

DELIVERING QUALITY AND RELIABILITY FOR THE WORLD'S LARGEST LNG TRAINS

CASE STUDY OVERVIEW

THE CHALLENGE

LNG RELIABILITY PLUS UNPRECEDENTED COMPLEXITY

The natural gas liquefaction process is an extremely demanding application and is highly dependent on reliable valve operation.

Not only do valves play a key role in the production process itself, requiring the ability to operate reliably at temperatures of -168°C (-270°F), they are integral to the safety of the liquefaction process. Valves must manage key safety processes, including over-pressurization protection and equipment isolation during shutdowns. Before the liquefaction process begins, valves are critical for gas treatment processing applications, including dehumidization and desulphurization.

Yet, when you are developing the largest LNG trains in the world, safe, reliable operation across a range of demanding applications is not the only challenge that must be met. Securing the necessary volume of specialized materials and protecting the developer against budget-breaking fluctuations in commodity pricing are also key to the success of a project of this magnitude. As is the ability to adapt to changing engineering specifications.

Because of the size of this LNG train project, general valve specifications had to be developed before detailed and process engineering work on the project was completed. As engineering work progressed, Pibiviesse worked closely with the engineering JV to adapt valve designs to new requirements, mitigating the impact in the project schedule.



CASE STUDY OVERVIEW

THE CHALLENGE

- › An engineering joint venture contracted to build the largest LNG trains in the world required a valve supplier that could deliver the high reliability demanded by the liquefaction process.
- › The project also required a supplier that could handle the scale and complexity of these unprecedented projects.

THE SOLUTION

- › Pibiviesse worked closely with the engineering venture throughout the dynamic development process to adapt valve designs to changing specifications, ensure material availability and production capacity, and streamline testing processes.
- › More than 2,400 valves were supplied in total, ranging in size from two to 42-inches.

THE RESULTS

- › Pibiviesse valves are now supporting the entire LNG value chain extending from offshore production through receiving and treatment to liquefaction.
- › The massive project was completed on schedule and the six LNG trains, which remain the largest in the world, have a record of reliable operation.

THE SOLUTION

PROVEN DESIGNS, EXTENSIVE COLLABORATION, AND INNOVATIVE PROJECT MANAGEMENT

Pibiviesse worked closely with the engineering firm throughout the feasibility study for the project. Based on the expertise, experience, and commitment demonstrated during the study, Pibiviesse was chosen to provide all of the actuated ball valves for the first LNG train. Shortly thereafter, Pibiviesse was selected for the second and the third LNG project as well.

Employing a forward-looking approach to planning and management, Pibiviesse worked with its suppliers to ensure the availability of required materials at fixed pricing, controlling the impact of fluctuating prices of stainless steel, high nickel alloys, and other commodities as the project progressed.

The company also formed a dedicated team to handle the project workload, working through a document portal to enable efficient communication of specifications and documentation, and embedding two engineers within the joint venture to ensure changing requirements could be quickly integrated into valve designs.

Valve designs were carefully refined through the process to ensure valves met the exact requirements of the application without oversizing. Valves supplied for the LNG trains ranged in size from two to 42-inches and included metal-seated valves, cryogenic valves, and side- and top-entry valves.

Cold-bypass control valves were provided for the anti-surge function of the compressors. These valves can discharge massive quantities of gas during an emergency, controlling the depressurization rate, as well as noise and vibration, to safeguard expensive compressors during this extreme condition.

A large number of the valves for the projects required cryogenic testing prior to installation. Pibiviesse expanded its cryogenic testing capabilities by opening new bays, increasing its total number of cryogenic testing bays to 15. In addition, the proven valve designs used for the projects enabled a testing method in which representative samples from manufacturing batches were tested rather than the entire batch, allowing for faster and less expensive cryogenic testing.

In total, approximately 400 valves were produced and delivered for each LNG train within the required timeframe. Site Resident Engineers facilitated on-site testing and commissioning prior to the successful startup of each LNG train.

THE RESULTS

THE RIGHT VALVE FOR EVERY APPLICATION

Through forward-looking planning, Pibiviesse was able to ensure material availability and eliminate the impact of fluctuating commodity prices throughout the duration of the project. Project timing was maintained through effective collaboration and dedicated resources that facilitated communication and expedited design modifications.

Valve costs were optimized through engineering services that precisely matched valve sizes to application requirements, eliminating the need for the more expensive, conservatively sized valves that had originally been specified. Cost savings were also realized through deep interaction between Pibiviesse valve engineers and piping and instrumentation engineers to ensure valve materials, design, actuation, and instrumentation were all precisely matched to the application. Testing costs and timing were also reduced through the use of proven designs that enabled testing samples rather than entire production batches.

Pibiviesse valves are now reliably supporting the entire LNG value chain, extending from offshore production through receiving and treatment to liquefaction for the world's largest LNG operation. All valves have performed to expectations.

Pibiviesse has fully supported this mega project that includes six LNG trains, project management, and on-time delivery of more than 2,400 actuated valves, all in a total time-frame of 36 months.

FOR ADDITIONAL INFORMATION VISIT:

www.circor.com/pibiviesse-ball-valves

