To meet your current and future needs, Subsea 7 has developed advanced pipeline welding technologies in order to satisfy a wide, diverse range of line pipe materials, pipeline fabrication codes and operator specifications.

Our Pipeline Production Team, with engineering centres in Glasgow and Paris, allied to our Global Welding Development Centre in Glasgow, can provide the most up-to-date welding and inspection solutions across the full range of pipeline fabrication needs.

**Key Benefits:**

- Reduced project risks and greater schedule certainty
- All of your pipeline production needs covered – welding, non-destructive examination and field joint coating
- Global network of spoolbases and offshore vessels to suit your pipeline installation requirements in the most cost-effective way
Subsea 7 has successfully deployed automatic welding solutions using equipment provided by leading suppliers including CRC-Evans, Serimax and Vermaat. Access to a range of welding technology allows Subsea 7 to utilize the most cost effective solution on a project to project basis.

Improved offshore welding technology

In order to provide high levels of insulation weld Subsea 7 has developed Pipe-in-Pipe (PIP) systems, in collaboration with ITP, to meet the most demanding requirements.

At the end of double joints, the outer pipe is swaged down to its inner pipe and welded. The swage weld is crucial to the PIP integrity, so its quality is subject to special attention.

A specialized automatic ultrasonic testing (AUT) system achieves accurate quality mapping of the weld to ensure the integrity of the high-performance PIP system.

AUT system for Pipe-in-Pipe (PIP) swaged weld

FJC (Field Joint Coating) can often limit production for both offshore and spool-base pipeline fabrication. Subsea 7 has developed specific equipment to fabricate thick Injection Moulded Polypropylene FJC with improved reliability. This has been installed on the Borealis within the small footprint available for the J-Lay application.

This highly automated equipment facilitates the production of high quality field joints with remarkable reliability and productivity, delivering a practical solution that mitigates the limits on production that other systems can experience.

Optimisation of FJC Technology

To remove the problems of “arc blow” in production welding, Subsea 7 established a full pipe body demagnetization facility at our Spoolbases.

This equipment can be installed within the existing pipe conveyor systems and the pipe length, now fully free of residual magnetism, is delivered to the firing line without interruption to pipe production.

Eliminate “arc blow”

One example of this is a small diameter internal clamp with a copper shoe facility to facilitate the use of mechanized welding. This equipment will significantly impact welding productivity and quality.

For J-Lay welding, continuity of production can be limited by overheating of the weld joint. Subsea 7 is developing an internal cooling system to provide thermal control which will facilitate increased productivity, keeping your costs under control.

We are further developing our ability to perform pipe end measurements using laser beam technology to facilitate more efficient pipe alignment and fit up on the firing line, increasing productivity and quality even further.

Driven by market requirements

Deepwater fields with High Temperature-High Pressure (HT/HP) conditions require risers that can incorporate heavy wall pipe thickness with very stringent weld flaw acceptance criteria. This presents challenges if the application of cost-effective welding solutions with low repair rates is to be maintained.

Subsea 7’s answer is a CMT/PGMAW (Cold Metal Transfer/Pulsed Gas Metal Arc Welding) process with the following technology advancements:

- Use of a very narrow bevel design
- Development of an improved PGMAW synergic waveform

Heavy Wall SCR Welding

Subsea 7 has successfully deployed its advanced PGMAW (Pulsed Gas Metal Arc Welding) technology for CRA (Corrosion Resistant Alloy) clad/lined and solid CRA pipe.

A key part of the welding solution is the use of the ‘Cold Metal Transfer’ (CMT) process for root welding. This technique allows the weld root to be deposited very precisely, with minimum heat input, giving good control of the rootbead quality and profile. These are essential features to maintain the corrosion performance of the pipeline. Assurance of the weld root quality is achieved by internal inspection using sophisticated camera and laser equipment.

Welding advances for clad/lined & solid CRA pipe

The use of high-strength Grade X80 steel reduces pipeline weight and delivers significant savings in fabrication and installation costs for deep water projects.

Subsea 7, in collaboration with Vallourec, has performed a qualification programme for reelable X80 linepipe in accordance with DNV OS-F101.

For CRA lined X80 pipe, a novel welding solution was needed. This utilized internal welding of the CRA lining and external welding using conventional C-Mn filler wire to satisfy the qualification requirements for reel-lay.

Welding reelable high-strength steels
A real commitment to finding solutions to your future needs

Subsea 7’s Global Pipeline Welding Development Centre was opened in 2013 in Glasgow, Scotland providing our clients with the most up-to-date welding solutions for the full range of pipeline fabrication requirements within a single facility.

The centre incorporates 16 welding bays and supports cutting and beveling facilities to perform pipeline welding and testing for spoolbase welding, vessel tie-ins and simulations for our S-Lay and J-Lay vessels, greatly reducing client uncertainty and risk. NDT facilities are upgraded including full pipe length radiography and AUT systems. A further advantage is the capacity to accurately simulate the production firing line facilitating realistic pre-production welding trials and operator training and allowing the efficient transfer of technology to our fabrication sites world-wide.

Some lead, others follow...

MILESTONES

2015 Deployment of CMT/PGMAW for fabrication of North Sea’s first SCR, Aasta Hansteen, and installed by R-Lay.
2014 First time use of mechanised PGMAW of small diam thin wall pipe at newly upgraded Leith Spoolbase facility.
2014 First Deployment of IMPP field joint coating system for J-Lay installation using Seven Borealis.
2013 J-lay installation of heavy PIP production lines for Total’s CLOV using the Seven Borealis.
2013 First time use of CMT/PGMAW for fabrication of 13 Cr pipe at Vigra.
2011 First use of orbital GTAW for the 2-inch duplex stainless steel pipeline scope at Vigra spoolbase.
2011 First use of CMT root-welding process on Dana’s Triton 10-inch HDPE lined pipe.
2010 First use of Real-Time Digital Radiography on the Apache Bacchus Bundle pipeline project at Wester fabrication site, Wick, Scotland.
2010 First use of the Phased Array system for AUT inspection of carbon steel pipelines on Total’s K5CU project.
2009/10 First reel ed clad pipe fabrication for Subsea 7, for BP’s Skarv project, Norway including camera and laser inspection.
2008/9 First lazy-wave SCR system fabricated by Subsea 7 at its Ubu spoolbase, Brazil, and installed by reel-lay for Shell’s BC10 project.
2006/7 First reel-lay SCR, 7.5 inch, for Chevron’s Blind Faith, Gulf of Mexico fabricated using an in-house developed GTAW mechanised welding system.

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