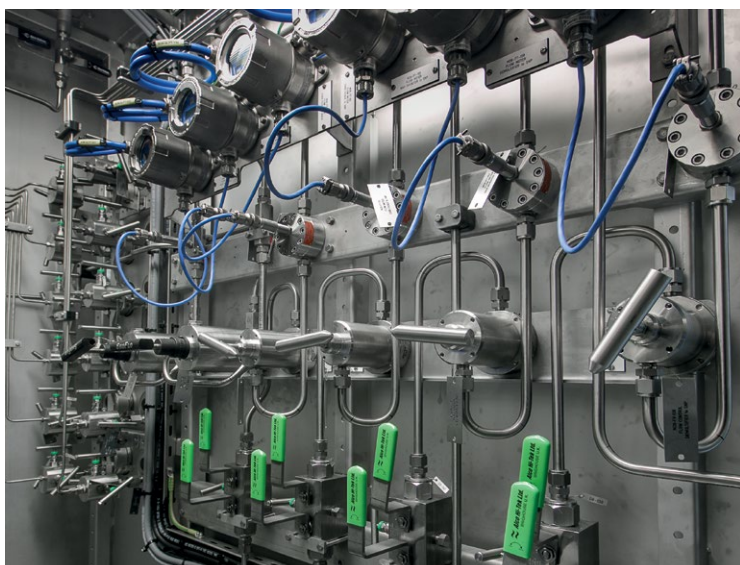


## Chemical Distribution Systems



Chemical Distribution System within Cabinet

### Product Definition

**Chemical distribution systems are commonly used in production facilities in the oil & gas industry. They prevent or mitigate a wide range of problems that might negatively affect the production flow and/or process completion. Frames designs, manufactures and supplies custom-built distribution systems for a broad range of process applications, including production processes, (produced) water treatment and hydrate control in pipelines and wells.**

### Product Description

Chemical distribution systems are used to convey chemicals over multiple injection points. The main advantages of distribution systems are cost reductions, reduced plot space requirements as well as weight reduction compared to a configuration in which a dedicated pump head is required for each injection point.

A chemical distribution system is generally composed of an injection rate control device (IRCD), isolation valves, a check valve and a flow meter. IRCD's are self-regulating, pressure-independent valves and can be locally or remotely adjusted for optimized control. Accurate flow control and metering systems prevent over or under injection of chemicals, resulting in substantially decreased operational costs.

Flow control valves (choke valves) are used for high flow applications allowing the injection of high volumes of MEG and Methanol. These systems use flow meter feedback to continually adjust the control valve orifice resulting in a pressure-independent flow control.

Thanks to years of experience in designing and assembling equipment for flow assurance, Frames specialists offer the valuable know-how required for advising effective solutions. Our in-house multi-disciplinary engineering capability ensures that each chemical distribution system is designed in accordance with client specifications and local legislation. Being supplier-independent, Frames is in an excellent position to select the best solutions, striking a balance between capital investment (CAPEX) and operating costs (OPEX).

# Chemical Distribution Systems

## Process Description

One of the main challenges in the upstream processes of the oil and gas industry is to protect pipeline and process equipment against waxes, scaling and asphaltene deposits. The engineering disciplines involved in flow assurance play an essential part in mapping the requirements that reduce or prevent loss of production due to pipeline or process equipment blockage. Frames Chemical Injection Systems play an effective role in optimizing flow assurance.

### Production Chemical Injection

Frames Production Chemical Injection Packages guarantee that flow assurance requirements are met in pipeline and process equipment and optimize processes in production facilities. Typical flow assurance chemicals used include wax inhibitors, pour-point depressants, asphaltene inhibitors, and scale inhibitors.

In addition to flow assurance, Frames Chemical Injection Systems are also used to protect and prolong the lifetime of pipelines and process equipment by hindering agents that can create failure modes. Typical Frames packages are used for corrosion inhibitors, biocides, demulsifiers, and foam inhibitors.

### (Produced) Water Treatment Chemical Injection

Crude oil and natural gas is generally extracted along with large amounts of produced water. In addition, the water/oil and water/gas ratio of modern extraction processes has been steadily increasing due to the implementation of secondary and tertiary extraction processes. A Frames Chemical Injection System provides a convenient solution for adding chemicals to treat the water prior to discharge or reinjection into a reservoir. Our systems are used for a wide range of treatment chemicals, including biocides, antifoam agents, deoilers, demulsifiers, nitrate inhibitors, and (sodium) hypochlorites.

### Hydrate Control

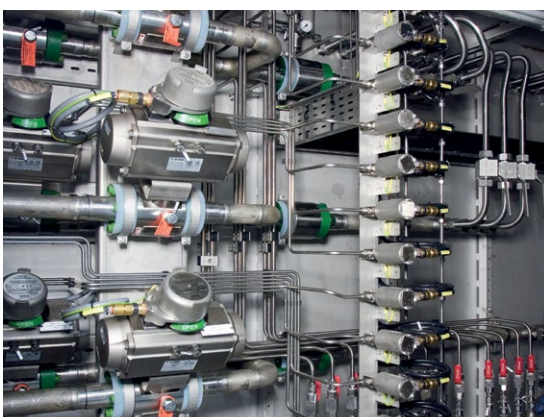
Hydrates are crystalline, ice-like structures that are formed under certain process conditions during the natural gas extraction. Hydrates attach to pipelines and equipment walls, and are capable of blocking the pathway in flow lines and other related gas handling equipment. In many processes, adding a chemical is an option reverted to when other solutions are commercially not viable. In such cases, Frames Chemical Injection Systems offer an efficient solution for injecting either methanol, MEG or LDHI / KHI.



Manual Operated Distribution System on a Chemical Injection Package



Turret Chemical Distribution Package



High Flow Methanol Distribution Package

# Chemical Distribution Systems

## Project Management

At Frames, we understand that success depends on sharp project management. As our client, we are driven to supporting your business, with our dedicated project team always on hand for one-on-one contact, providing you with the best possible service.

From concept through to design, production, testing and delivery, our project team will know your operating environment, and will use the latest technology to precisely meet your needs.

We are solution orientated, understand your industry and always use strict document control and professional planning to exercise tight process control and meet all delivery deadlines. Our global office network, international supply chain and partnerships with leading vendors mean we are always able to supply the best systems and meet all of the local requirements and regulations.

## Technical Details

- Wide range of materials, including SS316(L), (super) duplex and titanium
- Piping designed to code, such as ANSI, fabrication to ASME Section IX
- Instrumentation tubing, also used as process piping in both twin-ferule and cone-and-thread type
- Injection pressures up to 15.000 PSI / 1.034 bar(g) and flows from low l/h to high m3/h
- Compliance with local legislations, such as PED, Ce, ATEX, Nema, Dosh, and NR13
- Range of flow meter solutions, including variable area, positive displacement and Coriolis
- Remote or local adjustable injection rates with flow meter feedback
- Flexible design, including individually supplied panels in an open or closed rack configuration or integrated into the chemical injection system
- Space and weight optimization

## Added Value Frames

- Smart designs by Frames in-house multi-disciplinary engineering teams
- Frames solutions are custom-built for performance in your actual operating conditions
- Being supplier-independent, Frames selects the best available components from a global network of supply partners
- Full design, build and commissioning service for guaranteed progress and single-point accountability
- Cost-effective modular design with low installation and operating costs

## References

- Aseng, SBM Monaco/ Noble Energy Inc. – Equatorial Guinea
- Prelude FLNG FPSO, SBM Monaco / Shell – Australia
- Replicantes FPSO's, FPSO P-67 and P-70 – Integra / Petrobras – Brazil
- N'Goma FPSO, SBM Malaysia/ ExxonMobil Exploration – Angola

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# Frames Family Tree

