

# Welltec<sup>®</sup> Annular Barrier (WAB<sup>®</sup>)

For Zonal Isolation

To increase net present value of their assets, extended reach horizontal reservoir sections are becoming critical to operators looking to increase well productivity and maximise their ROI. Extended reach lower completion designs create significant concerns over the ability to execute a conventional cement or perforated liner well design due to the high inclination nature of the reservoir section. This is due to the required ability, across these heterogenous formations, to isolate unwanted water or gas inflow by compartmentalizing the reservoir. To achieve this, it is critical to design the well with reliable isolation between lower completion and open hole without the need for cement.



Welltec<sup>®</sup>

# For zonal isolation



## 01 Applications

Extended reach horizontal reservoirs sections

Water / gas isolation

High pressure OH isolation for stimulation

Suitable for all formation types and borehole geometries

## 02 Features

Rugged, all welded, metallic construction

Optional isolation of expansion port

Expansion assurance in multi-WAB applications

High expansion capability

Constant, high pressure  $\Delta p$  over full expansion range

No premature expansion

NACE compliant

Control line feedthrough optional – to communicate with hyd. activated devices or electrical devices

## 03 Benefits

Rotatable during deployment enabling liner to TD in challenging environments

Deployable through milled window

Slim OD allows for high rate circulation during deployment

Rapid set nature of WAB reduces time to production

High rate circulation capability

Full bore – as per casing / tubing

Our ISO 14310 rated, metal expandable WAB® for open hole zonal isolation, facilitates the ability to deploy 'cementless' extended reach, multi zone, horizontal, lower completions. The WAB® provides the on-demand, high pressure zonal isolation across varying borehole geometries unaffected by thermal changes in the wellbore, so often a problem in conventional open hole isolation.

# WCS product specifications

|                             |                                                                    |
|-----------------------------|--------------------------------------------------------------------|
| Welltec® WAB® ZI            | General Information                                                |
| Product Name                | Welltec® Annular Barrier (WAB®)                                    |
| ISO Standard                | Up to ISO 14310 V0                                                 |
| 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                                                               |

\*Additional Sealing Length can be modelled on request.

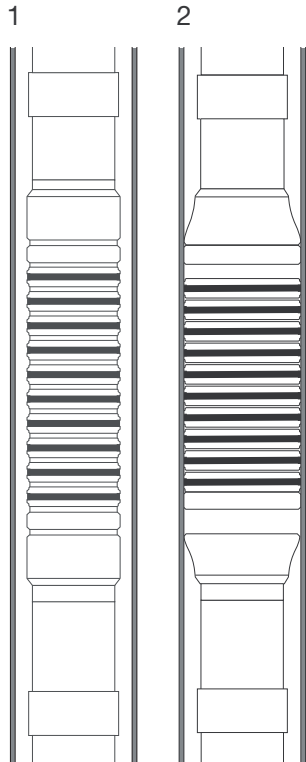
| Zonal Isolation                                      |                                       |                                       |                                      |                                      |                                      |   |
|------------------------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|---|
| *Welltec® WAB®                                       | 534WAB                                | 534WAB HP                             | 6WAB                                 | 6WAB HE                              | 614WAB                               | — |
| Expansion Range (mm)                                 | 5.75 > 6.50"<br>(146.05 ><br>165.1mm) | 5.75 > 6.50"<br>(146.05 ><br>165.1mm) | 6.00 > 7.00"<br>(152.4 ><br>177.8mm) | 6.00 > 7.50"<br>(152.4 ><br>177.8mm) | 6.25 > 6.80"<br>(158.7 ><br>172.7mm) | — |
| Minimum Running OD (mm)                              | 5.56"<br>(141.2mm)                    | 5.56"<br>(141.2mm)                    | 5.70"<br>(144.8mm)                   | 5.70"<br>(144.8mm)                   | 6.00"<br>(152.4mm)                   | — |
| ISO14310 Standard **                                 | Up to V0                              |                                       |                                      |                                      |                                      | — |
| Maximum Working Pressure psi (bar)                   | 10,000psi<br>(689bar)                 | 15,000psi<br>(1034bar)                | 5000psi<br>(345bar)                  | 5000psi<br>(345bar)                  | 12,000psi<br>(827bar)                | — |
| Constant element ΔP across expansion range psi (bar) | 10,000psi<br>(689bar)                 | 15,000psi<br>(1034bar)                | 5000psi<br>(345bar)                  | 1,500psi<br>(103bar)                 | 12,000psi<br>(827bar)                | — |
| 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"                                  | 4 ½"                                 | 4 ½"                                 | 5"                                   | — |
| ID in (mm)                                           | Full Bore (as per base-pipe)          |                                       |                                      |                                      |                                      | — |

|                                                      |                                      |                                     |                                      |                                      |                                       |                                        |
|------------------------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|----------------------------------------|
| *Welltec® WAB®                                       | 612WAB                               | 812WAB                              | 812WAB HP                            | 812WAB UHP                           | 912WAB                                | 1214WAB                                |
| Expansion Range (mm)                                 | 6.50 > 7.50"<br>(165.1 ><br>190.5mm) | 8.50 > 10.00"<br>(215.9 ><br>254mm) | 8.50 > 9.40"<br>(215.9 ><br>238.7mm) | 8.50 > 9.00"<br>(215.9 ><br>228.6mm) | 9.50 > 10.50"<br>(241.3 ><br>266.7mm) | 12.25 > 14.00"<br>(311.1 ><br>355.6mm) |
| Minimum Running OD (mm)                              | 6.25"<br>(158.7mm)                   | 8.180"<br>(207.8mm)                 | 8.240"<br>(209.5mm)                  | 8.2"<br>(208.28mm)                   | 9.00"<br>(228.6mm)                    | 11.380"<br>(289.1mm)                   |
| ISO14310 Standard **                                 | Up to V0                             |                                     |                                      |                                      |                                       | —                                      |
| Maximum Working Pressure psi (bar)                   | 6500psi<br>(448bar)                  | 10,000psi<br>(689bar)               | 15,000psi<br>(1034bar)               | 15,000psi<br>(1034bar)               | 8000psi<br>(552bar)                   | 6000psi<br>(414bar)                    |
| Constant element ΔP across expansion range psi (bar) | 6500psi<br>(448bar)                  | 10,000psi<br>(689bar)               | 13,000psi<br>(896 > 1034bar)         | 15,000psi<br>(1034bar)               | 8000psi<br>(552bar)                   | 6000psi<br>(414bar)                    |
| 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"                                 | 7"                                  | 5 ½"                                 | 7"                                   | 7 ¾"                                  | 9 ¾"                                   |
| ID in (mm)                                           | Full Bore (as per base-pipe)         |                                     |                                      |                                      |                                       | —                                      |

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

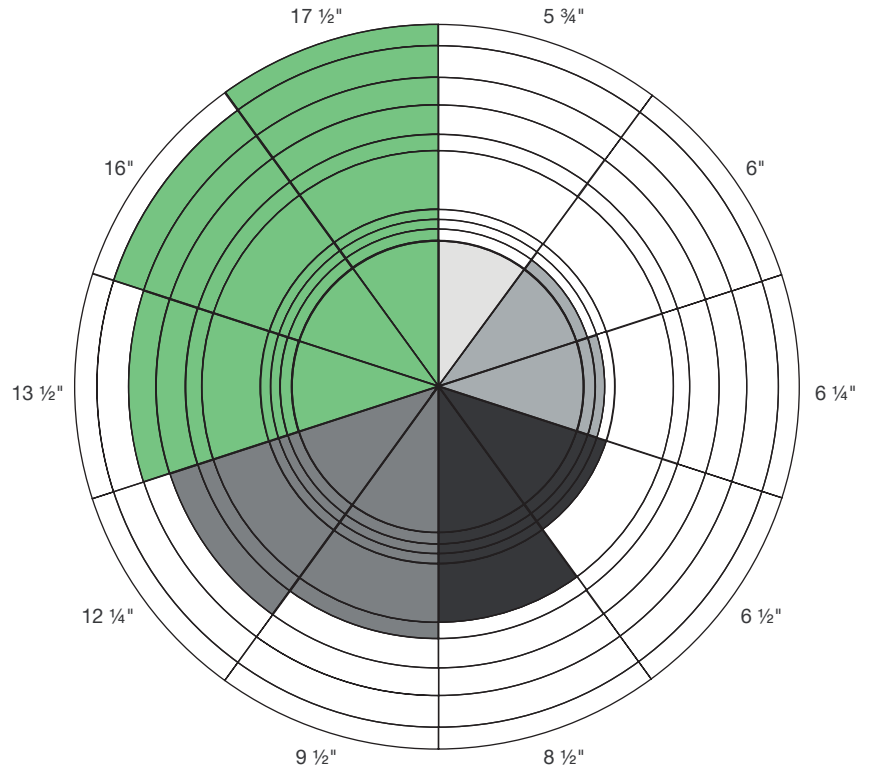
# 01. How it works

- 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.

- Conventional annular-barrier Delta P
- 812WAB Delta P

Delta P

