



# Tubeless Inflatable Packers

## Howard Kenworthy – Commercial Director

[www.Inflatable-Packers.com](http://www.Inflatable-Packers.com)

[www.IPIPackers.com](http://www.IPIPackers.com)



# All shapes, sizes and applications



Type	Applications
Casing Packers	Zonal Isolation Cementing
Plugs	Plug and Abandon Water Shut Off Temporary Barrier Cement (etc) Retainer
Straddles and other	Well and casing testing Acid frac / Mini Frac
Other	Pump Anchors (ALS)
Custom Made / Replacement	Usually an OEM component

**Only inflatables for open or cased hole**  
**No swellables or mechanicals**



**Inflatable Packers**  
**International Pty Ltd.**  
[inflatable-packers.com](http://inflatable-packers.com)

See this video and other IPI content at

[https://www.youtube.com/watch?v=Mip\\_po1OsAk](https://www.youtube.com/watch?v=Mip_po1OsAk)

Full deflation took 3 min 45 seconds



## Benefits – “The most robust packer on the market”?



**Slat Element Construction.**  
Single set, up to 8,000 psi, 3x expansion, limited recovery



**IPI Tubeless Construction**  
Controlled Failure Mechanism Test  
after 150 cycles above 10,000 psi. Up  
to 3x expansion, full recovery.



**Cable/Wire Weave Element Construction.** 5,000 psi / 2x max expansion, limited cycles with memory

# Benefits of “Tubeless” Format

- Contrawound wire reinforcement layers
- Does not require an “Inner Tube”
- Main advantage is “full recovery”:
  - All elements tested before shipping
  - Custom sizing for through tubing operations
  - “Permanent plugs” in milled casing can be recovered
  - Running with tighter annular clearance, higher pressures ( eg 10,000 psi, rather than 5,000 psi)
  - Last longer - more multi set cycles
- Manufacturing procedures enable rapid build /new designs
- Some Caveats
  - 95%
  - Temp>100>130>150C, better with larger diameter



**“The most robust packer on the market”?**



**9” PIBP within 30” conductor at 1,000psi**



# Versatile



## ***'Tear-Drop' Shaped Packers:***

*Aquifer storage recovery annular injection packer designed to control annular flow velocity around the packer by adjusting element expansion.*



***Isolation in oval conditions***



## ***Inward Inflatable Packers:***

*Diverter insert utilized as replacement safety equipment for an offshore drilling rig applications.*



# DuraGRIP Metal to Metal Option



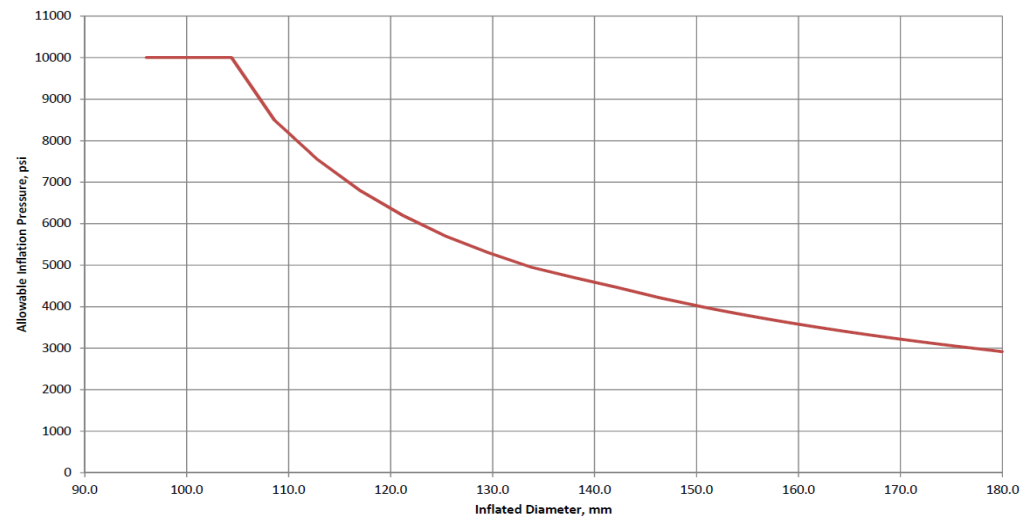
- DuraGRIP give bi-directional grip without compromising the packer
- A 23" OD Anchor Packer used to recover ("fish") 30" conductor offshore Norway Dec 2016. Proof pull test of 165T
- Supplied to one of several oilfield decommissioning clients that use IPI technology, globally
- Conventional oilfield elements give one way grip by stripping off a section of the top cover to expose metal reinforcing, compromising the packer

# Pushing the Performance Envelope – Hydraulic Fracturing example

## Packer Technology Overview – example > IPI's DuraFRAC elements:

- 33mm to 89mm OD systems for mining production, safety and formation characterisation
- Original High Pressure Straddle Packers up to 40MPa (6,000psi)
- Increased to 69MPa (10,000psi) as a standard
- 2018 burst test of 89mm (3.5") at 100mm (3.94") **at >20,000psi**
- Tests to 130degC up to 9,000psi testing conducted for projects in Europe

89mm O.D. DuraFRAC Packer Rated Pressure vs Inflation Diameter



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## Manufacturing Facilities

- Proprietary packer performance modelling, SolidWorks and Sky Trust software for HSE
- In house machine shop with modern, off line programmed OKUMA CNC's and large manual lathes
- Custom made Packer Elastomer Winding Machines, on site autoclave with monitoring
- Elastomer, pressure, hydraulic ram and temperature testing facilities
- Inventory held in Perth and Montana



# IPI Perth Facilities





# Many nationalities and professions. Apprentices to MBA's & PhD's







# Inflatable Packers International “IPI”

A privately owned Western Australian **designer and manufacturer** of (only) inflatable packers and associated equipment. Main operations are located in Perth, Western Australia with inventory in Montana, USA.

IPI provides solutions for the oil & gas, mining, geotechnical and water resources industries.

Water  
Resources

Geotechnical

Mining

Oil & Gas

IPI Inflatable Packers are **made differently** to conventional oilfield inflatable packers

The company commenced as a **custom made solution builder in 1999** and went on to develop its own unique products for the mining and geotech industries, where it is market leader.

It now offers a range of **industry standard oilfield inflatable products** together with a range of unique products for oilfield, plus **an OEM and custom made capability for oilfield**.

# The 1980's – pre IPI

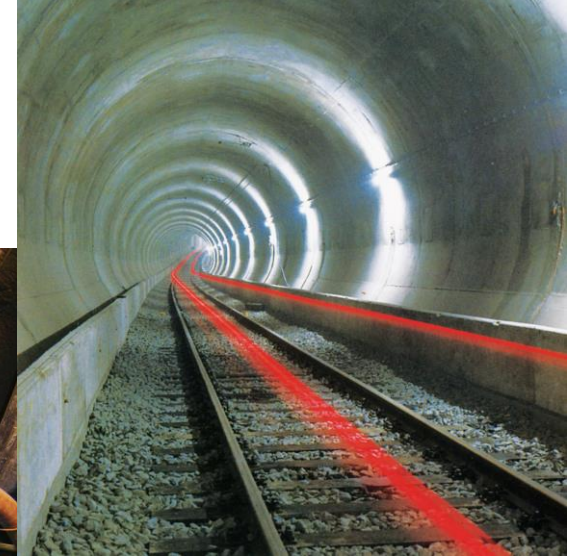
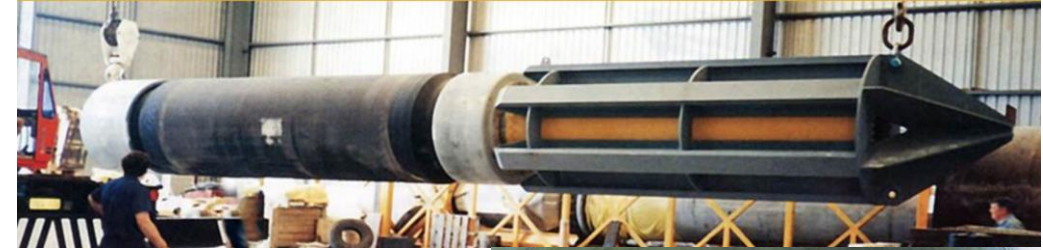
- 1984 AGE Developments established and develops inflatable packers for water well applications
- 1986 Dave Knell joins as first apprentice – now IPI Operations Director
- 1987 Clem Rowe joins as Engineering Director
  - Significantly develops the core packer technology
  - Develops large testing packers for Woodside
  - Develops mining permeability testing packers



Dave Knell at 16

# The 1990's – developing “geotechnical” Replacing oilfield packer technology

- 1993 – Worlds Largest Inflatables Packers designed by Clem and built by a team led by Dave
- Swiss geotechnical experts switch to Australian packers for rock stress testing – previously using oilfield inflatables
- Projects include Alpine Tunnels and nuclear waste site investigation
- CSIRO develops hydraulic fracturing for hard rock mining with Clem improving the inflatable packer rating to 6,000 psi
- 1999 – **IPI founded** by Clem under agreement /license with AGE – design and sell for the international market outside Australia.



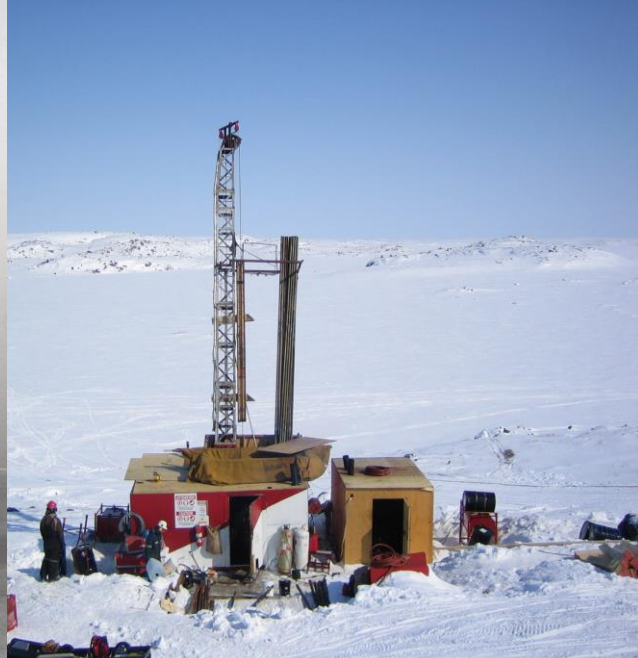




## The 2000's – Mainly about Mining

- 2001 – Raises investment and establishes in house manufacturing
- 2005 – IPI commences marketing product lines from previous successful custom products – 4 lines most successful:
  - Mining
    - Wireline permeability testing tools (Diverse - Global)
    - Mining hydraulic fracturing tools ( Mainly Chile)
  - Coal Bed Methane (Mining Technology)
    - Permeability testing tools ( Mainly India and Indonesia)
  - Shallow Offshore Oil & Gas (Malaysia)
    - Control line set casing packers as used on the NW Shelf
- 2008 – Bulgarian office, establish Montana, Santiago and Singapore
- 2009 - Commence supply into QLD CSG (CBM)







# El Teniente Mine – Codelco ( Chilean state copper co)

- Worlds Largest Underground Copper Mine, est 1819.
- >3,000km underground roadways
- >140,000 tons copper ore per day
- Primary Production method – block caving enabled by **hydraulic fracturing (“preconditioning”)**
- Minimizes use of explosives
- 3.5” straddle packers in 3.75” open hole
- Up to 10,000 psi, clean water
- (Burst @ 20,000 psi @ 4”)
- Auto inflation valve
- Frac Radius typically 70ft
- Frac Interval usually 80” ( can be 30”)
- IPI client (primary supplier) since 2007
- Same process now for rock burst mitigation (seismic events) to enable a new deep level of development





# 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

# IPI Around the World

**Location:** Illinois, USA ( US Govt funded)

**Objective:** Formation evaluation in 8-1/2" open hole for CO<sub>2</sub> sequestration application

**IPI Solution:** ST 114 straddle assembly deployed on work-string

8 test zones successfully tested in a single trip without operational issues or lost time



## 2010 > further into conventional oil and gas

- Progressively develop a full range of standard oilfield products
  - Standard casing packers (ECP) – challenges of WA!
  - Inflatable bridge plugs
  - Testing and treatment straddles
  - etc
- Plus innovative products ( ALS anchors, eg I-PCPs)
- QLD CBM moves to oilfield standards and use of IPI inflates for DST is mandated by clients
- Further developing synthetic elastomer packer technology
- ISO 9001 QMS
- Systems upgrades ( SolidWorks, Skytrust)
- Several engineers and BDMs with oilfield background
- BD presence in Houston, Dubai and Singapore
- Non oilfield business continues to develop – eg USA water well “frac”
- Now team <50 globally, 35+ in Perth

## IPI Global Reach – typically 80% Export



IPI supplies clients on all continents including Antarctica.



## Inflatable Casing Packer Differences



- Also know as ECP's (Baker), ACP's (Weatherford) or CAP's (TAM)
- All other suppliers offer slat reinforced with longer elements having no reinforcement in the centre
- IPI versions offer:
  - A valving system that is potentially VO rated
  - Can assemble on to client supplied pups ( eg premium threads)
  - All elements ( up to 20ft ) fully reinforced
  - Other formats, eg surface inflate via control line on clients casing



## Permanent Inflatable Bridge Plug (PIBP)

- Plug and abandonment (P&A's) with cement squeeze option
- Milled out casing applications
- Zonal isolation and shutoff in open or cased hole conditions (Vertical/Horizontal wells)
- Since 2016 used in Gulf of Mexico. Western Australian from 2017.
- Although a seal is more likely, it can deflate, POOH, redress and rerun if required.
- Partial length DuraGRIP™ metal to metal anchoring without compromising the seal integrity



P&A in the  
Gulf of Mexico



# Anchor Packer for Artificial Lift – new product



## Application and Benefits:

- Mounting system for Insert Progressing Cavity Pumps and Rod Pumps
  - Run in without pulling the tubing
  - Rigless operation – on shore or offshore
  - Tubing can be pressure tested while run in
  - Set anywhere in the tubing – no PSN's required
  - Set in deep and deviated wells by pressurisation of tubing
  - Trip out requires significant overpull

## Features:

- Combines a pressure activated inflatable seal and mechanical anchor ( axial and torque)
- Set below the IPCP,
- Set by pressurizing the annulus between the rods and the tubing
- Setting and deflate pressures varied by shear pins
- Sizes to suit tubing from 2 3/8" to 5.5" for most pump brands



See SPE Paper and JPT "New Technology" Nov 2018



# Custom-Made Solutions



A 18.5" OD Subsea swivel test packer rated to 5,000 psi for a Singapore client – not everything goes down hole!



Unusual shaped packer with sampling ports



# Quality & Recognition

## DNV-GL MANAGEMENT SYSTEM CERTIFICATE

Certificate No: 229537-2017-AQ-AUS-JAS-ANZ Initial certification date: 25, March, 2015 Valid: 25, March, 2015 - 25, March, 2018

This is to certify that the management system of

### Inflatable Packers International Pty Ltd

1 Pitino Court, Osborne Park WA 6017 Australia

has been found to conform to the Quality Management System standard:

**ISO 9001:2015**

This certificate is valid for the following scope:

**Design and Manufacture of Inflatable Packers, Casing packers and its associated equipment and tools.**

Place and date:  
Sydney, 27, April, 2017

JAS-ANZ



For the issuing officer:  
DNV-GL Business Assurance  
Level 7, 124 Walker Street  
North Sydney NSW 2060  
Australia

*Yngve Amundsen*

Yngve Amundsen  
Management Representative

Accreditation by the Joint Accreditation System of Australia and New Zealand, Act S131292 AS  
Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid. Refer to appendix for current certificate site address.  
URL: [www.dnv-gl.com/australia](http://www.dnv-gl.com/australia)  
ACCREDITED UNIT: DNV GL Business Assurance Australia Pty Limited, Level 7, 124 Walker Street, North Sydney NSW 2060, Australia.  
TEL: +61 2 955 00 1000. [www.dnv-gl.com/au](http://www.dnv-gl.com/au)

Achilles



## Certificate of Membership

This is to certify that

Inflatable Packers International Pty Ltd

is a supplier member of Achilles FPS Oil & Gas Asia Pacific Community, and that company information related to the following criteria has been checked and validated by Achilles Information (Australia) Pty Ltd, an independent third party:

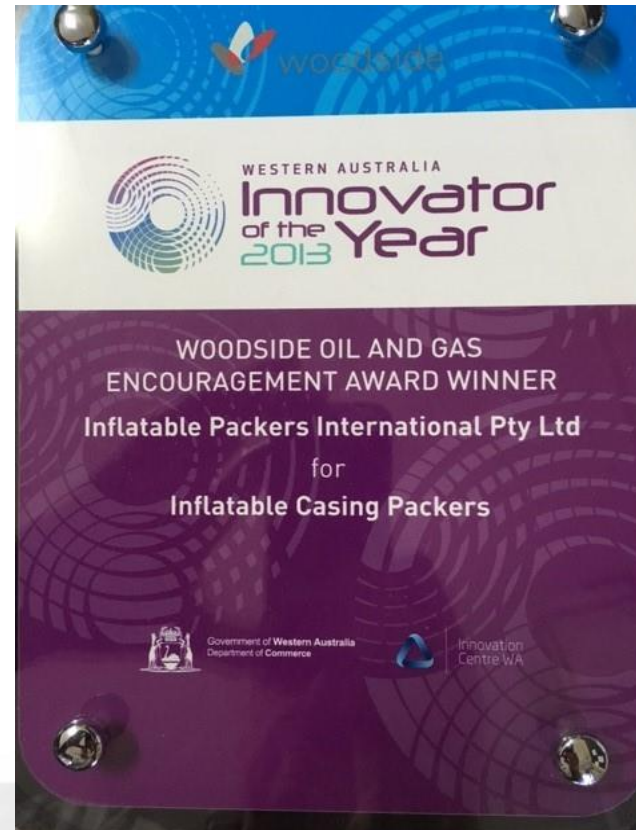
- Supply Chain Management
- Corporate Social Responsibility
- Health & Safety Management
- Quality Management
- Environmental Management
- Carbon Management
- Financial & Insurance

Supplier ID: 242631

Expiry Date: 05 October 2018

*Steve Darcy*  
Regional Director Asia Pacific  
Achilles

Achilles Certificate of Membership is a formal recognition by Achilles that this organisation has completed Stage 2 of a potential 3 stage prequalification process. Depending on the scope of work, further assessment(s) may be required by the relevant buying organisation(s).



Australian  
Export Awards  
RECOGNISING INTERNATIONAL SUCCESS



IPI  
20  
Years

# Our Vision...



**To be the world's first choice inflatable packer company**



# Questions?

