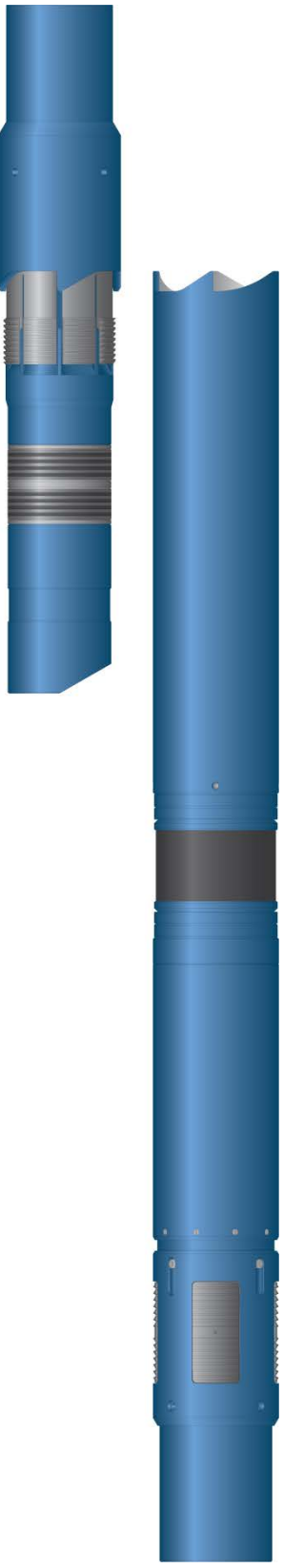
SUREstack™ MULTISTAGE FRACTURING SYSTEM

Liner Casing Packer

GRYPHON OILFIELD SOLUTIONS

The Liner Casing Packer is a hydraulic set packer designed to hang the liner string in the casing, providing isolation from above and below. The Liner Casing Packer is designed for a wide casing range, allowing it to be deployed in diverse applications including heavier weight casing. A locking, bi-directional slip design eliminates any concerns of premature setting or breaking slips during running operations. The latch unit and liner top have a built in clutch feature which allows for liner rotation up to the maximum thread torque. This feature also incorporates a 1.5 inch (38.1 mm) free point which provides simple rotation and removal of the drill / tie back string even in high deviation applications. With the Gryphon liner and latch assembly, the latch is the running tool making this 'one trip system' another option for saving completion costs.

Additionally, the Liner Casing Packer has the option of an upper Polished Bore Receptacle (PBR) which accepts either a Locator Seal Assembly or Anchor Latch Seal Assembly. Various PBR lengths are available providing a customized application solution.



Features and Benefits

- Adjustable setting pressures for different down hole applications
- 10,000 psi (69 MPa) differential pressure rating
- Ratchet maintains consistent pack off regardless of pressure differentials
- 1.5 inch (38.1 mm) free point assists latch removal
- Centralized above and below
- Rotationally friendly
- Locking bi-directional slip design
- Rated to 400° F (204° C) with standard trim
- Premium threads and elastomers available on request

Specifications

Size	Weight	Casing Range	Packer O.D.	Packer I.D.	Packer Seal Bore	Seal Assy. I.D.	Pressure Rating
in *mm*	lb/ft *kg/m*	lb/ft *kg/m*	in *mm*	in *mm*	in *mm*	in *mm*	psi *kPa*
6-5/8 x 4-1/2 *168.3 x 114.3*	15.10 *22.47*	20.00 *29.76*	5.800 *147.32*	3.780 *96.01*	4.865 *123.57*	3.780 *96.01*	10,000 *68,948*
7 x 4-1/2 *177.8 x 114.3*	13.50 *20.09*	23.00 - 32.00 *34.23 - 47.62*	5.900 *149.86*	3.875 *98.43*		3.900 *99.06*	
	11.60 *17.26*			3.938 *100.03*			
9-5/8 x 5-1/2 *244.5 x 139.7*	17.00 *25.30*	43.50 - 53.50 *64.74 - 79.62*	6.000 *152.40*	4.900 *124.46*	6.000 *152.40*	4.900 *124.46*	

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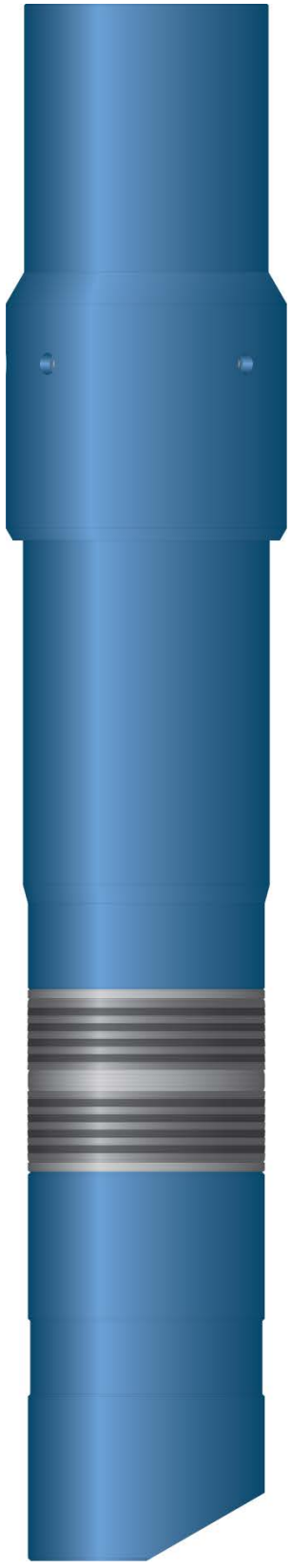
Seal Locator

The Seal Locator is used to locate and seal the end of a tieback casing string into the receptacle installed on the top of the liner top packer. It can be used in conjunction with a hold down body to ensure that a pressure tight seal is maintained when the pressure in the casing is increased, such as during fracturing treatment operations. Designed to provide a dependable, leak-proof seal between a packer seal bore and the a casing string, this seal assembly features the field proven Chevron type v-seal design in an opposed seal configuration using metal back up and spacer rings. For horizontal applications where string rotation is very limited, the Seal Locator can be anchored by adding the Gryphon hold down body above the seal locator to provide an anchor.



Features and Benefits

- Chevron type V-seals
- Available with a wide variety of seal configurations
- O.D. designed to pipe diameter
- 69 MPa (10,000 psi) rated
- Premium threads and elastomers available on request

Specifications			
Fits Packer Seal Bore	**Seal Locator Max. O.D.**	**Seal Locator Min. I.D.**	**Pressure Rating**
mm *in*	mm *in*	mm *in*	kPa *psi*
4.865 *123.57*	5.750 *146.05*	3.720 *94.49*	13,000 *89,632*
	5.900 *149.86*	3.900 *99.06*	10,000 *68,948*
6.000 *153.00*	7.000 *177.80*	4.900 *124.46*	

Latch Seal Unit

The Latch Seal Unit provides a positive anchoring of the production tubing to the liner casing packer preventing upward movement of the tubing due to pressure or tension. The latch automatically latches by engaging threads on the packer and is released by right hand rotation. A clutch feature built into the latch body allows liner rotation up to maximum thread torque. This feature also provides a 1.5 inch (38.1 mm) free point which allows for simple rotation and removal of the drill/tie back string even in high deviation applications. Designed to provide a dependable, leak-proof seal between a seal bore packer and the production string, this seal assembly features the field proven Chevron Type V-Seal design in an opposed seal configuration using metal back up and spacer rings.

Features and Benefits

- Chevron type V-seals
- Available with a wide variety of seal configurations
- Clutch allows for rotation up to maximum thread torque
- 1.5 inch (38.1 mm) free point which allows for simple rotation and removal
- Adjustable activation pressure for varied down hole applications
- Available with a wide variety of seal configurations
- I.D. and O.D. designed to pipe diameter
- 69 MPa (10,000 psi) rated
- Premium threads and elastomers available on request

Specifications			
Fits Packer Seal Bore	**Body Max. O.D.**	**Seal Unit Min. I.D.**	**Pressure Rating**
mm *in*	mm *in*	mm *in*	kPa *psi*
4.865 *123.57*	5.750 *146.05*	3.720 *94.49*	10,000 *68,948*
	5.900 *149.86*	3.900 *99.06*	
6.000 *153.00*	7.000 *177.80*	4.900 *124.46*	

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Hold Down Body

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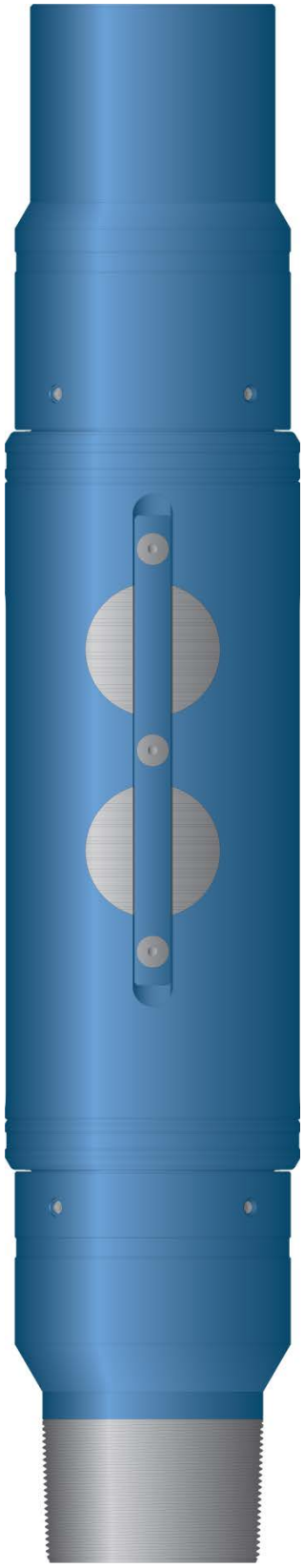
The Hold Down Body is a reliable pressure actuated hold down device which is designed to be run above a Locator Seal Assembly. This design is ideal for horizontal wells where rotation of the string is limited. When tubing pressure exceeds annulus pressure, the hydraulic hold down slips are forced outward against the casing wall, ensuring positive anchoring and eliminating any upward movement of the string. When the annulus pressure exceeds the tubing pressure, the hydraulic hold down slips automatically retract.



Features and Benefits

- Ideal for horizontal stimulation or testing operations
- Rugged slip design prevents upward movement
- Hydraulic area protected from debris
- Full drift I.D.
- Gauge rings ensure centralization
- Torque through capability
- Rated to 400° F (204° C) with standard trim
- Premium threads and elastomers available on request

Specifications						
Liner Size	**Liner Weight**	**Casing Size**	**Casing Weight**	**Gauge O.D.**	**Tool I.D.**	**Pressure Rating**
in *mm*	lb/ft *kg/m*	in *mm*	lb/ft *kg/m*	in *mm*	in *mm*	psi *kPa*
4-1/2 *114.3*	15.10 *22.47*	6-5/8 *168.3*	24.00 *35.72*	5.750 *146.05*	3.720 *94.49*	10,000 *68,948*
			20.00 *29.76*	5.850 *148.59*		
	11.60 *17.26*	7 *177.8*	20.00 - 29.00 *29.76 - 43.16*	6.031 *153.19*	3.880 *98.55*	

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