Tecno Plug®

Non-Intrusive Inline Isolation

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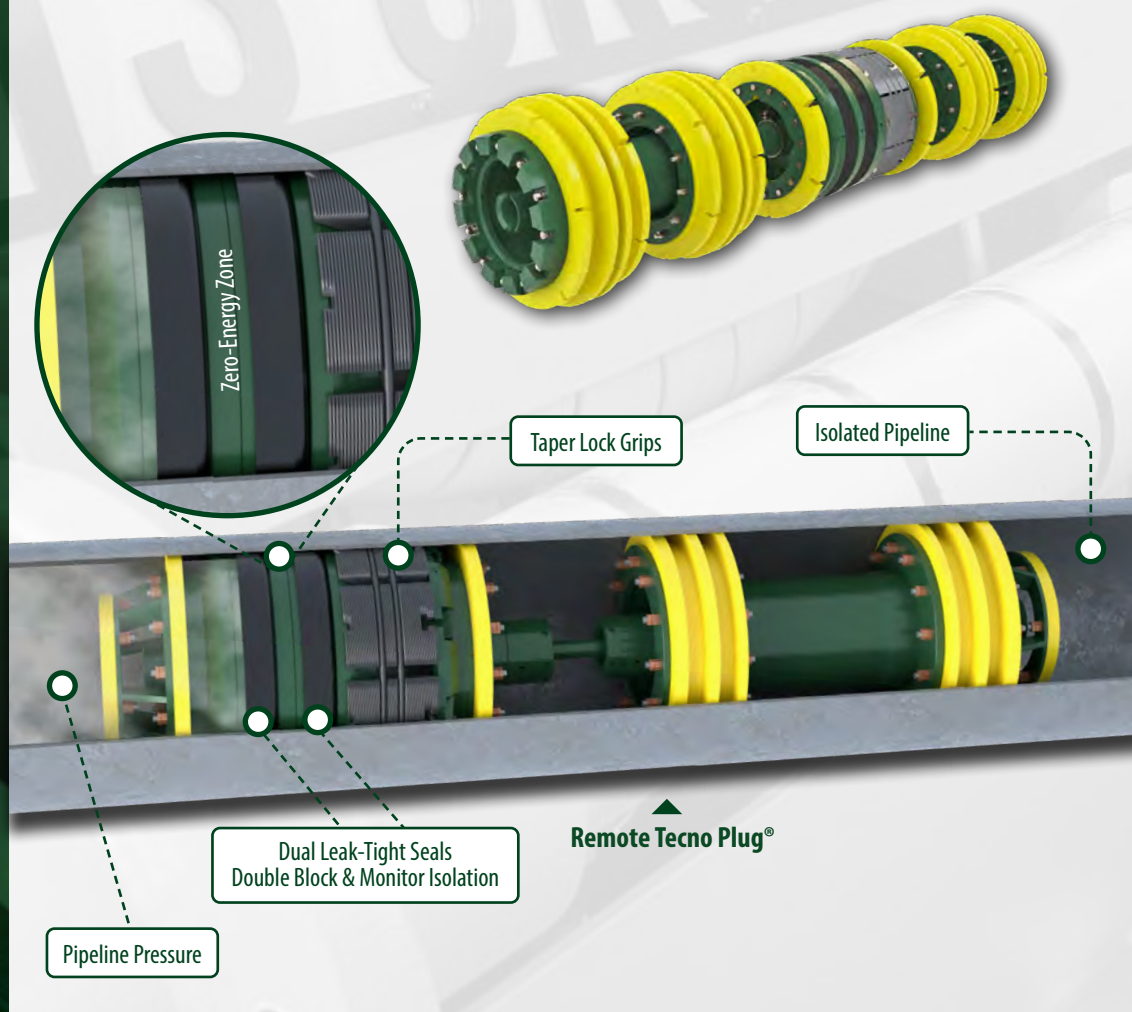
Non-Intrusive Inline Isolation

The safe isolation of pipelines and pipework systems is a key requirement for the maintenance and modification of oil, gas and petrochemical infrastructure. STATS Group has an extensive global track record of providing temporary pressurised isolation of onshore, topsides and subsea pipelines up to 56" and in a range of pipeline mediums. Piggable isolation tools require no welding or cutting into live lines, leaving no residual fittings or hardware on the pipeline.

STATS DNV type approved Tecno Plug® provides fail-safe double block and bleed / monitor isolation of pressurised pipelines while the system remains live and at operating pressure. Dual seals provide a zero-energy zone to enable maintenance work on pressurised systems to be carried out safely and efficiently. The dual seal configuration of the Tecno Plug provides an annulus void which can be pressure tested to verify both seals are leak-tight before maintenance work is carried out. Both seals are leak tested with full pipeline pressure. Once the seal integrity has been proved the annulus is then vented to ambient to create a zero-energy zone, providing effective double block and bleed isolation.

The large section elastomer seals are highly compatible with poor pipe surfaces and are engineered to suit corrosion or ovality issues ensuring a leak-tight seal even in ageing assets. The Tecno Plug has the ability to monitor the isolated pipeline pressure, this is achieved via a dual sealed pressure impulse line and ensures there is no leak path through the tool. If required, pressure application through the tool is attained by adding an additional module containing a second equalisation valve. Isolation safety is ensured as two separately controlled valves need to be functioned to allow pressure communication through the Tecno Plug.

The Tecno Plug fail-safe design uses differential pressure acting on the tool to energise the locks and seals, this is referred to as self-energisation. When the isolation plug is self-energised the isolation is maintained independent of the control system, it is however backed up by the hydraulic control system which maintains the isolation when the differential pressure is below the self-energisation threshold. Once the Tecno Plug is activated the hydraulic circuits are locked in by pilot operated check valves and manual isolation valves (tether controlled) or fail-safe solenoid valves (remote controlled). The check valve pilot lines can be separate lines controlled independently if required. The Taper lock-ring provides twice the required lock contact area giving 100% contingency. In the event that the control system is compromised, the tool actuation mechanism will unset when differential pressure is equalised. This feature ensures pipeline integrity is maintained and the Tecno Plug is always recoverable upon job completion.



The remotely operated Tecno Plug system is a piggable, remote controlled, tetherless isolation tool. The remote control system provides a high degree of flexibility and eliminates the need for tethers or specially modified pig-trap doors. Through-wall communication is achieved using an extremely low frequency (ELF) inductive system for reliable tracking and accurate positioning of the Tecno Plug. An onboard hydraulic power pack provides the necessary actuation and control functions for the tool.

The Remote Control Module provides a robust system for safety critical activities. Certain Remote Control Modules can be made available for use in a Zone 2, Potentially Explosive environment. The communication antenna and field cable are available for use in a Zone 1, Potentially Explosive environment.

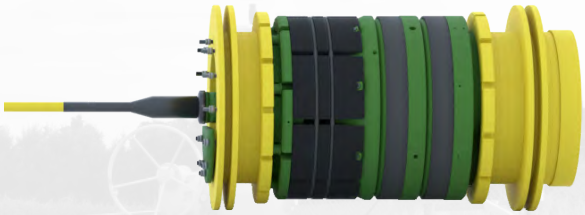
Pipeline Isolation Applications

- **Pipeline valve replacement / repair**
- **Riser replacement / repair**
- **Pressure testing i.e. leak detection of risers or repaired pipelines**
- **Mid-line pipeline repair / tie-in**
- **Platform abandonment and bypass**
- **Pipeline diversion**

12" Remote Tecno Plug®, New Zealand

Operator Benefits

- Safe breaking of containment on pressurised pipelines, providing a fully proved double block and bleed / monitor isolation, with a zero-energy zone maintained between the two barrier seals - in accordance with topside and subsea isolation guidelines
- Piggable isolation tools require no welding or cutting into live lines, leaving no residual fittings or hardware on the pipeline
- De-commissioning (bleeding down) and re-commissioning (refilling and re-pressurising) of pipelines minimised or eliminated, saving time and reducing costs
- Production continued during pipeline maintenance or modifications
- No flaring of gas or displacement of pipeline inventory
- No emissions of gas or hydrocarbon vapour to the atmosphere during blow down
- No danger of accidentally flooding offshore pipelines during construction
- No need to dispose of hydrates, chemicals and contaminated water
- Isolates short sections of pipeline anywhere in the pipeline system
- Emergency preparedness and operational readiness



STATS Tecno Plugs are fully certified by DNV to verify that the design criteria satisfies the requirements for Pipeline Isolation Plugs to provide dual seal and isolation in accordance with Offshore Standards; DNV-OS-F101 (Submarine Pipeline Systems) and recommended Practices; DNV-RP-F113 (Subsea Pipeline Repair) and in compliance with the following code; ASME BPVC Section VIII, Division 2.

Fully Proved Double Block: Seal Test Sequence

Once the Tecno Plug arrives at the isolation location it is hydraulically activated, setting the isolation plug. Setting the Tecno Plug retracts the internally mounted hydraulic cylinder within the plug activating the locks and seals to create the initial barrier.

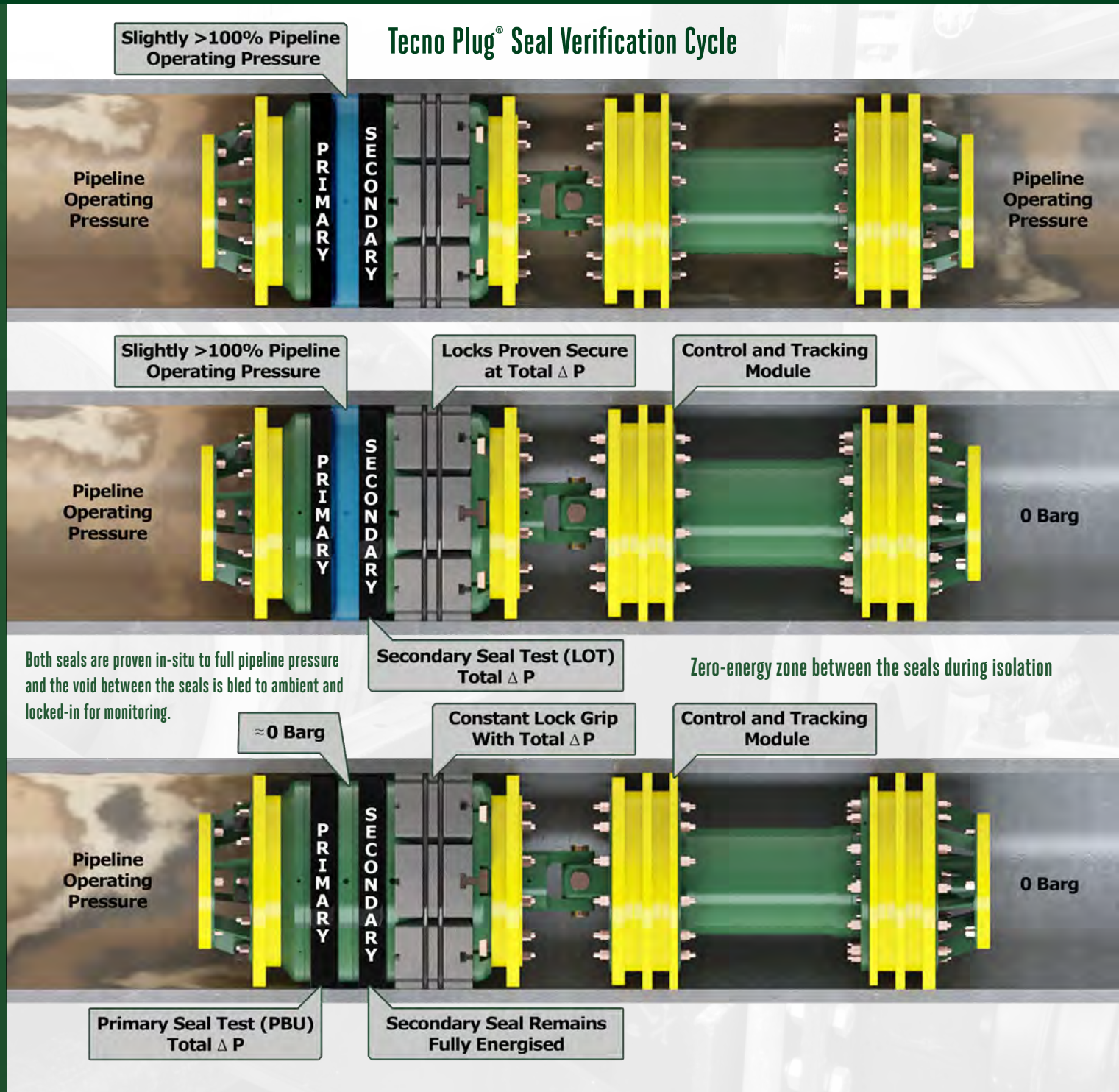
Once the Tecno Plug is confirmed as set, the pipeline pressure inboard (portion of the pipe to be isolated) is vented generating a pressure differential across the plug module.

As the pressure differential is applied, the trapped pipeline content in the annulus between the seals is compressed due to the seal compression. The other effect is that the hydraulic pressure in the actuation system drops.

The remaining hydraulic set pressure once the pipe is fully vented is locked-in by pilot operated check valves to ensure it is maintained, even in the unlikely event of a loss of power in the control module.

Once inboard pressure is fully vented, the Tecno Plug secondary seal is tested in-situ to above the pipeline pressure, in the correct direction. This proves the integrity of the secondary seal.

The annulus is then vented to the tail pressure and locked-in. This allows the primary seal to be tested to the full differential pressure. The isolation is then monitored for an extended period prior to breaching the pipeline integrity.



Tethered Tecno Plug®

Key Features

- Size range: 3″ – 56″
- Standard Tecno Plug up to 230 bar / 3336 psi with bespoke solutions up to 600 bar / 8702 psi available upon request
- DNV Type Approval in accordance with; DNV-OS-F101 (Submarine Pipeline Systems) and recommended Practices; DNV-RP-F113 (Subsea Pipeline Repair)
- Available as 3D bend compliant as standard with 1.5D on request
- Robust compact design, enables Tecno Plug to be set in short sections of pipeline. In many instances production can be continued during pipeline maintenance or modifications activities
- Twin compression elastomer seals are highly effective even in pipelines with corrosion and ovality issues
- High integrity isolation, taper lock grips provides twice the required lock contact area i.e. 100% contingency
- Annulus bleed between seals allows pressure to be vented to ambient creating a zero-energy zone providing true double block and bleed isolation
- Fail-safe design feature; taper lock grips and seals energised by differential pressure; referred to as self-energisation
- Self-energisation feature maintains safe isolation while differential pressure exists across the Tecno Plug
- Both seals fully energised by pressure – rubber pressure 1.1 – 1.4 times greater than pipeline pressure
- Reverse pressure can be applied across the Tecno Plug to facilitate system leak testing
- Outboard pressure monitoring options

30″ Tethered Tecno Plug®, New Zealand

Remote Tecno Plug®

Key Features

- Size range: 10″ – 56″
- Pressure range: standard remote control module housing is rated for 200 bar / 2900 psi external pressure
- DNV type approval in accordance with; DNV-OS-F101 (Submarine Pipeline Systems) and recommended Practices; DNV-RP-F113 (Subsea Pipeline Repair)
- The Remote Control Module provides a robust system for safety critical activities. Certain Remote Control Modules can be made available for use in a Zone 2, Potentially Explosive environment
- The communication antenna and field cable are available for use in a Zone 1, Potentially Explosive environment.
- Hydraulic system override releases the plug setting mechanism when pressure is equalised (Fail-safe passive unset feature)
- Through-wall communication is achieved using an extremely low frequency (ELF) inductive system for reliable tracking and accurate positioning
- Subsea communication via acoustic link (3000m depth rating)
- Remote Tecno Plug does not use lithium batteries negating the need for Emergency Response Procedures for the transportation / use of extremely hazardous materials

36″ Remote Tecno Plug®, Middle East

Piggable Bypass Technology - Unpiggable Lines

STATS have developed a patented pigging bypass system for our isolation plugs which allows two Tecno Plugs to be pigged towards a blind centre.

The technology was developed to facilitate the pipeline repair of unpiggable defects. This system allows a section of pipeline to be isolated where full bore pipeline access is unavailable due to a defect such as a pipeline buckle or dent. Each Tecno Plug is pigged from either end of the pipeline towards the defect to isolate the section and allow repair or replacement.

32" and 38" Remote Tecno Plugs®, Qatargas

Supporting client to achieve their sustainability goals

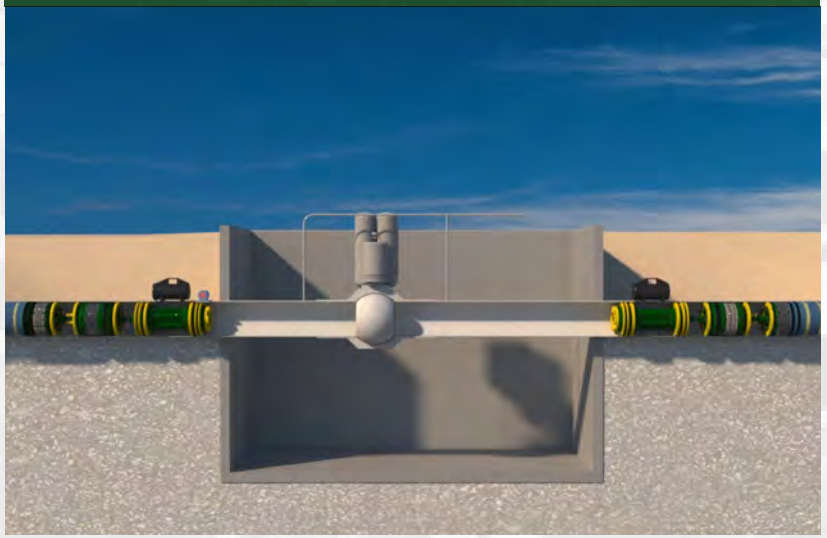
Reducing flaring and venting during repair and maintenance

Large sections of pipelines and process plant systems are frequently vented to facilitate valve repairs and other maintenance activities. Temporary isolation tools minimise this requirement by providing safe, localised isolations where incumbent valves are not available.

Using STATS proprietary double block isolation technologies for localised repair and maintenance allows worksites to be safely isolated without the need to depressurise large sections of the pipeline, thereby avoiding the need to discharge significant quantities of greenhouse gases into the atmosphere.

STATS isolation technologies have been independently verified to deliver carbon emissions savings of over 99% compared to venting a pipeline for repair and maintenance.

PROJECT EXAMPLES



Middle East

38" 80bar Pipeline - 80km

Welded repair required to remove an integrity threat. Tecno Plug® Double block isolation prevented the potential discharge of approximately 9,600 tons of CO_2 into the atmosphere.

North Sea

36" 120 bar Subsea Pipeline, 450km

Onshore isolation valve replacement. Using Tecno Plug® Double block isolation prevented the potential discharge of approximately 70,000 tons of CO_2 into the atmosphere

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