Schlumberger

Saltel Xpandable AZIP

Annular zonal isolation packer

Rated up to 10,000 psi [69 MPa]

Rated to 302 degF [150 degC]

APPLICATIONS

- Annular zonal isolation in open or cased vertical, deviated, or horizontal wells
- Long-term cement backup or replacement
- Primary cementing improvement

BENEFITS

- Seals effectively, even in oval, out-of-gauge, and irregular boreholes
- Provides a cost-effective solution for the life of the well
- Seals reliably through thermal cycling and temperature fluctuations
- Minimizes cost with no special well fluid requirements for expansion
- Saves time with on-demand expansion and immediate sealing
- Minimizes NPT with robust construction that withstands reciprocation and rotation to pass through doglegs and tight spots

FEATURES

- Proprietary expandable steel technology
- Simplified setting process
- Compatibility with all standard casings
- API Spec 19OH V1–qualified packer
- No reduction in casing ID
- Built-in safety feature if expanded in front of a washout

Saltel Xpandable AZIP* annular zonal isolation packer uses proprietary expandable stainless steel technology and a patented thin layer of bonded elastomer to achieve zonal isolation. The elastomer is used together with expandable dynamic seals for temperatures above 250 degF [121 degC].

Activation procedure

The packer is made up to a casing string that is run into the open or cased hole. Once in position, pressure is applied by pumping from surface to expand the packer. The lower end of the casing can be sealed with a plug and then the full string above is pressurized. Alternatively, the expansion port can be isolated using a cup tool or polished bore receptacle with an inner string.

The pressure is transmitted through the expansion port to the packer's integral stainless steel sleeve. The sleeve expands into the annulus between the casing and borehole or outer casing string, conforming to the shape of the wellbore or casing and isolating the annulus below the packer from the annulus above. Expansion of the sleeve also centralizes the casing string.

Different models of the packer are available to optimize performance for a range of applications.

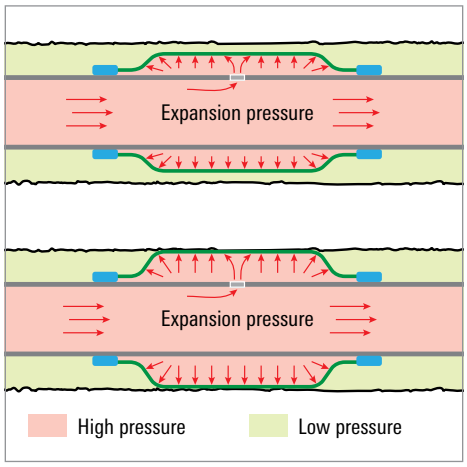
0-0 model

The expansion port is located in the middle of the packer and features a valve system that is integrated within the casing thickness and serves as a safety feature. If the packer is expanded in front of a severe washout, the valve closes, preventing fluid loss.

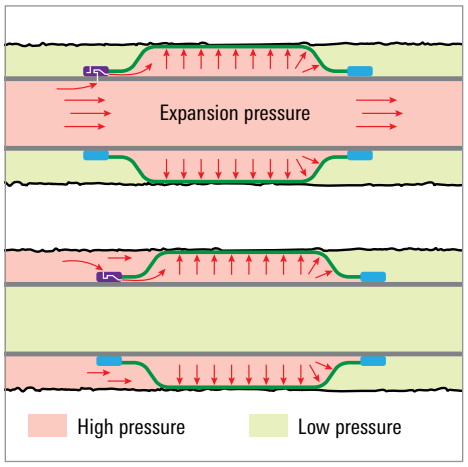
1-0 and 0-1 models

These packers feature an expansion and pressure compensation valve at the top (1-0) or bottom (0-1) end that permanently closes the expansion port and establishes casing integrity once the packer is set and a predetermined pressure is reached. This activation pressure can be modified by replacing an easily accessible shear pin. The valve also serves as a safety feature in the event of washouts.

Closing the expansion port immediately establishes fluid communication and pressure balance between the annulus at the valve end of the packer and the space inside the expanded steel sleeve. Balancing these pressures enables the packer to withstand higher annulus pressures at that end, providing high sealing capacity and excellent resistance to thermal cycling. The packer model selected depends on whether high pressure is expected above or below the packer.



Setting process for the 0-0 model of the packer.



Upper image: Setting process for the 1-0 model of the packer (similar to the process for the 0-1 model). Lower image: Subsequent pressure balancing of the high-pressure annulus and the packer chamber, enabling the packer to maintain an effective seal.

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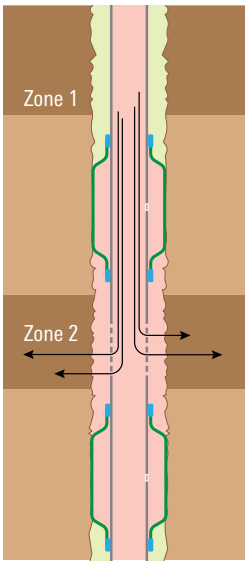
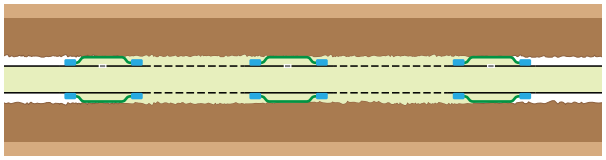
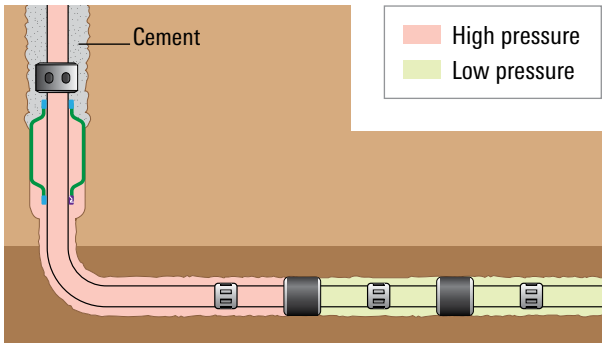


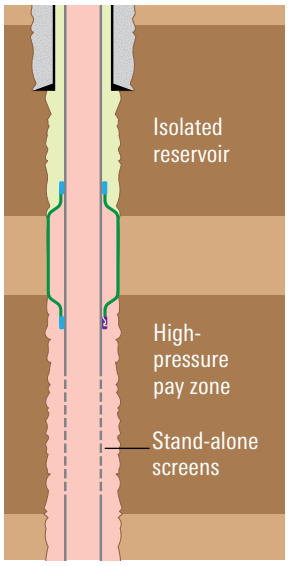
0-0 packer: Injection with zonal isolation.



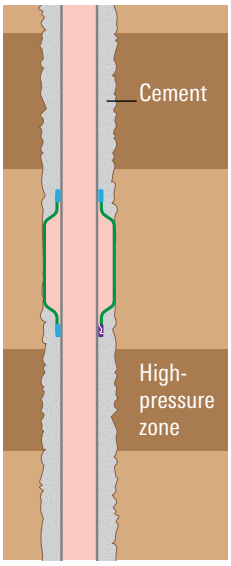
0-0 packer: Isolation of sand screens.



0-1 packer: Off-bottom cement above a high-pressure hydraulic fracturing completion.



0-1 packer: Isolation of high-pressure zone from lower-pressure zones above.



0-1 packer: Primary cement reinforcement above a high-pressure zone to prevent annular fluid migration.

0-0 Saltel Xpandable AZIP Packer Specifications

Casing size, in	2⅞	3½	4½	5	5½	6⅝	7	9⅝
Materials	All carbon steel (e.g., L80, T95, P110, Q125) or 13Cr steel†; Stainless steel expandable sleeve							
Assembly with basepipe	Welded‡	Welded‡	Welded‡ Crimped§	Welded‡ Crimped§	Welded‡ Crimped§	Welded‡ Crimped§	Welded‡ Crimped§	Welded‡ Crimped§
End type	Optional threaded pin and box or plain end							
Seal length, ft [m]	2.5, 4, or 8 [0.76, 1.22, or 2.44]							
Temperature rating, degF [degC]	302 [150]	302 [150]	302 [150]	302 [150]	302 [150]	302 [150]	302 [150]	302 [150]
Valve flow area, in² [mm²]	No valve	No valve	0.065 [42]	0.065 [42]	0.065 [42]	0.065 [42]	0.065 [42]	0.065 [42]
Max. running-in external OD (packer ends), in [cm]	3.65 [7.6]	4.25 [10.1]	5.6 [14]	5.875 [14.9]	8 [20.3]	8.15 [20.7]	8.15 [20.7]	11.35 [28.8]
Nominal diameter to be set in, in [cm]	4 [10.1]	4.90 [12.4]	6.125 [15.6]	6.125 to 6.5 [15.6 to 16.5]	8.5 [21.6]	8.5 [21.6]	8.5 [21.6]	12.25 [31.1]
Absolute max. diameter to be set in, in [cm]	4.40 [11.1]	5.25 [13.3]	7 [17.8]	7.25 [18.4]	10 [25.4]	10 [25.4]	10 [25.4]	14 [35.6]
Max. differential pressure injection/burst, psi [MPa]	10,000 [69]	10,000 [69]	15,000 [103]	10,000 [69]	10,000 [69]	10,000 [69]	10,000 [69]	5,000 [34]
Max. differential pressure production/collapse, psi [MPa]	1,700 [12]	1,200 [8]	3,500 [24]	2,500 [17]	3,000 [21]	3,000 [21]	2,000 [14]	1,500 [10]

†13Cr steel not available for welded packers. ‡Available with standard materials. §Available with standard or high-pressure and customized materials.

1-0 and 0-1 Saltel Xpandable AZIP Packer Specifications

Casing size, in	4½	5½	6⅝	7	9⅝
Materials	All carbon steel (e.g., L80, T95, P110, Q125) or 13Cr steel; Stainless steel expandable sleeve				
Assembly with basepipe	Crimped	Crimped	Crimped	Crimped	Crimped
End type	Optional threaded pin and box or plain end				
Seal length, ft [m]	2.5, 4, or 8 [0.76, 1.22, or 2.44]				
Temperature rating, degF [degC]	302 [150]	302 [150]	302 [150]	302 [150]	302 [150]
Max. running-in external OD (packer ends), in [cm]	5.6 [14]	8 [20.3]	8.15 [20.7]	8.15 [20.7]	11.35 [28.8]
Nominal diameter to be set in, in [cm]	6.125 [15.6]	8.5 [21.6]	8.5 [21.6]	8.5 [21.6]	12.25 [31.1]
Absolute max. diameter to be set in, in [cm]	7 [17.8]	10 [25.4]	10 [25.4]	10 [25.4]	14 [35.6]
Max. differential pressure injection/burst, psi [MPa]	10,000 [69]	10,000 [69]	10,000 [69]	10,000 [69]	5,000 [34]
Max. differential pressure production/collapse, psi [MPa]	3,500 [24]	3,000 [21]	3,000 [21]	2,000 [14]	1,500 [10]

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