

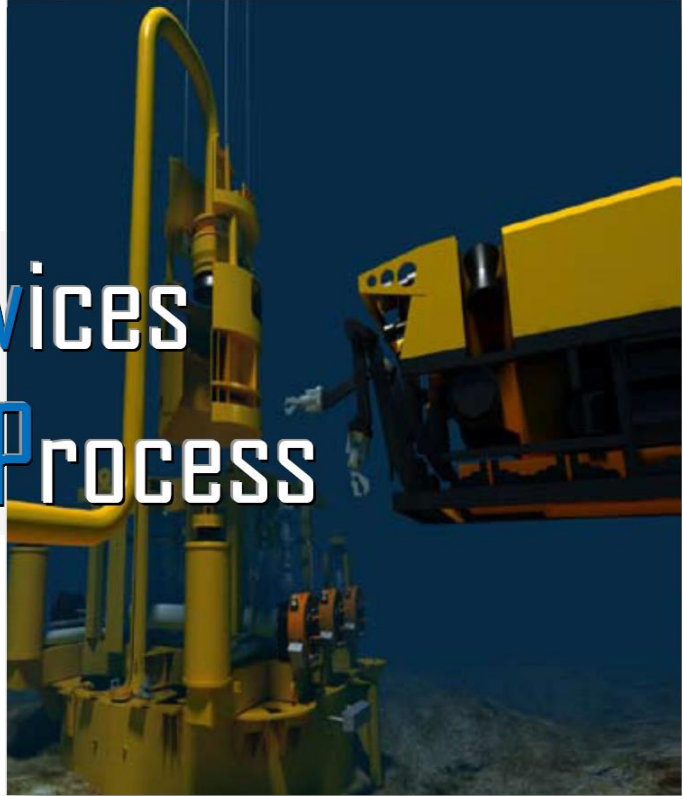


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Flow line Services & Well Tie-in Process





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- FLOWLINES SERVICES-

Flowlines are multi-phase pipelines which transmit the well production (oil, gas and water) to the Gathering Centers where the three phases are separated. The flowlines are of various nominal diameter and laid above-ground along organized corridors to minimize cluttering, obstruction and unsafe conditions.

Experienced, Knowledgeable, Productive People

Our global Fluid Control team is structured around top flowline professionals - individuals who understand your business and are dedicated to meeting your needs. The management, engineering, and sales support staff are among the most experienced in the oil and gas industry. Their knowledge and industry expertise show up in the quality of products and services delivered to you.

Unsurpassed Quality

Our Fluid Control quality system has been surveyed and approved by DNV and meets ISO 9001 and European Pressure Equipment Directive 97/23/CE. Products for sour gas service meet NACE MR-01-75 and API RP-14-E. Complete material certification and traceability are also available.

Premium Valves



We provide ULT and DR Plug valve which are our premium, quarter-turn valve designed for a wide range of standard and sour gas drilling, production and well-servicing applications. These valves are offered in single and dual body design in pressures to 20,000 psi. They range in size from 1 to 4 inches and come with threaded unions, flanged and clamp hub ends



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Components and Products available are:

- ◆ Quarter Turn Valve
- ◆ Plug Valve
- ◆ Speciality Plug Valve
- ◆ Check Valve
- ◆ Dart Check Valve
- ◆ Flapper Check Valve
- ◆ Choke Throttle Valve
- ◆ Flowline Choke Valve
- ◆ Pressure Relief Valve
- ◆ Butterfly Valve
- ◆ Actuators
- ◆ Swivel Joints
- ◆ Unions
- ◆ Pup Joints



- WELL TIE INS -

Well Tie In Process:

At FAAB we ensure the tie-in process encompasses all facets of tying in new wells and facilities into existing pipeline systems. We ensure our measurement, operations, design and reporting systems are aligned to produce the most effective and efficient process possible.

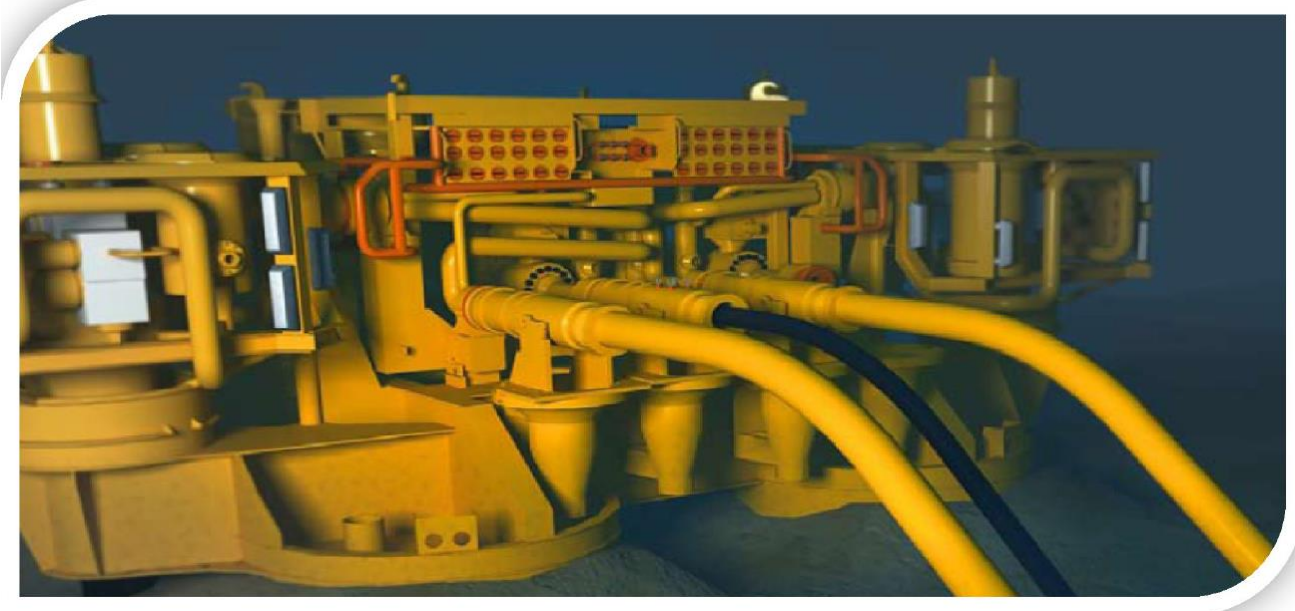
We do this by ensuring our designs reduce new well cycle time for our customers while incorporating consistent design applications. We enlist a common operations and measurement philosophy through all of the SemCAMS operated facilities. Our New Well Tie-in Manual identifies the policies, processes, procedures and standards we use for our design, operation, measurement and reporting functions.



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Subsea Tie-In Systems

Subsea flowlines are used for the transportation of crude oil and gas from subsea wells, manifolds, off-shore process facilities, loading buoys, S2B (subsea to beach), as well as re-injection of water and gas into the reservoir. Achieving successful tie-in and connection of subsea flowlines is a vital part of a subsea field development.

Subsea fields are developed using a variety of tie-in solutions. Over the past decade, Our Technologies has developed a complete range of horizontal and vertical tie-in systems and associated connection tools used for the tie-in of flowlines, umbilicals and jumper spools sizes 2" - 36" and for single and multi-bore application. Our horizontal and vertical tie-in systems have been extensively installed in many of the deepest, highest pressure and largest diameter subsea applications around the world.

Vertical Tie-in Systems

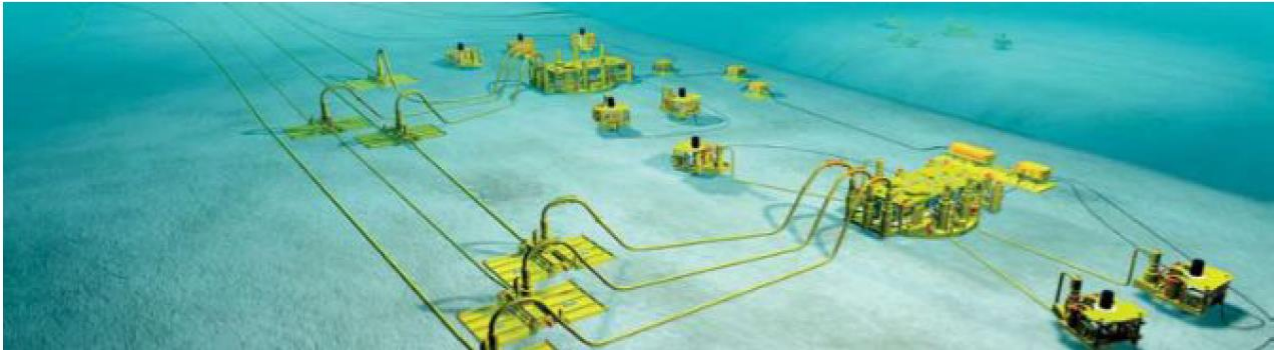
Vertical connections are installed directly onto the receiving hub in one operation during tie-in. Since the Vertical Connection System does not require a pull-in capability, it simplifies the tool functions, provides a time efficient tie-in operation and reduce the length of Rigid Spools. Stroking and connection is carried out by the the Connector itself, or by the ROV operated Connector Actuation Tool (CAT) System.



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Horizontal Tie-in Systems

Horizontal Tie-in may be used for both first-end and second-end tie-in of both flowlines,

umbilicals and Jumper spools. The termination head is hauled in to the Tie-in point by use of a subsea winch. Horizontal Tie-in may be made up by Clamp Connectors operated from a Tie-in tool, by integrated hydraulic connectors operated through the ROV, or by non-hydraulic collet connectors with assistance from a Connector Actuation Tool (CAT) and ROV. Horizontal connections leave the flowline/umbilical in a straight line, and is easy to protect if overtrawling from fishermen should occur.



We provide a series of Horizontal Tie-in systems:

- Our system is designed to perform a series of tie-ins and connections without returning the CAT (ROV-carried Connector Actuating Tool) to the surface.
- The FLYCON is designed to install and connect hydraulic and electrical umbilicals (jumpers) between subsea modules and structures by use of a standard work class ROV. Jumpers are launched to the location in tailor-made baskets. Various configurations of hydraulic jumpers and flying leads can be supplied to suit a variety of applications.
- The UTIS tool carries the clamp-connector to the tie-in area, and lands on the inboard hub. The ROV attaches the pull-in rope to the termination head, pre-laid some distance from the structure, and the termination head with the outboard hub



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is then pulled in, and the clamp is made up. UTIS may also connect pre-laid rigid spools.

- The ROVCON system is designed to perform a series of tie-ins and connections of pre-laid lines without returning to the surface. ROVCON® is attached underneath a work class ROV. The tie-in skid package performs tie-in using two winches. Stroking cylinders are used for final pull-in and closing of the connector.

Connection Products

We provide a series of standard single and multi-bore connectors from 2" to 36". Connectors are used to make strong pressure-tight connections designed to withstand high pressure, temperature, bending and torsional load conditions. The connector may also be exposed to high external pressure



as a result of deep water depths. Collet connectors consist of collet-style "finger" design which firmly locks around a mating hub. Collet connectors are used for both vertical and horizontal jumper spool connections and are available in both integral hydraulic and mechanical (with separate actuation tool) configurations. Clamp connectors consist of a two piece segmented clamp design and are particularly well suited for

larger bore, lower pressure horizontal connection applications.



Tie-in Structures & Modules

Each tie-in and connection point requires some form of subsea base structure. This base may be on a single well structure, a template, a manifold, or other individual structure such as a Riser Base, a Pipeline End Manifold (PEM), a Pipeline End



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Termination (PLET) or an In-line Tee. These individual structures may also contain manifold equipment such as isolation valves, gas-lift valves, wyes, pig-launchers and sensors. We manufacture a wide range of tie-in structures and modules tailored to meet the client's specific requirements and based upon standard interfaces and components.

Jumper/Spool Pieces

Custom jumpers/spool pieces are used to connect manifold systems to wells, sleds to wells and/or manifolds to sleds. Our Technologies offers rigid and flexible jumper configurations from 4 to 18 inches in diameter and lengths exceeding 150 feet (50 meters). Tie-in connections are either vertical or horizontal based on system selection. Designed for water depths exceeding 10,000 feet (3,000 meters) and working pressures to 15,000 psi, all jumpers or spool pieces are installed using guideline-less techniques. Jumpers or spool pieces are installed after onshore construction and testing to mate to previously installed equipment, based on subsea metrology data.

