OPERATIONS

OIL & GAS EXPLORATION AND PRODUCTION INTEGRATED WELL TESTING

Evaluation of Oil Wells with Mobile Testing Unit (MTU)

Decades as specialists in Hydraulic artificial lift systems with jet Claw® Pumps make SERTECPET® is the world’s undisputed leader and service provider for evaluation and production of oil wells with mobile production units (MTU). The Jet Claw® pump is used to stimulate well production and to determine well parameters and potential in a fraction of the time when compared to other systems. Testing is performed at various pressures and flow rates, using the SYAL® software created by SERTECPET® the data obtained from this testing enables our team of engineers to accurately determine the reservoir pressure. With the information gathered during the testing of the well SERTECPET® can precisely design the best artificial lift system for the well.

We are one the first company’s worldwide to manage the life cycle of our products and services, certified by API 18LCM for Well Testing and Production, SERTECPET® our clients can rest assured knowing that quality is our standard.

OIL WELLS PRODUCTION WITH ELECTRIC UNITS (MTU-e)

Based on efficiency and harmony with the environment SERTECPET® introduces its MTU-e units to the market. These units take advantage of the electrical energy available in the different locations of our clients, for the production of oil wells without CO2 emissions into the atmosphere and generating a Best price - value for our customers.

EARLY PRODUCTION FACILITIES

SERTECPET® has experience, qualified personnel and specialized equipment for the integral operation of facilities of production in oil fields, both in infrastructure of permanent projects as in early facilities operations. We are able to attend in an integral manner early facilities projects from each of its phases, including the engineering and conceptual & detailed design as far as the instrumentation and commissioning. SERTECPET® has a large stock of process equipment, which include pumps, treatment tanks and other pressure vessels to cover all needs in: separation, dehydration, treatment, storage, transfer, reinjection and transport of oil, gas and water formation; adapting to any requirement for early production facilities for the purposes described. All stages of EPF projects implementation from the Design until operation are endorsed by APIQ2. Our experience in engineering, implementation, commissioning, facilities operation and maintenance of early production are endorsed by practices such as Hazop, Hazid, What if risk analysis; compliance with operation and safety regulations as per API RP14C, operational reliability criteria, change management, for both on-shore and off-shore operations. Thanks to our Production Facility Plant (with ASME certification), we are able to manufacture all types of pressure vessels in short period of time according to our clients specific needs.

Our portfolio of available equipment include the following:

- Separators
- Gas Boot
- Tea
- Scrubber
- Skimmer
- Flames
- Storage Tanks
- Interconnection Lines
- Instrumentation

HORIZONTAL MOBILE UNIT UMH / HPS

SERTECPET® is a pioneer industry in design, construction, assembly and operation of Mobile Horizontal Pumping Systems; used for water re-injection, fluid transfer, power oil systems. This unit provides a swift and versatile solution for our client’s specific requirements mobilizing these unit within a 48 hour time frame.

Advantages

- It allows re-injecting water at high pressures and large flow rates.
- It is possible to inject one or more wells at a time, depending of the design of the operation equipment.
- Adaptable to a wide range of operation.
- Applicable for fluid transfer (OIL) to large volumes and distances.
**PRODUCTS AND SERVICES**

**MANUFACTURE OF BOTTOM EQUIPMENT FOR THE OIL INDUSTRY**

We are leaders in the manufacture of down hole products for the energy sector. The technology applied to the process of manufacturing guarantees high quality reliable products. The SERTECPET® Machining Plant incorporates the design Computer-assisted with Control Lathe Manufacturing Computerized Numerical (CNC) brand MAZAK. SERTECPET® works under the highest International standards The API Q1 standard of the Petroleum Institute American (API) certifies that our production plant works under the standards that govern the companies that provide products and services in the Oil and petrochemical sector. SERTECPET® is authorized to apply the API monogram under the 5CT, 5L, 7.1, 19-AC and 14L specifications for manufacturing and threading of parts and pieces.

**FLOW MEASUREMENT UNIT**

The fluid measurement unit service allows the quantification of multiphase flows (gas-liquid), by installing surface equipment, which will determine the potential of production and the quantity of gas from each well.

**WATER MANAGEMENT**

The oil that is extracted from one or more producing wells comes with formation water and natural gas. The water that is separated from the oil receives a treatment and is re-injected into other wells called “re-injectors wells”; high-pressure pumps are used for this procedure.

The purpose of this equipment is to use the water from high-pressure formation of a reinjection system as motor fluid for the artificial lifting system with Jet Claw® pump in locations with several wells.

The advantages of this system translate into optimization of energy and therefore, in reducing costs in the operation of our customers.

**Hydraulic Packer, Model “STP 7H”**

The STP 7H hydraulic packer is a durable and reliable tool, manufactured under API standards and specially designed to withstand the most harsh well conditions the STP 7H is the go-to tool for well completions. Our manufacturing facility allows us to process large quantities of products and we are able to maintain stocks for our clients guaranteeing a fast response to their urgent requirements. The 7H model is available is sizes 7 x 3 ½ and 7 x 2 7/8. This Packer generally is used in operations of production wells or injectors wells, amongst other application.
DESIGN AND MANUFACTURE OF CUSTOMIZED PRODUCTS

Through its multidisciplinary team of professionals specialists in the different branches of science, SERTECPET® is able to develop customized solutions with a high degree of technological development.

The design, programming and machining of parts and pieces for Several industries are developed through CAD software - CAE (Computer Aided Design-Computer Aided Engineering) for three-dimensional modeling that allows verification and performance optimization through effort analysis, fluid regime simulation.

ISO, API, NACE standards are used in the design of tools guaranteeing its standard use, mechanical resistance and compatibility of constituent materials. A CAD-CAM system (Computer Aided Design- Computer Aided Manufacturing) for the generation of control programs numerical, in accordance with the specification of ISO 6983 and EIA 4-1S-274.

PRODUCTION OPTIMIZATION

Specialized Production Optimization Services as a result of the knowledge and experience of our team, multidisciplinary professionals in the area of Engineering Area Reservoir and Production. We provide the necessary support to optimize the production of wells and oil fields that produce at natural flow, with artificial lifting and enhanced recovery with reservoir simulators, specialized software for interpretation of pressure tests and analysis of artificial lifting such as SYAL® and Claw® developed by SERTECPET®, several analyzes are performed as a decline in production and pressure, trend analysis, BSW%, analysis of multi-rate tests, among others to determine parameters optimal operation of wells in production. They allow determining the conditions necessary to maximize the oil recovery based on the above, our customers need to feel confident that we are a strategic partner for decision making in this area.

PRESSURE SENSORS

SERTECPET® has the latest technology in electronic sensors of high capacity and reliability. We operate under the most demanding industry guidelines, delivering highly detailed reports and interpreted by our professionals based on the information obtained by the sensors (Memory gauges). One of the advantages is versatility and easy adaptation to work with the Jet Claw® Pump, this allows them to be used in oil wells in severe conditions.

MAIN PRESSURE TESTS

- Restoration Pressure Tests (Build UP)
- Static Tests
- Flowing Pressures
- Fall-off tests
- Wells Interference
MECHANICAL WELL CLEANING - CLEAN WELL

Our reliability and high quality of service make the Clean Well business line of SERTECPET® one of the services preferred by our customers for cleaning assemblies of wells with various configurations and optimal dimensions in the static and rotating versions. We have the following Elements for the provision of the service:

**SERTECPET®** is an industry that designs and develops solutions for the energy and hydrocarbon sector, based on the knowledge, technology and innovation. We are the developers of the Jet Claw® smart pump patent, leading the hydraulic artificial lift, with more than 4,700 units installed around the world, since the year 2000.

**HOW DOES A JET CLAW® PUMP WORK?**

**THE VENTURI EFFECT**

The motor fluid passes through the nozzle and produces a transformation of potential energy to kinetic, increasing the speed and reducing pressure. This generates a differential of pressure that causes fluid suction.

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The Jet pump has no moving parts and the hydraulic artificial lifting system does not need work over for its maintenance. It is manufactured in our Production Plant (CNC) with various materials such as carbon steel and stainless.

MECHANICAL CONFIGURATIONS OF INSTALLATION:

- Jet Claw® Direct, Reverse or Smart in sliding sleeve pump
- Jet Claw® cavity pump
- Jet Claw® pump in cavity for high volumes

ARTIFICIAL LIFTING SYSTEM WITH JET CLAW PUMP

We build and assemble mobile production and injection units; that are compact, safe and easy to transport.

Repair and Assembly of Bottom Tools.

SERTECPET’s hydraulic pumping workshop offers these services:

- Inspection and repair of Jet Claw hydraulic pumps.
- Repair and technical maintenance for equipment and bottom completion tools, sliding sleeves, no-go, standing valve and packers.
- Test and analysis of functioning for hydraulic pumps in a certified test bank

ADVANTAGES OF THE LIFTING SYSTEM HYDRAULIC WITH JET CLAW® PUMP

- High equipment performance.
- Optimize costs and maintenance time since work over is not needed.
- It is a flexible and versatile system, applicable in vertical wells, deviated, horizontal, shallow and deep.
- It is applied for the recovery of mature fields.
- Handles solids and gas volumes.
- Handles high water cuts, is applicable in environments abrasive and corrosive

WE DEVELOP THE SYAL® SOFTWARE, TO DESIGN AND SELECT THE ARTIFICIAL LIFTING HYDRAULIC WITH JET PUMP CLAW® RTM REAL-TIME MONITORING SYSTEM

Syal Characteristics:

- Calculate single-phase flow pressure losses and multiphase in pipes.
- Determine reservoir properties with PVT analysis.
REAL CLAW ® RTM TIME MONITORING SYSTEM

The deposit parameters are monitored permanently with real-time transmission technology, with sensors located at the bottom and they send the information to the surface. From there, it is sent to any electronic device. Claw® RTM allows you to view information about reservoir conditions and

OPERATION PARAMETERS

<table>
<thead>
<tr>
<th>Performance Parameters</th>
<th>Performance Standard Ranks</th>
<th>Performance Limits</th>
</tr>
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<tbody>
<tr>
<td>Operating depth</td>
<td>5,000-15,000 ft</td>
<td>18,500 ft</td>
</tr>
<tr>
<td>Operation Temperature</td>
<td>150 – 300 F</td>
<td>480 F</td>
</tr>
<tr>
<td>Well Deviation</td>
<td>48 (&lt;10/100 ft dog leg)</td>
<td>85 (15/100 ft dog leg)</td>
</tr>
<tr>
<td>Production Ranks</td>
<td>250 – 6500 BPD</td>
<td>7,500 BPD</td>
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SERTECPET is the leader in Artificial Hydraulic Lifting Technology Our clients that maintain the artificial hydraulic lifting system with Jet Claw® pump are backed by a complete multidisciplinary team of technicians with high experience and knowledge to provide advice and training efficiently. We maintain through research and development the continuous innovation and the generation of solutions to overcome the challenges in every oil field around the world.

OPERATION ENVIRONMENTS

- API severity > 8 API
- Recovery method – Hydraulic or Slickline
- Type of surface pump - positive displacement pump or horizontal surface centrifugal pump (HPS) Good (up to 200 scf/stb)

<table>
<thead>
<tr>
<th>Performance environment - withstands corrosive and abrasive environments</th>
<th>API severity &gt; 8 API</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas handling – Good (up to 200 scf/stb)</td>
<td>Recovery method – Hydraulic or Slickline</td>
</tr>
<tr>
<td>Solid handling - Excellent</td>
<td>Type of surface pump - positive displacement pump or horizontal surface centrifugal pump (HPS) Good (up to 200 scf/stb)</td>
</tr>
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</table>
We develop several types of Jet Claw® pumps to optimize hydraulic artificial lifting:

### Jet Claw® Smart Pump

*We optimize Well testing through the valve hydromechanics included in the Jet Claw® Smart pump*

The Hydromechanical valve of the Jet Claw® Smart, facilitates the passage of the fluids, when stopping pumping, it will remain closed by hydrostatic pressure, restoring so instantaneous reservoir pressure, avoiding the effect of well storage.

**Characteristics:**
- The Jet Claw® Smart pump is used in exploratory wells and development or production for tests and evaluations of wells.
- This type of pump is incorporated with a valve special bottom closure, and electronic sensors.
- The shut-off valve reduces the storage effect, (Wellbore Storage) optimizing the tests of pressure restoration (Build Up).

### Jet Claw® Reverse Pump

The Jet Claw® Reverse pump has a mechanical system of grip that allows you to stay in the bottom by lifting the fluids through the tubing. It is frequently used for produce reservoir fluids in a short time.

**Characteristics:**
- This type of pump is used for exploratory wells, with high sand content and for recovery of acids and solvents in wells that have received treatments.
- It is frequently used to obtain data from instant deposit, it is necessary to only displace the fluids that are located in the pipe of production (Tubing), so the training fluid can be obtained immediately.
- This pump is housed in a sliding sleeve, is displaced and recovered quickly and effective with Slick Line thin cable unit through the production pipe (Tubing).

### Jet Claw® Direct Pump

The Jet Claw® Direct pump is a hydraulic device that allows to lift fluids from the bottom of the well through the direct motor fluid injection (tubing injection and return through the annular space) based on the physical principle of Venturi. The Jet Claw® Direct pump is designed to maximize the continuous production of oil wells.

**Characteristics:**
- It is commonly used for the continuous production of wells and for production tests.
- It displaces and recovers hydraulically.
- Conventional Jet Claw® Pump is housed in a sliding sleeve or in a cavity.
- In wells with damaged casing pipe, it is advisable to use only this type of pump, because the return pressure through the annular space is low.
INTEGRAL PROJECTS

EPC / EPCM PROJECTS AND INDUSTRIAL PLANTS INSTALLATION

We develop integral projects type EPC (Engineering, Procurement and Construction). Additionally, we provide customer support with the EPCM (Engineering, Procurement and Construction Management) to create civil, mechanical, electrical, instrumentation and control infrastructure in the oil and energy sectors, as well as the electromechanical installation of Industrial Plants. We have our own human resources, machinery, equipment and infrastructure that allows us to be strategic partners of our clients in large-scale projects.

CIVIL INFRASTRUCTURE PROJECTS

We have the human/technological resource, machinery, equipment and tools for development of civil and architectural infrastructure projects, including, but not limited to the following:

- Design, construction and extension of roads
- Design, construction, expansion and readjustment of platforms
- Soil movement, slope construction
- Piling
- Foundations
- Architectural infrastructure works: buildings, warehouses and camps
- Steel structures: shelters, piperacks, skids, etc.
- Sewers: sanitary, storm and industrial

DUCTS, PIPELINES AND FLOWLINES

We have the human/technological resource, machinery, equipment and tools for the construction of flowlines and pipelines, including, but not limited to the following activities:

- Construction of right of way (ROW)
- Pipeline transport and laying
- Bending, ditching, lowering and covering of pipes
- Pipe welding with or without internal and external coating
- Design, provision and installation of Cathodic protection
- Provision of pumping systems and execution of pipeline pressure tests
- Pre-commissioning, commissioning and start-up of ducts, pipelines and flowlines

CONSTRUCTION AND REPAIR OF API 650 AND API 653 PROCESS TANKS

We have the human/technological resource, machinery, equipment and tools for development of design, construction and repair of storage and process tanks, including, but not limited to the following activities:

- Development of conceptual, basic and detailed engineering
- Mechanical integrity studies
- Design, provision and installation of Cathodic Protection Systems
- Shop-fabrication of tanks (full or partial) at the Facility Plant with CNC equipment
- Logistics and transportation
- Assembly of tanks on site
- Provision of pumping systems and execution of pressure tests
- Surface preparation, either metal blasting in the workshop and pre-painting, or sandblasting of the entire surface on site
- Application of coatings
- Pre-commissioning, commissioning and start-up
CONCEPTUAL, BASIC, DETAIL ENGINEERING SERVICES AND SPECIALIZED STUDIES

We have the human and technological resources, including the required licensing, for the development of engineering projects, including, but not limited to the following services:

- Development of conceptual, basic and detailed engineering
- Pre-feasibility and feasibility studies
- Specialized studies: PEER REVIEW, HAZOP, HAZID, WHAT IF and ACR
- Technical consulting services
- Integral project audit and management services

FACILITIES PLANT

Our modern plant develops design and construction projects of specialized packaged equipment for surface facilities in the oil, energy and industrial sectors, as well as for the design and construction of metal structures, API 650 tanks and pressure vessels with ASME stamp “U” and “R”.

We have certified human resources (AWS, CWI, NACE CIP I and II, API 653, PMP®, ASNT etc.), CNC machinery and own infrastructure, allowing us to be a strategic partner for our clients in large-scale projects.

Our plant is a fundamental complement in the development of integral infrastructure projects in which SERTECPET® participates.

Design and construction of pressure vessels with ASME stamp

We design, build, repair and maintain Packaged Equipment, which consist of piping, equipment, electrical interconnections, instrumentation and control, all contained on a skid. These packaged equipments are designed and built in our plant under the client’s requirements and with the most demanding quality standards, backed by our international certifications.

In our plant the following equipment is designed and built:

- Fluid separation units for oil facilities (separators, FWKO, scrubbers, KOD, etc.)
- Production and injection manifolds
- Heat exchangers
- Electrostatic dehydrators
- Heaters
- Desalting plants
- Measuring systems (ACT or LACT units)
- Compressed air supply systems
- Power control rooms (PCR) or other containerized facility
- Treatment and dehydration of gas
- Pumping systems
- FAT tests (workshop acceptance) and SAT (site acceptance)

Design and construction of skids and packaged equipment

We design, build, repair and maintain Packaged Equipment, which consist of piping, equipment, electrical interconnections, instrumentation and control, all contained on a skid. These packaged equipments are designed and built in our plant under the client’s requirements and with the most demanding quality standards, backed by our international certifications.

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- Treatment and dehydration of gas
- Pumping systems
- FAT tests (workshop acceptance) and SAT (site acceptance)
• Laying of trays, conduit, wiring and electrical connection, installation of instruments and control programing.
• FAT tests (workshop acceptance) and SAT (site acceptance).

Pressure Vessel and Production Facilities Construction Plant (ASME), specialized in the engineering, design and provision of process equipment and pressure vessels.

Design and construction of metal structures and pipelines

We design, build, repair and maintain metal structures for the following facilities:

• Industrial structures and buildings
• Sheds, workshops and warehouses
• Camps
• Metal support systems for pipes, pipelines, cables and equipment in general
• Pipeline for fluid conduction, including bridges for river or road crossings
• Pressure pipes for hydroelectric power plants including splits and branch systems, as well as elbows and other accessories associated with this type of pipe