



Innovative Design & Applications of Inflatable Packers for Well Intervention, Integrity and P&A Challenges

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Agenda

- Introduction to IPI Packers
- IPI Packer Element technology
- IPI's Portfolio for the Well Intervention
- IPI's Portfolio for the Well Integrity
- IPI's Portfolio for P&A



IPI Packers Introduction



Introduction to IPI Packers

IPI Packers is an independently owned designer, manufacturer, and supplier of inflatable element technologies to the global Oil and Gas industry. Standard or custom designed inflatable solutions to our client's wellbore challenges can be supplied throughout the lifecycle of their asset from exploration through P&A.

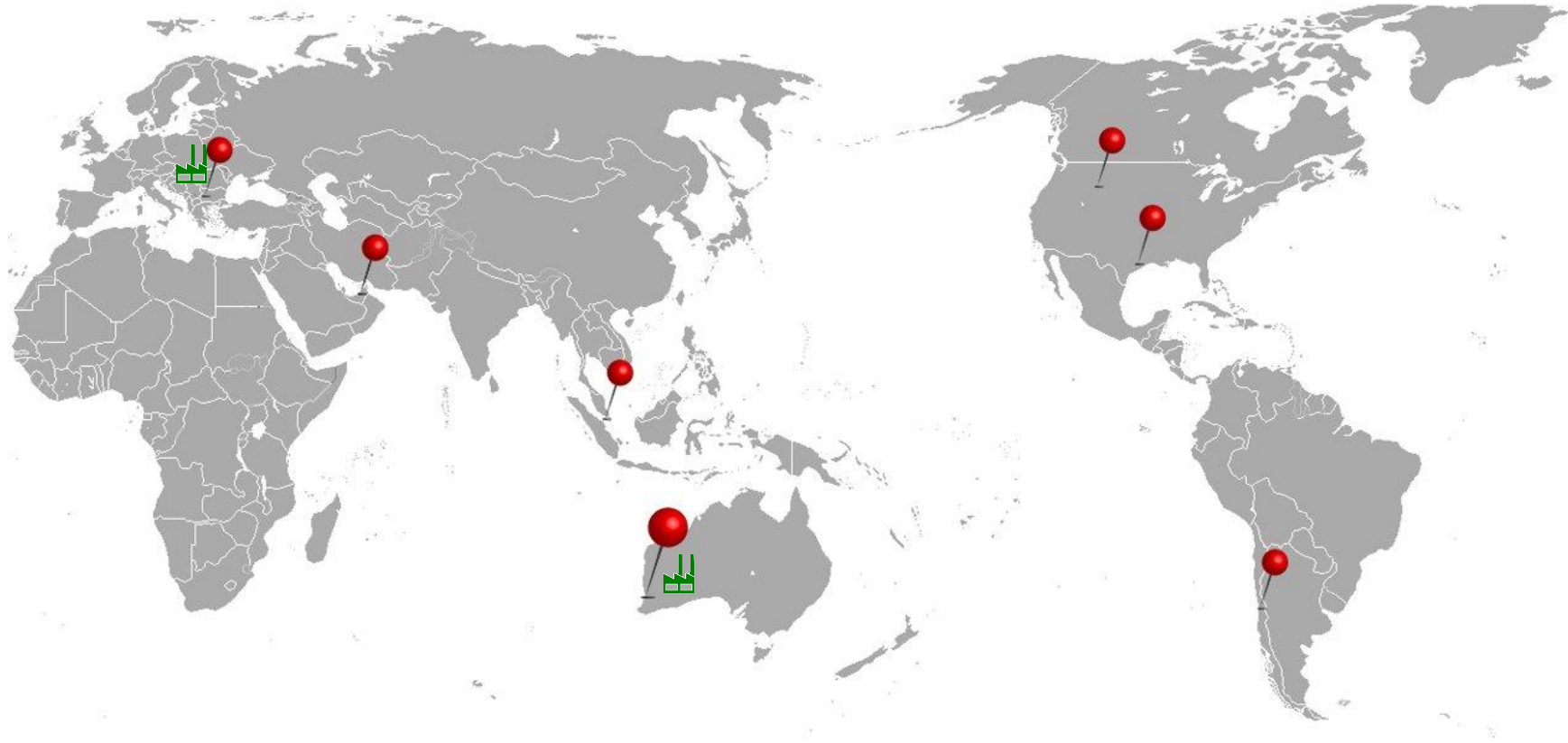
Oil & Gas

Mining & Water
Geotechnical

Technology Focus, Distinctly Different Inflatable Packer Technology

Inflatable Packers Intro

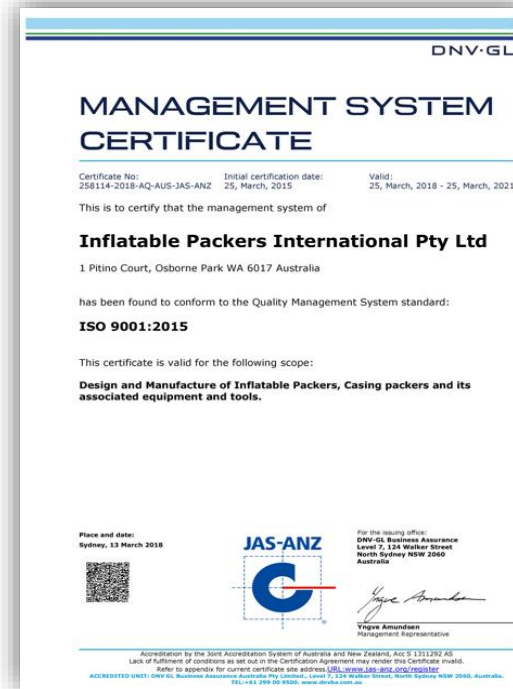
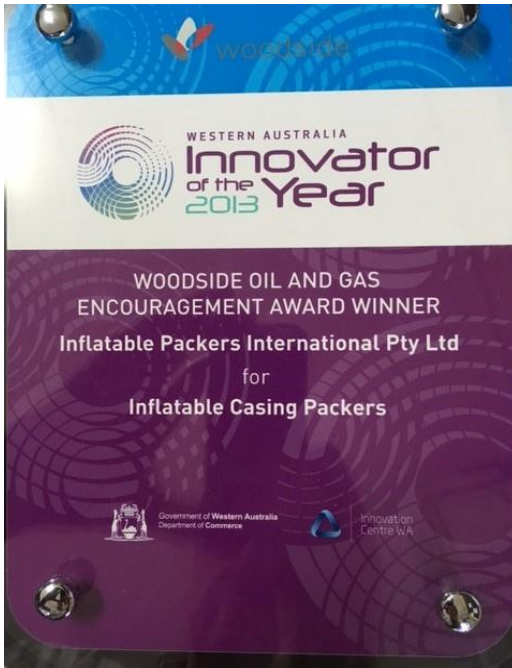
Global Reach



- Headquarter in Perth
- 2 Manufacturing Facilities
- 6 Regional Offices

IPI supplies clients on all continents including Antarctica.

Inflatable Packers Intro Quality & Recognition



IPI Packer Element technology



Design Types

- Slat



- Cable



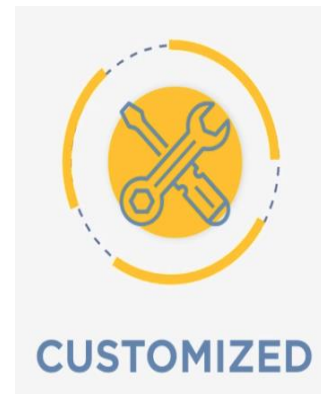
- IPI Contra-Wound



What makes IPI different ?



IPI's design has reinforcement layers embedded throughout the cross-section of the inflation element, within the rubber matrix.

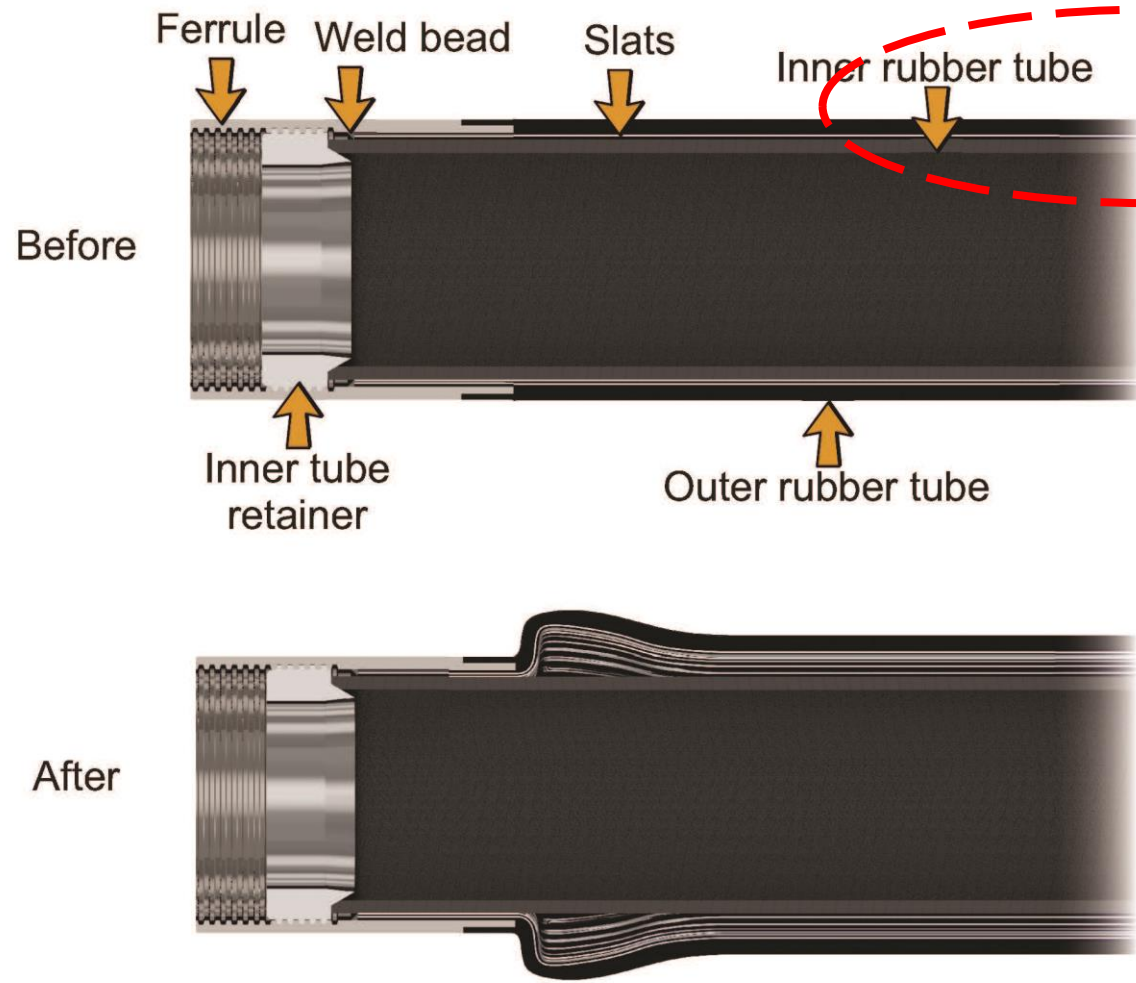


This superior technology offers all the advantages of typical oilfield inflatable packers, but does not have the limitations imposed on other inflatable packers in the market.



**Inflation Packers
International**

Permanent Deformation of Slat Packers



What is the difference?

IPI Packers' Design



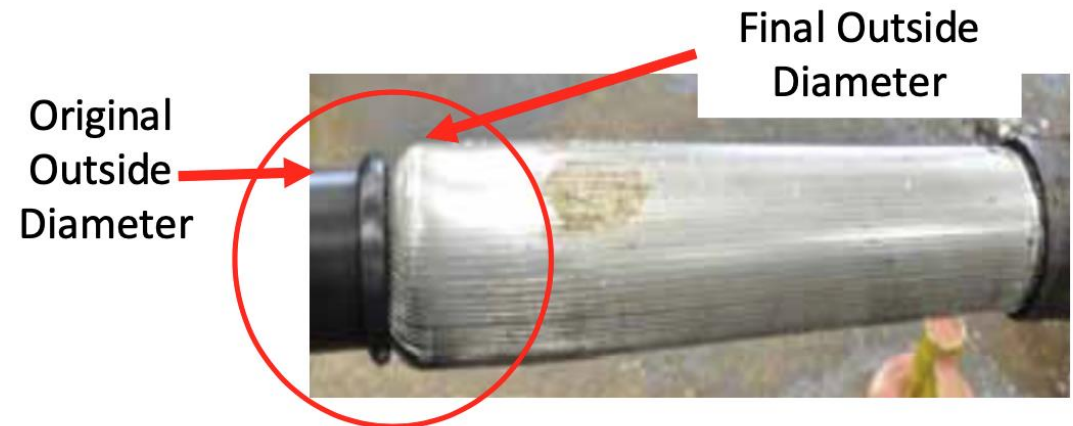
Elimination of key components traditionally found in conventional designs such as metallic slats, rubber covers, and pressure-containing bladders make our fundamental design characteristics quite similar to a heavy-duty, temperature-resistant, automobile tire.

Unmatched Post-Deflation Recovery Characteristics



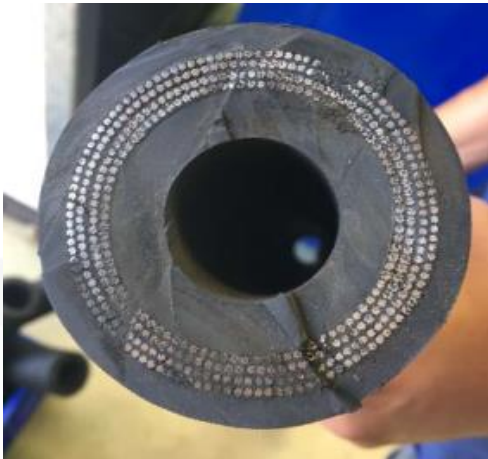
Best-in-class post-deflation OD recovery eliminates the risk of becoming stuck during retrieval in tight clearance conditions.

Plastic Deformation of Slat Reinforcement

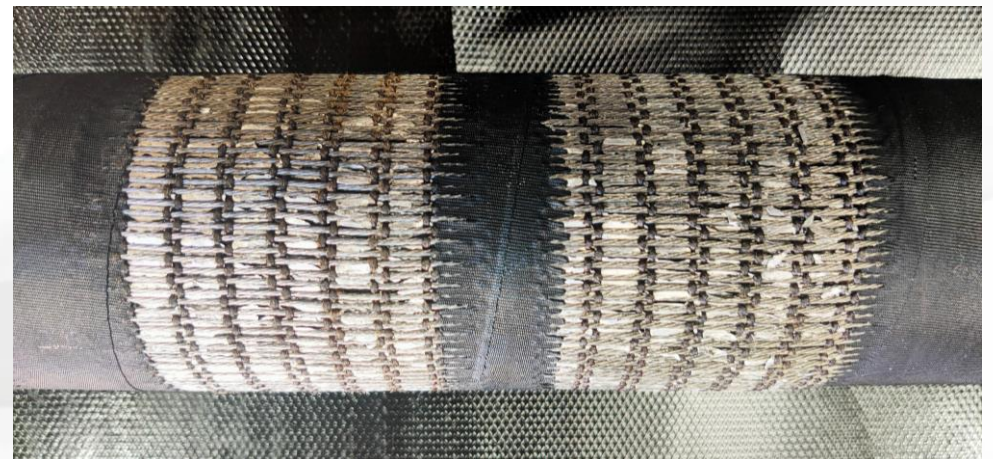


Typical Competitor's Design

DuraGRIP™ Surface Finish - Anchoring Technology



Internal Reinforcement Wire



External Anchoring Wire

DuraGRIP™ Surface Finish Anchoring Technology

IPI developed DuraGrip™ surface fishing technology for Bi-directional anchoring and sealing without compromising packer integrity.

External Anchoring Wire Surface Finish



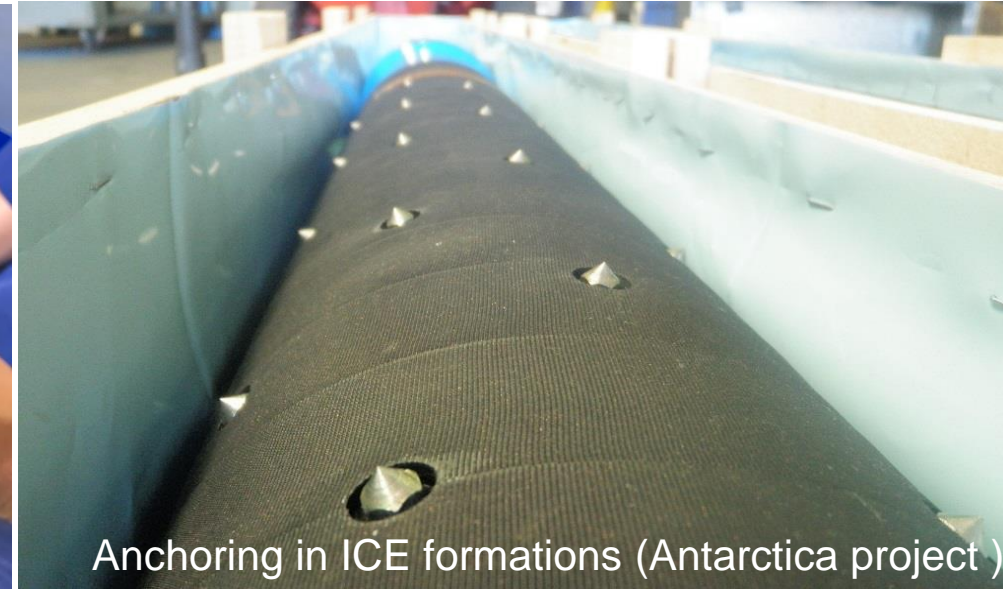
Unmatched Customization Capabilities



Formation Testing Packer
(Retracts to cylindrical shape after deflation)



20,000 PSI Element



Anchoring in ICE formations (Antarctica project)



Surface Pipe Annular Valve Packer
(Retracts to cylindrical shape after deflation)



Custom-Made Supporting Equipment

Exceptional Expansion Characteristics



9" OD Bridge Plug in 30" Conductor



Unmatched Adaptability to
Irregular Borehole Geometry

Multi-Set Capability



100 Runs/Trips and successful sets in 8.5" OH



27 Runs/Trips and successful sets in 8.5" OH

Custom-Made Solutions

IPI has historically been a custom equipment manufacturer, however, in recent years the company has built a wide range of standard oilfield products using an inflatable packer technology with superior capabilities compared to typical oilfield inflate packers.



*Biggest Inflatable Packer Built in Oilfield History
1.8m (70-7/8") OD – 26 Tonnes
Offshore Platform Pile Reforming Packer*

IPI's Portfolio Well Intervention



ST Range of Testing Tools

Applications:

- MiniFrac, Coalbed methane DST, IFO and DFIT testing for formation evaluation inc Caprock integrity analysis
- Casing and casing patch leak-off testing
- Acid stimulation
- 2.4", 3.5" and 4.5" tools with a wider range of packer OD options working to 5,000 or 10,000 psi on tubing or CT



Features:

- Innovative design eliminates squeeze pressure during packer inflation – improves shut-in pressure accuracy
- Low-pressure-loss tool chassis. Very Modular !
- Ability to circulate while in the shut-in stage enables air/nitrogen induced hydrostatic head reduction for DST applications
- Backup pull-release emergency deflation mechanism available
- Available upgrades for real-time downhole measurement systems

Made differently to perform better



Retrievable Inflatable Bridge Plug RIBP

Permanent and temporary abandonment
Right Hand Rotation, or Shear Disconnect, Zonal isolation
operations

Bottom Hole Shut off operation in Open or Cased hole
condition

Tubing/casing isolation for wellhead change-out
Equalization feature allowing any potential pressure
across the packer to be equalized, prior to deflation

DuraGRIP™ packer element, which provides bi directional
sealing and anchoring



Permanent Inflatable Bridge Plug - PIBP

Permanent Solution for gas tight seal inside casing, milled windows, and open hole.

Right Hand Rotation, or Shear/Hydraulic Disconnect

Deflate Option as a contingency

Configurable to squeeze cement below

DuraGRIP™ packer element, which provides bi directional sealing and anchoring





**IPI Inflatables Packers
International**

Case Study: Thru-Tubing Water Shut-off



Challenge:

A leading offshore operator in Southeast Asia required a solution to control water-cut production in an offshore well. Multiple zones required effective zonal isolation within the 5-1/2" liner to selectively squeeze water shut-off (WSO) chemicals after passing through a 2.8" ID restriction. The main challenges associated with this application were as follows:

- High expansion thru-tubing application
- Multiple 2.8" ID restrictions at various depths
- Extended-reach horizontal conditions
- Retrievability through well restrictions was a critical requirement

Solution:

IPI designed a 2.68" OD inflation element within a short notice period to reduce expansion and maximize operational ratings at expected well conditions. The inflation element was configured with IPI's DuraGRIP™ technology for leak-free bi-directional anchoring in cased hole conditions. The following solution was provided to cover all treatment zones:

- Run #1: 2.68" X 2-1/8" Thru Tubing Retrievable Inflatable Bridge Plug (TT RIBP) to shut-off the bottom water-producing zone.
- Run #2: 2.68" X 2-1/8" TT RIBP to provide zonal isolation above the first bridge plug and serve as a base for the WSO treatment chemicals.
- Run #3: 2.68" X 2-1/8" Single Set Treatment Packer (SSTP) to isolate the upper interval of the treatment zone and effectively squeeze the WSO treatment chemicals into the formation by pressurizing against the TT RIBP.

Results:

Water production and crossflow within the desired formation intervals were successfully shut-off, allowing the operator to improve water-cut production to desired levels.

CS: Thru-Tubing Well Intervention - Acid Stimulation

Challenge:

A leading operator in the Middle East required a solution to selectively isolate a formation across a perforated 4.5-inch liner in a vertical injection well. Zonal isolation was required to effectively acidize the formation of interest. The main challenges associated with this application were as follows:

- Tight clearance nipple restrictions within the upper tubing completion required the inflatable packer to fully retract to its original run-in-hole outside diameter to prevent becoming stuck upon retrieval
- The zone of interest was located across a corroded casing liner with risk of burst in case of elevated inflation pressure
- Material compatibility to HCl concentration as high as 15%
- Low-fluid level conditions posed the risk of premature packer inflation during deployment due to pressure overbalance in the CT reel

Solution:

A 2.36" OD Multi-Set Acid Stimulation System (ST60) configured with a 3.50" OD DuraGRIP™ bi-directional packer element in conjunction with a back-pressure valve to manage pressure overbalance inside the CT reel and prevent premature packer inflation during deployment

Results:

The ST60 system functioned as designed, allowing the operation to be carried out without complications or safety incidents. The operating company was able to effectively acidize the formation of interest and optimize injectivity flow rates to desired levels.



IPI's Portfolio for the Well Integrity

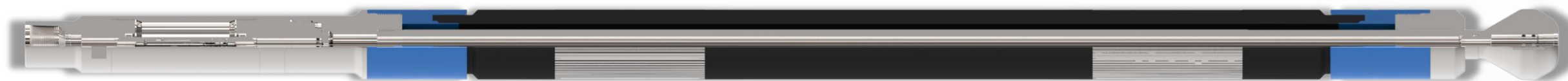




Casing Integrity Testing Tool (CITT)

Applications:

- Cased hole mechanical integrity testing
- Temporary isolation for zonal stimulation
- Blowout preventer (BOP) stack leak testing
- Open hole injection testing



Features:

- Multiple set capability
- Maximum differential pressure rating of 5,000 psi (workstring tensile limitations may apply)
- ADV valve for multiple controlled inflation sequences
- Deployed on workstring or coiled tubing
- Robust DuraGRIP surface finish technology enables anchoring in severe conditions

Made differently to perform better



Swage Casing Patch System

- Expandable steel tubular with a thin elastomer coating.
- The elastomer coating is vulcanized on the patch and is designed to create a positive seal along the patch/casing interface and to form a compressed anchor surface that keeps the patch firmly in place
- Patch expansion of up to 20% can be achieved, providing a high tolerance for running the patch past well irregularities.

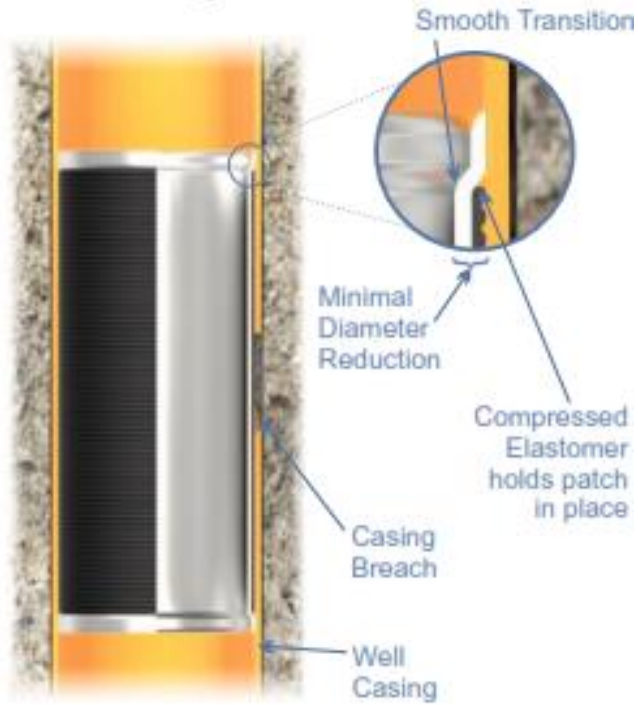


Run-In

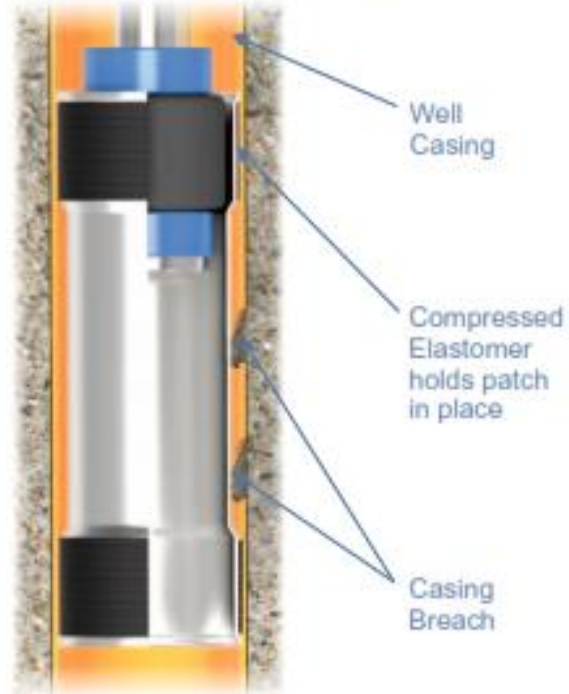
Swage Casing
Patch in
Three Stages

Complete,
Ready for
Production

Single Patch



Dual Patch

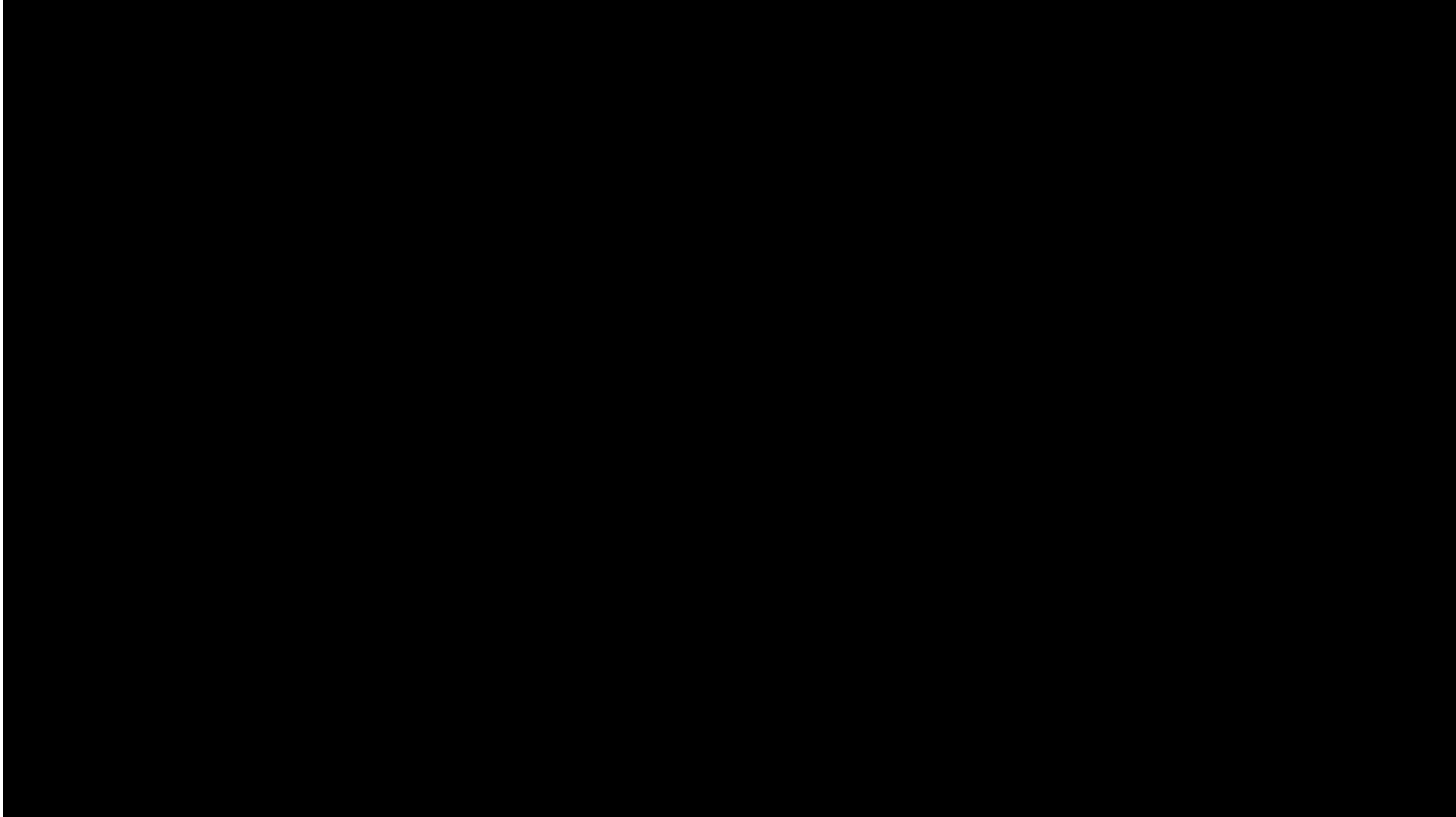


Screen Seal



IPI's Portfolio for the P&A





Large Diameter Plug & Abandonment Packers

APPLICATIONS:

- Exploration well plug and abandonment

FEATURES:

- Suitable for setting in open hole or casing
- Available to suit standard casing sizes of 13 3/8", 20" and 30" - other sizes including high expansion are available
- Factory set spring check and relief valve systems assure positive pressure shut-in over pressurization
- Shear valve inflation protection system to prevent premature inflation
- Lifting points provided on both ends of all plugs to facilitate handling
- Designed to support differential pressure from above or below
- The standard range of plugs is designed for setting in casing
- Options for open hole applications are also available

Inflation Valve OD		Packer OD*		Max Inflation Diameter	
in	mm	in	mm	in	mm
3.5	89	3.5	89	8.67	220
		4.5	114	11.0	280
		5.0	127	12.2	310
		5.5	140	13.8	350
5.5	142	5.5	140	13.8	350
		6.3	160	15.0	400
		7.75	197	19.3	490
7.75	196	9.0	230	22.6	575
		11.0	280	27.6	700
		15.5	395	33.1	840

Casing Size	Packer Diameter		Rubber Length	Anchoring Type		Plain Type	
	in	mm	mm	bar	psi	bar	psi
13.375	10.625	270	900	65	950	25	360
20	17	434	800	65	950	25	360
30	23	582	980	20	300	8	115

Since 2016, well over 100 have been deployed in Gulf of Mexico, Offshore California, and West Shelf of Australia

https://www.inflatable-packers.com/IPI/download/%7B477BFE84-FB7C-4A20-906E-135EF7141CA0%7D/PIBP-DO_GoM_REV31.pdf

32 flawless runs with BiSN plug on top for Chevron Australia – APPEA paper # AJ200096

PIBPs ranges from 3.5” OD to 17” OD been successfully deployed

<https://www.publish.csiro.au/AJ/fulltext/AJ20096?subscribe=false>

PIBP was Deployed on Deep water well to establish a kickoff point as part of a sidetrack drilling operation

<https://www.inflatable-packers.com/ipi/download/february-2020-deep-water-p-a>

One run (BiSN, IPI Inflate) on drill pipe under development

Shorter revision available, minimizing section window length etc, and higher effectiveness for metal alloy plugs

RIBPs have been extensively used in Queensland Australia, Chevron, and the US.

RIBPs deployed on pipe, CT, and Capillary tube





Thanks You..Q&A

