SECTION 4
Sealbore Packers and Accessories
# Sealbore Packers and Accessories

## Comp-Perm™ Permanent Sealbore Packers

## CompSet™ Packer

## CompSet™ Ultra Packer

## ACCESSORIES

- Completion Tools Seal Systems
- Uni-Pac™ Seals
- Completion Tools Sealbore Packer Accessories
- Completion Tools Tubing Seal Accessories
- Dual Flow Head
- Mule Shoes
- Mechanical Shear Safety Joint
- Hydraulic Shear Safety Joint
- Expansion Shear Joints
- Packer Plugs and Accessories
- Straddle Fixture
- Spud-Type Packer Retrieving Tool
Comp-Perm™ Permanent Sealbore Packers

Superior Completion Services’ Comp-Perm™ Permanent Sealbore Production Packers are part of a highly versatile system of tools and accessories that can be set mechanically, hydraulically, or on wireline. The production packers are frequently used as sump packers or on stimulation jobs where extremely high pressures and/or temperatures are encountered.

Standardized threads, seal diameters, seal lengths and packer tops allow maximum interchangeability with other common sealbore equipment. Optional packer bottoms are included in the full line of packer accessory equipment.

APPLICATIONS

- Completion operations
- Sand control
- Production packer applications

Features and Benefits

- Wireline-, mechanical- or hydraulic-setting options
- Adjustable shear for setting
- Metal backup system expands to casing ID to prevent rubber extrusion
- Parts keyed for easy millout
- A variety of elastomer materials (AFLAS®, Viton®, nitrile) are available
Comp-Perm™ Permanent Sealbore Packers

**TECHNICAL DATA**

Differential pressure rating 10,000 psi (68.9 MPa)
Temperature rating up to 350°F (177°C)

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* Packers tested to API 11D1 and rated V0 – V6. Please contact your Superior representative for further information on specific sizes.

REFERENCES

Completion tools seal systems data sheet
Packer plugs and accessories data sheet
CompSet™ Packers

CompSet™ HP-II (≤10,000 psi Differential)
CompSet™ XTR (12,500 psi Differential)
CompSet™ Ultra (15,000 psi Differential)

Superior Completion Services’ CompSet™ externally retrievable sealbore packers are designed for high-pressure (HP) and high-temperature completions. These packers provide positive isolation during maximum loads, differentials and temperature cycles for harsh completion. They also provide stimulation applications, including gravel and frac-packing, high-rate water packing, stimulations and horizontal completions. The CompSet™ packers can also be used as production sealbore packers and have been tested and manufactured in accordance with API 11D1 specifications.

APPLICATIONS
• Gravel/frac packing
• Sand control
• Horizontal, deviated and vertical wells
• Zonal isolation; production isolation

Features and Benefits

• Single-sealing packing element eliminates extrusion and extends packer life downhole
• External retrieving sleeve facilitates easy packer retrieval with obstruction in sealbore
• Designed for simple external release and retrieval; optional internal release
• Large bore through packer and seals
• Single high pressure sealing element
• Splined to facilitate milling removal if required
• Gauge ring on lower end of packer helps prevent premature setting when an obstruction or tight spot is encountered
• Hydraulic- or wireline-set
• Can be released with restricted ID
• Rotationally locked
CompSet™ Packers

TECHNICAL DATA

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REFERENCES

Completion tools seal systems data sheet
Packer plugs and accessories data sheet
## CompSet™ Packers

### TECHNICAL DATA

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### CompSet Extreme Packers

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*Alternate bore configurations available upon request.

## REFERENCES

Completion tools seal systems data sheet
Packer plugs and accessories data sheet
CompSet™ Ultra Packer

Superior Completion Services’ CompSet™ Ultra Retrievable Sealbore Packer is designed for ultra-high temperature and pressure completions. The packer provides positive isolation during maximum loads, differentials and temperature cycles for harsh completion production environments.

APPLICATIONS

- Gravel/frac packing
- Sand control
- Horizontal and vertical wells
- Zonal isolation; production isolation

Features and Benefits

- Single-sealing packing element eliminates extrusion and extends packer life downhole
- External retrieving sleeve facilitates packer retrieval with obstruction in sealbore
- Designed for simple external release and retrieval; optional internal release
- Large bore through packer and seals
- Single high pressure sealing element
- Splined to facilitate milling removal if required
- Gauge ring on lower end of packer helps prevent premature setting when an obstruction or tight spot is encountered
- Hydraulic- or wireline-set
- Can be released with restricted ID
- Rotationally locked

TECHNICAL DATA

Available sizes

10 1/8 in., 9 7/8 in. and 7 3/4 in.
(257.2 mm, 250.8 mm and 196.85 mm)

Differential pressure rating

15,000 psi (103.4 MPa)

Temperature rating

350°F (177°C)

REFERENCES

Completion tools seal systems data sheet
Seal Systems

Superior Completion Services provides a variety of Seal Systems and alloy materials to accommodate most well conditions. It is important to know the well conditions and the work needed before choosing the proper seal system. Consideration should be given to temperatures, hostile elements, seal movements and maximum pressure differentials. These factors will determine the seal type, metal material and accessories to be utilized.

For all sealbore tubing accessories, standardization of threads, seal diameters and seal lengths have been carefully considered in the design to maximize interchangeability with competitive sealbore equipment. All steel components for the sealbore tubing accessories are manufactured to meet NACE MR0175 standards for H2S service. The accessories are also available in several types of material with the following examples:

- High-strength alloy steel for high-pressure applications
- 9CR-1MO alloy steel for H2S and CO2 applications
- High-nickel alloy steel for severe corrosion applications

Two basic seal types are currently available:
- Elastomer bonded to metal commonly known as molded seals available in:
  - Nitrile, Viton®, Fluorel®, EPDM, ECO
  - HSN materials Chevron-style, lip-type seals commonly known as V-rings available in:
    - Nitrile, Viton, Fluorel, Teflon®, AFLAS®, Ryton® and Kalrez® materials

Molded Seal System

This system is recommended for applications where it is likely that the seals will be disengaged from the packer sealbore with differential pressure present. Two seal rings are bonded to a metal sleeve with an internal O-ring to provide a positive seal. This system is available in various elastomers and is application dependent.

Standard Chevron Seal System

This system’s seal stack consists of chevron seal rings with steel spacers. This seal configuration is best suited for applications in which the seals will not disengage from the packer sealbore.

**HSN seal stack:** recommended for maximum temperatures of 350°F (177°C) in a standard service environment
Seal Systems

Seal Spacer Tube

In installations requiring floating seals and sealbore extensions, installation costs can be reduced by using spacer tubes between the seal units, reducing the number of seal units required.

VTR Premium Seal System

This system’s seal stack consists of alternate Viton, Teflon and Ryton seal rings with middle and end metal spacers. It is recommended for maximum temperatures of 400°F (205°C) high pressure, and a limited H2S and/or CO2 environment. Not recommended for applications where amine-based inhibitors will be used.

ATR Premium Seal System

This system’s seal stack consists of alternate AFLAS, Teflon and Ryton with metal end and middle spacers. Recommended for maximum temperatures of 400°F (205°C), amine inhibitors and H2S and/or CO2 environments.

KTR Premium Seal System

This system’s special seal stack consists of Kalrez, Teflon and Ryton with metal end and middle spacers. Recommended for maximum temperatures of 500°F (260°C), amine inhibitors and a high H2S and/or CO2 environment.

Viton, Kalrez and Teflon are registered trademarks of DuPont Performance Elastomers LLC. Flourel is a registered trademark of 3M Co. AFLAS is a registered trademark of Asahi Glass Co., Ltd. Ryton is a registered trademark of Chevron Phillips Chemical Co. LLC.
Uni-Pac™ System

Superior Completion Services has developed a unique, state-of-the-art production seal for high-pressure, high-temperature (HP/HT) environments. This production sealing design uses the same technology incorporated in the HP packer one-piece sealing element. Uni-Pac™ Seals are designed to be used with locators, pop-lock assemblies, anchor assemblies, straddle assemblies and indexing mule shoes.

APPLICATIONS

• HP/HT environments

Features and Benefits

• Zero extrusion gap
• Reliable seal for unloads
• Limited thread connections
• No slip-on metal spacers
• One-piece mandrel
• Available with high-torque, metal-to-metal connections
• Premium Uni-Pak seals are offered in a variety of materials

TECHNICAL DATA

Available sizes 2.688 to 6.00 in. (68.3 to 152.4 mm)*
Differential pressure rating up to 15,000 psi (103.4 MPa)

REFERENCES

Completion tools tubing seal accessories data sheet
Mule shoes data sheet
Sealbore Packer Accessories

Re-entry Guide
The re-entry guide is the standard bottom for all Superior Completion Services packers unless ordered otherwise. The wireline re-entry guide is available with a choice of thread connections to adapt to sealbore extensions, millout extensions or tubing run below a packer.

Sealbore Extension Coupling
This concentric coupling is used to connect two sealbore extensions together to obtain more sealbore length. These couplings allow for a continuous, concentric sealbore connection between sealbore extensions.

Adapters
Tubing adapters used for running a tailpipe below a packer, sealbore extension or millout sub are available with a choice of tubing threads. Millout adapters are used to adapt the millout sub to the packer. These are not required for all sizes of sealbore packers.

Knockout Plug
With a knockout plug installed, the packer serves as a temporary bridge plug, allowing pressure work to be performed above the packer. The knockout plug is removed with the production tube as the seal assembly is landed and falls to the bottom of the well. These plugs feature a pressure-balanced equalization system to ensure easy and reliable operation.

Flapper Assembly
The flapper assembly contains a spring-loaded, flapper-type, backpressure valve that holds pressure from below only. The valve is opened with the production tube when the seal assembly is landed into the packer and automatically closes when the production tube is removed. A differential pressure below the packer acts across the seal area of the flapper, holding it closed. This force must be overcome with tubing weight to open the flapper.
Sealbore Packer Accessories

Sealbore Extension
This extension is generally used in installations where floating seals are required due to excessive tubing contraction. Sealbore extensions have the same sealing bore ID as the corresponding packer to allow a continuous sealbore for the lower-most seals of a long seal assembly. Sealbore extensions are available in a variety of lengths.

Millout Sub
The millout sub is used in installations where a larger ID is required to accommodate the latching mechanism of a washover tool. This allows the permanent packer to be retrieved with the tool after milling over the outside of the packer. Millout subs are commonly installed between the packer and sealbore extension in installations using floating seal units.
Sealbore Packer Accessories

Superior Completion Services’ Sealbore Packer Accessories meet NACE MR0175 standards for H2S service. The accessories are also available in other materials such as:

- High-strength alloy steel for high-pressure applications
- CR-MO alloy steels for H2S and CO2 applications
- Incoloy® alloys for severe corrosion applications

Incoloy is a registered trademark of Special Metals Corporation.
Tubing Seal Accessories

Locator Seal Nipple
Superior Completion Services’ locator seal nipple is run between the seal assembly and production tubing. The locator is designed to locate on the top of the sealbore to provide an indication of the seal assembly’s location. The locator is designed to prevent downward tubing movement but allows the seals to move freely with tubing contraction.

Pop-Lock Locator
The pop-lock locator is run between the seal assembly and production tubing. The locator’s latch assembly is designed to engage a corresponding thread in the downhole completion assembly. At a predetermined overpull, the latch will release from the thread, providing a surface indication of positive latch engagement and release. The locator provides a positive depth confirmation by tagging a large surface at the top of the packer’s sealbore. Pop-lock locators are offered in a variety of threads, including premium threads.

Anchor Latch
Superior Completion Services’ anchor latch is run between the seal assembly and the production string. A positive latch snaps into the corresponding thread on the completion assembly and anchors the tubing in place. The anchor latch may be released by applying a slight upstrain with RH rotation.

Tubing Seal Nipple
The tubing seal nipple allows the seal assembly to connect directly to the tubing without a locating shoulder or pop-lock locator assembly. The seals and tubing are then able to pass through the corresponding sealbore without locating.
Tubing Seal Accessories

**Seal Spacer Tube**
In installations requiring floating seals and sealbore extensions, installation costs can be reduced by using spacer tubes between the seal units, reducing the number of seal units required.

**O-Ring Seal Sub**
The Superior Completion Services O-ring sub provides a seal between a polished stinger (run on the end of wash pipe) and a corresponding outer assembly. Other applications for the sub include diverting fluid through screen assemblies or isolating lower zones from upper zones during treating operations.
Dual-Flow Head

Superior Completion Services’ **Dual Flow Head** is run in conjunction with a production seal assembly, forming a positive seal in the top gravel-pack packer and may also be used with Superior Completion’s sealbore packers to create a dual tubing completion. The long-string flow is routed through isolation tubing running through the upper zone screen assembly. The upper zone flows concentrically between the OD of the isolation string and the ID of the production seal assembly.

**APPLICATIONS**

- Dual tubing completions
- High-pressure completions
- Deep dual completions

**Features and Benefits**

- Allows high-pressure dual completions
- Easily retrieved; no dual-packer required

**TECHNICAL DATA**

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**REFERENCES**

- Comp-Perm™ permanent sealbore packers data sheet
- CompSet™ packers data sheet
- CompSet™ Ultra packer data sheet
Mule Shoes

Half-Mule Shoe
Superior Completion Services’ half-mule shoe is run below seal assemblies to allow easy entry into packer bores.

Indexing Mule Shoe
Superior Completion Services’ indexing mule shoe with spring protection is designed to assist in guiding the end of a downhole assembly when entering a reduced ID, such as a packer bore or liner top. The rotational action incorporated in the mule shoe design eliminates the need to rotate the pipe from surface. The lower portion of the mule shoe rotates in multi-degree increments, manipulating the angled end of the mule shoe to easily enter the reduced ID. The sub is actuated by applying set-down weight to the end of the assembly, compressing the actuator spring. As the set-down weight is removed, the end of the assembly travels through a J-track, rotating a fixed distance each cycle.

Dual-Indexing Mule Shoe
The dual-indexing mule shoe includes two indexing mechanisms to provide redundant operation. This is especially useful in highly deviated wells or in applications where wellbore cleanliness is in question.
### Mule Shoes

#### TECHNICAL DATA

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<tr>
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<td>4.750</td>
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</table>
Mechanical Shear Safety Joint

Superior Completion Services’ **Mechanical Shear Safety Joint** provides a known break point in the downhole assembly. It has been designed to withstand differential pressures of 10,000 psi (68.9 MPa) for standard service applications. Upon request, 12,500- and 15,000-psi (86.2- and 103.4-MPa) differential pressure rated designs are available. Milled slots and lugs provide a rotational lock feature to aid in packer entry, fishing and milling operations. Premium threads and metallurgy are also available upon request.

**APPLICATIONS**

- Long horizontal sections
- General completion assemblies

### Features and Benefits

- Rotationally locked assembly
- Shear-pinned value is adjustable to break at 70,000 to 230,000 lb (31,818 to 104,545 kg) tension
- 12-, 24- and 36-in. (304.8-, 609.6- and 914.4-mm) seal surface are available
- Optional overshot with internal molded seals used during contingency operations

### TECHNICAL DATA

<table>
<thead>
<tr>
<th>Mechanical Shear Safety Joint</th>
<th>Size</th>
<th>Maximum OD</th>
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Hydraulic Shear Safety Joint

Superior Completion Services’ **Hydraulic Shear Safety Joint** is designed for the ComPlete™ single-trip systems to run above screen sections, blank sections, and directly above isolation packers. This shear sub contains a hydraulic-release mechanism, which is able to carry the full load of the gravel-pack assembly into the wellbore. This prevents the load from being carried by the shear joint screws, allowing long, heavy assemblies to be run without fear of premature shearing.

The hydraulic-actuation feature is initiated by applying tubing to annulus differential pressure. Once actuated, the load is relieved from the hydraulic mechanism and transferred to the shear screws. If retrieval is initiated, this break point in the assembly enables retrieval of isolation packers separately from screens in the same zone. The shear joint contains polished OD sealing lengths ranging from 8 to 24 in. (203.2 to 609.6 mm). A bonded inverted seal overshot is available for re-entry if needed.

**APPLICATIONS**

- Long completion intervals
- Multizone single-trip completions

**Features and Benefits**

- Allows full weight carrying capability prior to actuation
- Allows standard shear values for retrieval while maintaining high weight carrying ability
- Rotationally locked assembly
- Production molded seal assembly available for contingency operations
Hydraulic Shear Safety Joint

TECHNICAL DATA

<table>
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<tr>
<th>Hydraulic Shear Safety Joint</th>
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* Recommended to be run above ComPlete™ MST system isolation packers.

REFERENCES
ComPlete™ system data sheets (HST, MST, RST)
Expansion Shear Joints

Superior Completion Services’ Expansion Shear Joints provide limited up or down movement between the upper and lower connections. The expansion joint is rotationally locked and sealed to withstand high differential pressures. The assembly is shear-pinned together and movement will not occur until the pre-set shear release value is exceeded.

APPLICATIONS

• Long assemblies with projected tubing movement
• Subsea wells
• Reservoirs with concerns over compaction

Features and Benefits

• Allows both upward and downward travel
• Variable initial shear value settings
• Provides a smooth mandrel for resealing if required
• Bonded seal overshot available for contingency operations

TECHNICAL DATA

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<thead>
<tr>
<th>Size</th>
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Packer Plugs and Accessories

VT Equalizing Packer Plug
The VT Equalizing Packer Plug is used to temporarily seal the ID of Superior Completion Services’ sealbore packer. The plug latches into the top threads of the packer to form a positive seal in both directions. The packer plug contains an equalizing valve to allow the plug to be set and returned above a flapper valve or other closed system.

Dual-Equalizing Packer Plug
The Dual-Equalizing Packer Plug has the same features as Superior Completion Services’ VT equalizing packer plug. It includes an optional grapple release control bar that may be run with a standard short catch overshot for retrieval.

Packer Plug Running Tool
The Packer Plug Running Tool consists of an overshot that is shear-pinned to the packer plug control bar prior to being run into the wellbore. The running tool also engages an equalizing valve located above the top of the packer plug. The equalizing valve is run in the open position, which allows the plug to be landed in a closed system. Once landed, the running tool is sheared free, closing the equalizing valve and isolating the area below the packer plug.

Packer Plug Retrieving Tool
The Packer Plug Retrieving Tool is made up of a washover head with an internal retrieving sleeve. The retrieving sleeve engages the lug mounted on the packer plug control bar to provide positive engagement for reliable retrieving. The overshot has milling teeth to break up hard debris when washing over the plug control bar.

Debris-Free Retrieving Tool
Superior Completion Services’ Debris-Free Packer Plug Retrieving Tool is uniquely designed to allow complete washover of the packer plug prior to engaging the retrieving tool. The retrieving tool is shrouded by a shearscrewed and spring-loaded wash pipe assembly. Once the packer plug is circulated clean, set-down weight shears the retrieving tool from the outer shroud, allowing it to engage the plug. The spring-loaded shroud stays engaged with the plug top, trapping debris that may have been washed into the tubing.
Straddle Fixture

Superior Completion Services’ Straddle Fixture isolates the uppermost molded seal frac sleeve of an intelligent (selective) or dual sand control completion. The straddle running tool includes a premium box connection; the shear pins rotationally lock the running tool. The Straddle Fixture is forced in position and anchored with an anchor latch ring and released with upward pull. The fixture is designed with an internal retrieving thread for easy engagement. Straight upward pull will shear the support under the latch ring, releasing the fixture. The Straddle Fixture will also release with a slight upward pull and RH rotation.

APPLICATONS

- Production isolation

<table>
<thead>
<tr>
<th>Features and Benefits</th>
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<tbody>
<tr>
<td>• Positive locator</td>
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<tr>
<td>• Rotationally locked assembly</td>
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<tr>
<td>• Shear-type/straight-pull release</td>
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<tr>
<td>• Redundant rotational release</td>
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<td>• Pressure balanced</td>
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TECHNICAL DATA

- Available seal unit sizes: 4 to 6 in. (110.6 to 152.4 mm)
- Available materials: 4140 and 13 chrome

REFERENCES

- CompSet™ Packers data sheet
- CompSet™ Ultra Packers data sheet
Spud-Type Packer Retrieving Tool

The **Spud-Type Packer Retrieving Tool** is utilized to reclaim Superior Completion Services’ CompSet™ series of externally retrievable packers. The tool utilizes a standard retrieving overshot in conjunction with an inner jar-down mandrel to assist in releasing the CompSet™ HP packers. The inner mandrel is free to move up and down through the overshot, providing a mechanical jarring effect.

**APPLICATIONS**
- Packer retrieval

**Features and Benefits**
- Sliding inner mandrel assists in mechanical jarring action
- Standard retrieving overshot
- Allows upward and downward jarring action on the packer
- LH thread for contingency release

**REFERENCES**
- CompSet™ Packers data sheet
- CompSet™ Ultra Packers data sheet