Welltec® Annular Barrier (WAB®)

For Well Abandonment

Globally, operators are faced with a large volume of wells, that require plug & abandonment, and they are now realizing that these wells have not been constructed to accommodate risk free, CAPEX effective P&A. Couple this to ever stringent local regulations, operators' P&A costs have significantly increased and can range from USD 4 million for a single platform well and up to USD 12 million for a single subsea well.

Welltec®

For well abandonment

01 Applications

- IS0 14310 V0 liner hanger
- IS0 14310 V0 production packer (permanent)
- Cased hole isolation plug

02 Features

- Rugged, all welded, metallic construction
- Tubing / liner integrity re-instated post setting
- Burst protection optional
- High expansion capability
- Constant, high pressure Δp over full expansion range
- No premature expansion
- NACE compliant

03 Benefits

- Removes the need for cement
- Rotatable during deployment enabling liner to TD in challenging environments
- Rotatable during primary cement operations enhancing cement placement
- Deployable through milled windows
- Slim OD allows for high rate circulation during deployment
- Rapid set nature of WAB reduces time & complexity
- High rate circulation capability
- Full bore – as per casing / tubing

To support this market shift, our WAB® range, when incorporated within the cased hole for IS0 14310 V0 barrier or open hole, for IS0 14310 V3 isolation across the cap rock during well construction phase, will provide added future value as the foundation for placement of P&A cement plug, significantly reducing the future complexity and cost associated with P&A, and can also be incorporated as a drill pipe deployed open / cased hole plug for placement of P&A cement plugs in challenging environments

Our v0 WAB® range for cased hole applications has been tested to is01410 v0 leak criteria, the highest validation level within this industry standard, and provides, a verifiable, life of well barrier against sap.

Our v3 WAB® range for open hole isolation, has been validated to is01410 v3, the highest fluid validation level within this industry standard. The WAB® provides life of well v3 isolation assurance within the open hole section. Additionally, it can be set within cement or used in combination with 2nd stage cement systems to support high pressure columns of cement, preventing sap or production of unwanted gas or water.

The steel packer expandable sleeve is expanded between the base pipe and the casing or the borehole by applying pressure in the casing. It conforms to the actual wellbore or casing geometry and primary sealing is achieved through a patented series of elastomer seals. The WAB® seals are optimised along the length of the steel sleeve, backed up by a series of metal fins that provide metal to metal or metal to rock contact, and high strength anchoring capability. Once the WAB® is set, casing integrity is re-instated via internal hydraulic isolation mechanism.

WCS product specifications

Welltec® WAB® AB	General Information
Product Name	Welltec® Annular Barrier (WAB®)
Product Structure	Single Piece, Machined Sleeve – Fully Welded to Base Pipe
Seal Length	Up to 2m
Base Casing	Compatibility with all Standard Casing Material / Weight / Threads
Standard Material	Alloy 28 / Super Duplex SST
Standard Elastomers & Seals	HNBR / Aflas / FFKM
Non-Elastomer Seals	PTFE

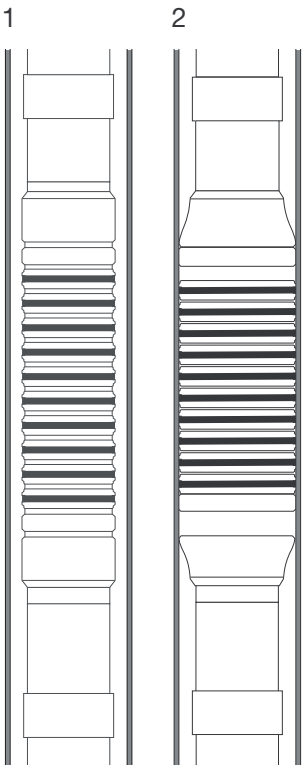
	Primarily slim bore abandonment plugs (AP)			
*Welltec® WAB®	534WAB	6WAB	614WAB HP	612WAB
Expansion Range (mm)	5.75 > 6.50" (146.05 > 165.1mm)	6.00 > 7.00" (152.4 > 177.8mm)	6.25 > 6.80" (158.7 > 172.7mm)	6.50 > 7.50" (165.1 > 190.5mm)
Minimum Running OD (mm)	5.56" (141.2mm)	5.70" (144.8mm)	6.00" (152.4mm)	6.25" (158.7mm)
ISO14310 Standard **	Up to V0			
Maximum Working Pressure psi (bar)	10,000psi (689bar)	5000psi (345bar)	12,000psi (827bar)	6500psi (448bar)
Constant element ΔP across expansion range psi (bar)	10,000psi (689bar)	5000psi (345bar)	12,000psi (827bar)	6500psi (448bar)
Standard element lengths ft (m)	Up to 7.2ft (2.2m)			
Temperature range °C (°F) ****	260°C (500°F)			
Base-pipe range (up to)	4 ½"	4 ½"	5"	4 ½"
ID in (mm)	Full Bore (as per base-pipe)			

	Primarily for well construction & large bore abandonment plugs					
*Welltec® WAB®	812WAB	912WAB	1214WAB	1312WAB	16WAB***	1712WAB***
Expansion Range (mm)	8.50 > 10.00" (215.9 > 254mm)	9.50 > 10.50" (241.3 > 266.7mm)	12.25 > 14.00" (311.1 > 55.6mm)	13.50 > 14.80” (342.9 > 375.9mm)	16.00 > 19.00 (406.4 > 482.6mm)	17.50 > 20.05” (444.5 > 520.7mm)
Minimum Running OD (mm)	8.180" (207.8mm)	9.00" (228.6mm)	11.380" (289.1mm)	12.20” (309.9mm)	15.50” (393.7mm)	17.00” (431.8mm)
ISO14310 Standard **	Up to V0					
Maximum Working Pressure psi (bar)	10,000psi (689bar)	8,000psi (552bar)	6000psi (414bar)	5000psi (345bar)	5000psi (345bar)	4000psi (276bar)
Constant element ΔP across expansion range psi (bar)	10,000psi (689bar)	8,000psi (552bar)	6000psi (414bar)	5000psi (345bar)	5000psi (345bar)	4000psi (276bar)
Standard element lengths ft (m)	Up to 7.2ft (2.2m)					
Temperature range °C (°F) ****	260°C (500°F)					
Base-pipe range (up to)	7"	7 - 7 ⅝"	9 ⅞"	10 ¾"	13 ⅜"	14"
ID in (mm)	Full Bore (as per base-pipe)					

*Custom specification and control line feedthrough options available on request ** V0 Leak Criteria available on request for all WAB® sizes *** In development **** Maximum Temperature is based on FFKM seals & elements

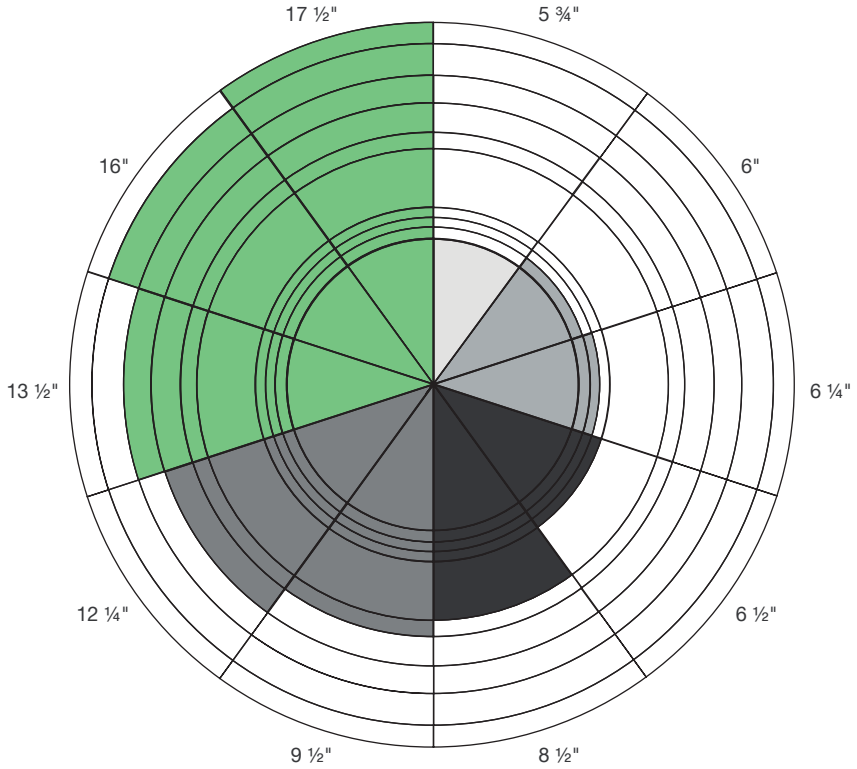
01. How it works

1: Mounted on base pipe
2: Hydraulic expansion controlled from surface



02. Our product range

Per open hole size.



03. The benefits

The WAB®'s metal construction provides a fast, high expansion, rugged seal against the open hole or casing irrespective of the fluid in the well. Furthermore, as shown in the chart below, there is no degradation of the maximum delta P capability versus expansion diameter.