

# REFERENCE CASE

## OFFSHORE OIL & GAS



## HIPPS Certification and Verification for Spanish Underground Natural Gas Storage Facility

When Frames needed certification and verification services for the high-integrity pressure protection system (HIPPS) used in the Castor underground natural gas storage (UGS) facility, an experienced partner with expertise in the certification of safety components was needed. That's why TÜV Rheinland was the perfect choice for the project.

Basic Facts	
Clients	Frames
Timeframe	September 2010 – December 2011
Project location	Mediterranean Sea, 21 km offshore Vinarós, Spain
Main services	<ul style="list-style-type: none"><li>▪ SIL 3 certification of the HIPPS</li><li>▪ SIL loop calculation</li><li>▪ Verification and validation of HIPPS hardware and software</li><li>▪ Technical support for functional safety management activities</li><li>▪ Technical consulting</li><li>▪ System certification</li></ul>
Involved regulations/standards	<ul style="list-style-type: none"><li>▪ IEC 61508:2010</li><li>▪ IEC 61511:2003 + corrigendum 2004</li></ul>

### Initial situation and requirements

The Castor project is an underground natural gas storage (UGS) facility 21 km offshore of Vinarós, which supports the gas storage capacity in Spain. There was a dire need to implement this facility for Spanish industry and for the government, and the highest quality of equipment a necessity to prevent defects and ensure safety.

Frames is engaged in the design, manufacture, supply, installation, and commissioning of systems for oil and gas treatment, flow control and safeguarding applications. The company also provides subsea control systems, as well as pneumatic, hydraulic, and electro-hydraulic process control and safety shutdown systems. For the Castor UGS facility Frames Energy Systems supplied the high-integrity pressure protection system (HIPPS) to prevent over-pressurization. To guarantee compliance of the system with international standards and to independently confirm the engineering competency and performance of the company were in accordance with the relevant standards, an unbiased third-party was needed.

## Solutions, results

With extensive experience in the assessment and certification of HIPPS, TÜV Rheinland was the preferred choice of Frames for the Castor UGS facility.

Throughout the whole project, we supported the company with technical consulting services and support for all functional safety management activities. In addition, we supported Frames during the design phase of the HIPPS, which included the safety integrity level (SIL) loop calculation. To issue the SIL certificate 968/EL 776.00/11 for the HIPPS, ensuring compliance with the international standards IEC 61508 and IEC 61511, we also conducted comprehensive verification and validation of the HIPPS hardware and software.

The system certification approved and performed by TÜV Rheinland provides definite proof that the HIPPS is in accordance with the applicable technical standards and fulfils all relevant requirements.

### Did you know?

The Castor underground natural gas storage facility is able to contain 1.3 billion cubic meters of gas: representing three months of consumption for the Spanish region of Valencia.



### Your contact:

TÜV Rheinland Group  
Industrial Services  
is@tuv.com  
www.tuv.com/functional-safety

### About TÜV Rheinland:

Founded more than 140 years ago, TÜV Rheinland is a global leader in independent inspection services, ensuring quality and safety for people, the environment, and technology in nearly all aspects of life.

We inspect technical equipment, products and services, oversee projects and help to shape processes for companies around the world. Since 2006 we have been a member of the United Nations Global Compact to promote sustainability and combat corruption.

Secure plants are prerequisite if you want to achieve the highest levels of efficiency. We provide extensive automation and functional safety services to support you with your technical installations over their entire life cycle. We can provide you with consultation on planning and repairs, and check quality and safety - from single components to industrial plants.

### Benefits for the client

TÜV Rheinland supported Frames with:

- Internationally recognized certification of the HIPPS for the Castor UGS facility.
- Extensive training given by high-qualified experts to the employees of Frames on safety instrumented systems (SIS), eventually leading to their certification as TÜV Rheinland FS Engineer for SIS.
- Confirmation that the engineering practices comply with all relevant and state-of-the-art technology standards.

To learn more about Frames, please visit [www.frames-group.com](http://www.frames-group.com).