECHNOLOGY

The Buss Loop® Reactor consists of the Reaction Mixer (Venturi "jet ejector"), the Reaction Vessel, the Reaction Pump and an external heat exchanger. As the entire gas-liquid mass (including catalyst) is circulated through the loop, the entire volume is considered working volume and the whole system acts as a reactor.

- The Reaction Mixer is a high performance gassing tool and generates very small gas bubbles (µm range) producing very high mass transfer rates. The two-phase mixture created in the reaction mixer is then injected into the fluid of the autoclave.
- The Reaction Vessel of a Buss Loop® Reactor has a simple geometry (no baffles or internal heat exchange surface so it is easy to empty and easy to clean). The two-phase mixture that "jets" into the reaction autoclave causes intensive secondary mixing, maintaining the small bubbles created in the reaction mixer and provides additional high mass transfer reaction volume.
- The independent heat exchanger can be built as large as required and is not limited by the reactor's working volume.
- The circulation pump produces high power input per unit volume (kW/m³). The special pump design allows pumping of liquids with high solid (catalyst) contents and high gas loads (up to 30 vol %) without cavitation.

AVAILABLE TECHNOLOGIES

Buss ChemTech has developed complete processes in the areas of ethoxylation, hydrogenation (sugar alcohols, resin/rosin, nitroaromatic compounds) as well as for a broad range of fatty-acids (amines, nitriles, amides, chlorides, etc.).

OTHER EXPERTISE

Over 900 reactions, including hydrogenations, oxidations, alkoxylations, alkylations and many others, have been developed and/or optimized by Buss ChemTech during the last several decades for industrial scale processes, saving our clients millions. This experience is a reliable basis which can be adapted to a client's process within a short timeframe and with minimal effort.

DEVELOPMENT

Our laboratory and pilot plant facilities are available to simulate almost any industrial application and even open the door to new chemical processes.

SUMMARY:

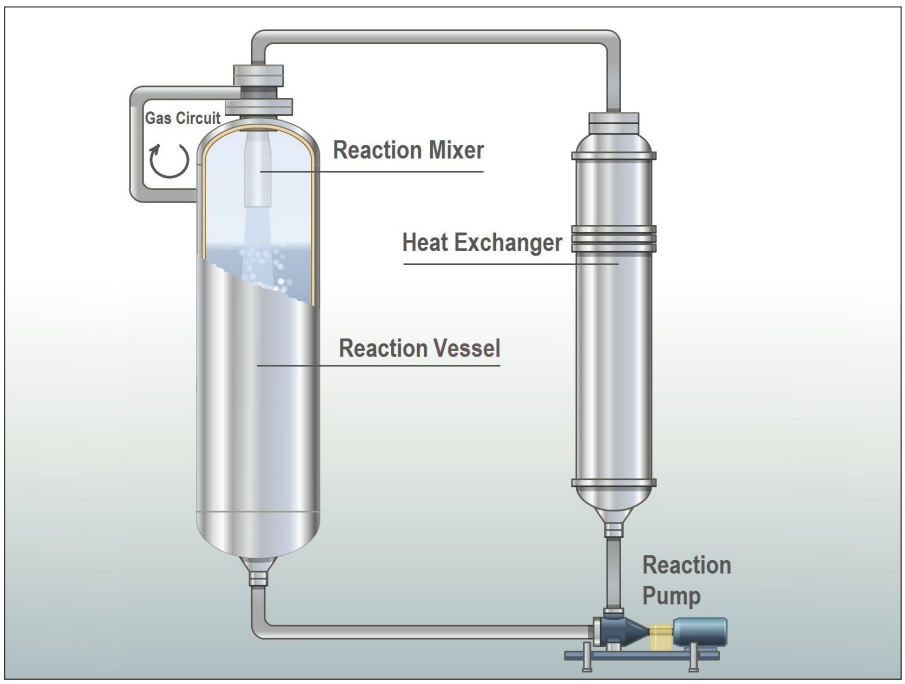
Our main focus is on plant safety, process intensification, reliability of scale-up and guaranteed plant performance:

- "Safety First" is not just a slogan for Buss ChemTech, it is our commitment to you, the environment and to our clients' and our staff members. Performing a safety analysis during the design stage, avoiding explosive mixtures in our process design, specifying the appropriate monitoring equipment and building in safe shutdown procedures into the process control scheme, are all components of the "inherently safer design" concept we employ.
- Improved performance, whether through improved selectivity and yield, shorter reaction times or lower catalyst usage, is the goal of our research and development efforts.
- The design characteristics of a Buss Loop® Reactor system allow us to scale up to virtually any size reactor with confidence.
- Process guarantees are derived from our know-how, experience and project-specific lab and/or pilot scale testing (if necessary).

With the Buss ChemTech approach, our clients get the information they need to estimate CAPEX, OPEX and payback period - with minimized investment in time and money.

Buss Loop® Reactor technology is generally suitable for all kinds of processes, but strongly recommended if one or more of following conditions apply:

- catalytic gas/liquid reactions
- highly exothermic reactions
- flexible operating volume required
- continuous processes
- requirement for treatment of the gas phase (condensation, absorption, etc.)



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