Liner Hanger Systems

Vector-Max™ hydraulic-set liner hanger
**VECTOR-MAX™** Hydraulic-Set Liner Hanger Assembly

The Vector-Max is a premium 4.5-in. x 7.0-in. high-load liner hanger/packer for horizontal, vertical, or deviated wells. Hanger design protects slips from damage, and running tool design prevents unplanned release. The robust torque-clutch ring enables rotation during installation.

**Key Features**
- Fully compatible with the Multistage Unlimited® frac system
- One-piece, high-strength mandrel
- Expanding metal liner top packer seal with bonded elastomeric cover, ISO V3 rated to 10,000 psi (68.95 MPa) at 325°F (163°C)
- Unique design prevents premature release of running tool
- Hanger cone design keeps slips fully recessed and protected from damage during deployment
- Robust torque ring clutch allows for liner rotation, push, and pull during deployment
- Standard 4.00-in (101.6 mm) XT-39 connections on running tool
- Setting-ball seats are located in the running tool
- Large bypass flow area
- 20-ft (6.1 m) tieback extension is standard. Other lengths available on request.

**Dimensions and Ratings**

<table>
<thead>
<tr>
<th>Hanger body maximum OD</th>
<th>7.00-in., 23.00–26.00 lb/ft</th>
<th>6.075 in.</th>
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</thead>
<tbody>
<tr>
<td>177.8-mm, 34.23–38.7 kg/m</td>
<td>154.3 mm</td>
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<tr>
<td>7.00-in., 29.00–32.00 lb/ft</td>
<td>5.850 in.</td>
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<tr>
<td>177.8-mm, 43.2–47.6 kg/m</td>
<td>148.6 mm</td>
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</tbody>
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Hanger mandrel nominal ID 3.930 in. (98.82 mm)

Torque at upper-end fingers 25,000 lb-ft (33.9 kN-m)

Mandrel API collapse 10,000 psi (68.95 MPa)

Mandrel API burst strength 10,000 psi (68.95 MPa)

Mandrel tension strength 417,000 lbf (185,490 daN)

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**TBR debris barrier**

**Tool joint connection**
4.00-in XT-39

**Drill pipe wiper**

**Liner-top-packer setting-dog assembly**

**Upper packoff assembly**

Seal stack: Vee packing configuration
GF (PTFE/HNBR-Kevlar/virgin PEEK) 90 Duro Viton O-ring

**Setting ball**

Attaches running tool to hanger during deployment. Mechanically releases the running tool after the hanger assembly is set.

**Right-hand-release float nut**

**LWP releasing sub**

**Liner wiper plug**

**Hanger slip-actuating piston detail**

Cylinder API burst = 16,400 psi
Cylinder API collapse = 15,860 psi

**Hanger mandrel body**

API buttress pin down, 125 MYS

**Hanger cone**

125 MYS

**Hanger slips**

4140-43, 110 Ksi MYS

**Hanger cylinder**

125 MYS

**Hanger top packer seal**

Aflas or HNBR

**Liner top packer seal setting-dog assembly**

**Tie-back receptacle**

125 MYS

**Torque ring clutch assembly detail**

Torque at upper-end fingers: 25,000 lb-ft

**LWP releasing sub detail**

**LWP releasing sub**

**Liner wiper plug**

**Lower packoff assembly**

LPA seal stack: Vee packing stack, GF (PTFE/HNBR-Kevlar/virgin PEEK) 90 Duro Viton O-ring

**Setting-ball seats**

Located in the running tool
**VECTOR-Max™ Weight-Set Liner-Top Packer**

This is a 4.5-in. x 7.0-in. liner-top packer with metal-to-metal seal. Hold-down slips prevent upward movement after setting. The running tool design prevents unplanned release, and the robust torque-clutch ring enables rotation during installation.

**Key Features**

- Fully compatible with the Multistage Unlimited® frac system
- One-piece, high-strength mandrel
- Expanding metal liner top packer seal with bonded elastomeric cover, ISO V3 rated to 10,000 psi (68.95 mPa) at 325°F (163°C)
- Unique design prevents premature release of running tool
- Robust torque-ring clutch allows for liner rotation, push, and pull during deployment
- Hold-down slips limit upward movement after system is set
- Large bypass flow area
- 10-ft (3.05 m) tieback extension is standard. Other lengths available on request.

**Dimensions and Ratings**

**Hanger body maximum OD**

- 7.00-in., 23.00–26.00 lb/ft ........................................ 6.075 in.
- 177.8-mm, 34.23–38.7 kg/m ...................................... 154.3 mm
- 7.00-in., 29.00–32.00 lb/ft ........................................... 5.850 in.
- 177.8-mm, 43.2–47.6 kg/m ...................................... 148.6 mm

**Hanger mandrel nominal ID**

- 3.930 in. (98.82 mm)

**Torque @ upper-end fingers**

- 25,000 lb-ft (33.9 kN-m)

**Mandrel API collapse**

- 10,000 psi (68.95 mPa)

**Mandrel API burst strength**

- 10,000 psi (68.95 mPa)

**Mandrel tension strength**

- 417,000 lbf (185,490 daN)

**Torque clutch ring**

Right-hand-release float nut

Attaches running tool to the liner top packer during deployment. Mechanically releases the running tool after the assembly is set.
VECTOR-1™ Hydraulic-Set Liner Hanger

The Vector-1 liner hanger is an economical 4.5-in. x 7.0-in. hydraulic-set hanger designed for uncemented applications in horizontal, deviated, or vertical wells.

Key Features
- Fully compatible with Multistage Unlimited® frac system
- One-piece mandrel
- Liner top packer is ISO V3-rated to 10,000 psi (68.95 mPa) at 275° F (135° C)
- Anti-preset mechanism prevents premature setting
- Large bypass flow area
- Unique packer seal configuration
- Bi-directional hold-down slips
- 10-ft (3.05 m) tieback extension is standard. Other lengths available on request.

Dimensions and Ratings

Hanger body maximum OD
- 7.00-in., 26.00–29.00 lb/ft ........................................ 5.958 in.
- 177.8-mm, 11.79–13.15 kg/m .................................. 151.33 mm

Hanger mandrel nominal ID........................................ 3.930 in. (98.82 mm)

Torque @ upper-end fingers ..................................... 3,000 lb-ft (4.1 N-m)

Mandrel API collapse............................................. 10,000 psi (68.95 mPa)

Mandrel API burst strength..................................... 10,000 psi (68.95 mPa)

Mandrel tension strength................................. 338,600 lbf (105,600 daN)

-Packoff assembly

- Upper hold-down slips 4140-45, 110 Ksi MYS
- Lower hold-down slips 4140-45, 110 Ksi MYS

- Anti-preset mechanism

- Torque-clutch ring assembly

- Float nut

- Running tool

- Drill pipe

- Setting ball

- Tie-back receptacle 125 MYS

- Packoff assembly
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