



DEEP WATER



UNCONVENTIONALS



# Swell Technology Systems for Well Construction

ENHANCE WELL INTEGRITY WITH RELIABLE ISOLATION SOLUTIONS

**HALLIBURTON**

Completion  
Tools





**1** Swellpacker® Isolation System Above Top of Cement

**2** Swellpacker® Isolation System on Liner Tiebacks

Liner Hanger

**3** Swellpacker® Isolation System Below Liner Hangers

**4** Swellpacker® Isolation System in Production Zones with Cement

Swellpacker® Isolation System on Shoe Joint for Formation Integrity Test

**5**

## Swell Technology Systems for Well Construction

With more than 75,000 installations globally, operators turn to Halliburton because of our experience and reliability and because we find solutions for even the toughest challenges.

To ensure reliability and integrity in every well, you need to have the right equipment, the correct equipment, experience, and personnel. Halliburton Swellpacker® systems have been installed in more than 60 different countries, each with their own unique reservoir challenges.

When tackling a new challenge, we do not settle for traditional solutions — we listen to the customer, size up the well and get the job done. Such commitment is why Halliburton was chosen to install 90 Swellpacker Slip-On systems in a single wellbore in the Bakken. And why our Swellpacker system was run to more than 40,000 feet measured depth and 22,000 feet true vertical depth.

At Halliburton, we aren't satisfied with just meeting requirements — we want to exceed expectations and define the limits.



## Engineered Swell Solutions for Your Well Challenges

### WELL CONSTRUCTION

When designing the construction of your well, Halliburton knows the challenges you face. We offer the products, services and special expertise needed to optimize your well construction, no matter what the conditions.

Operators know that depleted or even overpressured reservoirs can hinder the ability to achieve optimal zonal isolation using conventional methods. Complicated wellbore geometry has pushed the limits of technology in perfecting annular pressure confinement and isolation of multiple zones. Depleted reservoirs necessitate well designs with more casing setting points to isolate depleted reservoirs before drilling ahead to higher pressure areas. More casing setting points dictate smaller annular volumes between the casing and the open hole or casing and casing. The smaller annular volumes create more difficulties for current methods to provide sufficient zonal isolation or to prevent sustained casing pressure. More casing setting points can also dictate larger annular volumes in under-reamed openhole sections.

So as operations move into deeper water and more severe environments, operators are faced with extreme and ever-changing conditions. Halliburton Swellpacker® isolation systems, along with swellable elastomers in cement, adapt to these difficult downhole conditions and provide a competent solution to many of today's challenges.

Halliburton takes you from the initial planning stage, through completion and production of the well, with a custom construction plan flexible enough to adjust to constantly changing environments.

### HOW HALLIBURTON CAN HELP

Swellpacker systems are available in either chemically bonded to the pipe or slip-on versions, and include end rings to both protect the element during the run-in-hole process and act as extrusion limiters once the packer is set.

Swellpacker systems can be engineered to optimize the construction of your well using the following options:

- » Swellpacker oil-swelling (OS) isolation systems are a blend of polymers that react and swell when exposed to any liquid hydrocarbon. Swellpacker OS systems can be rated up to 15,000 psi (1034 bar) and 390°F (200°C).
- » Swellpacker water-swelling (WS) isolation systems are a blend of polymers that react and swell when exposed to water. Swellpacker WS systems can be rated up to 10,000 psi (690 bar) and 320°F (160°C).
- » Swellpacker hybrid-swelling (HS) isolation systems are a blend of polymers that react and swell when exposed to water and/or liquid hydrocarbon. Swellpacker HS systems can be rated up to 10,000 psi (690 bar) and 390°F (200°C).



HAL40676

Well integrity during the well construction and completion process is a key component in the long-term economic viability of oil and gas production and injector wells. The swellable technology systems presented provide unique and complementary solutions to existing technologies to meet the ever-increasing demands and requirements placed on operators to create safe and competent wellbores. The simplicity inherent in swellable technology systems helps provide reduced risk solutions that can be used up and down the wellbore to enhance overall well integrity.

## 1

## Swellpacker® Systems Above Top of Cement

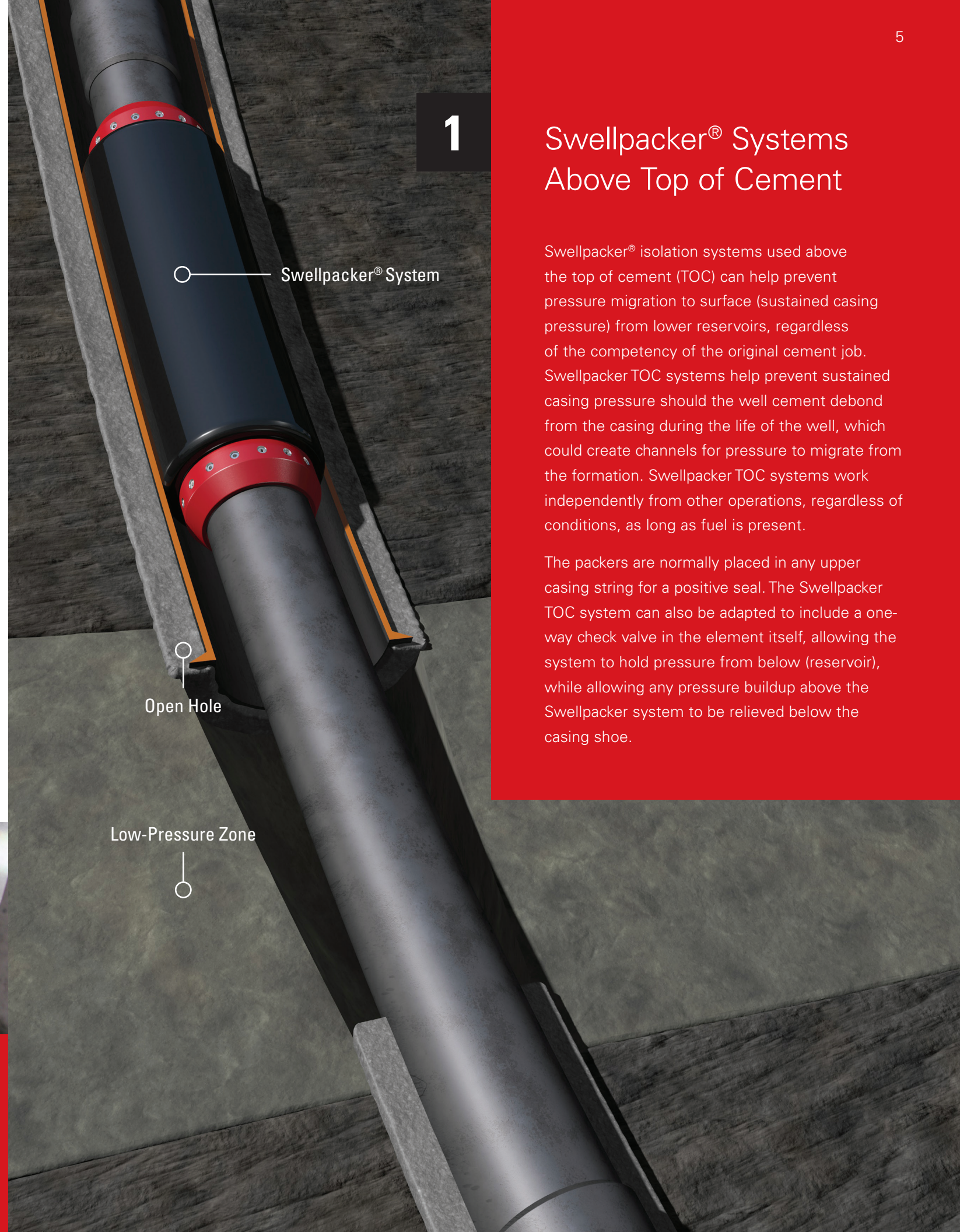
Swellpacker® isolation systems used above the top of cement (TOC) can help prevent pressure migration to surface (sustained casing pressure) from lower reservoirs, regardless of the competency of the original cement job. Swellpacker TOC systems help prevent sustained casing pressure should the well cement debond from the casing during the life of the well, which could create channels for pressure to migrate from the formation. Swellpacker TOC systems work independently from other operations, regardless of conditions, as long as fluid is present.

The packers are normally placed in any upper casing string for a positive seal. The Swellpacker TOC system can also be adapted to include a one-way check valve in the element itself, allowing the system to hold pressure from below (reservoir), while allowing any pressure buildup above the Swellpacker system to be relieved below the casing shoe.

○ Swellpacker® System

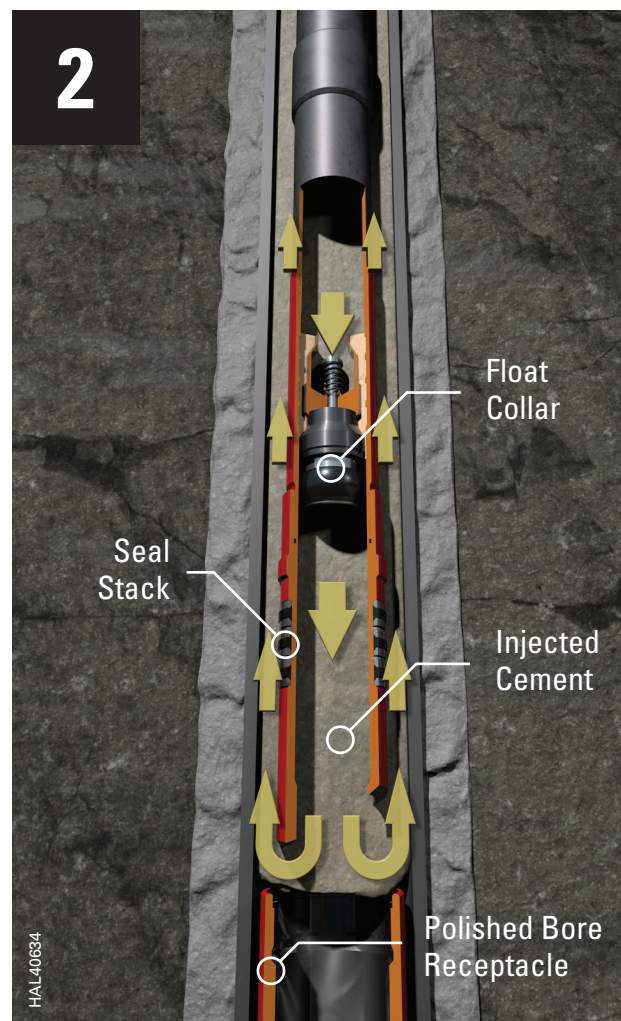
○ Open Hole

○ Low-Pressure Zone



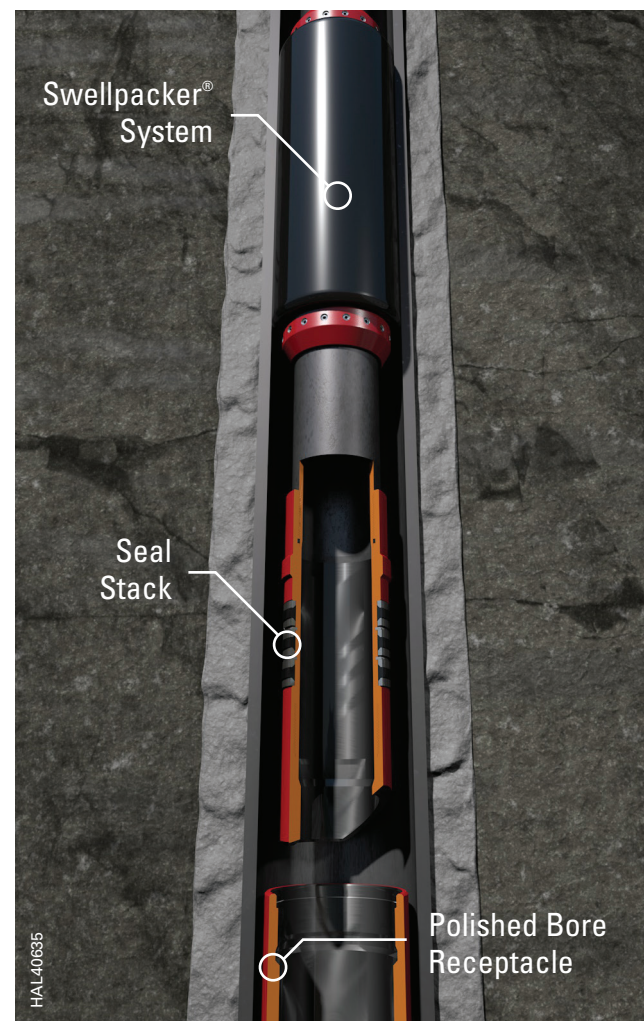


## Swellpacker® Isolation Systems on Liner Tiebacks



### CONVENTIONAL METHOD

When running a tieback string, tack cement is normally used to anchor the tieback string and seal assembly in place. When cementing the tieback string in place, you run the risk of needing to move the tieback string through unset cement to sting the seal assembly into the tieback receptacle. Additionally, the remnants of the cement, float equipment and cementing plugs must be drilled and cleaned out before completing the well.



### THE HALLIBURTON METHOD

Using Swellpacker® systems on the liner tiebacks, can help prevent cementing issues. Swellpacker systems are installed above the seal assembly and the tieback string is run in the hole to the tieback receptacle. The seal assembly is pressure tested and then raised so that fuel for the swellable element is circulated to the proper location (if fuel is not already in place). The seal assembly is lowered back into the tieback receptacle, and the Swellpacker system is allowed to swell.

The Swellpacker system provides pressure-holding capability and creates a significant anchoring force for the liner tieback string. With no cement, float equipment or cement plugs to drill, much of the risk is reduced and days of operations are eliminated.



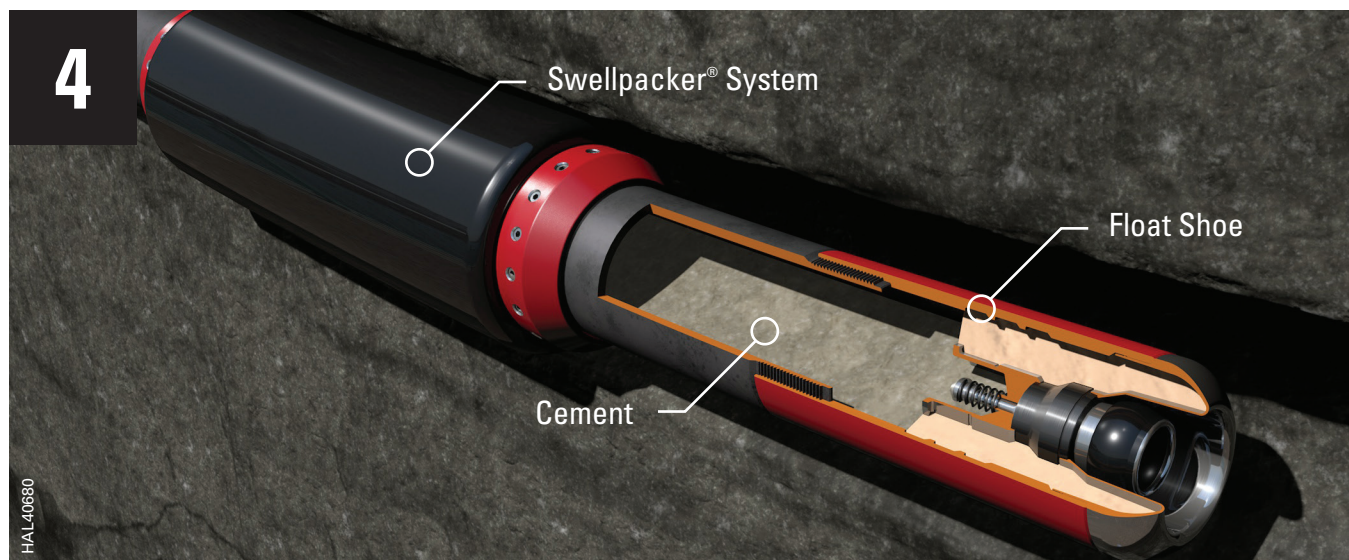
## Swellpacker® Systems Below Liner Hangers

Swellpacker® systems on liner casing, below a mechanical liner hanger inside the parent casing, helps ensure a positive seal to isolate the openhole section from the surface. The liner hanger Swellpacker system can be designed to swell either before the mechanical liner hanger is set, or after the mechanical liner hanger packoff is energized. Liner-top squeeze jobs can be eliminated, resulting in a substantial savings of time and costs. Liner hanger Swellpacker systems can be used with or without cement.

## Low Temperature Does Not Have to Mean Slow Swell

Halliburton water-swallowable elastomers for low-temperature environments help deliver industry-leading performance in subsea applications. This elastomer provides enhanced wellbore integrity at temperatures as low as 32°F in a wide range of salt types, offering a robust isolation solution for a variety of subsea challenges.





## Swellpacker® Systems in Production Zones with Cement

Swellpacker® systems in production zones for cement assurance are used to complement the cement slurry by providing total zonal isolation. During cementing, a variety of circumstances can affect the efficiency of the cement job. Insufficient centralization, poor mud cleanout, lack of rotation and reciprocation, and reduced velocity during cementation can negatively impact the quality of the cement job. Swellpacker systems, when combined with primary cementing operations, can provide comprehensive long-term zonal isolation, helping the productive life of the well and minimizing the potential of an a costly workover operation.

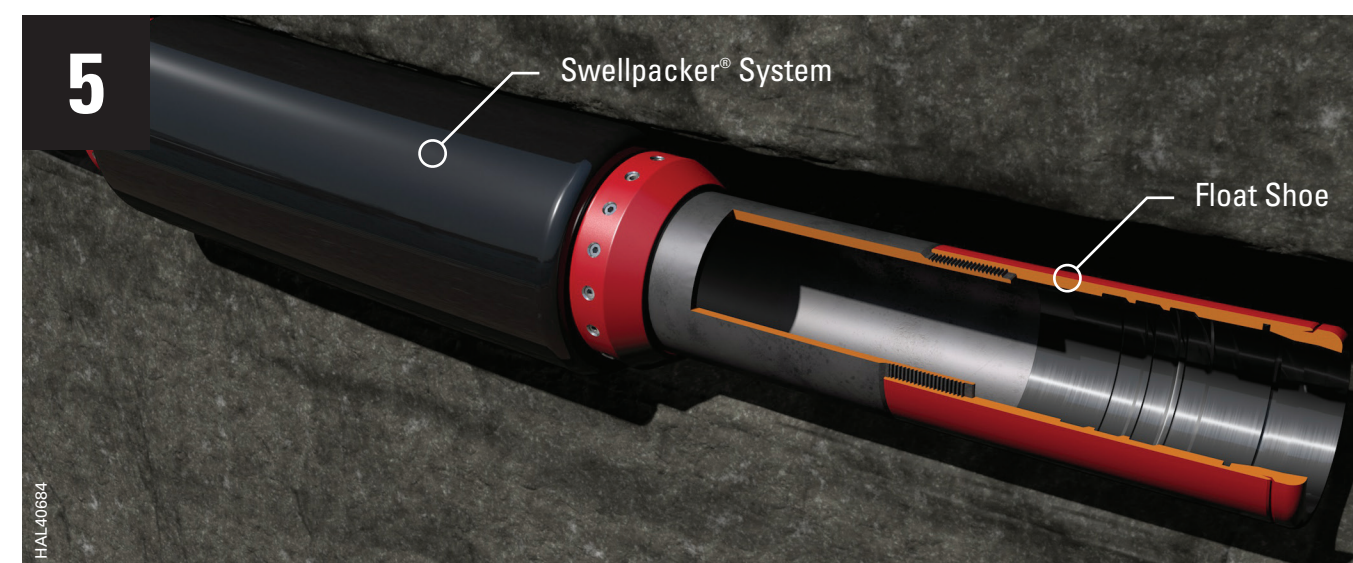
Swellpacker systems in production zones for cement assurance have the added benefit of providing a reactive downhole means to address the microannulus that would occur when set cement de-bonds from the casing. The systems remain dormant while encased in the cement sheath. Once the microannulus opens, and liquids or gas attempt to flow through the microannulus, the packer will swell to close the flow path. The swellable rubber will conform to almost any irregular geometry in the casing or cement.

## Swellpacker® Systems at Shoe Joints

Swellpacker® systems used on shoe joints create a competent pressure seal on the shoe joint and allow for a formation integrity test (FIT), regardless of the tail cement condition. Swellpacker systems at shoe joints are designed to swell by means of the base fluid used in the drilling fluid, generally water or oil. If competent tail cementation is achieved, the shoe joint Swellpacker system does not activate.

If mud cleanout in the shoe joint area is insufficient, contaminated fluid is the fuel for the packer. The shoe joint Swellpacker system will swell and allow a competent FIT while facilitating drilling ahead.

Shoe joint Swellpacker systems are normally placed on the shoe track as the casing is run.



## Swellpacker® Systems on Scab Liners

Swellpacker® systems on scab liners are also a logical choice when scab liners are used. Scab liners are placed in the well to simply provide a casing conduit from the lower liner to the upper tieback casing string. Cementing a scab liner in place is time

consuming and performing a competent cementing job in relatively small annuli can be difficult. Using Swellpacker systems on scab liners helps reduce such risks and provides high-pressure sealing capabilities.



## We Test to the Limit... So We Can Build Confidence

Our technology center located in Singapore brings together key personnel, including product management, global technical support teams, and research personnel to enhance collaborative efforts with customers during the design, testing and qualification of our Swellpacker® systems.

Our testing facilities provide the latest technologies in pressure monitoring, swell-rate testing and fluid compatibility for both full-scale and small-scale tests. Testing can be performed in both static and dynamic temperature environments to accurately replicate downhole conditions. We work with our customers to engineer solutions and test protocols that meet their most stringent requirements.

We collaborate with our customers to approve the procedures before the test unit is built and the test is executed.\* These procedures contain the specifics of the test, timeline, reporting, and the testing budget. Our facilities include digital logging and recording systems to allow customers to evaluate the technology.

*\* Remote witnessing of the testing is available upon request.*





Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

H011837

02/21 © 2021 Halliburton. All Rights Reserved.