

WELLTEC® **ANNULAR BARRIER (WAB®)** FOR WELL COMPLETION

At Welltec®, we design and test our WAB® range in accordance to ISO 14310, the industry standard which defines packer design validation grades.

Our V0 WAB® range for cased hole applications has been tested to ISO14110 V0 leak criteria, the highest validation level within this industry standard, and provides, a verifiable, life of well barrier against SCP (Sustained Casing Pressure.)

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Welltec®

The steel packer expandable sleeve is expanded between the base pipe and the casing 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.

Through its versatility in application, and robustness in design, the Welltec® Annular Barrier (WAB®) for Well Completion can be utilized to provide solutions, to many requirements throughout the completion phase of a well.

Firstly, the WAB's ISO14310 V0 leak rate capability, when set in cased hole, enables the incorporation of the WAB as a high-pressure production packer for both high pressure gas, and oil well applications.

Furthermore, the ability to rotate and reciprocate during installation and cementing operations, and then expand and seal, on demand, via a onetime application of surface pressure, in horizontal applications, allows the WAB to be incorporated as a liner hanger, significantly reducing risk and complexity, in these often-challenging applications. Couple this with the V0 leak rate capability, the WAB liner hanger offers significant benefits over conventional, dual stage set, liner hangers. Once the WAB is set, tubing / casing integrity is re-instated via internal hydraulic isolation mechanism.

The WAB can be mounted and welded onto any base casing in a simple and cost-effective way. Both ends are therefore fixed and provide life of well protection to the expanded WAB Sleeve.

Applications

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

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

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



WCS PRODUCT SPECIFICATIONS

| | |
|-----------------------------|--|
| Welltec® WAB® WC | 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 |

| | SLIM BORE LINER HANGER (LH) & PRODUCTION PACKER (PP) | | | | |
|--|--|---------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| *Welltec® WAB® | 534WAB | 534WAB HP | 6WAB | 614WAB | 612WAB |
| Expansion Range in (mm) | 5.75 > 6.50" (146.05 > 165.1mm) | 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 in (mm) | 5.56" (141.2mm) | 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) | 15,000psi (1034bar) | 5000psi (345bar) | 12,000psi (827bar) | 6500psi (448bar) |
| Constant element ΔP across expansion range psi (bar) | 10,000 (689bar) | 15,000 psi (1034bar) | 5000 (345bar) | 12,000 (827bar) | 6500 (448bar) |
| Standard element lengths ft (m) | Upto 7.2ft (2.2) | | | | |
| Temperature range °C (°F) **** | 260°C (500°F) | 260 °C (500°F) | 260°C (500°F) | 260°C (500°F) | 260°C (500°F) |
| Base-pipe range (up to) | 4 ½" | 4 ½" | 4 ½" | 5" | 4.5" |
| ID in (mm) | Full Bore (as per base-pipe) | | | | |

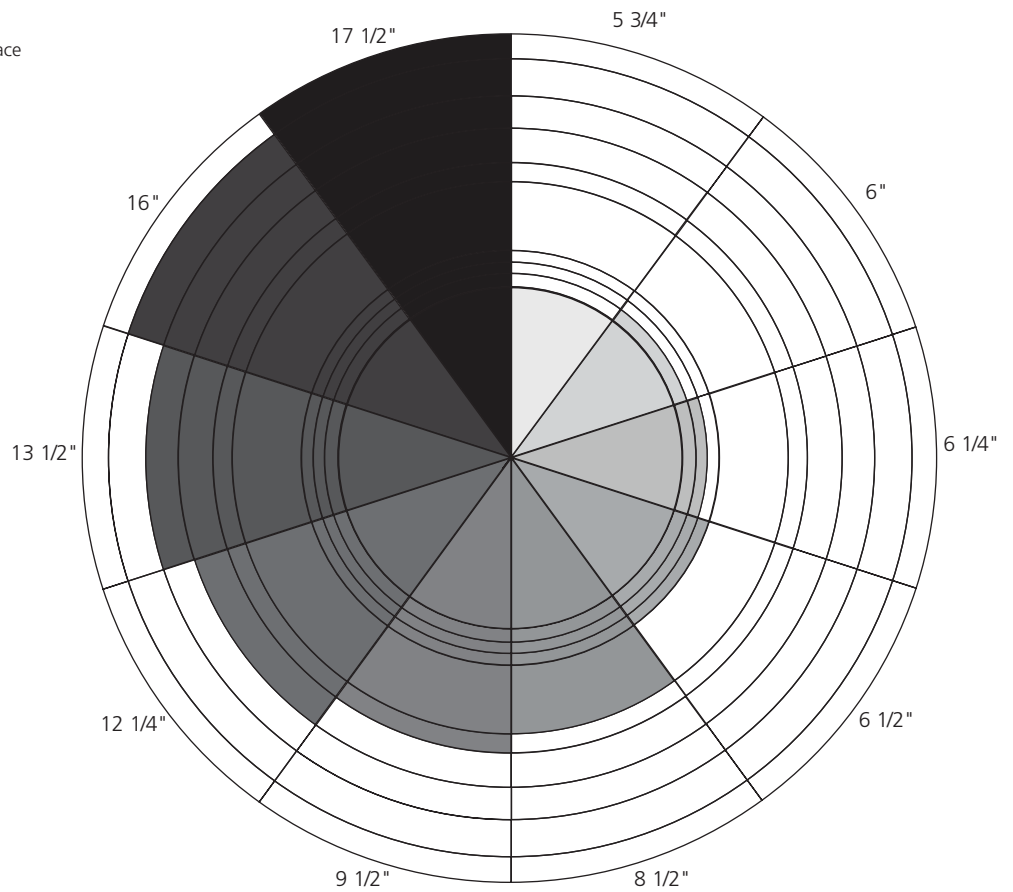
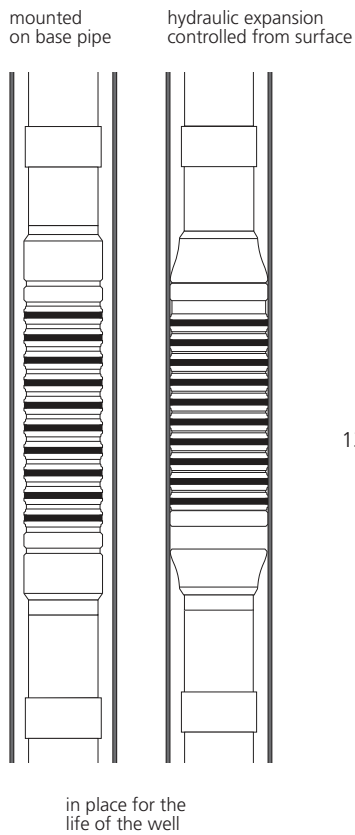
*Custom specification and control line feedthrough options available on request ** V0 Leak Criteria available on request for all WAB sizes *** In development **** Maximum Temperature is based on FFKM seals & elements

| | LARGE BORE LH & PP | | | | | |
|--|-------------------------------------|--------------------------------------|-------------------------------------|---------------------------------------|--|--|
| *Welltec® WAB® | 812WAB | 812WAB HP | 812WAB UHP*** | 912WAB | 1214WAB | 1214WAB HP*** |
| Expansion range in (mm) | 8.50 > 10.00" (215.9 > 254mm) | 8.50 > 9.40" (215.9 > 238.7mm) | 8.40 > 9.00" (213.36 > 228.6) | 9.50 > 10.50" (241.3 > 266.7mm) | 12.25 > 14.00" (311.1 > 355.6mm) | 11.60 > 12.40" (294.64 > 314.96mm) |
| Minimum running OD in (mm) | 8.180" (207.8mm) | 8.240" (209.5mm) | 8.2" (208.28 mm) | 9.00" (228.6mm) | 11.380" (289.1mm) | 11.380" (289.1mm) |
| ISO14310 Standard ** | Up to V0 | | | | | |
| Maximum working pressure psi (bar) | 10,000psi (689bar) | 15,000psi (1034bar) | 15,000psi (1034bar) | 8000psi (552bar) | 6000psi (414bar) | 10,000psi (689bar) |
| Constant element ΔP across expansion range | 10,000psi (689bar) | 13,000psi (896 > 1034 bar) | 15,000psi (1034bar) | 8000psi (552bar) | 6000psi (414bar) | 10,000psi (689bar) |
| Standard element lengths ft (m) | Upto 7.2ft (2.2) | | | | | |
| Temperature range °C (°F) **** | 260°C (500°F) | 260 °C(500°F) | 260 °C(500°F) | 260°C (500°F) | 260°C (500°F) | 260°C (500°F) |
| Base-pipe range (up to) | 7" | 5 ½" | 7" | 7-5/8" | 9-7/8" | 9-5/8" |
| 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

HOW IT WORKS...

OUR PRODUCT RANGE PER OPEN HOLE SIZE:



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.

