BISEP®

Hot Tapping & Plugging

Issue 6 - Nov 2024

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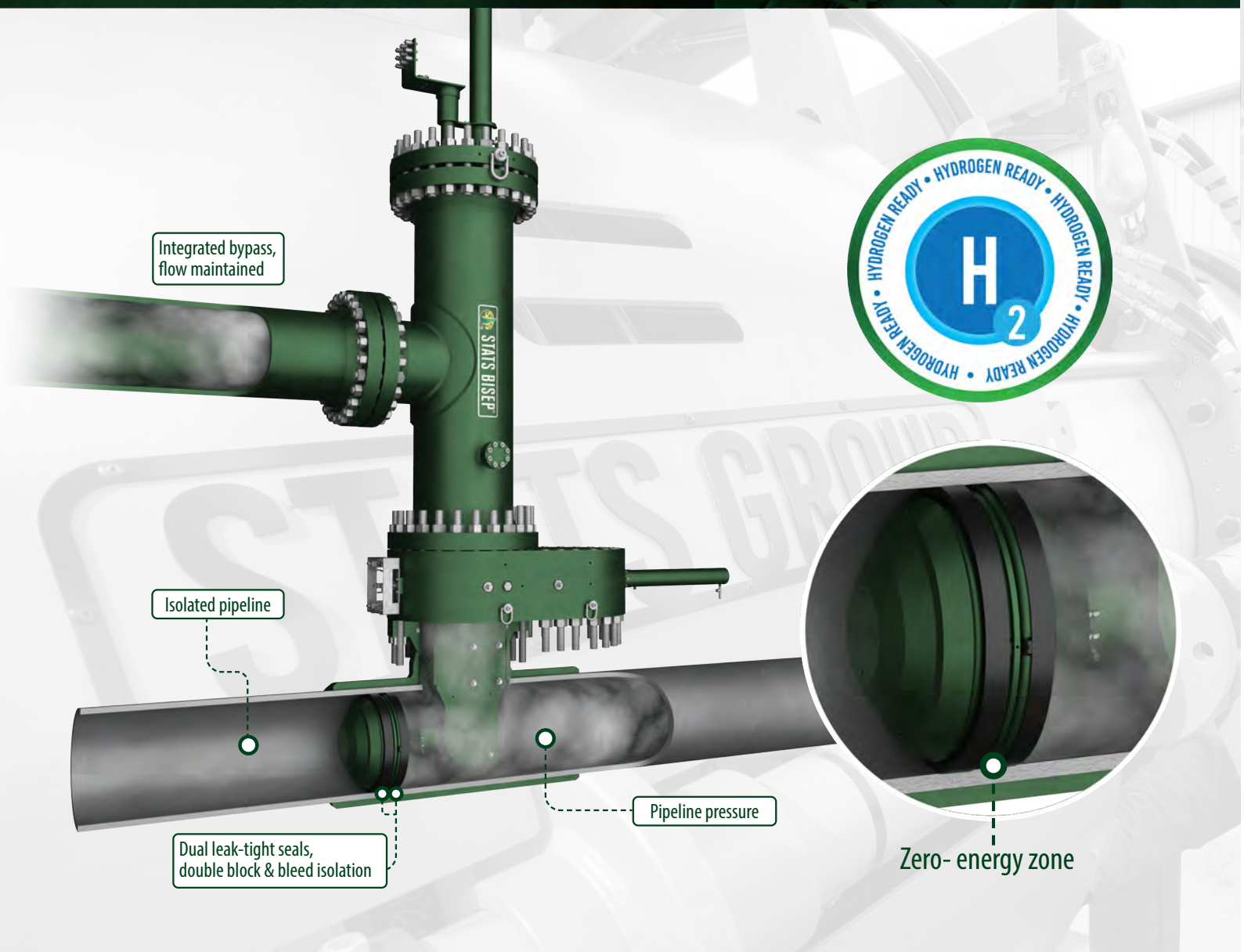
BISEP®
Hot Tapping & Plugging

STATS BISEP® offers pipeline operators an industry leading technology solution for temporary line plugging. Achieved using patented and DNV Type Approved technology, the BISEP provides a fail-safe double block and bleed isolation deployed through a single full bore hot tap intervention, without the need for additional hot tapped bleed or vent ports. The BISEP offers significant safety advantages over traditional line stop technologies, with the hydraulically activated dual seals providing leak-tight isolation of live, pressurised pipelines.

This high integrity isolation is provided by a spherical dual seal plug which is hydraulically deployed into the pipeline from a pressure competent launcher, through a dual seal isolation valve. The seals are hydraulically compressed resulting in radial expansion against the pipe bore. During isolation barrier proving, each seal is independently tested with full pipeline pressure in the direction of the expected pressure differential, proving both seals of the double block isolation are leak-tight. Following successful seal proving, the vented annulus void is then closed and monitored confirming isolation integrity throughout the isolation period.

The line pressure acting against the BISEP pressure head offers a fail-safe feature by providing actuation independent of the hydraulic system. The ejection load resistance is provided by the BISEP deployment head.

Multiple BISEPs can be used to provide mid-line isolation of pipeline sections and the introduction of a bypass line allows sectional isolation to take place without the need to shut down the entire system or affect product flow.



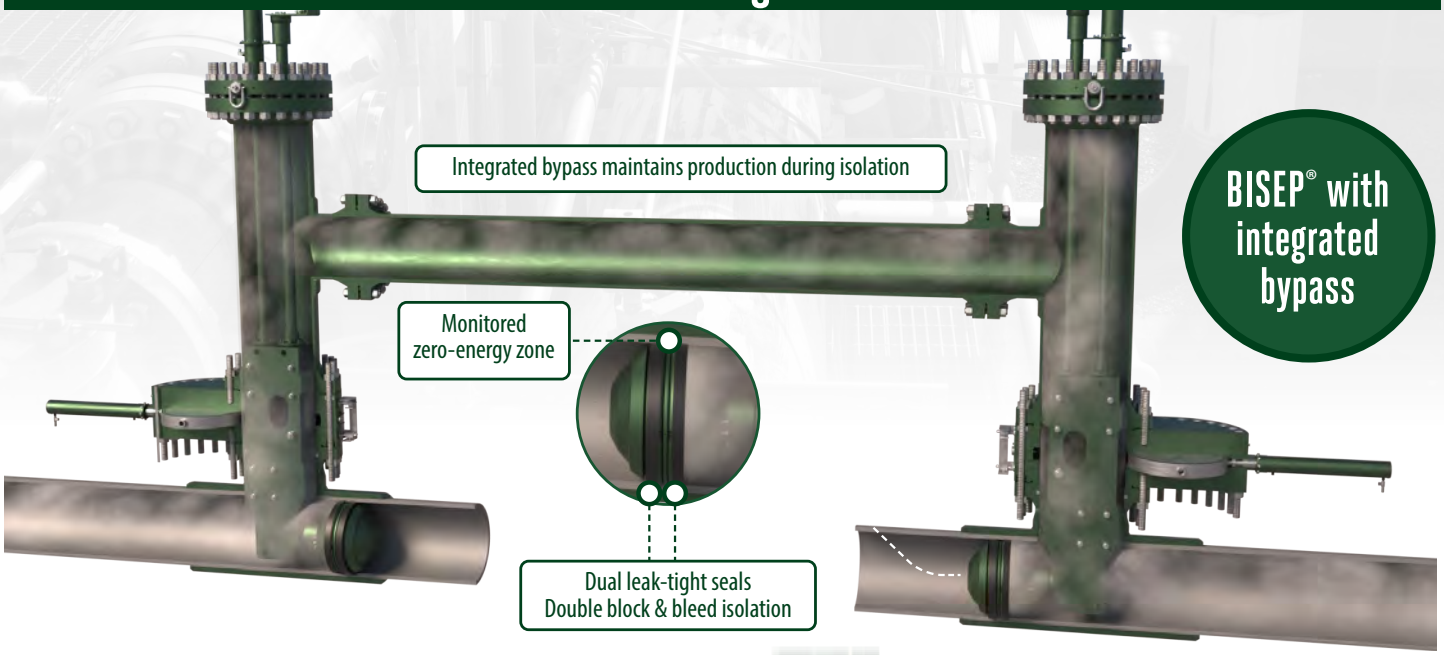
Pipeline Isolation Applications

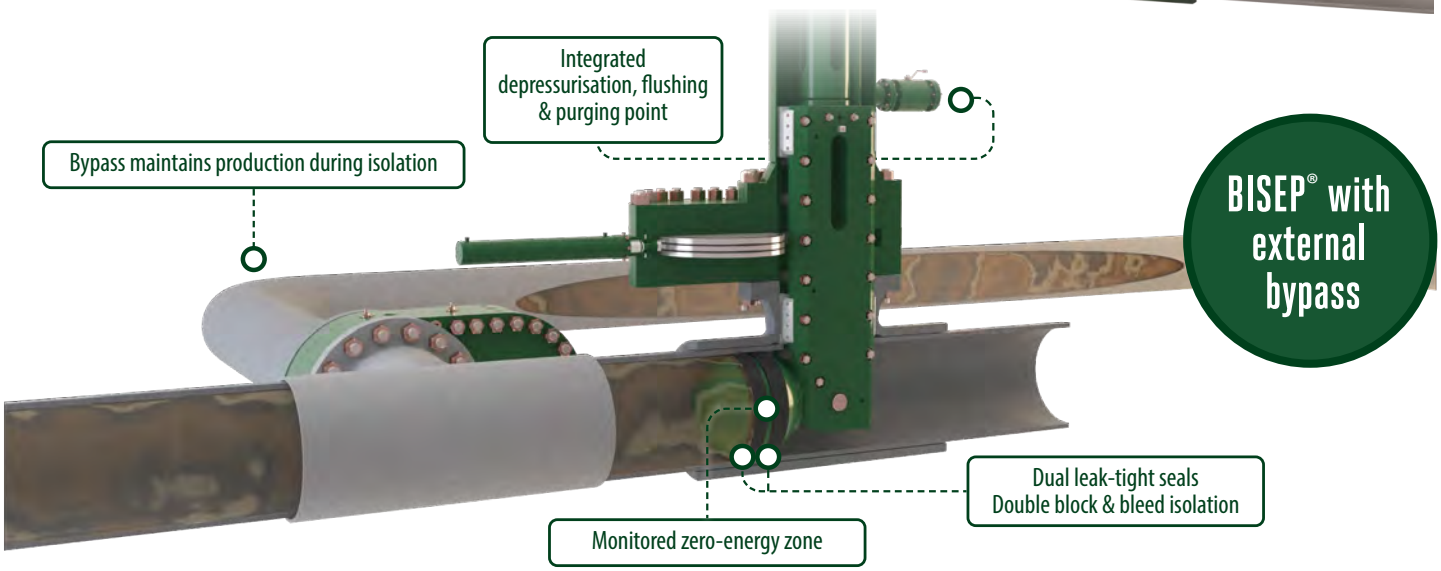
- Pipeline / launcher valve installation or replacement
- Pipeline / riser repair, replacement or decommissioning
- Pipeline / pipework re-routing
- Mid-line repair of pipeline defects
- Isolate pressure vessels
- Water or gas injection line isolation
- Isolation of pipeline end manifolds, pipeline end terminals for repair, upgrade or replacement

- ONSHORE
- OFFSHORE
- SUBSEA
- TOPSIDES
- PROCESS PLANT

Main Industries Served

BISEP® Configurations

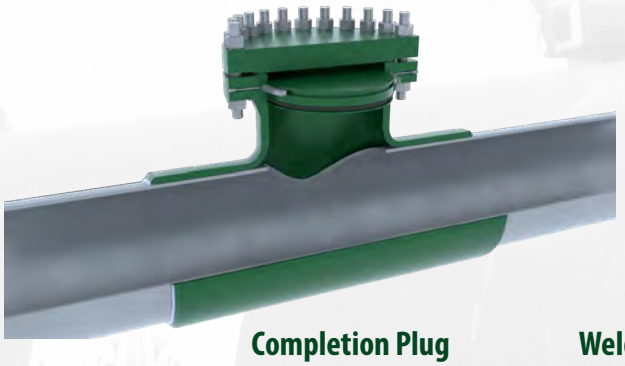




Reinstatement Pressure Testing

The BISEP is designed to resist back pressure and therefore can also be used as a test boundary for pipeline reinstatement testing. Uniquely the BISEP is designed to take 50% of its design pressure in the reverse direction. This allows pressure higher than the isolated pipeline pressure to be applied to the reinstated pipework (as a pressure test or purge) prior to removing the BISEP.

STATS also supply welded and mechanical split tee fittings for hot tap and BISEP applications along with its patented dual seal slab valves and hot tapping services. To allow the BISEP and valve to be recovered fittings can be supplied with a completion plug and blind flange to isolate the branch off-take.



Completion Plug

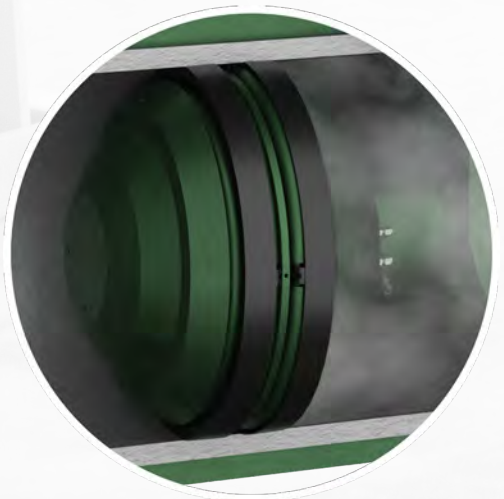
Welded Split Tee

Mechanical Clamp

Operator Benefits

- Fully verified double block and bleed isolation through a single hot tap intervention
- Leak-tight isolation dramatically increases safety over traditional line stop technologies
- Isolation remains stable and leak-tight even with significant fluctuating pipeline pressures
- Single hot tap intervention significantly reduces timescales and costs and also allows installation on short sections of pipework.
- Full compliance with oil and gas industry standard double block and bleed requirements
- Minimal production disruption on interconnected pipeline networks during valve repairs / tie-ins

The BISEP is fully certified by DNV to verify 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 code compliant with: ASME BPVC Section VIII, Division 2.



BISEP®

Specification

- **Size range: 3" – 56"**
- **Pressure range: up to 153 bar, available in ANSI Class 600 and 900 ratings**
- **Maximum operating temperature: 100˚C, minimum operating temperature: -20˚C**
- **Other pressure and temperature combinations available by request**

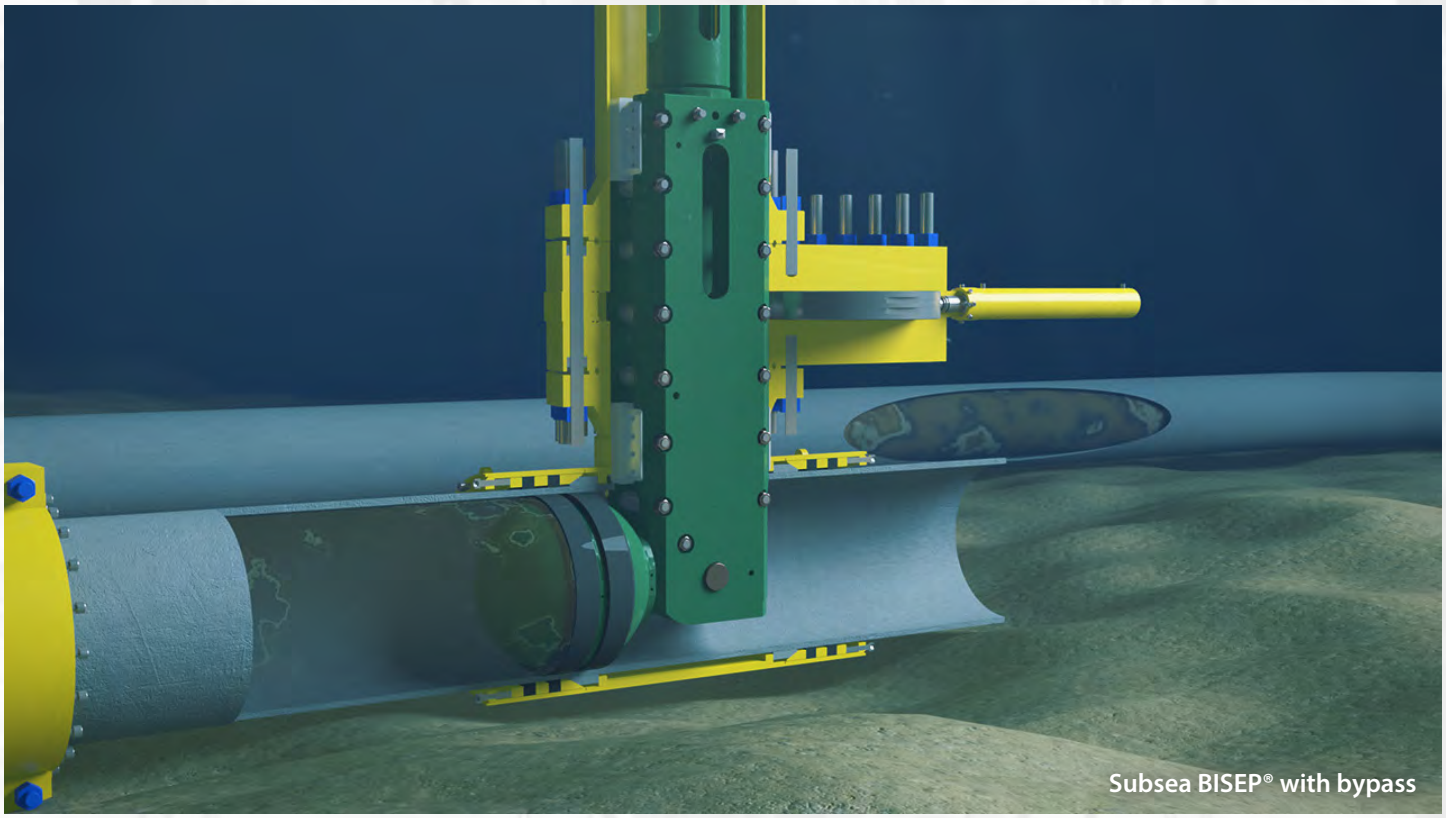
Key Features

- Monitored dual seal annulus void proves seal integrity before and during intervention work
- Isolation integrity continuously monitored through annulus void, hydraulic set circuit and body vents
- Seal annulus void provides a Zero-Energy Zone (minimal volume x pressure)
- Design provides axial restraint through bearing on dual clevis plates (no single point failure)
- Dual compression seals provide higher integrity isolation than traditional cup seals
- Hydraulically activated seals can be manipulated to improve performance when sealing in pipes with issues such as ovality and internal surface irregularities; ie weld seams, corrosion, erosion
- No additional pipeline hot taps required for bleed or vent ports
- Self-Energisation of seals maintains isolation integrity independent of hydraulic control circuit
- Ability to accommodate reinstatement pressure test against the rear of the plugging head
- BISEP isolation installed upstream of fitting, maintaining fitting in safe zone during workscope
- BISEP launcher ported to facilitate venting, purging and flushing of isolated section
- Can be deployed through a conventional equal tee, clamp or branch

  Design allows for deployment into flow conditions (Engineering Assessment Required)
- Hydraulic rotation of the plugging head enables BISEP deployment into pipes in any orientation. In addition to horizontal and vertical pipes the BISEP can also operate in pipes inclined from the horizonal making it more versatile than traditional line stop systems

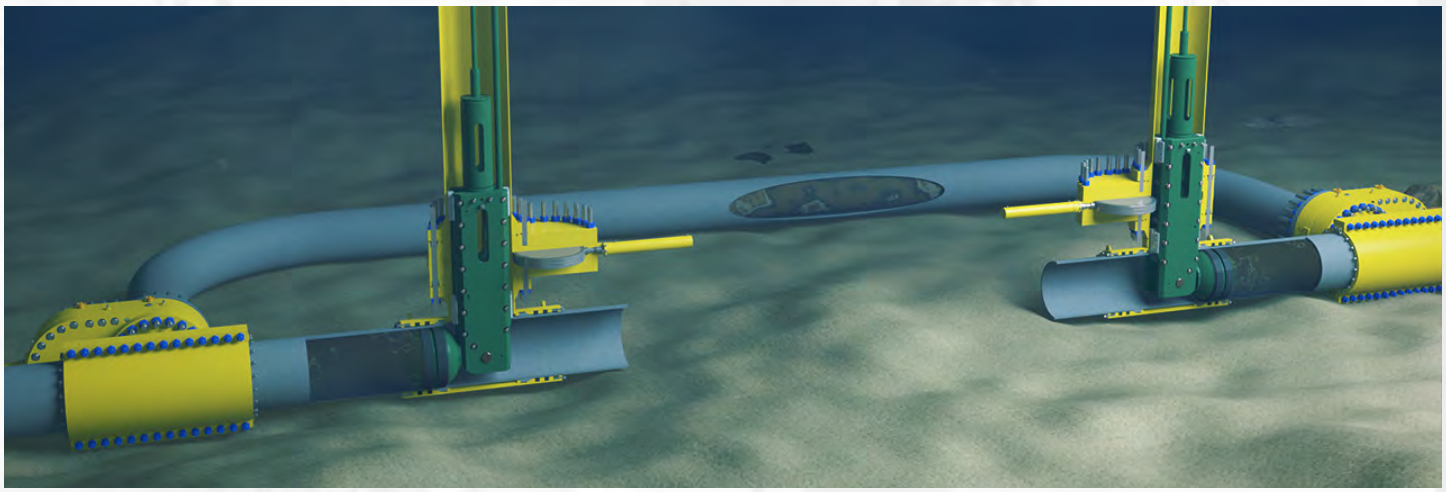
Subsea Isolations with the BISEP®

Hot Tapping and Plugging



Subsea BISEP® with bypass

The BISEP when deployed subsea provides the highest level of hot tap installed pipeline isolation in the industry. Complying with all relevant subsea isolation guidelines, the BISEP ensures safe worksite conditions for divers from breaking containment to reinstatement.



The BISEP is the only hot tap installed double block isolation tool that satisfies the design criteria for DNV Type Approval for Pipeline Isolation Plugs. 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 is code compliant with: ASME BPVC Section VIII, Division 2.

The use of the BISEP provides high integrity, temporary subsea isolation that offers operators significant benefits by avoiding the need to decommission and then recommission the entire subsea infrastructure.

Main BISEP Subsea Applications

- Sectional replacement / pipeline repair
- Pipeline tie-in operations
- Pipeline re-routing
- Dead leg removal
- Pipeline abandonment and decommissioning
- Isolation of subsea manifolds or skids for repair or replacement

14" BISEP® Cl600, East China Sea

Key Features for Subsea Activities

- Double block and bleed isolation compliant with subsea industry isolation best practice. (DNV-RP-F113 Pipeline Subsea Repair – recommended practice)
- Monitored dual seal annulus void proves seal integrity before and during intervention work
- Isolation integrity continuously monitored through annulus void, hydraulic set circuit and body vents Seal annulus void provides a Zero-Energy Zone (minimal volume x pressure)
- In bad weather, enhanced actuation system allows long-term disconnection from support vessel
- Isolation remains stable and leak-tight even with significantly fluctuating pipeline pressures
- The BISEP design ensures diver safety in the event of negative and positive pipeline differential pressures
- Ability to accommodate reinstatement pressure test against the rear of the plugging head

28" BISEP® Cl600 South China Sea

STATS GROUP

MANAGING PRESSURE, MINIMISING RISK

SureTap®

Hot Tapping Machines

Issue 8 - Nov 2024

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SureTap®
Hot Tapping Machines

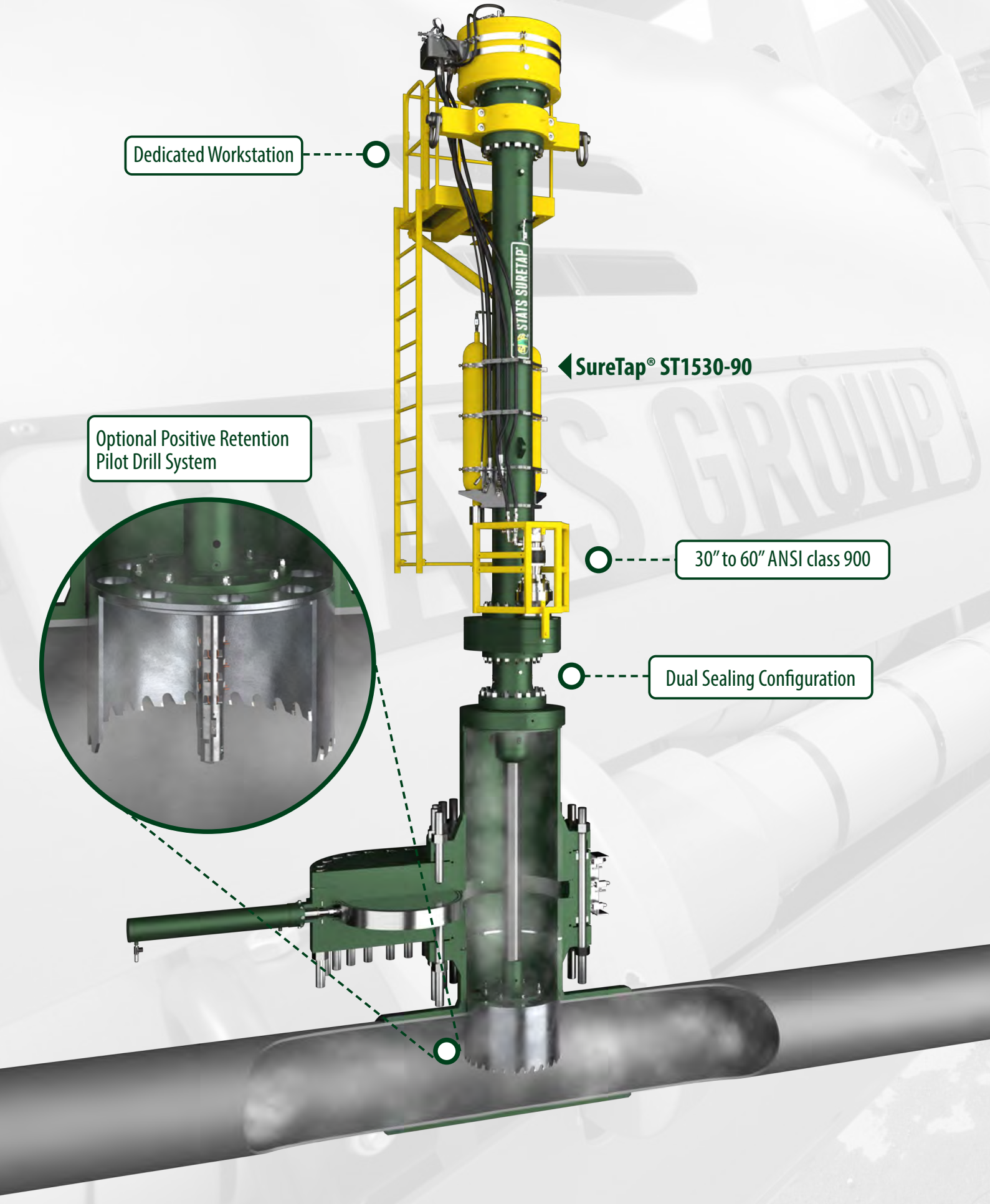
The SureTap range of proprietary tapping machines provide performance and reliability to meet all your critical, high pressure tapping requirements. Designed and built to incorporate industry leading features, the SureTap range incorporates a dual sealing configuration allowing taps to be performed safely on a wide range of pipeline materials and mediums, including use with sour (H2S) products. A positive retention pilot drill system has been incorporated to ensure robust securing and recovery of the cut pipeline coupon.

All SureTap machines have the capability for onshore, topsides or subsea operation and are fully compatible with industry standard tapping equipment including the deploying and recovery of completion plugs.

Materials of Construction

The SureTap machines are manufactured from high quality materials to European or North American standards. All components used to contain pressurised process fluids are manufactured from pressure vessel grade materials (to ASTM or EN standards), impact tested at sub-zero temperatures and resistant to sulphide stress cracking (SSC).

SureTap® ST410-90


Dedicated Workstation
SureTap® ST1530-90
Optional Positive Retention Pilot Drill System
30" to 60" ANSI class 900
Dual Sealing Configuration

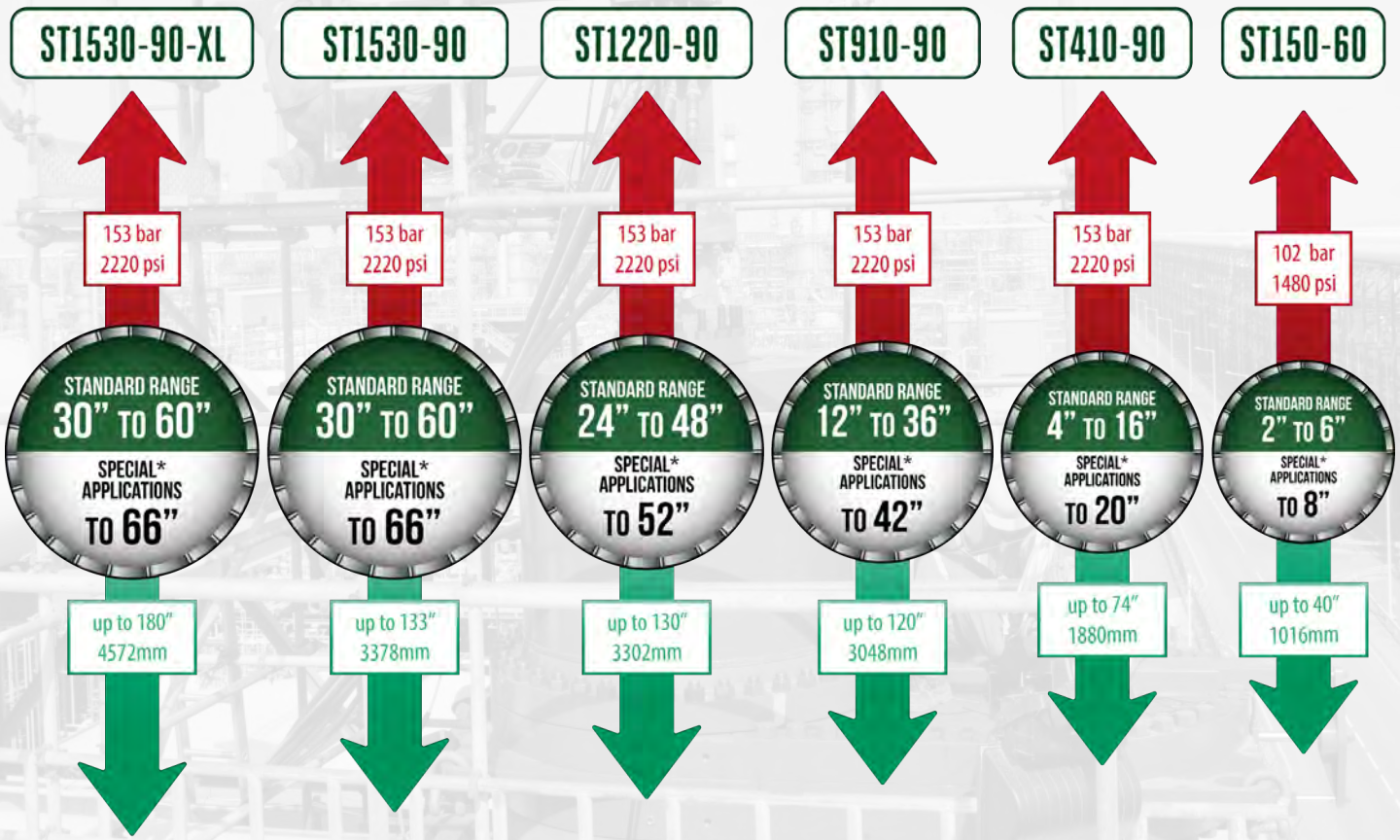
Legislation, Codes & Directives

Design Compliant with:

- ASME B16.5: Pipe flanges and flanged fittings
- ASME B31.3: Process piping
- ASME B31.4: Pipeline Transportation System for Liquid Hydrocarbons and Other Liquids
- ASME B31.8: Gas Transmission & Distribution Piping Systems
- ASME BPVC. Section VIII, Division 1: Design and Fabrication of Pressure Vessels
- ASME BPVC. Section VIII, Division 2: Alternative Rules
- NACE MR0175/ISO 15156-2: Petroleum and natural gas industries - Materials for use in H2S containing environments in oil and gas production
- EU directive 2006/42/EC: Machinery. EU directive 97/23/EC: Pressure equipment


SureTap® ST410-90

SureTap® Range

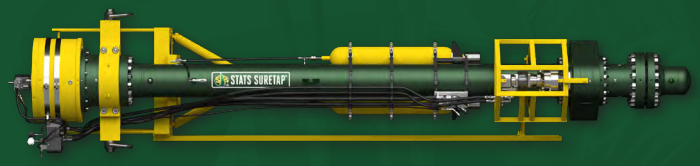


Standard Range | Special* Applications | Pressure Rating | Stroke

* Please consult STATS for advice regarding special applications

SureTap® ST1530-90-XL MACHINE

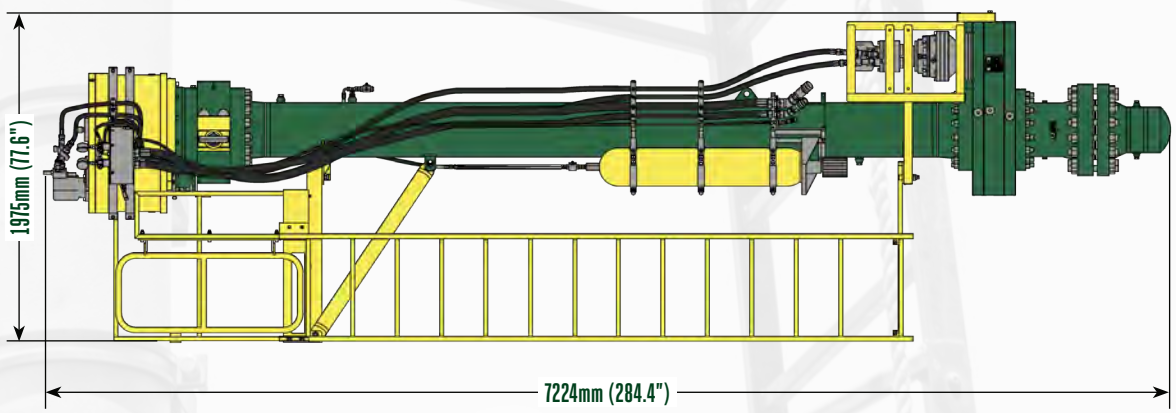
30" – 60"* cutter size
153 bar / 2220 psi pressure rating



- Process fluid seal housing features dual seal configuration
- Positive retention pilot drill system for robust securing and recovery of the cut pipe coupon
- Pressure compensated feed system
- Variable speed and feed configuration
- Suitable for use with sour (H2S) products
- Compatible with industry standard tapping equipment
- Capable of deploying and recovering completion plugs
- Dedicated transportation frame for secure shipping, storage and routine maintenance
- Dedicated work station for ease of use and operator safety
- Power provided from a portable, custom hydraulic power unit (HPU)
- Subsea compatible
- Pressure class: ANSI Class 900

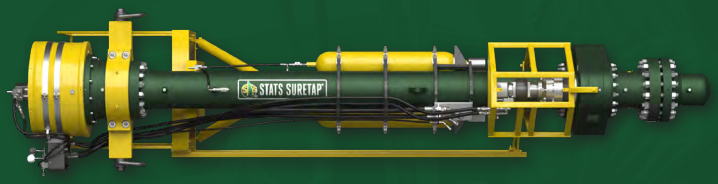
* Please consult STATS for cuts up to 66"

Operating Parameters		
Pressure – temperature rating:	ASME B16.5 Class 900. Table 2 - 1.1	
Maximum operating pressure:	153 Bar @38°C	2220 psi @ 100°F
Operating temperature range - process fluid:		
Standard configuration	-20°C to 150°C	-4°F to 302°F
Operating temperature range - ambient (atmospheric):	-20°C to 40°C	-4°F to 104°F
Minimum cutter size:	30″	
Maximum cutter size: *STANDARD RANGE*	60″	
Maximum cutter size: *SPECIAL APPLICATIONS*	66″	
Boring bar rotational speed:	0 to 17 rpm	
Boring bar feed rates:		
Feed rate 1	0.08mm/rev	0.003"/rev
Feed rate 2	0.18mm/rev	0.007"/rev
Feed rate 3	0.28mm/rev	0.011"/rev
Auxiliary feed	343mm/min	13.5″/min
Boring bar travel:		
Standard machine	4572mm	180″
Machine weight:	6480kg	14286lbs
Overall dimensions, L x W x H:	7224 x 1400 x 1975mm	284.4 x 55.1 x 77.6″
Machine + Skid Weight:	7410kg	16336lbs
Shipping dimensions, L x W x H:	7300 x 1430 x 2110mm	287.5 x 56 x 83″



SureTap® ST1530-90 MACHINE

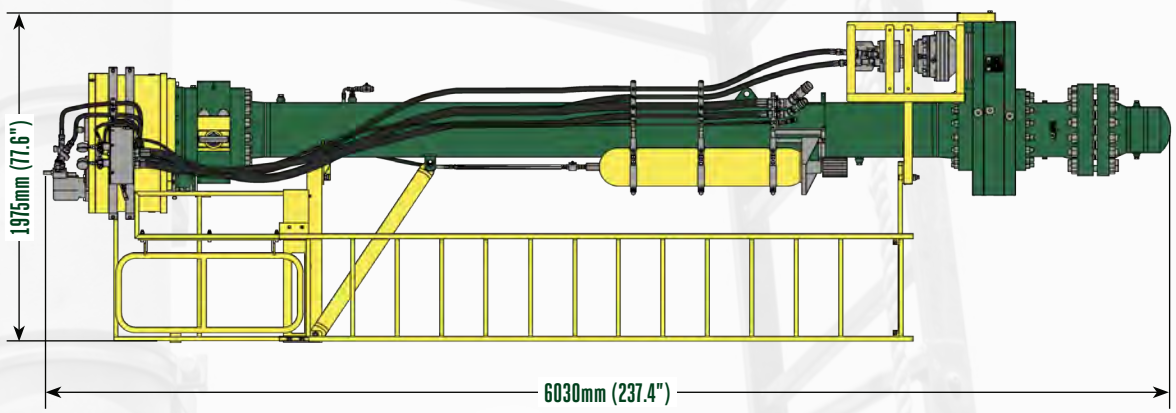
30" – 60"* cutter size
153 bar / 2220 psi pressure rating



- Process fluid seal housing features dual seal configuration
- Positive retention pilot drill system for robust securing and recovery of the cut pipe coupon
- Pressure compensated feed system
- Variable speed and feed configuration
- Suitable for use with sour (H2S) products
- Compatible with industry standard tapping equipment
- Capable of deploying and recovering completion plugs
- Dedicated transportation frame for secure shipping, storage and routine maintenance
- Dedicated work station for ease of use and operator safety
- Power provided from a portable, custom hydraulic power unit (HPU)
- Subsea compatible
- Pressure class: ANSI Class 900

* Please consult STATS for cuts up to 66"

Operating Parameters		
Pressure – temperature rating:	ASME B16.5 Class 900. Table 2 - 1.1	
Maximum operating pressure:	153 Bar @38°C	2220 psi @ 100°F
Operating temperature range - process fluid:		
Standard configuration	-20°C to 150°C	-4°F to 302°F
Operating temperature range - ambient (atmospheric):	-20°C to 40°C	-4°F to 104°F
Minimum cutter size:	30″	
Maximum cutter size: *STANDARD RANGE*	60″	
Maximum cutter size: *SPECIAL APPLICATIONS*	66″	
Boring bar rotational speed:	0 to 17 rpm	
Boring bar feed rates:		
Feed rate 1	0.08mm/rev	0.003"/rev
Feed rate 2	0.18mm/rev	0.007"/rev
Feed rate 3	0.28mm/rev	0.011"/rev
Auxiliary feed	343mm/min	13.5″/min
Boring bar travel:		
Standard machine	3378mm	133″
Machine weight:	6142kg	14286lbs
Overall dimensions, L x W x H:	7224 x 1400 x 1975mm	284.4 x 55.1 x 77.6″
Machine + Skid Weight:	6971kg	15369lbs
Shipping dimensions, L x W x H:	6100 x 1430 x 2110mm	240 x 56 x 83″



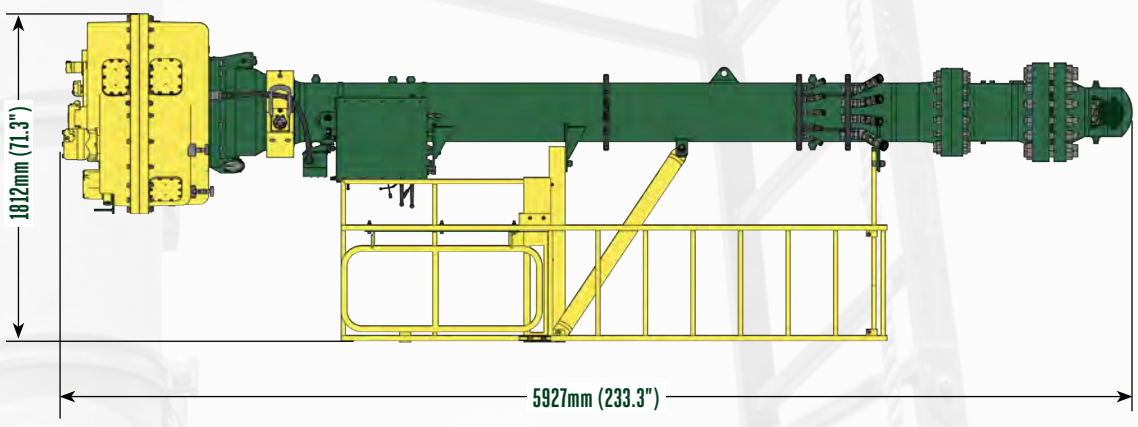
SureTap® ST1220-90 MACHINE

24" – 48"* cutter size
153 bar / 2220 psi pressure rating

- Process fluid seal housing features dual seal configuration
- Positive retention pilot drill system for robust securing and recovery of the cut pipe coupon
- Pressure compensated feed system
- Variable speed and feed configuration
- Suitable for use with sour (H2S) products
- Compatible with industry standard tapping equipment
- Capable of deploying and recovering completion plugs
- Dedicated transportation frame for secure shipping, storage and routine maintenance
- Dedicated work station for ease of use and operator safety
- Power provided from a portable, custom hydraulic power unit (HPU)
- Subsea compatible
- Pressure class: ANSI Class 900

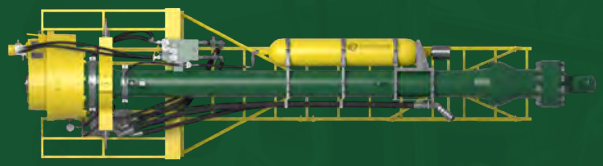
* Please consult STATS for cuts up to 52"

Operating Parameters		
Pressure – temperature rating:	ASME B16.5 Class 900. Table 2 - 1.1	
Maximum operating pressure:	153 Bar @38°C	2220 psi @ 100°F
Operating temperature range - process fluid:		
Standard configuration	-20°C to 150°C	-4°F to 302°F
Operating temperature range - ambient (atmospheric):	-20°C to 40°C	-4°F to 104°F
Minimum cutter size:	24″	
Maximum cutter size: *STANDARD RANGE*	48″	
Maximum cutter size: *SPECIAL APPLICATIONS*	52″	
Boring bar rotational speed:	0 to 30 rpm	
Boring bar feed rates:		
Feed rate 1	0.13mm/rev	0.005"/rev
Feed rate 2	0.18mm/rev	0.007"/rev
Auxiliary feed	343mm/min	13.5″/min
Boring bar travel:		
Standard machine	3302mm	130″
Machine weight:	4650kg	10250lbs
Overall dimensions, L x W x H:	5927 x 1400 x 1812mm	233.3 x 55.1 x 71.3″
Machine with Ladder / Platform & Transport Frame Weight:	5120kg	11290lbs
Shipping dimensions, L x W x H:	6010 x 1430 x 1955mm	236.6 x 56.3 x 77″



SureTap® ST910-90 MACHINE

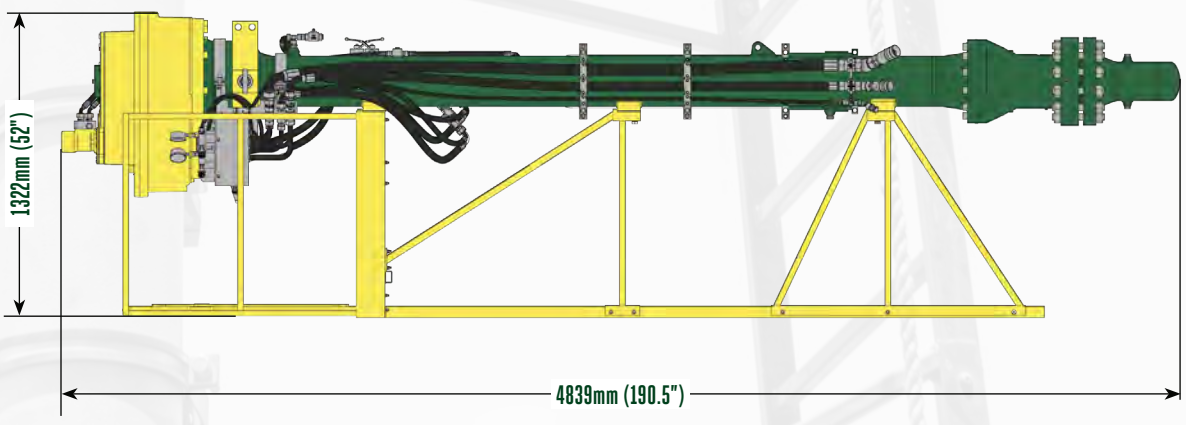
12" – 36"* cutter size
153 bar / 2220 psi pressure rating



- Process fluid seal housing features dual seal configuration
- Positive retention pilot drill system for robust securing and recovery of the cut pipe coupon
- Pressure compensated feed system
- Variable speed and feed configuration
- Suitable for use with sour (H2S) products
- Compatible with industry standard tapping equipment
- Capable of deploying and recovering completion plugs
- Dedicated transportation frame for secure shipping, storage and routine maintenance
- Subsea compatible
- Pressure class: ANSI Class 900

* Please consult STATS for cuts up to 42"

Operating Parameters		
Pressure – temperature rating:	ASME B16.5 Class 900. Table 2 - 1.1	
Maximum operating pressure:	153 Bar @38°C	2220 psi @ 100°F
Operating temperature range - process fluid:		
Standard configuration	-20°C to 121°C	-4°F to 250°F
Operating temperature range - ambient (atmospheric):	-20°C to 40°C	-4°F to 104°F
Minimum cutter size:	12″	
Maximum cutter size: *STANDARD RANGE*	36″	
Maximum cutter size: *SPECIAL APPLICATIONS*	42″	
Boring bar rotational speed:	0 to 30 rpm	
Boring bar feed rates:		
Feed rate 1	0.10mm/rev	0.004"/rev
Feed rate 2	0.15mm/rev	0.006"/rev
Boring bar size:	101.6mm	4″
Boring bar travel:	3048mm	120″
Machine weight:	1934kg	4264lbs
Overall dimensions, L x W x H:	4839 x 1221 x 1322mm	190.5 x 48 x 52″
Machine with Ladder / Platform & Transport Frame weight:	2800kg	6172lbs
Shipping dimensions, L x W x H:	5131 x 1700 x 1422mm	202 x 66.9 x 56″



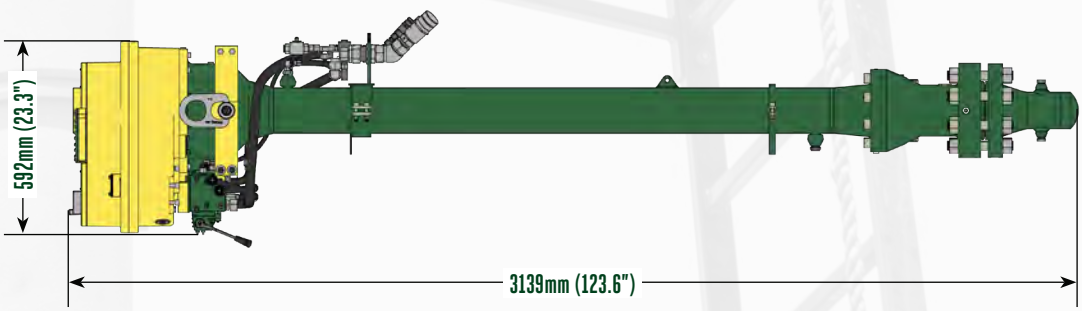
SureTap® ST410-90 MACHINE

4" – 16"* cutter size
153 bar / 2220 psi pressure rating

- Process fluid seal housing features dual seal configuration
- Positive retention pilot drill system for robust securing and recovery of the cut pipe coupon
- Pressure compensated feed system
- Variable speed and feed configuration
- Suitable for use with sour (H2S) products
- Compatible with industry standard tapping equipment
- Capable of deploying and recovering completion plugs
- Dedicated transportation frame for secure shipping, storage and routine maintenance
- Subsea compatible
- Pressure class: ANSI Class 900

* Please consult STATS for cuts up to 20"

Operating Parameters		
Pressure – temperature rating:	ASME B16.5 Class 900. Table 2 - 1.1	
Maximum operating pressure:	153 Bar @38°C	2220 psi @ 100°F
Operating temperature range - process fluid:		
Standard configuration	-20°C to 121°C	-4°F to 250°F
Operating temperature range - ambient (atmospheric):	-20°C to 40°C	-4°F to 104°F
Minimum cutter size:	4"	
Maximum cutter size: *STANDARD RANGE*	16"	
Maximum cutter size: *SPECIAL APPLICATIONS*	20"	
Boring bar rotational speed:	0 to 40 rpm	
Boring bar feed rates:		
Feed rate 1	0.08mm/rev	0.003"/rev
Feed rate 2	0.13mm/rev	0.005"/rev
Boring bar size:	69.9mm	2.8"
Boring bar travel:	1880mm	74"
Machine weight:	540kg	1190lbs
Overall dimensions, L x W x H:	3139 x 611 x 592mm	123.6 x 24.1 x 23.3"
Machine with Ladder / Platform & Transport Frame weight:	809kg	1784lbs
Shipping dimensions, L x W x H:	3300 x 800 x 750mm	129.9 x 31.5 x 29.5"



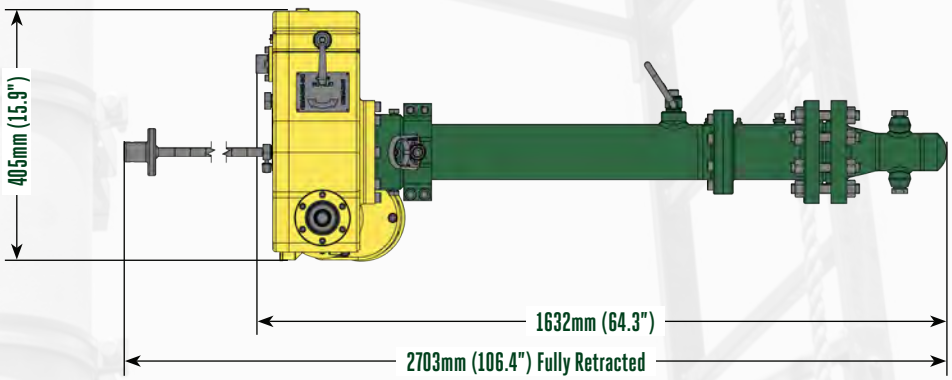
SureTap® ST150-60 MACHINE

2" – 6"* cutter size
102bar / 1480 psi pressure rating

- Variable speed and feed configuration
- Suitable for use with sour (H2S) products
- Compatible with industry standard tapping equipment
- Capable of deploying and recovering completion plugs
- Dedicated transportation frame for secure shipping, storage and routine maintenance
- Subsea compatible
- Pressure class: ANSI Class 600

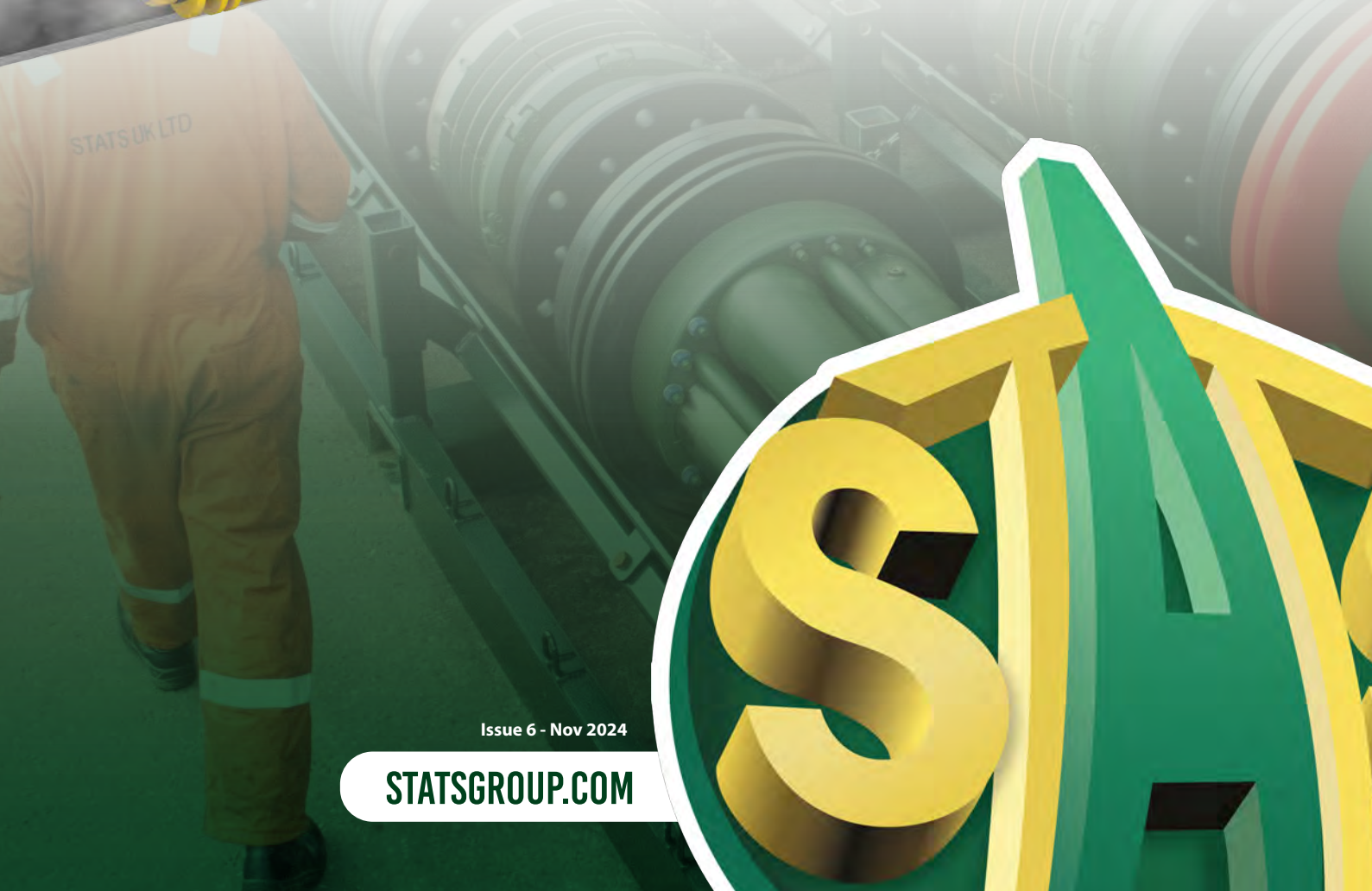
* Please consult STATS for cuts up to 8"

Operating Parameters		
Pressure – temperature rating:	ASME B16.5 Class 600. Table 2 - 1.1	
Maximum operating pressure:	102 Bar @38°C	1480 psi @ 100°F
Operating temperature range - process fluid:		
Standard configuration	-20°C to 121°C	-4°F to 250°F
High temperature service module	0°C to 370°C	32°F to 698°F
Operating temperature range - ambient (atmospheric):	-20°C to 40°C	-4°F to 104°F
Minimum cutter size:	2″	
Maximum cutter size: *STANDARD RANGE*	6″	
Maximum cutter size: *SPECIAL APPLICATIONS*	8″	
Boring bar rotational speed:	0 to 40 rpm	
Boring bar feed rates:		
Feed rate 1	0.08mm/rev	0.003"/rev
Feed rate 2	0.13mm/rev	0.005"/rev
Boring bar size:	42.8mm	1.7″
Boring bar travel:	1016mm	40″
Machine weight:	125kg	276lbs
Overall dimensions, L x W x H:	1632 x 595 x 405mm	64.3 x 23.4 x 15.9″
Machine with Ladder / Platform & Transport Frame weight:	210kg	463lbs
Shipping dimensions, L x W x H:	1800 x 700 x 530mm	70.9 x 27.6 x 20.9″



Tecno Plug®

Non-Intrusive Inline Isolation



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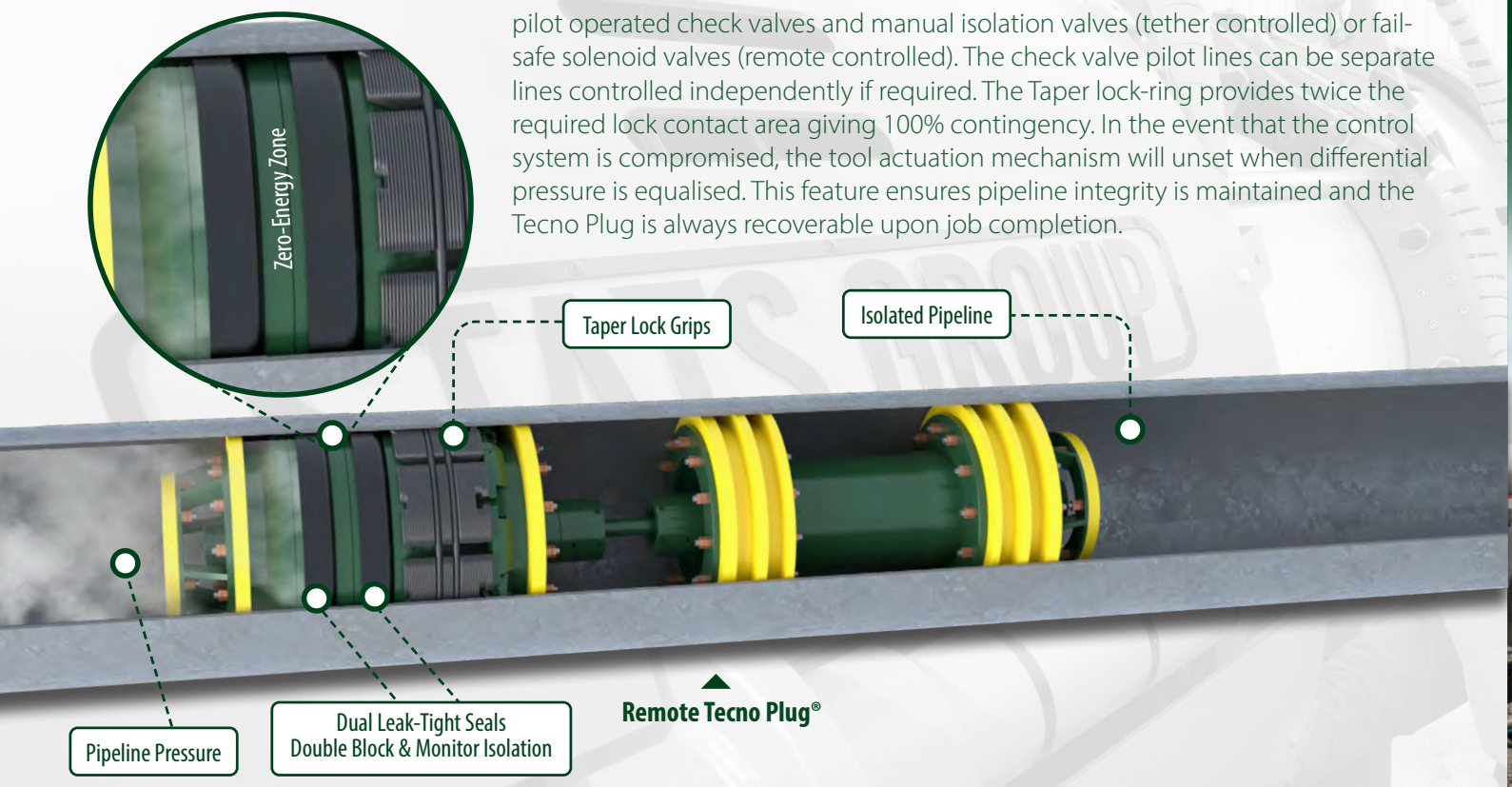
Tecno Plug®
Non-Intrusive Inline Isolation

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.

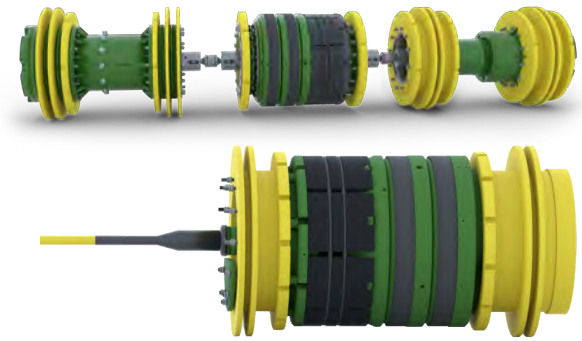
Pipeline Isolation Applications

- **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

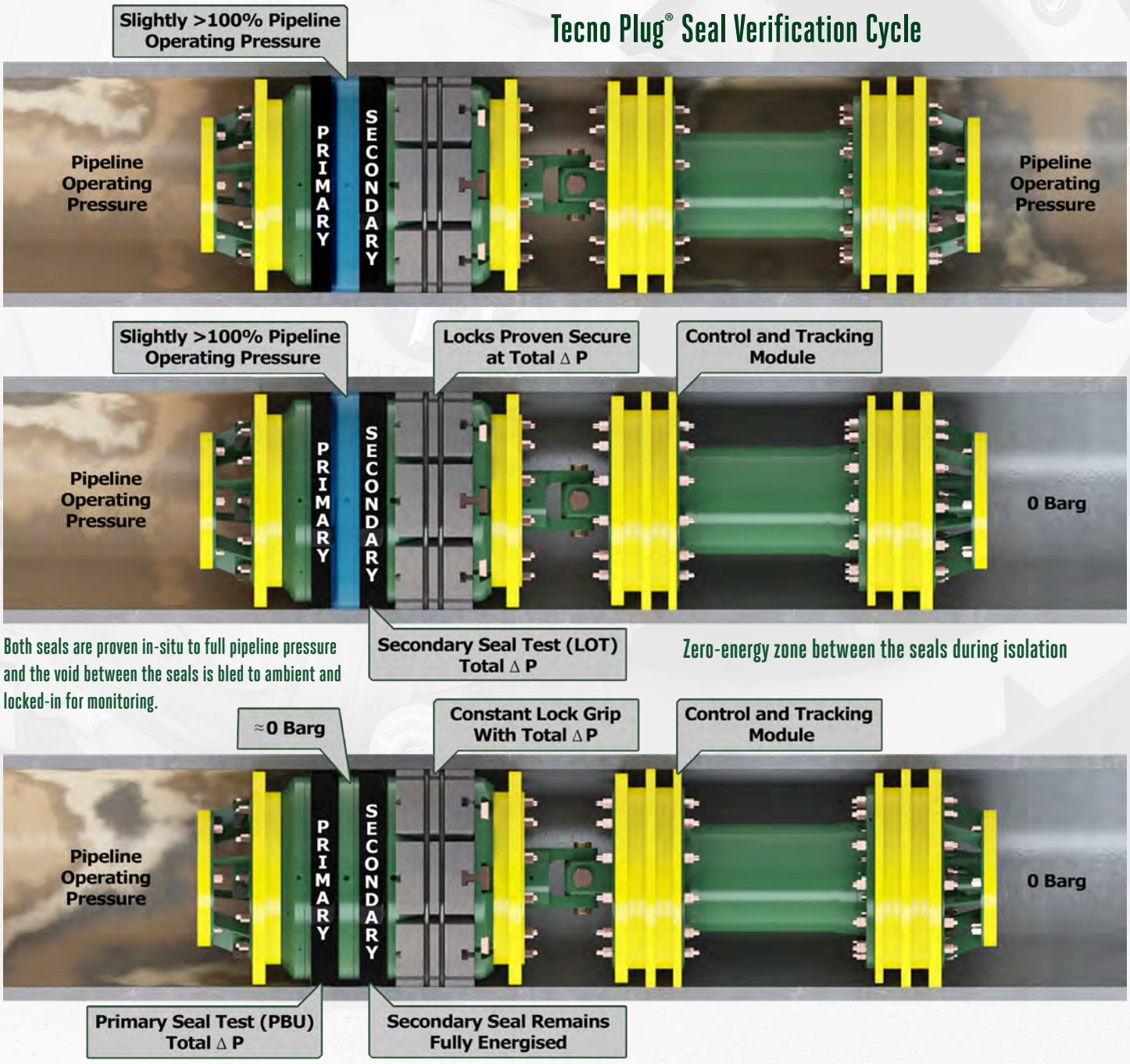


STATS Tecno Plugs are fully certified by DNV to verify that the design criteria satisfies the requirements for Pipeline Isolation Plugs to provide dual seal and isolation in accordance with Offshore Standards; DNV-OS-F101 (Submarine Pipeline Systems) and recommended Practices; DNV-RP-F113 (Subsea Pipeline 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.

Tecno Plug® Seal Verification Cycle



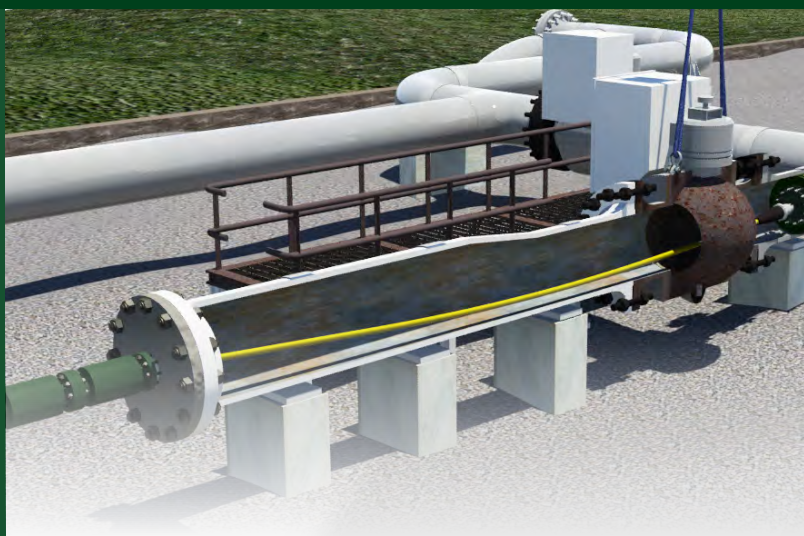
Both seals are proven in-situ to full pipeline pressure and the void between the seals is bled to ambient and locked-in for monitoring.

Zero-energy zone between the seals during isolation

Tethered Tecno Plug®

Key Features

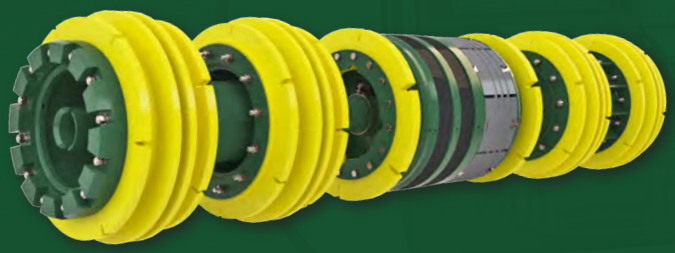
- Size range: 3" – 56"
- Standard Tecno Plug up to 230 bar / 3336 psi with bespoke solutions up to 600 bar / 8702 psi available upon request
- DNV Type Approval in accordance with; DNV-OS-F101 (Submarine Pipeline Systems) and recommended Practices; DNV-RP-F113 (Subsea Pipeline Repair)
- Available as 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



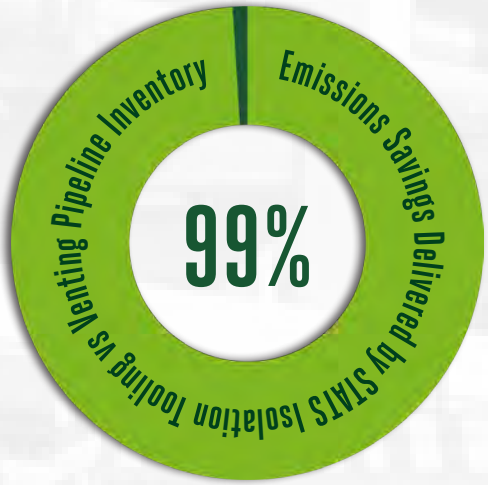
- Size range: 10" – 56"
- Pressure range: standard remote control module housing is rated for 200 bar / 2900 psi external pressure
- DNV type approval in accordance with; DNV-OS-F101 (Submarine Pipeline Systems) and recommended Practices; DNV-RP-F113 (Subsea Pipeline Repair)
- The Remote Control Module 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

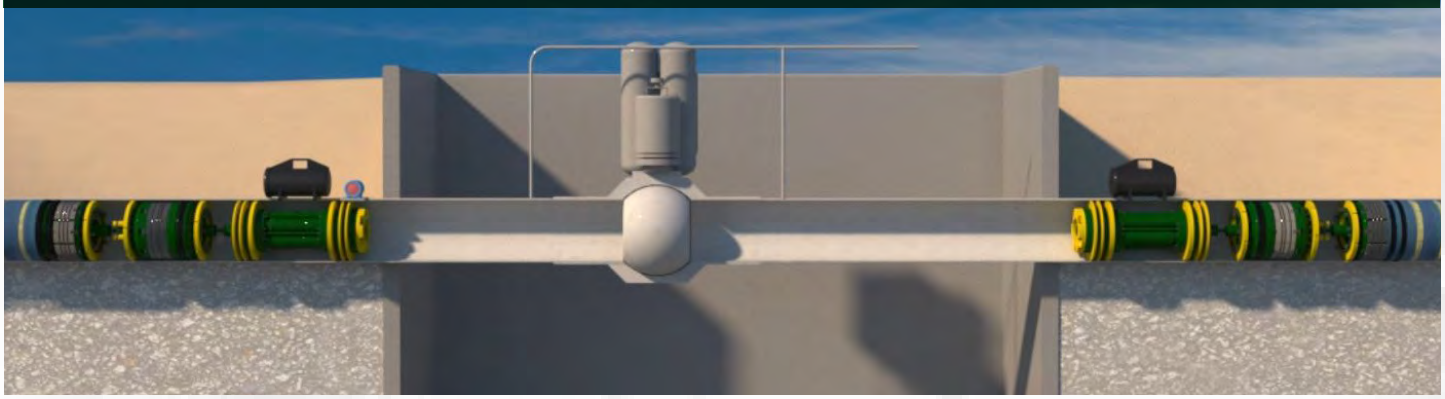
Reducing flaring and venting during repair and maintenance

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 CO2 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 CO2 into the atmosphere

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