PRODUCT BROCHURE

Design & Manufacture of Oil Field Drilling and Downhole Completion Equipment

DNV·GL

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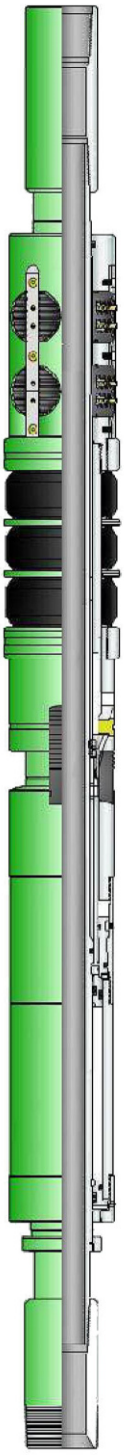
HYDRAULIC SET PRODUCTION PACKER

MODEL: WC-HP-1 & WC-HPL-1[Large Bore]
PRODUCT No.: WC-20101 & WC-20112

HP-1 is an industry standard, fully hydrostatic, hydraulic set and shear release single string retrievable packer. The packer is hydraulically activated by applying tubing pressure against a underneath plugging device. The packer requires only straight pull to release.

MODEL: HPL-1 is the large bore version of the HP-1 packer. Features, advantages and operational procedures are the same as those for HP-1 packers.



Features/Benefits:

- Operationally simple.
- Hydraulically activated, hydrostatic set-low pressure, rig pump capable activation.
- Field adjustable shear release.
- Built-in un-loader and bypass to aid in releasing and retrieving.
- Pack-off is mechanically locked constantly reinforced by hydrostatic pressure.
- Triple seal multiple duro meter elements ensure pressure integrity over a wide range of temperatures and conform easily to casing irregularities.
- No mandrel movement during setting allows stacked packer application.
- Hydraulic set for low hydrostatic head wells
- Straight pull or optional rotational release
- Hydraulic hold-down for differential pressure from below

Application:

- Production, injection and zonal isolation.
- Single string selective completions or dual string completions with multiple packers.
- Deviated wells or other application where no rotation for installation or removal is desired.
- Application where displacing and setting after the well is flanged up is desirable.
- Test the tubing string before packer setting or to independently set and test individual packer in multiple packer completion

Setting procedure:

The packer is set by pressuring the tubing to obtain a differential at the packer. To accomplish this temporary plugging device below the packer must be provided.

Run a Hydro-Trip Pressure Sub, below the Packer or a Flow Control Seating Nipple installed at some point below the packer, with a Blanking Plug run and retrieved by standard wire-line techniques. Wireline Re-Entry Guide with Pump-Out Plug or Ball Seat can also be used to blank off tubing.

If more than one Packer is to be run, place the tubing plugging device below the lowest packer. When the tubing is pressured in this case, all of the hydrostatic packers will be set simultaneously. If it is desirable to individually set and test each packer, the packer is adaptable to individual setting and testing by a simple adjustment of shear screws in the segment retainer housing. Dress the lowest packer with two brass shear screws. When dressing packers for this type hook-up, should be dressed with shear screws of same shear values. Dress the second (middle packer in three-packer hookups, or upper in two-packer hookups) with five brass shear screws, and a third (upper) packer with eight brass shear screws. This allows the packer to be set individually. The first will set at 1,000 psi, the

at 2,000 psi and the third at 3,000 psi differential pressure. In order to test the packers individually, a means of temporary communication between the tubing and the casing (i.e. a Sliding Sleeve below each packer) will be necessary. The lower packer can be set and tested down the casing. The second packer can then be set, the sleeve below it opened, and the second packer tested down the casing. The third packer is set and tested the same way. It is recommended that a blanking plug be used to temporarily plug the tubing for setting the packers because of the higher setting pressures.

Releasing procedure:

The Packer is equipped with 30,000 lb shear ring for a straight up-strain release. Shear rings of distinctive shear values are available ranging from 20,000 lb to 50,000 lb for different sizes of packers.

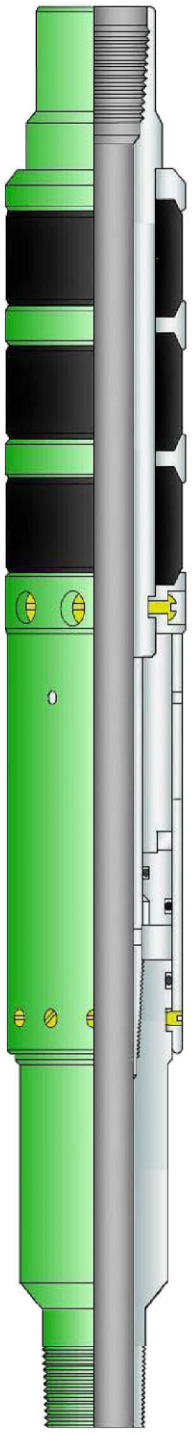
Specification Guide:

Casing				Packer				
SIZE inch mm	Weight lb/ft	Min. ID inch mm	Max. ID inch mm	Size	Nominal ID inch mm	Nominal ID HPL-1 inch mm	OD inch mm	End Connection Specification
4-1/2 114.30	9.5-13.5	3.910 99.31	4.090 103.9	43A	1.995 50,67	-	3.771 95.78	2-3/8 EU 8 RD
5 127,00	15-18	4.250 108,0	4.408 112,0	43B			4.125 104.78	
	11.5-15	4.408 112,00	4.560 115,8	43C			4.250 107,95	
5-1/2 139,70	26							
	20-23	4.625 117,50	4.778 121,40	45A2			4.500 114,30	
	14-20 15.5-20	4.778 121,40	4.950 125,70	45A4			4.641 117,88	
	13-15.5	4.950 125,70	5.190 131,80	45B			4.781 121,44	
7 177,80	38	5.830 148,10	5.937 150,80	47A2	2.441 62,00 or 1.995 50,67	2.992 75,997 With 3-1/2 EU 8 RD End Conn.	5.656 143,66	2-7/8 EU 8 RD or 2-3/8 EU 8 RD
	32-35	6.004 152,50	6.094 154,79	47A4			5.812 147,62	
	26-29	6.189 157,20	6.276 159,40	47B2			5.968 151,59	
	20-26	6.276 159,40	6.456 164,00	47B4			6.078 154,38	
	17-20	6.456 164,00	6.578 167,10	47C2			6.266 159,16	
9-5/8 244,48	47-53.5	8.343 211,90	8.681 220,50	51A2	2.992 75,997 or 2.441 62,00 or 1.995 50,67	3.958 100,53 With 4-1/2 EU 8 RD End Conn.	8.218 208,74	3-1/2 EU 8 RD or 2-7/8 EU 8 RD or 2-3/8 EU 8 RD
	40-47	8.681 220,50	8.835 224,40	51A4			8.437 214,30	
	29.3-36	8.836 224,40	9.063 230,20	51B			8.593 218,26	

ISOLATION PACKER

MODEL: WC-HP-2
PRODUCT No.: WC-20102

HPL-2 Isolation Packer is a hydraulic set, single string tandem packer used in multiple zone wells. It is used as the upper packer in multiple zone applications. Isolation Packer run above another hydraulic retrievable packer to isolate a zone between them for treatment, injection, or production. The field-proven isolation packer can also isolate casing holes or perforations. The simple design and straight tubing-pull release make the packer a cost-effective tool to isolate zones in low-pressure applications.



Features/Benefits:

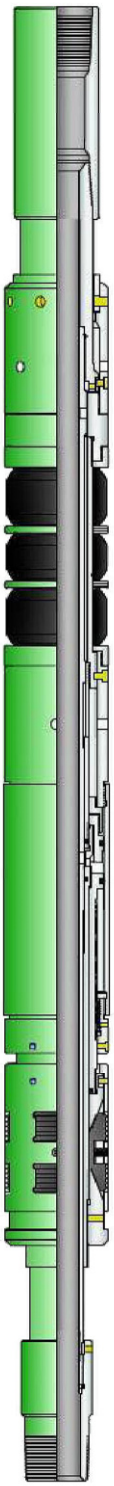
- Economical Design
- The straight-pull, shear-release pins are unaffected by differential pressure, enabling easy changes to the release force before running.
- The compact design eases passage through doglegs and deviated wells to help prevent sticking and improve running efficiency.
- The hydraulic setting avoids the need to rotate the work string in running or retrieving the packer, which simplifies procedures, improves efficiency, and saves rig time.

Application:

- Low-pressure wells.
- Stacked applications.
- Applications prohibiting tubing rotation.
- Isolation of casing holes and perforations.

Specification Guide:

Casing				Packer		
SIZE	Weight	Min. ID	Max. ID	Max. OD	Min.ID	End Connection Specification
inch mm	lb/ft	inch mm	inch mm	inch mm	inch mm	inch
4 1/2 114.3	9.5-13.5	3.920 99.57	4.090 103.89	3.776 95.91	1.995 50.67	2 3/8 EU 8RD
5 127.0	11.5-15	4.408 111.96	4.560 115.82	4.266 108.36	1.995 50.67	2 3/8 EU 8RD
	15-18	4.276 108.61	4.408 111.96	4.141 105.18		
5 1/2 139.7	13-20	4.778 121.36	5.044 128.12	4.641 117.88	1.995 50.67	2 3/8 EU 8RD
				4.630 117.60	2.441 62.00	2 7/8 EU 8RD
	20-23	4.670 118.62	4.778 121.36	4.516 114.71	1.995 50.69	2 3/8 EU 8RD
7 177.8	17-26	6.276 159.41	6.538 166.07	6.110 155.19	2.441 62.00	2 7/8 EU 8RD
9 5/8 244.4	43.5-53.5	8.535 216.78	8.755 222.37	8.250 209.55	2.992 75.997	3 1/2 EU 8RD



HYDRAULIC SET HIGH ANGLE HIGH PRESSURE PRODUCTION PACKER

MODEL: WC-HP-3

PRODUCT NO.: WC-20105

This is a fully Hydraulic Set Production Packer to be used in single or multiple zone installations. It is highly recommended for deviated wells where conditions are not suitable for Mechanical or Wire line Set Packers.

Features/Benefits:

- No tubing movement is required for setting the Packer. This allows the well to be kept positively controlled at all the times.
- Two or more packers can be set together or in any desired sequence.
- Bi-directional slips.
- Two balanced pistons are utilized during the setting of the Packer.
- The packer could be released with straight pull or by rotation.

Application:

- For single or multiple zone isolation.
- For deviated wells where conditions are not suitable for mechanical or wire-line set packers

Specification Guide:

Casing				Packer		
Size inch mm	Weight lb/ft	Min. ID inch mm	Max. ID inch mm	Max. OD inch mm	Min.ID inch mm	End Connection Specification
5 1/2 139.7	14-20	4.778 121.36	5.012 127.30	4.500 114.30	1.995 50.67	2 7/8 EU 8RD
5 1/2 139.7	14-20	4.778 121.36	5.012 127.30	4.500 114.30	1.995 50.67	2 7/8 EU 8RD
6 5/8 168.27	28-32	5.675 144.14	5.791 147.09	5.487 139.36	2.441 62.00	2 7/8 EU 8RD
6 5/8 168.27	20-24	5.921 150.39	6.049 229.84	5.733 145.61	2.441 62.00	2 7/8 EU 8RD
7 177.8	20-26	6.276 159.41	6.456 163.98	6.078 154.38	2.441 62.00	2 7/8 EU 8RD
7 177.8	20-26	6.276 159.41	6.456 163.98	6.078 154.38	2.441 62.00	2 7/8 EU 8RD
9 5/8 244.4	43.5-53.5	8.535 216.78	8.755 222.37	8.250 209.55	2.992 75.997	3 1/2 EU 8RD

FULLY HYDRAULIC SET LARGE BORE PRODUCTION PACKER

MODEL: WC-HPL-4

PRODUCT No.: WC-20103

This is fully hydraulic set retrievable large bore production packer, used for production, zone isolation, selective multiple-zone completions, stimulation etc.

The packer features a mechanical, bidirectional slip system to anchor the packer and resist upward and downward tubing movement it also has a built-in internal bypass system that allows formation pressure to equalize before the slip is fully released. The packer is set by applying tubing pressure, which acts on the packer's setting piston area, shears the setting screws and activates the packer-setting mechanism. The setting-mechanism trigger pressure is adjusted by adding or removing easily accessible shear screws. The packer's hydrostatic chamber allows the packer to be successfully set at lower pump pressures.

Once the packer is fully set, the pack-off force is mechanically locked into the slips and sealing element with a positive lock-ratchet mechanism. This allows the tubing to be landed in either compression or neutral condition.

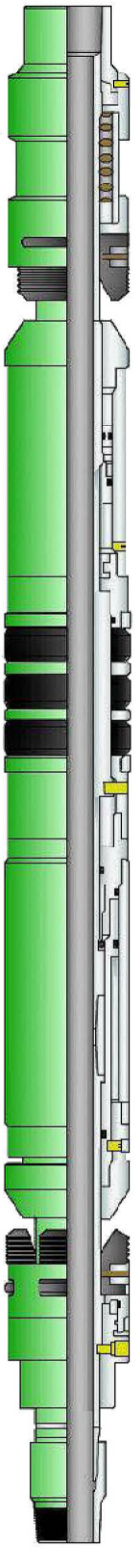
Packer release is accomplished by a simple upward pull on the tubing string. Unlike many hydrostatic packers, the packer can be adjusted or redressed in the field by onsite personnel. This packer also features an optional slick-line-intervention, selective-set feature with a choice of upward or downward shift.

Features/Benefits:

- **No Tubing Manipulation required:** The setting mechanism of this Packer is activated with pump pressure. The Packer can be set after the well is flanged up and the tubing is displaced.
- **Setting Mechanism:** The design of the setting mechanism ensures sustained pack-off force throughout life of the Packer. Setting activation pressure can be adjusted by dressing up with required number of Shear Screws.
- **Opposed:** Double grip slips prevent movement of the Packer in either direction due to pressure differentials.
- **Unloaded valve:** Built-in equalizing and circulation system ensures increased safety and easy retrieval.
- **Multiple:** Packing element system Design is compact and field proven.
- Quick and reliable installation in highly deviated wells.

Specification Guide:

Casing				Packer		
Size	Weight	Min. ID	Max. ID	Max. OD	Min. ID	End Connection Specification
inch mm	lb/ft	inch mm	inch mm	inch mm	inch mm	
4.5 114.5	9.5-13.5	3.920 99.56	4.090 103.88	3.771 95.8	1.995 50.67	2 3/8 EU 8RD
5 127.0	11-13	4.494 114.14	4.560 115.82	4.250 108.0		
5 1/2 139.7	20-23	4.625	4.778	4.540	2.441 62.00	2 7/8 EU 8RD
	15.5-20	4.778	4.950	4.651		
	13-15.5	4.950	5.190	4.815		



HYDRAULIC SET HIGH PRESSURE PRODUCTION PACKER

MODEL: WC-HP-5

PRODUCT No.: WC-20104

This is a high-pressure, double-grip, retrievable packer that isolates the annulus from the production conduit in flanged wells, deviated wellbores, gas-lift installations, and other completions in which a mechanically set packer is unsuitable.

The built-in zone-activated, pressure-balance system offsets pressure differentials across the packer, making it ideal for stacked-packer installations.

The packer could be released by straight pick-up of the tubing string. It also features an upper slip releasing system that reduces the strain required to release the slips by dislocating a key non-directional slip first, which automatically releases the other slips.

Features/Benefits:

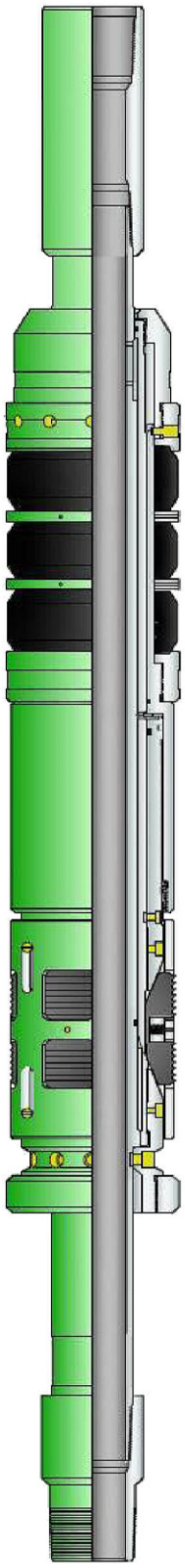
- The straight-pull, shear-release pins are unaffected by differential pressure, enabling easy changes to the release force before running.
- All components are locked to prevent pressure buildup or debris from presetting the packer, improving reliability when running the packer in the wellbore.
- The pressure-balance system offsets pressure differentials across the packer, enabling the element to maintain an effective seal.
- The double-grip system enables the packer to hold differential pressures securely from above and below, preventing packing-element movement and ensuring proper pack-off.

Applications:

- Suitable for highly deviated wells and doglegs.
- Onshore offshore completions, Stacked completions.
- Water injection/Gas lift. Coiled-tubing completions.

Specification Guide:

Casing				Packer		
Size	Weight	Min. ID	Max. ID	Max. OD	Min. ID	End Connection Specification
inch mm	lb/ft	inch mm	inch mm	inch mm	inch mm	
5 1/2 139.7	13 -15.5	4.950 125.73	5.190 131.83	4.781 121.44	1.995 50.67	2 3/8 EU 8RD
	15.5-20	4.778 121.36	4.950 125.73	4.614 117.20		
	20-23	4.625 117.48	4.778 121.36	4.500 114.30		
7 177.8	20-26	6.276 159.41	6.456 163.98	6.078 154.38	2.992 75.997 or 2.441 62.00	3 1/2 EU 8RD or 2 7/8 EU 8RD
	26-29	6.189 157.20	6.276 159.41	5.968 151.59		
	32-35	6.004 152.50	6.094 154.79	5.812 147.62		
9 5/8 244.4	43.5-53.5	8.535 216.78	8.755 222.37	8.250 209.55	2.992 75.997	3 1/2 EU 8RD



HYDRAULIC SET HIGH ANGLE PRODUCTION PACKER

MODEL: WC-HP-6

PRODUCT No.: WC-20106

HP-6 Hydraulic Set High Angle Production packer is a compact, effectual packer, designed for typical completion applications. The short body length makes it ideal for high angle deviations and horizontal applications. This compact, economical packer requires no mandrel movement. Straight pull release, pressure equalization, and shear out features provide quick release and easy retrieval.

Features/Benefits:

- No downward mandrel movement makes this tool ideal for stacked packer completions.
- Straight-pull release, adjustable up to 50,000 lb (22,680 kg), eliminates the need to rotate the tubing to release the packer, saving valuable rig time.
- Shear screws, isolated from the hydraulic pressure, require low shear-out force, making the tool easy to release, even at full pressure differential.
- Built-in bypass ports equalize pressure across the packer for easy retrieval.
- Short overall length allows packer to negotiate highly deviated wells and severe doglegs for shorter run-in times.

Applications:

- Highly deviated wells and severe doglegs.
- Offshore oil and gas wells with low to medium pressure requirements.
- Stacked packer completions.
- Coiled tubing completions.
- Injection wells.

Specification Guide:

Casing				Packer		
Size	Weight	Min. ID	Max. ID	Max. OD	Min. ID	End Connection Specification
inch mm	lb/ft	inch mm	inch mm	inch mm	inch mm	
5-1/2 139.7	14 - 17	4.819 122.40	5.09 129.29	4.625 117.48	1.995 50.67	2 3/8 EU 8RD
6-5/8 168.3	24 - 28	5.791 147.09	5.921 150.39	5.540 140.72	2.441 62.00	2 7/8 EU 8RD
7 177.8	20 - 26	6.276 159.41	6.456 163.98	6.000 152.40	2.441 62.00	2 7/8 EU 8RD
	26 - 32	6.094 154.79	6.276 159.41	5.891 149.63	2.441 62.00	
	23 - 29	6.184 157.07	6.366 161.70	6.005 152.52	2.992 75.997	3 1/2 EU 8RD
9-5/8 244.5	43 - 53.5	8.535 216.79	8.755 222.38	8.250 209.55	2.992 75.997	3 1/2 EU 8RD

HYDRAULIC THERMAL PACKER

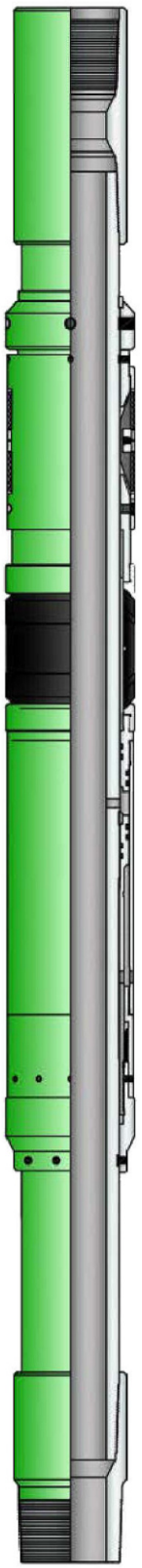
MODEL: WC-HTP

PRODUCT No.: WC-20130

HTP is a retrievable, hydraulic-set production special large bore packer that is set in casing to divert casing-to-tubing flow. It is set by pressuring up the tubing string against a plugging device below the packer.

Bi-directional, case-carburized slips hold the packer against well pressures from above and below. Internal Spring-loaded slips maintain the packer in the set position.

This is a straight shear release packer. The shear release value is adjustable. This packer could be set either putting pump-out plug or hydro trip pressure sub at the bottom of the packer.



Features/Benefits:

- Multiple packers can be set together
- Easily converted between straight Pull to release or cut to release
- Releasing screw adjustment compatibility
- Optional Multi-string completions with control line Feed-through
- Double Grip slip design
- Single-piece mandrel construction

Applications:

- Multi-zone production applications
- Single trip applications
- Electric submersible pump completions

Specification Guide:

Casing				Packer		
Size	Weight	Min. ID	Max. ID	Max. OD	Min. ID	End Connection Specification
inch mm	lb/ft	inch mm	inch mm	inch mm	inch mm	
5 1/2 139.7	13 -15.5	4.950 125.73	5.190 131.83	4.781 121.44	1.995 50.67	2 3/8 EU 8RD
	15.5-20	4.778 121.36	4.950 125.73	4.614 117.20		
	20-23	4.625 117.48	4.778 121.36	4.500 114.30		
7 177.8	20-26	6.276 159.41	6.456 163.98	6.078 154.38	2.441 62.00	2 7/8 EU 8RD Or 3 1/2 EU 8RD
	26-29	6.189 157.20	6.276 159.41	5.968 151.59		
	32-35	6.004 152.50	6.094 154.78	5.812 147.62		
9 5/8 244.4	43.5-53.5	8.535 216.78	8.755 222.37	8.250 209.55	2.992 75.997	

HYDRAULIC SET DUAL BORE PRODUCTION PACKER

MODEL: WC-HP-8

PRODUCT No.: WC-20110

This is a double-grip, retrievable dual-string production packer that isolates the annulus from the production conduit. This multitalented packer has sequential upper slip releasing system. Each slip is easily released individually to reduce the force required for packer release. The angles on the slips, cone and upper slip body direct forces that provide smooth slip release from the casing.

The packer is available with short or long string setting capabilities and a variety of tubing connections. The packer has been carefully designed for maximum flexibility when it comes to submersible pump applications. By changing only a few parts, this can be modified from a high-pressure production packer to a packer installation for submersible pumps. The angles on the slips, cone and the upper slip body direct releasing forces which provide smooth release from the casing.

Features/Benefits:

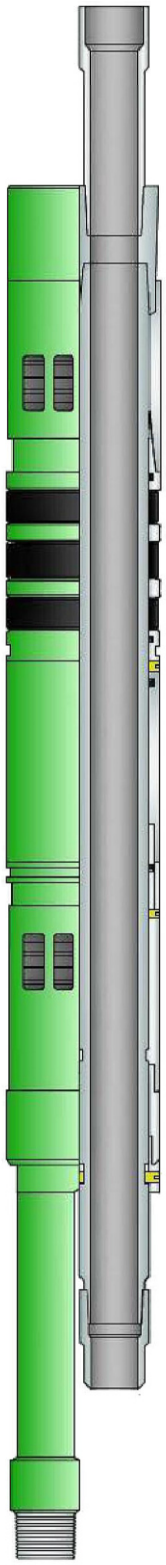
- The packer can be pressure tested on-site to save rig time.
- The straight-pull, shear-release pins are unaffected by differential pressure, enabling easy changes to the release force before running.
- The compact design eases passage through doglegs and deviated wells to help prevent sticking and improve running efficiency.
- All components are locked to prevent pressure buildup or debris from presetting the packer, improving reliability when running the packer in the wellbore.
- Multiple bores. The packer is available with a snap latch, J-latch short string, and long and short-string set.
- Elastomer and metallurgy options are available.

Applications:

- Deviated and horizontal wells,High-volume instrumented applications
- Well monitoring, gas venting, chemical injection, and hydraulic-line access, Multiple-zone isolation

Specification Guide:

Casing		Packer	Long string		Short string	
Size	Weight	OD	End Connection	ID	End connection	ID
inch mm	lb/ft	inch mm		inch mm		inch mm
5-1/2 139.7	14-20	4.625 117.48	1.900 NU 10rd	1.531 38.89	1.660 NU 10rd	1.313 33.35
7 177.8	23-32	5.938 150.83	2 3/8 EU 8rd	1.938 49.23	2 3/8 EU 8rd	1.938 49.23
	17.29	6.000 152.40				
7 5/8 193.9	33.7-39	6.453 163.91				
	24-29.7	6.625 168.28	2 7/8 EU 8rd	2.406 61.11	2 7/8 EU 8rd	2.406 61.11
8 5/8 219.1	28-40	7.531 191.29				
9-5/8 244.5	47-53.5	8.250 209.55	3 1/2 EU 8rd	3.000 76.20	3 1/2 EU 8rd	3.000 76.20
	36-47	8.500 215.90				



HYDRAULIC SET RETRIEVABLE PRODUCTION PACKER

MODEL: WC-HP-9

PRODUCT No.: WC-20111

HP-9 is a retrievable, hydraulic-set production special large bore packer that is set in casing to divert casing-to-tubing flow. It is set by pressuring up the tubing string against a plugging device below the packer.

Bi-directional, case-carburized slips hold the packer against well pressures from above and below. Internal Spring-loaded slips maintain the packer in the set position.

The WC-HP-9 packer is a straight shear release packer. The shear release value is adjustable. This packer could be set either putting pump-out plug or hydro trip pressure sub at the bottom of the packer

Features/Benefits:

- Multiple packers can be set close together
- Easily converted between straight Pull to release or cut to release
- Releasing screw adjustment compatibility
- Special Large Bore packer ID
- Single-trip capability
- Double Grip slip design
- Single-piece mandrel construction
- Triple Packing element of different hardness

Applications:

- Multi-zone production applications
- Single trip applications
- Electric submersible pump completions

Specification Guide:

<table>
<tr><th colspan="2">Casing</th><th colspan="2">Packer</th></tr>
<tr><th>Size</th><th>Weight</th><th>Max. OD</th><th>Min. ID</th></tr>
<tr><th>inch
mm</th><th>lb/ft</th><th>inch
mm</th><th>inch
mm</th></tr>
<tr><td rowspan="6">7
177.8</td><td rowspan="2">20 - 26</td><td rowspan="2">6.100
154.94</td><td>3.875
98.42</td></tr>
<tr><td>4.000
101.60</td></tr>
<tr><td rowspan="2">23 - 29</td><td rowspan="2">6.000
152.40</td><td>3.875
98.42</td></tr>
<tr><td>4.000
101.60</td></tr>
<tr><td rowspan="2">26 - 32</td><td rowspan="2">5.938
150.83</td><td>3.875
98.42</td></tr>
<tr><td>4.000
101.60</td></tr>
<tr><td rowspan="2">9 5/8
244.5</td><td>40 - 47</td><td>8.470
215.14</td><td rowspan="2">4.950
125.73</td></tr>
<tr><td>47.5 - 53.5</td><td>8.313
211.15</td></tr>
</table>

HYDRAULIC SET SINGLE STRING RETRIEVABLE PRODUCTION PACKER

MODEL: WC-HP-10
PRODUCT No.: WC-20112

This is a new standard high performance single string retrievable hydraulic set, shear release packer. This offers features that provide maximum pre-set prevention while running, improved sealing and retrieving reliability as well as metallurgy and elastomeric selection fit for the well environment. The simple and reliable design is compliant.

There is a selective set version of Hydraulic Set Single String Packer. Setting and retrieval is essentially the same with the exception of an inner sleeve that must be shifted before the packer will set. The selective setting mechanism prevents the packer from premature setting when high tubing to annulus pressure differentials are encountered or when tubing pressure tests are performed.

Features/Benefits:

- Operationally simple
- Hydraulically set
- Shear release
- Built-in un-loader and bypass to aid in releasing and retrieving
- Hydraulic interlock system prevents preset.
- Patented element system - incorporates a "zero gap" back-up system
- All O-Rings tested during assembly of the packer
- Bi-directional slip
- Short and compact design.
- No mandrel movement during setting allows stacked packer application.
- Selective version available for this Packer

Applications:

- Production, injection and zonal isolation.
- Single string selective completions or dual string completions with multiple packers.
- Completion where maximum pre-set prevention while running is desired.
- Deviated wells or other application here no rotation for installation or removal is desired
- Applications where displacing and setting the packer after the well is flanged up is desirable.

Specification Guide:

CASING			PACKER				
Size		Weight	Packer Size	Min ID		Gauge OD	
inch	mm	lb/ft		inch	mm	inch	mm
5 1/2	139.7	15.5-23	450-199	1.995	50.67	4.500	114.3
			450-244	2.441	62.00		
7	177.8	23-26	608-292	2.992	75.997	6.080	154.4
			608-244	2.441	62.00		
			608-199	1.995	50.67		
		23-32	591-292	2.992	75.997	5.910	150.1
			591-244	2.441	62.00		
			591-199	1.995	50.67		
9 5/8	244.5	40-53.5	831-199	1.995	50.67	8.310	211.1
			831-244	2.441	62.00		
			831-292	2.441	62.00		
			831-395	3.958	100.533		

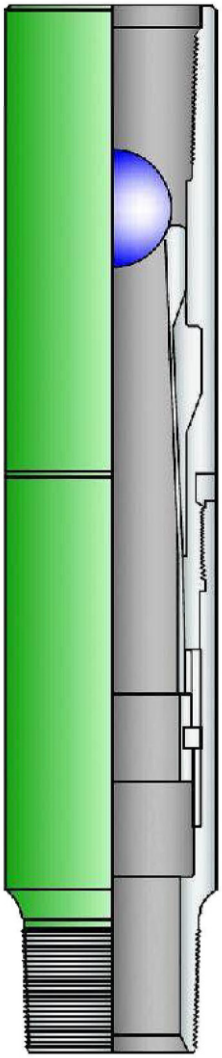
HYDRO TRIP PRESSURE SUB

MODEL: WC-HTS

PRODUCT No.: WC-20122

It is installed in the tubing string underneath a hydraulically actuated tool such as hydraulic packer to provide a means to apply required tubing pressure to activate the tool.

To set a hydrostatic packer, drop a ball to run through the tubing and packer up to the seat of Hydro-Trip Pressure Sub. And further pressure is applied to set the packer. Afterwards pressure increased to shear screws to allow the ball seat to move down until the fingers snap back into a groove. Subsequently the ball passes down the tubing through the full opening.



Specification Guide:

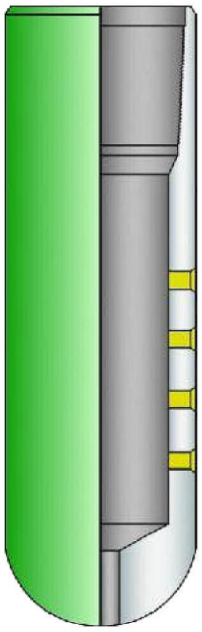
Size	Ball Size	Ball Seat ID		End Connection Specification
		Before Shifting	After Shifting	
inch mm	inch mm	inch mm	inch mm	
1.900 48.26	1.438 36.51	1.250 31.75	1.516 38.51	1.900 EU or NU
2.375 60.33	1.500 38.10	1.375 34.93	1.860 47.24	2 3/8 EU or NU
	1.750 44.45	1.625 41.28	1.906 48.41	
2.875 73.03	2.125 53.98	2.000 50.80	2.375 60.33	2 7/8 EU or NU
3.500 88.90	2.500 63.50	2.312 58.72	2.781 70.64	3 1/2 EU or NU
	2.750 69.85	2.500 63.50	2.953 75.01	
4.500 114.30	3.063 77.79	2.734 69.44	3.615 91.82	4 1/2 EU or NU
	3.375 85.73	2.958 75.13	3.865 98.17	

BALL CATCHER SUB

MODEL: WC-BCS

PRODUCT No.: WC-20120

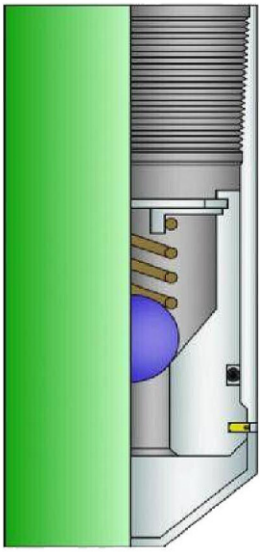
Ball catcher sub provides a means of catching the ball and sheared out ball seat from a hydro trip pressure subs or pump out plugs. It has multiple sets of large diameter holes those allow fluid passage without restriction.



Features/Benefits

Large bypass area in the catcher sub is made with multiple sets of large diameter holes. These holes are sized to catch the ball and seat, but allow fluid to pass through the tool without plugging.

NOTE: All feasible distinct sizes of Ball Catcher Sub could be provided with specific grades of material and end connections; standard or premium thread, as per the customer's requirement.



AUTO FILL PUMP OUT PLUG

MODEL: WC-POP-A

PRODUCT No.: WC-20124

It is used as a tubing plugging device against which pressure is being applied in order to set Hydraulic Set Packers.

This is made up with the tail pipe below the Packer to be set.

With the ball seating down, it acts as a reverse check valve preventing flow down the string, while allowing the string to fill from below.

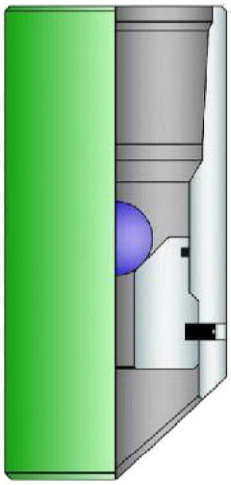
Without dropping a ball to seat, the tubing can be pressured up.

Once the Packer is set, tubing pressure is increased to values shown in the chart below to shear the screws holding the ball seat.

The ball seat and the ball with spring etc. are blown out of the sub to the bottom of the well.

Tubing below the plug should have sufficient ID clearance to permit passage of the ball, ball seat, spring etc.

To set a packer number of screws installed in the pump out plug must be compatible with the concerned/rated precise requirement.



PUMP OUT PLUG WITH HALF MULE

MODEL: WC-POP-H

PRODUCT No.: WC-20125

It is used as a tubing plugging device against which pressure is being applied in order to set Hydraulic Set Packers.

This is made up with the tail pipe below the Packer to be set.

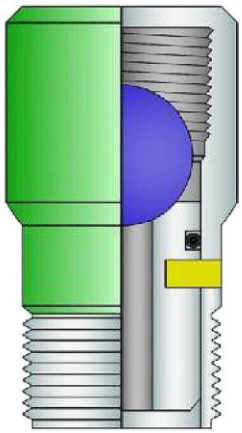
A ball is dropped to run through the tubing and packer up to the ball seat, subsequently the tubing is pressured up.

Once the Packer is set, tubing pressure is increased to values shown in the chart below to shear the screws holding the ball seat.

The ball and ball seat are blown out of the sub to the bottom of the well.

Tubing below the plug should have sufficient ID clearance to permit passage of the ball, ball seat, spring etc.

To set a packer number of screws installed in the pump out plug must be compatible with the concerned/rated precise requirement.



PUMP OUT PLUG WITHOUT MULE

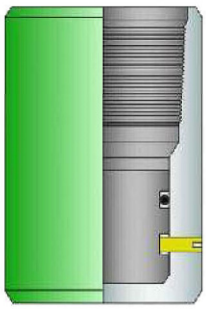
MODEL: WC-POP

PRODUCT No.: WC-20126

It is used as tubing plugging device simultaneously allows hanging more tubing string down the line as per requirement

SHEAR OUT PLUG

MODEL: WC-SOP
PRODUCT No.: WC-20121



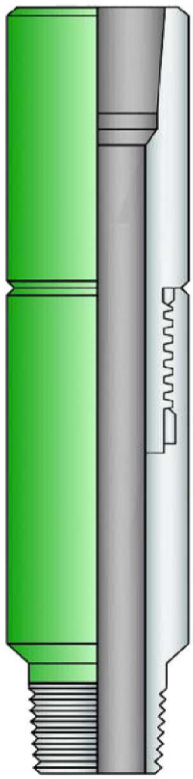
Shear-out Plug provides a means of temporarily plugging the bottom of a tubing string to prevent fluid flow up the tubing while tripping in the hole and against which pressure is being applied in order to set hydraulic packers.

Specification Guide: [POP, POP-A/H & SOP]

Size inch mm	Max. OD inch mm	Nom. ID inch mm	Standard End Connection
2 3/8 60.33	3.062 77.77	2.000 50.80	2 3/8 EU 8RD
2 7/8 73.03	3.687 93.65	2.347 59.61	2 7/8 EU 8RD
3 1/2 88.90	4.500 114.30	3.000 76.20	3 1/2 EU 8RD
4 1/2 114.30	5.125 130.18	3.870 98.30	4 1/2 EU 8RD

SAFETY JOINT

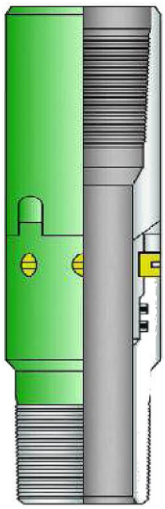
MODEL: WC-SJ-1
PRODUCT No.: WC-20117



The safety joint provides for emergency recovery of the major portion of the tubing string while it becomes necessary to abandon the equipment under the string. Precision left hand square threads facilitate release of the joint by right hand tubing rotation. Equipment requiring right hand rotation should not be used to below the safety joint.

- **Specification Guide:**

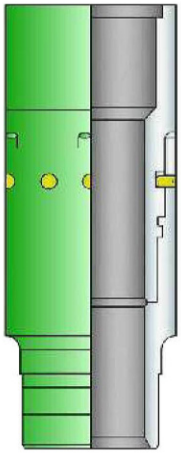
Size inch mm	Max. OD inch mm	Nominal ID inch mm	End Connection Specification
1.900 48.26	2.22 56.39	1.53 38.86	1.900 NU 10 RD
2 3/8 60.33	2.88 73.15	2.00 50.80	2 3/8 EU 8RD
2 7/8 73.03	3.69 93.73	2.44 61.98	2 7/8 EU 8RD
3 1/2 88.90	4.50 114.30	2.98 75.69	3 1/2 EU 8RD



TUBING SAFETY JOINT

MODEL: WC-SJ-T
PRODEUCT No.: WC-20118

The Safety Joint requires only a straight pull for parting. These assemblies are often placed in the tubing string between packers when two or more packers are run in tandem. This safety joint should be placed above the position where sand or other adverse conditions may occur to prevent normal movement of the tubing.



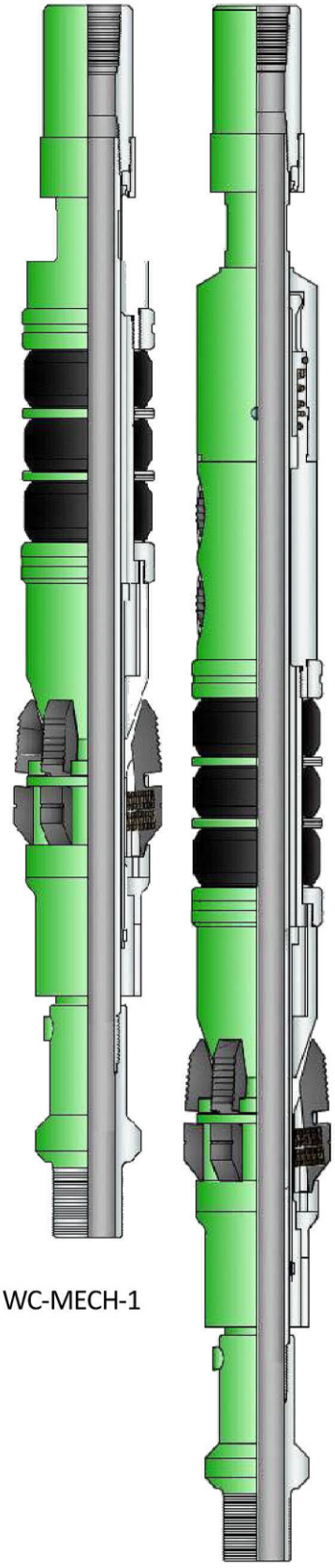
NON ROTATIONAL SHEAR OUT SAFETY JOINT

MODEL: WC-SOS-AR
PRODUCT NO.: WC-20119

Non rotational shear out safety joint is used between packers in dual and triple completions also in selective completions using hydrostatic single string packers. It is also used when rotational releasing is not desired. When run above the upper packer in a single string completion, the shear value should be adjusted to compensate for any hydraulic conditions that exist when the string is landed, or that are created by well treating operations. This model has torque transmission feature.

- **Specification Guide:**

Size	Max. OD	Nominal ID	End Connection Specification
inch mm	inch mm	inch mm	
1.900 48.26	2.22 56.39	1.53 38.86	1.900 NU 10 RD
2 3/8 60.33	2.88 73.15	2.00 50.80	2 3/8 EU 8RD
2 7/8 73.03	3.69 93.73	2.44 61.98	2 7/8 EU 8RD
3 1/2 88.90	4.50 114.30	2.98 75.69	3 1/2 EU 8RD



WC-MECH-1

WC-MECH-2

MECHANICAL SINGLE / DOUBLE GRIP & DOUBLE GRIP LARGE BORE RETRIEVABLE PACKER

MODEL: WC-MECH-1, WC-MECH-2 & WC-MECH-2L
PRODUCT No.: WC-20901, WC-20902 & WC-20903

This packer is a retrievable set-down packer that features a large bypass area. The bypass area is controlled by a face-seal type bypass valve which is actuated by a 30" inch stroke mandrel. The Packer is available in a single-grip version for use as a conventional long-stroke production packer and in a double-grip version (with hold-down buttons) for combination production and well stimulation operations.

The double-grip packer are used where pressure differential from below the packer is anticipated, features an integral hydraulic hold-down buttons that is located below the bypass valve.

The double-grip packer also incorporates a unique built-in "differential lock" that utilizes a balance sleeve actuated by pressure from below the packer. This pressure creates an additional downward force which, combined with set-down weight helps to maintain the force necessary to keep the bypass valve closed.

Features/Benefits:

- Differential lock helps keep the by-pass closed and locked to the mandrel during high pressure operations.
- Automatically returns to run-in position when moved up the hole.
- Hydraulic hold-down buttons for differential pressure from below.
- Long stroke mandrel simplifies circulation of fluids without releasing the packer.
- Large by-pass allows speedy equalization of fluids.
- Rocker type slips.
- Standard right-hand set, optional left-hand set.

Setting procedure:

The Double Grip Packer runs in with the by-pass valve in the open position to permit free circulation both through and around the packer. The packer should be run one foot below the setting depth. To set, pick-up the tubing to the desired setting position, rotate to the right and then slack-off. The J-pin will move clear of the J slot and the cone will move under the slips. Application of set-down weight, for standard packing element system (7,000 lb for sizes 4-1/2 ~ 5-1/2, 5,000 lb for sizes 2-7/8~4-1/2,9,000 lb for size 7", 11,000 lb for size 8-5/8 and 15,000 lb for size 9-5/8), closes and seals the by-pass valve, sets the slips and packs-off the packing elements. The formation below the packer, which is now completely isolated from the annulus above, is accessible only through the tubing string.

Releasing procedure:

To release the packer, raise the tubing string, as the J-pin of the bottom sub engages the slip stop ring (jay housing), the J-pin automatically moves into the running position. This allows the tool to be moved up or down the wellbore as necessary. When the tubing is raised to release the packer, the by-pass valve opens to permit circulation through and around the packer.

NOTE: If the J-Pin would un-jay when the tubing is slacked off, rotates to the left (only enough to remove any right-hand torque form the tool) and pick up.

Specification Guide:[MECH-1 , MECH -2 & MECH-2L]

Casing				Packer			
SIZE inch mm	Weight lb/ft	Min. ID inch mm	Max. ID inch mm	Size	Nominal ID inch mm	OD inch mm	End Connection Specification Box Up & Pin Down
4-1/2 114,30	9.5-13.5	3.910 99.31	4.090 103.9	43A	1.995 50,67	3,771 95,78	2-3/8 EU 8RD
5 127,00	15-18	4.250 107,9	4,408 112,0	43B		4,125 104,78	
	11.5-15	4.408 112,0	4,560 115,8	43C		4,250 107,95	
5-1/2 139,70	26						
	20-23	4.625 117,5	4.777 121,3	45A2	1.995 50,67	4.500 114,30	2-7/8 EU 8RD
				45A2X2-3/8	2.441 62,00		
	15.5-20 14-2	4.778 121,4	4.950 125,7	45A4	1.995 50,67	4.641 117,88	2-3/8 EU 8RD
	17-20	4.778 121,4	4.892 124,25	45A4X2-3/8	2.441 62,00		2-7/8 EU 8RD
5-3/4 146,05	13-15.5	4.950 125,7	5.190 131,8	45B	1.995 50.67 2.441 62,00	4.781 121,44	2-3/8 EU 8RD or 2-7/8 EU 8RD
		4.893 124,3	5.044 128,1	45BX2-3/8			
	22.5	4.950 125,7	5.190 131,8	45B	1.995 50,67		2-3/8 EU 8RD
		4.893 1243	5.044 1281	45BX2-3/8	2.441 62,00		2-7/8 EU 8RD
6-5/8 168,28	34	5.561 141,2	5.609 142,5	45E2	1.995 50,67	5.4 05 137,3 1	2-3/8 EU 8RD
	28-32	5.610 142,5	5.791 147,1	45E4		5.4 84 139, 29	
		5.600 142,2		46A2	2.441 62,00	5.4 75 139, 07	2-7/8 EU 8RD
	24-28	5.791 147,1	5.921 150,4	45EF	1.995 50,67	5.4 84 139,2 9	2-3/8 EU 8RD
				46A4	2.441 62,00	5.5 88 141,9 4	2-7/8 EU 8RD
	24	5.830 148,1	5.937 150,8	47A2		5.656 143,66	
	17-20	5.938 150,8	6.135 155,8	47A4		5.812 147,62	

7 177,80	38	5.791 147,1	5.921 150,4	46A4	2.441 62,00	5.588 141,94	2-7/8 EU 8RD
		5.830 148,1	5.937 150,8	47A2		5.656 143,66	
	32-35	5.922 150,4	6.135 155,8	46B		5.781 146,84	
		5.938 150,8		47A4		5.812 147,62	
		6.004 152,5	6.094 154,8	47A4 X 3	2.992 75,997		3-1/2 EU 8RD
	26-29	6.136 155,8	6.276 159,4	47B2	2.441 62,00	5,968 151,59	2-7/8 EU 8RD
	20-26	6.276 159,4	6.456 164,0	47B4	2.441 62,00	6.078 154,38	2-7/8 EU 8RD
	17-20	6.456 164,0	6.578 167,1	47C2	2.441 62,00	6.266 159,16	2-7/8 EU 8RD
7-5/8 193,68	33.7-39	6.579 167,1	6.797 172,6	47C4	2.441 62,00	6.453 163,91	2-7/8 EU 8RD
			6.765 171,83	47C4X3	2.992 75,997		3-1/2 EU 8RD
	24-29.7 20-24	6.788 172,7	7.025 178,4	47D2	2.441 62,00	6.672 169,47	2-7/8 EU 8RD
		6.766 171,9		47D2X3	2.992 75,997		3-1/2 EU 8RD
		7.025 178,4	7.125 181,0	47D4	2.441 62,00	6.812 173,02	2-7/8 EU 8RD
				47D4X3	2.992 75,997		3-1/2 EU 8RD
8-5/8 219,08	44-49	7.511 190,8	7.687 195,2	49A2	2.992 75,997	7.312 185,72	3-1/2 EU 8RD
	32-40	7.688 195,3	7.921 201,2	49A4		7.531 191,29	
	20-28	7.922 201,2	8.191 208,1	49B2		7.781 197,64	
9-5/8 244,48	47-53.5	8.343 211,9	8.681 220,5	51A2	3.958 100,53	8.218 208,74	4-1/2 EU 8RD
	40-47	8.681 220,5	8.835 224,4	51A4		8.437 214,30	
	29.3-36	8.836 224.43	9.063 230.20	51B2		8.593 218.26	
10-3/4 273.05	32.75-40.5	10.050 225.27	10.190 258.83	-	3.958 100.53	9.875 250.83	4-1/2 EU 8RD

LOK-SET MECHANICAL RETRIEVABLE DOUBLE GRIP PACKER

MODEL: WC-MECH-3 & WC-MECH-3L

PRODUCT No.: WC-20905 & WC-20906

It is a general purpose packer for production, injection, zone isolation or remedial operations. It holds pressure from above or below while allowing the tubing to be placed in tension, compression or in a neutral condition. This is a Full-Bore Double-Grip Retrievable Packer with an integral un-loader. Opposed non-transferring dovetail Slips prevent movement of the Packer in either direction due to pressure differentials, while allowing landing of the tubing in tension, compression or neutral. The Lock segments serve as a releasable Lock Ring to maintain pack-off once the packer is set, and locks the un-loader in the closed position until the tool is released. The split Lock and Control Segments allow the tool to be set and released with right-hand rotation. The Retrievable Lok-Set Packers are compression set retrievable packers.

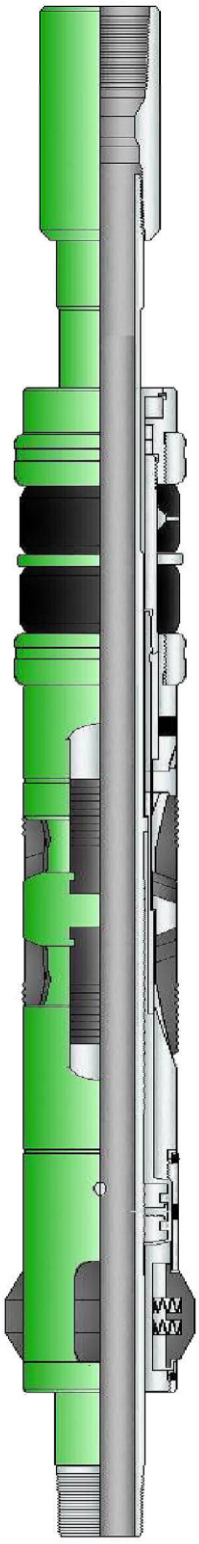
Features/Benefits:

- Internal by-pass.
- Opposed dovetail slips positive set.
- Holds pressure from above or below.
- Can leave tubing in a tension, compression or neutral condition.
- Right hand rotation sets and releases the packer.
- Retracted dovetail slips.
- Converts to mechanical bridge plug with the addition of a valve.
- Optional packing element systems.

Applications:

- Production.
- Injection.
- Zone isolation operations.

Note: The Model: WC-MECH-3L Lok-Set Packer is similar to the Model: WC-MECH-3 packer and is recommended when a larger than normal bore through the packer is required.



Specification Guide: [MECH-3]

Casing				Packer		
Size inch mm	Weight lb/ft	Min. ID inch mm	Max. ID inch mm	OD inch mm	ID inch mm	End Connection Specification Box Up & Pin Down
5 127.0	15-18	4.250 107.95	4.408 111.96	4.125 104.78	1.995 50.67	2 3/8 EU 8RD
	11.5-15	4.408 111.96	4.560 115.82	4.250 107.95		
5 1/2 139.7	26					
	20-23	4.625 117.48	4.778 121.36	4.500 114.30		
	15.5-20	4.778 121.36	4.950 125.73	4.641 117.88		
	13-15.5	4.950 125.73	5.190 131.83	4.781 121.44		
6 152.4	26	4.950 125.73	5.190 131.83			
	20-23	5.191 131.85	5.390 136.91	5.062 128.57		
	15-18	5.391 136.93	5.560 141.22	5.156 130.96		
6 5/8 168.3	34	5.561 141.25	5.609 142.47	5.406 137.31		
	24-32	5.610 142.49	5.921 150.39	5.484 139.29		
	17-24	5.992 150.42	6.135 155.83	5.781 146.84	2.441 62.00	2 7/8 EU 8 RD
	24	5.830 148.08	5.937 150.80	5.656 143.66	1.995 50.67	2 3/8 EU 8RD
	17-20	5.938 150.83	6.135 155.83	5.812 147.62	2.441 62.00	2 7/8 EU 8 RD
7 177.8	38	5.830 148.08	5.937 150.80	5.656 143.66		
	32-35	5.938 150.83	6.135 155.83	5.812 147.62		
	26-29	6.136 155.85	6.276 159.41	5.968 151.59		
	23-26	6.276 159.41	6.366 161.70	6.078 154.38		
	17-20	6.456 163.98	6.578 167.08	6.266 159.16		
7 5/8 193.7	33.7-39	6.579 167.11	6.797 172.64	6.453 163.91		
	24-29.7	6.798 172.67	7.025 178.44	6.672 169.47		
	20-24	7.025 178.44	7.125 180.98	6.812 173.02		
9 5/8 244.48	47-53.5	8.343 211.9	8.681 220.5	8.218 208.74	2.992 75,997	3 1/2 EU 8RD
	40-47	8.681 220.5	8.835 224.4	8.437 214.30		
	29.3-36	8.836 224.43	9.063 230.2	8.593 218.3		
10-3/4 273.05	32.7-40.5	10.050 225.27	10.190 258.83	3.958 100.53	9.875 250.83	4-1/2 EU 8RD

Specification Guide: [MECH-3L]

Casing				Packer		
SIZE inch mm	Weight lb/ft	Min. ID inch mm	Max. ID inch mm	OD inch mm	ID inch mm	End Connection Specification
5 1/2 139.7	20-23	4.625 117.48	4.778 121.36	4.500 114.30	2.441 62.00	2 7/8 EU 8RD
	17-20	4.778 121.36	4.892 124.26	4.641 177.88		
	13-15.5	4.950 125.73	5.190 131.83	4.781 121.44		
5 3/4 146.05	22.5	4.893 124.83	5.044 128.12	4.781 121.44		
6 152.4	26					
6 5/8 168.3	20	5.989 152.12	6.094 154.79	5.812 147.62	2.992 75.997	3 1/2 EU 8RD
	17	6.136 155.85	6.276 159.41	5.968 151.59		
7 177.80	32-35	5.989 152.12	6.094 154.79	5.812 147.62		
	26-29	6.136 155.85	6.276 159.41	5.968 151.59		
	20-26	6.276 159.41	6.456 163.98	6.078 154.38		
	17-20	6.456 163.98	6.578 167.08	6.266 159.16		
7 5/8 193.7	33.7-39	6.579 167.11	6.765 171.83	6.453 163.91		
	24-29.7	6.766 171.86	7.025 178.44	6.672 169.47		
	20-24	7.025 178.44	7.125 180.98	6.812 173.02		

MECHANICAL SET PRODUCTION PACKER

MODEL: WC-MECH-4

PRODUCT No.: WC-20907

This is a mechanical set double grip retrievable production packer for medium to high Pressure applications.

The Packer allows unrestricted flow and passage of full gauge wire line tools and accessories with an unrestricted ID, making it ideal for zone isolation injection and production applications.

It can be set with production tubing in tension, compression or neutral maximizing effectiveness in shallow wells or fiberglass tubing operation.

The packer's mechanical lock-set action closes an internal bypass and allows application of pressure above or below the packer.

The packer is released by a ¼ right-hand turn at the tool, followed by straight pickup of the production tubing.

Optional emergency release feature is also available on request.

Features/Benefits:

- Pressure differential rating up to 6,000 psi.
- 10,000 psi., Differential rating packer is also available.
- Allows tubing to be left in tension, compression or neutral.
- Internal By-Pass allows packer to equalize prior to releasing.
- An ideal production packer.
- Withstands pressure differentials from above and below.
- Ideal packer for Production, Stimulation & Injection purposes.
- Tubing can be recovered leaving packer down hole by using an On-Off tool.

Applications:

- Onshore-Offshore work over. Production and completion.
- High Pressure Water Injection.
- Casing integrity Testing & treating operations.

Specification Guide:

Casing				Packer		
Size	Weight	Min. ID	Max. ID	Max. OD	Min. ID	End Connection specification
inch mm	lb/ft	inch mm	inch mm	inch mm	inch mm	
4 1/2 114.3	9.5 - 13.5	3.920 99.56	4.090 103.88	3.765 95.6	1.933 49.10	1.900 EU 10RD
5 1/2 139.7	14 - 20	4.778 121.36	5.012 127.30	4.500 114.30	1.93 50.30	2 3/8 EU 8RD
6 5/8	17-24	5.921 150.39	6.135 155.83	5.766 146.46	2.441 62.00	2 7/8 EU 8RD
7 177.8	20 - 26	6.276 159.41	6.456 163.98	6.078 154.38		
9 5/8 244.4	43.5 - 53.5	8.535 216.78	8.755 222.37	8.250 209.55	2.990 75.94	3 1/2 EU 8RD
10 3/4	32.75-45.5	9.950 252.73	10.192 258.88	9.687 246.05	3.894 98.91	4 1/2 EU 8RD

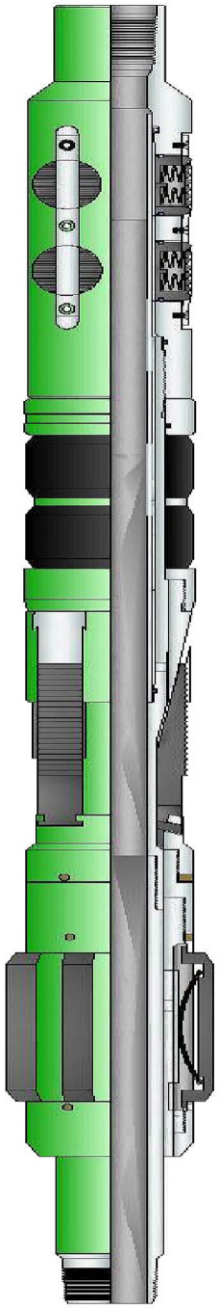
RETRIEVABLE MECHANICAL SET SQUEEZE PACKER

MODEL: WC-RMSP

PRODUCT No.: WC-21002

Packer is a full-opening, hook wall packer used for testing, treating, and squeeze cementing operations. In most cases, the tool runs with a circulating valve assembly.

Packer body includes a J-slot mechanism, mechanical slips, packer elements and hydraulic slips. Large, heavy-duty slips in the hydraulic hold down mechanism help prevent the tool from being pumped up the hole. Drag blocks operate the J-slot mechanism on packer bodies. Automatic J-slot sleeves are standard equipment on all packer bodies. Circulating valve, if used, is a locked-open/locked-closed type that serves as both a circulating valve and bypass. Valve automatically locks in the closed position when the packer sets. During testing or squeezing operations, the lock prevents the valve from being pumped open. A straight J-slot in the locked-open position matches with a straight J-slot (optional) in the packer body. This combination eliminates the need to turn the tubing to close the circulating valve or reset the packer after the tubing has been displaced with cement.



Features and Benefits:

- The full-opening design of the packer mandrel bore allows large volumes of fluid to pump through the tool. Tubing-type guns and other wire-line tools can be run through the packer.
- The packer can be set and relocated as many times as necessary with simple tubing manipulation.
- Bi-directional carburized slips provide greater holding ability and improved wear resistance in high-strength casing.
- Pressure through the tubing activates the slips in the hydraulic hold down mechanism.
- An optional integral circulating valve locks into open or closed position during squeezing or treating operations and opens easily to allow circulation above the packer.

Specification Guide:

Casing				Packer		
Size inch mm	Weight lb/ft	Min. ID inch mm	Max. ID inch mm	Main Body OD inch mm	ID inch mm	End Connections
5 1/2 139.7	13-20	4.778 121.36	5.044 128.12	4.550 115.6	1.813 45.70	2 3/8 EU 8RD
	20-23	4.670 118.62	4.778 121.36	4.380 111.3		2 7/8 EU 8RD
	23-26	4.494 114.15	4.670 118.6)	4.250 107.9	1.900 48.30	2 7/8 EU 8RD
5 3/4 146.05	14-18	5.100 129.54	5.365 136.27	4.890 124.2	1.900 48.30	2 7/8 EU 8RD
7 177.8	17-38	5.920 150.37	6.538 166.07	5.650 143.5	2.370 60.2	2 7/8 IF, 2 7/8 EU 8RD
	49.5	5.540 140.72	5.920 150.37	5.250 133.4	2.000 50.80	2 7/8 EU 8RD
9 5/8 244.5	29.3-53.5	8.535 216.79	9.063 230.20	8.150 207.0	3.750 9.430	4 1/2 API IFTJ

WC-MECH-6

WC-MECH-6H

SNAP SET COMPRESSION PACKER WITH & WITHOUT HOLD DOWN

MODEL: WC-MECH-6H & WC-MECH-6
PRODUCT No.: WC-20909 & WC-20910

Snap Set Compression Packer with& without hold down are retrievable set down packers featuring a bypass area through the packer and an integral unloaded. They are used as an upper packer in a single string two packer installation, for zone isolation, injection or production.

Packers are used above either retainer production packers or retrievable packers.

Features/Benefits:

- Proven multiple packing element system.
- Operation of the packer is simple. No tubing rotation is required.
- A collet-type snap-latch prevents the packer from setting before landing the seal assembly or before setting a lower retrievable packer. Lower portion of the tool is rotationally locked to deliver torque in either direction through the packer.

Applications:

- Onshore-Offshore work over.
- Production completion.
- High Pressure Water Injection.
- Casing integrity Testing & treating operations

Specification Guide:

Casing				Packer		
Size	Weight	Min. ID	Max. ID	Max. OD	Min. ID	End Connection
inch mm	Lb/ft	inch mm	inch mm	inch mm	inch mm	
5 1/2 139.7	14-20	4.778 121.36	5.012 127.30	4.500 114.30	1.995 50.67	2 3/8 EU 8RD
7 177.8	20-26	6.276 159.41	6.456 163.98	5.875 149.22	2.995 75.997	2 7/8 EU 8RD
9 5/8 244.4	43.5-53.5	8.535 216.78	8.755 222.37	8.250 209.55	2.992 75.997	3 1/2 EU 8RD

TENSION SET PACKER

MODEL: WC-TP

PRODUCT No.: WC-20904

Tension packer is compact, economical retrievable packer, primarily used in water flood applications. It is also used for production or treating operations. It is used where a set down packer is critical. As a tension set, it is ideally suited for shallow wells where set down weight is not available.

Features/Benefits:

- Compact
- J-slot control for normal set and release
- Shear pin secondary release
- Right-hand emergency release
- Separate drag block
- Inexpensive
- Parts are interchangeable with other manufacturers

Applications:

- Water flood, shallow or low fluid level wells with insufficient tubing weight to set compression packers.
- Onshore-Offshore work over.
- Production completion.
- High Pressure Water Injection.
- Casing integrity Testing & treating operations

COMPRESSION SET RERIEVABLE PACKER

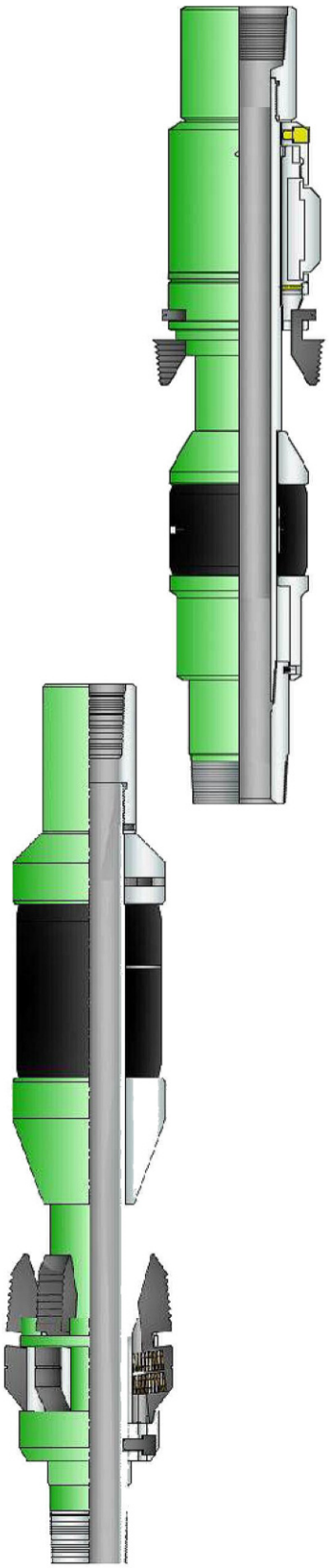
MODEL: WC-GCP

PRODUCT No.: WC-20914

This is a compact, economical set-down Retrievable Casing Packer that can be used by itself for production applications or, with a companion un loader and hold-down, it can be used for well stimulation, testing and other pressuring operations and then left in the well as a production packer.

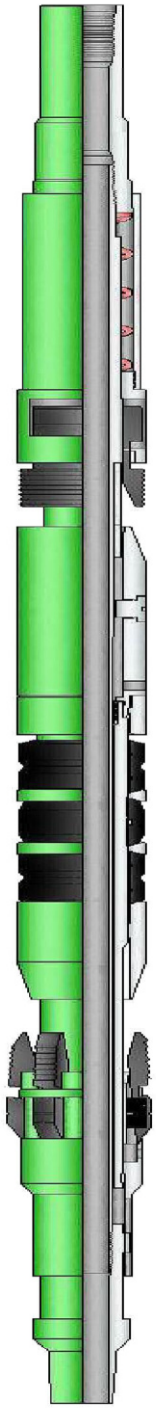
Features / Benefits

- Short And Compact
- Large bore permits passage of recording instruments.
- Cost Economical.
- Alternate Packing Element System For different temperatures.
- Simple Construction
- Ease Of Operation - A simple and reliable J- Slot mechanism, actuated from the surface, makes the Model WC-GCP Retrievable Casing Packer very easy to set and release.



Specification Guide:

Casing		Packer Size	Preferred Range Of Casing ID's		Cone & Guide Ring OD	Packing Element OD	Absolute Limits Of Slip Travel		End Connection	
OD	Weight lb/ft		Min	Max			Min	Max	Box Up	Pin Down
4-1/2	9.5-13.5	43A	3.910	4.090	3.771	3.718	3.709	4.091	2-3/8 OD EU 8 Rd	2-3/8 OD EU 8 Rd
5	15-18	43B	4.250	4.408	4.125	3.938	4.103	4.409		
5	11.5-15	43C	4.408	4.560	4.250	4.156	4.255	4.561		
5-1/2	26									
5-1/2	20-23	45A2	4.625	4.778	4.500					
5-1/2	15.5-20	45A4	4.778	4.950	4.641	4.375	4.543	4.966		
5-1/2	13-15.5	45B	4.950	5.190	4.781	4.687	4.825	5.248		
5-3/4	22.5									
6	26									
6	20-23	45C	5.191	5.390	5.062	4.938	5.059	5.482		
6	15-18	45D	5.391	5.560	5.156		5.197	5.620		
6-5/8	34	45E2	5.561	5.595	5.406	5.250	5.449	5.872		
6-5/8	28-32	45E4	5.596	5.791	5.484					
6-5/8	17-20	47-B2 x 3.00	6.049	6.276	5.812	5.656	5.911	6.400	3-1/2 OD EU 8 Rd	3-1/2 OD EU 8 Rd
6-5/8	28-32	46A2	5.600	5.791	5.475	5.375	5.473	6.013	2-7/8 OD EU 8 Rd	2-7/8 OD EU 8 Rd
6-5/8	24-28	46A4	5.792	5.921	5.588					
6-5/8	17-20	46B	5.922	6.135	5.781	5.500	5.707	6.247		
6-5/8	24	47A2	5.830	5.921	5.656	5.500	5.653	6.262		
6-5/8	17-20	47A4	5.922	6.135	5.812					
7	32-35									
7	26-29	47B2	6.136	6.276	5.968	5.781	5.919	6.528		
7	20-26	47B4	6.276	6.456	6.078					
7	17-20	47C2	6.456	6.538	6.266	6.125	6.357	6.966		
7-5/8	33.7-39	47C4	6.539	6.765	6.453					
7-5/8	24-29.7	47D2	6.766	7.025	6.672	6.500	6.607	7.216		
7-5/8	20-24	47D4	7.025	7.125	6.812					
8-5/8	40-49	49A2	7.511	7.725	7.312	6.938	7.300	8.059	3-1/2 OD EU 8 Rd	3-1/2 OD EU 8 Rd
8-5/8	32-40	49A4	7.725	7.921	7.531					
8-5/8	20-28	49B	7.922	8.191	7.781	7.500	7.798	8.369		
9-5/8	47-53.5	51A2	8.300	8.681	8.218	7.938	8.051	8.934	4-1/2 OD 8 Rd Long Csg	4-1/2 OD 8 Rd Short Csg
9-5/8	40-47	51A4	8.681	8.835	8.437					
9-5/8	29.3-36	51B	8.836	9.063	8.593	8.312	8.548	9.244		
10-3/4	32.7-55.5	53A	9.625	10.192	9.500	9.250	9.548	10.192		
11-3/4	38-60	53B	10.605	11.200	10.500	10.000	10.503	11.263		
12-3/4	43-53	55A	11.750	12.300	11.625	10.875	11.675	12.435		
13-3/8	48-72	55B	12.300	12.715	12.000	11.687	12.173	12.745		



10K MECHANICAL SET PRODUCTION PACKER

MODEL: WC-MECH-10

PRODUCT No.: WC-21001

MECH-10, Mechanical Set Production Packer is a high performance Full Bore Single String Retrievable Packer. It is specifically designed to perform reliably in high pressure fracturing and production applications. It is compression set and can be landed in compression, tension, or a neutral condition.

It is available reliable performance in a retrievable packer under combined conditions of 350°F and 10,000 psi differential above or below the packer.

Features/Benefits:

- Ease of operation - 1/4 turn to right to set, 1/4 turn to right to release
- High performance three-piece element system for high pressure sealing and pressure reversal loads
- Independent lower and upper Jay Assemblies contributing to short, compact design
- Tubing can be landed in tension, compression or neutral
- Full opening ID for stimulation and thru-tubing perforating
- Built in un-loader with bonded seal for bypass
- Bypass opens before release of upper slips for safety and ease of release, Staged loading of upper slips for ease of release
- Solid upper slip cone for added strength and elimination of release sleeve, Reliable and rugged rocker type lower slip assembly

CASING		PACKER		
Size inch mm	Weight lb/ft	Max OD inch mm	Min ID inch mm	End Connection Specification
4-1/2 114.3	15.1	3.650 92.71	1.995 50.67	2-3/8 EU 8RD
	11.6 ~ 13.5	3.750 95.25		
5 127.0	21.4~23.2	3.880 98.55		
	15-18	4.100 104.14		
5-1/2 139.7	20-23	4.500 114.30	2.441 62.00	2-7/8 EU 8RD
	17-20	4.600 116.84		
	15.5-17	4.720 119.89		
7 177.8	29-32	5.910 150.11		
	26-29	6.000 152.40		
	23-26	6.080 154.43		
	20-23	6.180 156.97		
7-5/8 193.7	45.3-47.1			

MECHANICAL TENSION / COMPRESSION SET PACKER

MODEL: WC-MECH-13

PRODUCT No.: WC-21014

Mech-13 is an injection packer designed specifically for injection wells. It is a double grip tool, which utilizes upper slip releasing system that makes so successful.

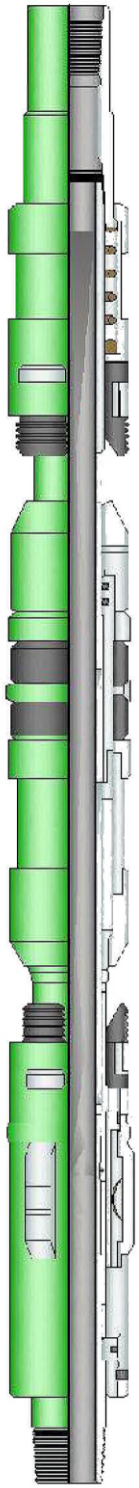
Effectively meets several requirements for zone isolation, injection, pumping and production. The packer is ideal for completions where periodic casing integrity tests are required.

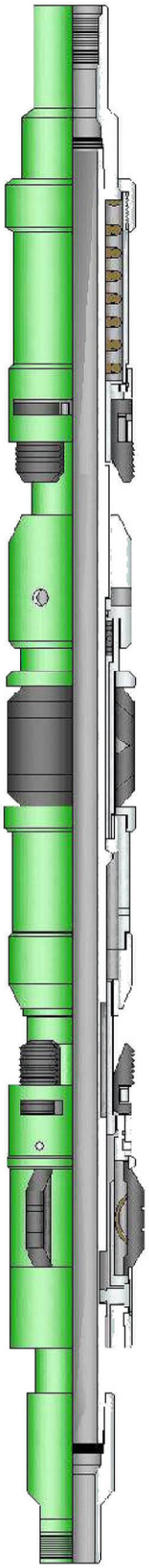
Our Model WC-TS10 On-Off Tool can be run above the MECH-13 making it ideal for use with fiberglass tubing. With the proper selection of metallurgy and/or coatings the MECH-13 can be used to inject or produce any corrosive fluids.

Features/Benefits:

- Holds pressure differentials from above or below
- Only 1/4 right rotation to set and release
- Can be left in neutral, compression or tension
- Field proven releasing system
- Variable safety shear release
- Versatility of design for most injection needs
- Can be set using tension or compression
- Available with CO_2 and thermal trim

CASING		PACKER		
Size inch mm	Weight lb/ft	Max. OD inch mm	Min. ID inch mm	End Connection Specification
4-1/2 114.3	9.5~13.5	3.750	1.995 50.7	2 3/8 EU 8RD
5 127.0	11.5~18.0	4.125 104.8		
5-1/2 139.7	14~17	4.625 117.5		
	20~23	4.500 114.3	2.441 62.0	2 7/8 EU 8RD
6 5/8 168.3	24~32	5.500 139.7		
	17~24	5.750 146.1		
7 177.8	17~26	6.000 152.4	2.992 76.0	3 1/2 EU 8RD





MECHANICAL THERMAL PACKER

MODEL: WC-MTP

PRODUCT No.: WC-21015

MTP, thermal packer is designed for steam injection/production wells. It is a double grip tool, which utilizes the upper slip releasing system.

The WC-MTP simple 1/4 turn, right-hand rotation to operate eliminates the need for tedious torque which may damage the tubing. After rotating 1/4 turn to the right, the WC-MTP is set with tension. It used for steam injection/production wells.

An internal by-pass reduces the swabbing effect during run-in and retrieving. The by-pass closes upon setting the packer. During releasing, the by-pass opens allowing the pressure to equalize.

Features/Benefits:

- Holds pressure differential from above and below
- Only 1/4 turn rotation required for operation
- Choice of packing systems
- Field proven releasing system
- Variable shear safety release
- An internal by-pass reduces the swabbing effect during running and retrieving.
- One piece mandrel through packer.

Specification Guide:

CASING		PACKER		
Size inch mm	Weight lb/ft	Max. OD inch mm	Min. ID inch mm	End Connection Specification
5-1/2 139.7	13~17	4.724 120.0	1.995 50.7	2-3/8 EU 8RD
7 177.8	17~26	6.079 154.4	2.441 62.0	2-7/8 EU 8RD
	23~29	6.000 152.4		

SWAB CUP PACKER

MODEL: WC-SP
PRODUCT No.: WC-21101

Swab Cup Packer is an economical means of isolating casing leaks and depleted zones. It is also a production or injection packer for low pressure application. This packer can be run with cups opposed or in the same direction with packing element back-up rings for higher pressure application and comes in a full range of tubing and casing sizes in two-cup or four-cup models.

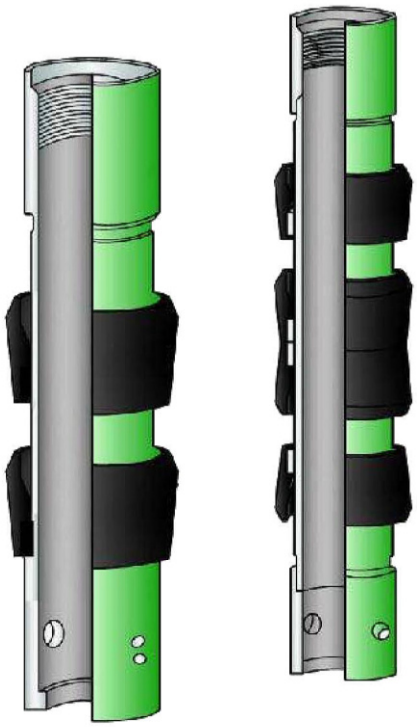
Features/Benefits:

- Economic design
- Cup direction option
- Tubing size options

GAS VENT PUMPING PACKER

MODEL: WC-GVP
PRODUCT No.:WC-21102

Gas Vent Pumping Packer offers an inexpensive option for isolating casing leaks or depleted perforations in pumping wells. This tools prevents gas lock by allowing gas to vent to the surface past damaged zones. The interval between top and bottom cups can be of required lengths. Available with double or multiple cups.



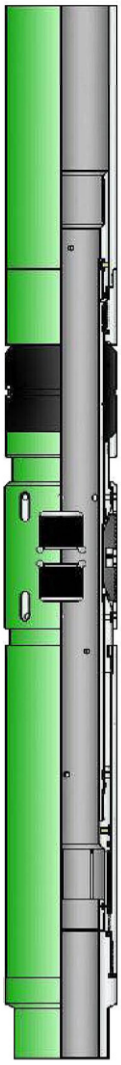
Features/Benefits:

- Inexpensive alternative to squeeze job.
- Variable intervals easily adjusted.
- Optional double to multiple cups.

Specification Guide:

Casing		Tubing Size inch	Liner Thread Connection Size inch	Packer	
Size inch mm	Weight lb/ft			Max. OD inch mm	Min. ID inch mm
4 1/2 114.3	9.5-13.5	2 3/8	3" LINE PIPE	3.813 96.85	2.690
5 1/2 139.7	13-20	2 3/8	3" LINE PIPE	4.000 101.60	2.750
		2 7/8	3 1/2" LINE PIPE	4.625 117.48	3.125
7 177.8	20-29	2 7/8	4 1/2" LTC	5.000 127.0	3.125

WC-WSRP-1



WC-WSRP

WIRE LINE SET RETRIEVABLE SEAL BORE PACKER

MODEL: WC-WSRP [Single Bore]&WC-WSRP-1[Double Bore]
PRODUCT No.: WC-20801&WC-20805

Wire Line Set Retrievable Seal Bore Packer is a Retrievable Packer which is hydraulically set by pressure in the production tubing. It is particularly suitable for **Extended Reach Drilling (ERD)** Wells. These are set by using a Hydraulic Setting Tool with the combination of appropriate Wireline Adapter Kit. With the aid of exact Retrieving Tool these packer are released by shear ring mechanism. Once set does not require string weight or tension to remain anchored. Bidirectional slips prevent any movement of the tool. The packer is retrieved by a straight pull shear ring release mechanism making use of our WC-RT retrieving tool.

These packers are available with dual seal bore feature for facilitating easy anchor tools as our Model: WC-WSRP-1.

Features/Benefits:

- Run and set with the production tubing.
- Hydraulic setting eliminates the requirements for spacing out and the use of sliding sleeves. (Opening and closing) for the displacement of fluids.
- Effects on the tubing (compression and tension) are transmitted to slips-there is no shear ring which limits these stress.
- Retrieval independent of tubing with a Retrieving Tool. It can be left at the bottom of the well with a Wireline plug in a nipple to isolate the formation.
- Opposed slips positioned under the packing to avoid setting. Problems with retrieval due to annulus.
- Available for standard, H_2S or CO_2 services [NACEMR 01-75].

Applications:

This Packer can be used as a simple/Single or oil production wells or in water or gas injection wells.

The stresses created on the tubing are contained by it and therefore upper joint of the tubing must be checked to see that it can stand these stresses.

Specification Guide:

CASING		SIZE	Lower Seal Bore	Upper Seal Bore	Max. OD	ID Thru Seals	Accessories Size
Size	WEIGHT						
inch	lb/ft		inch	inch	inch	inch	
5 1/2	17-20	2 7/8" X5 1/2"	2.688	4.000	4.567	1.995	40- 26
7	26-29	2 7/8" X 7"	3.250	5.125	5.955	2.406	80-32
	32-35				5.810		
	26-29	3-1/2" X 7"	4.000		5.955	2.992	80-40
	32-35				5.810		
9-5/8	40-47	3-1/2" X 9 5/8"	4.000	5.500	8.425	2.992	80-40
		4-1/2" X 9 5/8"	4.750			3.000	190-47
			4.875			4.000	190- 48
	43.5-53.5	3-1/2" X 9 5/8"	4.000		8.335	2.992	190-40
		4-1/2" X 9 5/8"	4.750			3.000	190-47
			4.875			4.000	190-48

HYDRAULIC SET SEAL BORE RETRIEVABLE PACKER

MODEL: WC-HSSRP [Single Bore] & WC-HDSRP [Dual Bore]

PRODUCT No.: WC-20114 & WC-20108

The packer is a hydraulic set, high performance, seal bore retrievable production packer. Although originally designed for premium gravel pack applications, they may also be used as standard completion packers in high pressure and high temperature wells where premium retrievable retainer production packers are required.

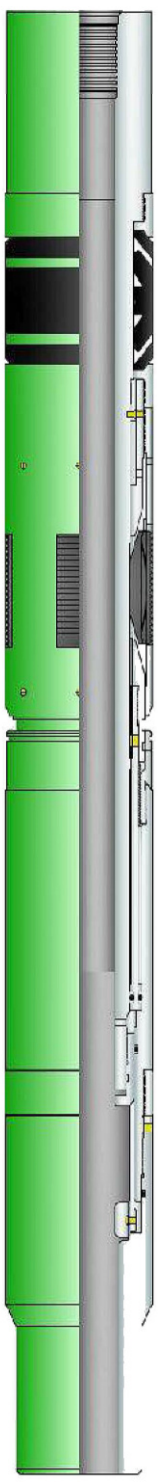
This packer is fully compatible with standard sealing accessories including retrievable and expandable plugs.

Features/Benefits:

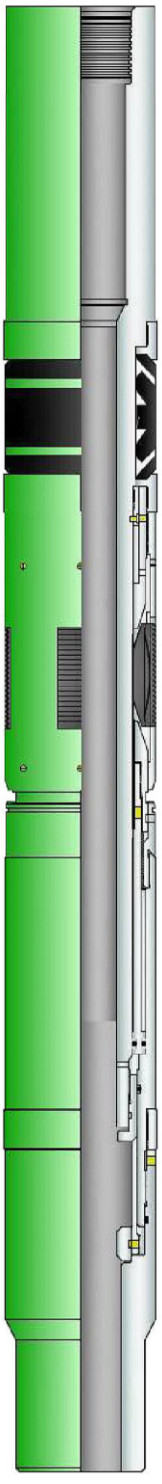
- One trip installation
- No tubing manipulation required, the setting mechanism is actuated hydraulically with pump pressure alone at any depth. The tubing can be displaced and the packer set after the well is flanged up.
- Single, self energizing cup forming packing element for repeated low and high differential reversals. Nitrile packing elements are standard.
- Bi-directional, case hardened slips are suitable for all grades of casing. The slips are protected by the slip cage during run in.
- Packers may be run in tandem with anchor tubing seal nipple
- A left hand thread is provided in the body head of the packer. This accepts standard packer accessories and also provides a means of positioning the retrieving tool.
- The releasing mechanism for the packer is not affected by the differential pressure of tail pipe weight.
- Short overall length facilitating easy running/retrieving through doglegs and tight spots.

Specification Guide:

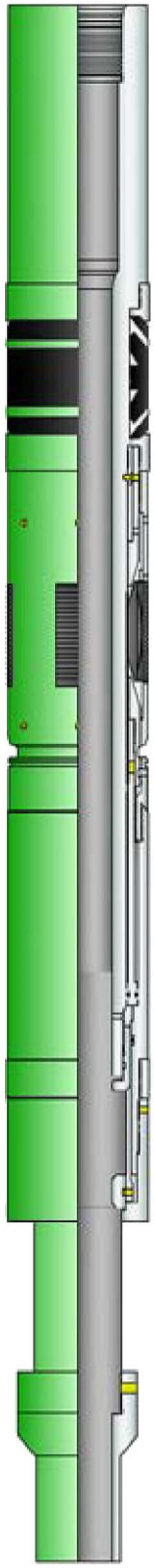
Casing				Packer			
Size	Weight	Min. ID	Max.ID	Max. OD	Lower Bore	Upper Bore	Min. Bore Thru Seal
inch mm	lb/ft	inch	inch	inch	inch	inch	inch
7 117.8	29-35	6.004	6.184	5.812	3.250	4.000	3.250
	23-29	6.184	6.366	6.000	3.875 or 4.000	4.750	3.875 or 4.000
9 5/8 244.5	47-53.5	8.379	8.681	8.319			
	40-47	8.525	8.835	8.465	4.750	6.000	4.750



WC-HSSRP



WC-HDSRP



HYDRAULIC SET SEAL BORE RETRIEVABLE PACKER

Model: WC-HSSRP-2 [PBR]

Product No.: WC-20115

This packer is a fully retrievable, high performance retainer production packer.

Although originally designed for premium gravel pack applications, it may also be used as standard completion packer in high pressure and/or high temperature wells where premium retrievable retainer production packer is required.

The packer is fully compatible with standard WELLCARE sealing accessories including retrievable and or expandable plugs.

This has the advantage over Model: WC-HSSRP Packer since it has benefit of a Shear Ring provided in the Body of the Packer enabling the Packer to be retrieved by straight pull using a Retrieving Tool of short length.

Features/Benefits:

- One trip installation.
- No tubing manipulation required. The setting mechanism is actuated hydraulically with pump pressure alone at any depth, and The tubing can be displaced and the packer set after the well is flanged up.
- Single, self-energizing cup-forming packing element for repeated low and high differential reversals. Nitrile packing elements are standard.
- Bi-directional, case hardened slips are suitable for all grades of casing. The slips are protected by the slip cage during run-in.
- Tubing may be run with Locator Tubing Seal Assembly pinned in WC-HSSRP-2 (Packer Bore Receptacle). WC-HSSRP-2 will be connected to Packer through Anchor Tubing Seal Nipple.
- Packers may be run with Anchor Tubing Seal Nipple above the Packer.
- A left hand thread is provided in the body head of the packer. This accepts standard packer accessories and also provides a means of positioning the retrieving tool.
- Packer is design for Straight Pull retrievable applications
- Short overall length facilitating easy running/retrieving through doglegs and tight spots.
- Short length of Retrieving Tool required to retrieve the Packer.

Casing				Packer			
Size	Weight	Min. ID	Max.ID	Max. OD	Lower Bore	Upper Bore	Min. Bore Thru Seal
inch	lb/ft	inch	inch	inch	inch	inch	inch
7	29-35	5.879	6.189	5.812	3.250	4.000	3.250
	23-29	6.184	6.366	6.000	3.875 4.000	4.750	3.875 4.000
9 5/8	47-53.5	8.379	8.681	8.319			
	40-47	8.525	8.835	8.465	4.750	6.000	4.750

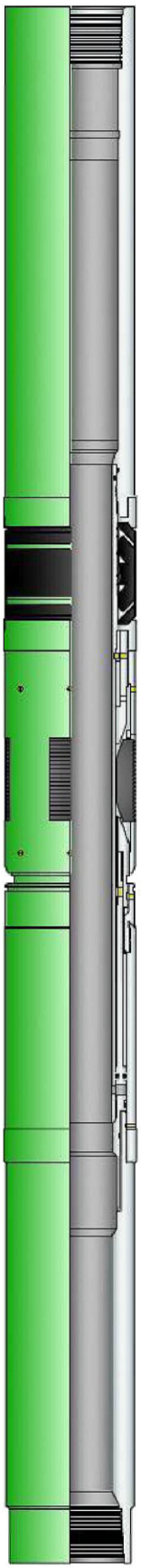
HYDRAULIC SET HIGH PERFORMANCE SEAL BORE RETRIEVABLE & DRILLABLE PACKER

MODEL: WC-HSSRP-3

PRODUCT NO.: WC-20116

This production packers are high performance, hydraulic-set, retrievable seal bore packers for medium to high-pressure production and testing applications. These rugged, dependable packers can be retrieved with tubing or drill pipe and the retrieving tool. These packers feature a large upper seal bore that maximizes the ID of the completion to optimize well access.

The packers are available in most oilfield material specifications—from alloy steel to corrosion-resistant alloy (CRA) materials—that are suitable for hydrogen sulfide (H_2S) service.



Features/Benefits:

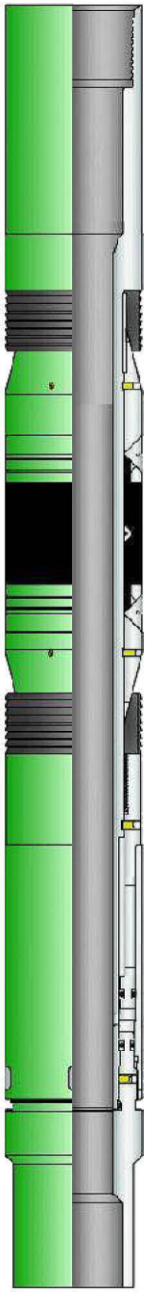
- Setting cylinder below the element reduces leak paths to maximize completion integrity.
- Packers are easily retrieved for well intervention operations using the retrieving tool.
- An O-ring pressure-test kit is available to enable shop-testing of packer assemblies, ensuring their integrity before shipment offshore and thereby reducing the risk of nonproductive time.
- Rotationally locked components facilitate deployment by enabling rotation into liner tops and horizontal sections and by facilitating milling.
- One-trip installation saves rig time.
- Hydraulic setting capability eliminates the need for tubing manipulation and allows packer to be set after wellhead is flanged up, expediting installation of the completion.
- Alternative materials and connections are available

Applications:

- One-trip applications on land or offshore
- Deviated and horizontal wells
- Running with tubing-conveyed perforating (TCP) guns suspended below the packer
- High-pressure, high-flow applications
- Applications in which tubing movement may be encountered

Specification Guide:

Casing				Packer			
OD	Weight	Min. ID	Max. ID	Max. OD	Lower Bore	Upper Bore	Bottom Thread Connection
inch mm	lb/ft	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm
7	23-32	6.094 154.79	6.366 161.70	5.938 150.83	3.875 98.43	4.750 120.65	4 1/2, 12.6 lb NEW VAM
	29-35	6.004 152.50	6.184 157.07	5.813 147.65	3.250 82.55	4.000 101.60	3 1/2, 9.2 lb NEW VAM
7 5/8	24-29.7	6.875 174.63	7.025 178.44	6.688 169.88	3.875 98.43	4.750 120.65	5 1/2, 17 lb NEW VAM
9 5/8	32.3-43.5	8.775 222.89	9.001 228.63	8.440 214.38	6.000 152.40	-	5 1/2, 15.5 lb NEW VAM
	47-53.5	8.535 216.79	8.681 220.50	8.319 211.30			5 1/2, 23 lb NEW VAM



WC-HSDDP

WC-HSSDP

HYDRAULIC SET SEAL BORE DRILLABLE PACKER

MODEL: WC-HSSDP [Single Bore] & WC-HSDDP [Double Bore]
PRODUCT No.: WC-20401 & WC-20402

These are hydraulic set permanent drillable packers. They have an enlarged seal bore to accept seal assemblies. In double bore the packer has an upper larger seal bore for anchor tools or seal accessories to be latched and sealed.
The range and combination of bore sizes are designed such that all the accessories are commonly used for both the series of packers.

A large bore version of single bore packer [Model: WC-HSDDPL] are made in sizes so as to use the same range of accessories of above packers. They have a lower pressure rating because of the increased bore size.
The hydraulic setting mechanism makes the packers suitable for use in highly deviated or horizontal wells.
Manufactured from special alloy grade material components, enables the packers to be used in a wide range of operating conditions.

Features/Benefits:

- Solid, slim lined construction and a packing element system which resists swab-off. This permits a fast run-in (when compared with earlier models of permanent packers) without fear of impact damage or premature setting, yet packs off securely and permanently when the packer is set.
- Two opposed sets of full circle; full strength slips ensure that the packer will stay where it is set.
- Interlocked expandable metal back-up rings contact the casing and create a positive barrier to packing element extrusion.
- Setting requires no rotation or reciprocation, thereby eliminating the problems of spacing out, landing etc.
- Packers run with Anchor Seal Nipples.
- O-Rings are supported by back-up rings to better life seal integrity.
- Packers are rated up to 10,000 psi pressure differentials.
- Guides are furnished as per standard, to attach mill-out extensions; seal bore extensions or other equipment below the packer.
- All alloy materials within the packer are suitable for H_2S service.
- Body & Guide (components in flow paths) can be furnished in customer's choice of material.
- Fluid displacement is possible after well is flanged up and prior to setting the packer.
- Setting sequence of packer may be controlled to start at 1,500 psi.

Specification Guide:

Casing				Packer		Packer Sealing Bore					
						Upper			Lower		
SIZE	Weight	Min. ID	Max. ID	Size	OD	Seal Bore	Seal Assembly Size	Min. Bore Thru Seal	Seal Bore	Seal Assembly size	Min. Bore Thru Seal
in mm	Lb/Ft.	in mm	in mm)		in mm	in mm		in mm	in mm		in mm
5 (127.0)	15-21	4.125 (104.8)	4.436 (112.7)	32 30X19	3.968 (100.8)	3.000 (76.2)	20-30	2.390 (60.7)	1.968 (50.0)	20-19	1.000 (25.4)
										21-19	1.312 (33.3)
5 ½ (139.7)	13-17	4.812 (122.2)	5.044 (128.1)	44 32X25	4.500 (114.3)	3.250 (82.6)	40-32	2.500 (63.5)	2.500 (63.5)	20-25	1.875 (47.6)
6 5/8 (168.3)	17-32	5.675 (144.1)	6.135 (155.8)	82 40X32	5.468 (138.9)	4.000 (101.6)	80-40	3.250 (82.6)	3.250 (82.6)	80-32	2.406 (61.1)
	17-20	6.049 (153.6)	6.456 (164.0)	84 40X32	5.687 (144.4)						
7 (177.8)	32-44	5.675 (144.1)	6.135 (155.8)	82 40X32	5.468 (138.9)						
	20-35	6.049 (153.6)	6.456 (164.0)	84 40X32	5.687 (144.4)						
7 5/8 (193.7)	17-20	6.456 (164.0)	6.765 (171.8	88 40X32	6.187 (157.1)						
	33.7-39										
	24-39	6.625 (168.3)	7.025 (178.4)	92 40X32	6.375 (161.9)						
8 5/8 (219.8)	24-36	7.812 (198.4)	8.150 (207.0)	128 47X40	7.500 (190.5)	4.750 (120.6)	81-47	3.875 (98.4)	4.000 (101.6)	80/120-40	3.000 (76.2)
9 5/8 (244.4)	32.3-58.4	8.435 (214.2)	9.001 (228.6)	194 60X47	8.125 (206.4)	6.000 (152.4)	190-60	4.875 (123.8)	4.750 (120.6)	191-47	2.500 (63.5)
										190-47	3.000 (76.2)
							192-60	4.750 (120.6)		192-47	3.875 (98.4)
9 5/8 (244.4)	32.3-58.4	8.435 (214.2)	9.001 (228.6)	194 47X40	8.125 (206.4)	4.750 (120.6)	192-47	3.875 (98.425)	4.000 (101.6)	190-40	3.000 (76.20)

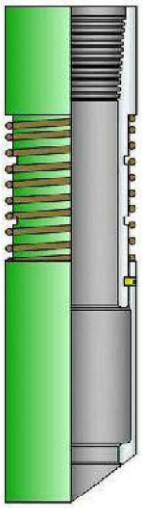
AUTO ORIENTING BOTTOM SUB WITH HALF MULE SHOE

MODEL: WC-BSWH-A

PRODUCT No.: WC-21704

The bottom sub of LTSA is provided with double-start helical groove and two Guide Pins. Half Mule Shoe as shown in the accompanying illustration.

The double start helix provides for uniform self orienting action of the Half Mule Shoe to permit easy entry in the Packer bore.



HYDRAULIC SETTING TOOL

MODEL: WC-HST

PRODUCT No.: WC-21201

The Hydraulic Setting Tool, a hydraulic force-pull combination setting tool, is designed for setting packers, bridge plus and cement retainer in wells. It is used to set products for which there is a Wireline Adapter Kit compatible with the Size 10 or 20 Wire-line Pressure Setting Assembly on tubing or drill pipe string. The Hydraulic Setting Tool will automatically release from the tool when sufficient force is applied.

Features/Benefits:

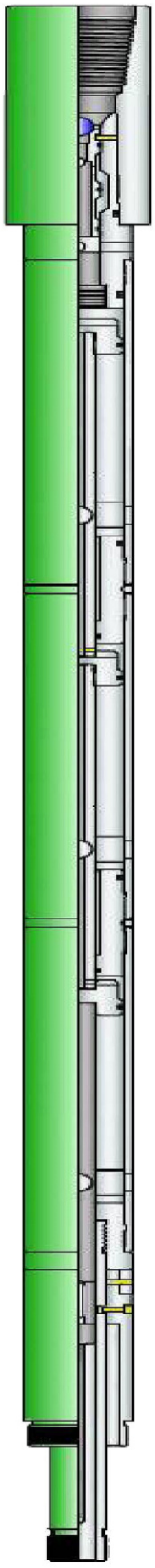
- Tubing conveyed
- Can push tools to bottom in deep or deviated wells
- Tubing will fill and drain automatically
- Setting Tool can be tested from above after setting the packer
- Also permit circulation through the Setting tool at any time
- Premature setting is prevented by means of a shear screw in the cross link sleeve.
- Setting pressure may be adjusted by varying the number of shear pins

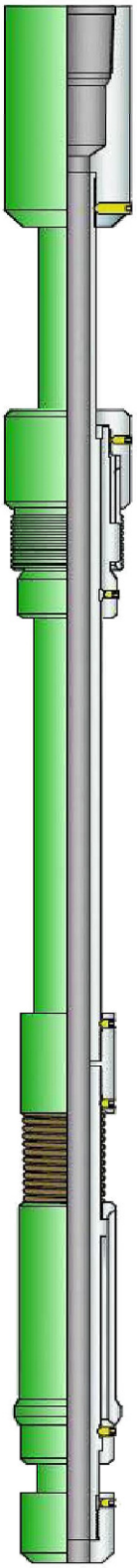
Application:

Particularly useful for setting packers in deviated wells or wells where it is difficult to get down hole with a wire line set packer.

Specification Guide

Size	Max. OD inch mm	Thread Connection Box up
#10	2.750 69.58	2 7/8 IF
#20	3.313 84.15	3 1/2 IF





RETRIEVING TOOL

MODEL: WC-RT
PRODUCT No.: WC-21301

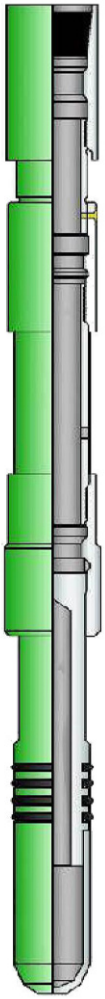
The Retrieving Tool is used to retrieve seal bore packers of various sizes & types as shown in specification guide.

Retrieving Tool runs to the exact depth to get engaged with the packer and set down force is applied. A set down force of 15,000 pounds is sufficient to fully latch the Retrieving Tool into the packer. At this point, the release collet is positioned directly below the support ring of the packer. Straight pull will engage the release collet and the support ring. Tension force is applied which will shear the screws in the support ring and shift it upward thus releasing the packer.

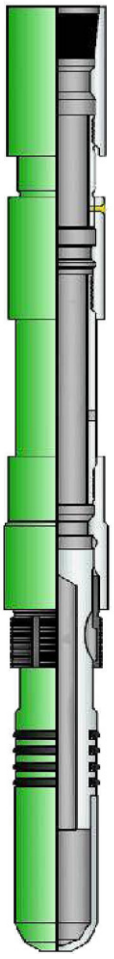
The retrieving tool may be released from the packer at any time by rotating the tubing to the right while holding with an up strain.

NOTE: All feasible distinct sizes of Retrieving Tool could be provided with specific grades of material and end connections; standard or premium thread, as per the customer's requirement.

WC-STNE



WC-LRTPP



WC-LHTPP

SETTING TOOL NIPPLE

MODEL: WC-STNE
PRODUCT NO.: WC-21801

Packer Setting Tool Nipple is attached to left hand square thread of the Packer by means of Setting Nut. Fluid Ports are positioned around the holes of the Packer Body so the pressure would be applied to set the Packer. These Fluid ports are sealed off within the Packer Bore by an O-ring below and Chevron Seal above. Setting Tool is released by rotating 15 turn of right hand rotation and picked up.

LOCATOR TYPE PACKER PLUG

MODEL: WC-LRTPP
PRODUCT NO.: WC-22401

Locator type packer plug is used to convert a model WC-WSSDP & WC-WLSDP retainer production packer that has been previously set, into a temporary bridge plug. It permits the performance of pressuring operation above the packer without affecting the zones below. It is attached with shear screws to a shear sub which is made up on the bottom of the work string or a retrievable squeeze tool. Set-down weight shears the screws and leaves the plug in the packer. It is retrieved with a conventional overshot.

LATCHING TYPE PACKER PLUG

MODEL: WC-LHTPP
PRODUCT NO.: WC-22402

Latching type packer plug is used for the same purpose and in the same way as the locator type but will hold pressure in both directions. It is run in the same way but is retrieved by holding a slight up strain and turning to the right 15 turns after engaging with a conventional overshot.

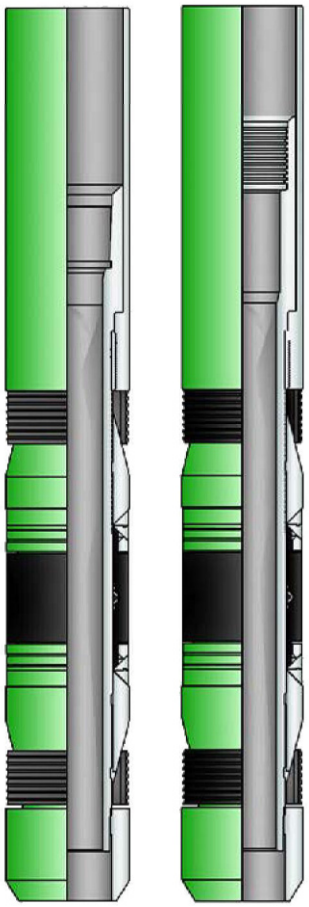
WIRE LINE SET SEALBORE DRILLABLE PACKER

MODEL: WC-WSSDP [Single Bore] & WC-WSDDP [Double Bore]
PRODUCT No.: WC-20501 & WC-20503

The Wire Line Set Drillable Packer is Permanent Production Packer is a high performance permanent production packer. It is frequently used as a high-performance squeeze or as a permanent or temporary bridge plug. The standard version of the Wire Line Set Drillable Permanent Production Packer has a 70 hard nitrile packing element and is rated at 10,000 psi differential pressure up to 300°F. For bottom hole temperatures between 200°F and 400°F, a 90 hard packing element should be specified.

Features/Benefits:

- Proven reliability
- Slim-lined
- Solid construction that makes possible a significant savings in rig time by providing a faster run-in without fear of impact damage or premature setting
- Two opposed sets of full-circle, full-strength slips
- A packing element that resists swab off but packs off securely when the packer is set
- A smooth, continuous ID sealing bore
- Unique Interlocked expandable metal back-up rings that contact the casing creating a positive packing element extrusion barrier



WC-WSSDP WC-WSDDP

Specification Guide:

Casing				Packer				Seal Assembly		
Size	Weight	Min. ID	Max. ID	Size	OD	Upper Seal Bore	Lower Seal Bore	Size	Min Bore Thru Seals	
inch mm	lb/ft	inch mm	inch mm		inch mm	inch mm	inch mm		inch	mm
5 127,00	15-21	4.125 104,78	4.436 112,67	32-26	3.968 100,79	3.000 76.20	2.688 68,28	40/80-26	1.968	49,99
								41/81-26	1.750	44,45
				32-25			2.500 63,50	20-25	1.875	47,37
				32-19		2.500 63.50	1.968 49,99	21-19	1.312	33,32
								20/40-19	0.984	24,99
	11.5-13	4.437 112,70	4.670 118,62	34-26	4.250 107,95	2.688 68,28	2.688 68,28	40/80-26	1.968	49,99
								41/81-26	1.750	44,45
				34-25		2.500 63,50	2.500 63,50	20-25	1.865	47,37
5-1/2 139,70	23-26			34-19		1.968 49,99	1.968 49,99	21-19	1.312	33,32
								20/40-19	.984	24,99
	20-23	4.625 117,48	4.811 122,20	42-26	4.328 109,93	2.688 68.28	2.688 68.28	40/80-26	1.968	49,99
								41/81-26	1.750	44,45
				42-19		1.968 49,99	1.968 49,99	21-19	1.312	33,32
								20/40-19	.984	24,99
	13-17	4.812 122,22	5.044 128,12	44-26	4.500 114,30	3.250 82.55	2.688 68,28	40/80-26	1.968	49,99
								41/81-26	1.750	44,45
				44-19		2.750 69.85	1.968 49,99	21-19	1.312	33,32
								20/40-19	0.984	24,99
7 177,80	38-49.5	5.540 140,71	5.921 150,39	81-32	5.350 135,89	4.000 104.80	3.250 82,55	60/80-32	2.406	61,11
								61/81-32	1.990	50,55
	32-44	5.675 144,15	6.135 155,83	82-32 82-26	5.468 138,89			60/80-32	2.406	61,11
								61/81-32	1.990	50,55
						2.688 68,28	2.688 68,28	40/80-26	1.968	49,99
								41/81-26	1.750	44,45
	23-32	6.049 153,64	6.366 161,70	84-32 84-26	5.687 144,45	4.000 104.80	3.250 82,55	60/80-32	2.406	61,11
								61/81-32	1.990	50,55
						3.250 82.55	2.688 68,28	40/80-26	1.968	49,99
								41/81-26	1.750	44,45
	20-29	6.184 157,07	6.456 163,98	86-32	5.875 149,22	4.000 104.80	3.250 82,55	60/80-32	2.406	61,11
								61/81-32	1.990	50,55
	17-20	6.456 163,98	6.765 171,83	88-32	6.187 157,15			60/80-32	2.406	61,11
								61/81-32	1.990	50,55
				88-26		3.250 82.55	2.688 68,28	40/80-26	1.968	49,99
								41/81-26	1.750	44,45
9-5/8 244,48	32-58.4	8.438 214,33	9.001 228,63	194-47	8.125 206,38	6.000 152.40	4.750 120,65	192-47	3.875	98,43
								190-47	3.000	76,20
								191-47	2.500	63,50
				194-40			4.000 104.80	80-40	2.985	75,82
				194-32			3.250 82,55	60/80-32	2.406	61,11
								61/81-32	1.990	50,55

WIRE LINE SET LARGE SEAL BORE DRILLABLE PACKER

MODEL: WC-WLSDP

PRODUCT NO.: WC-20505

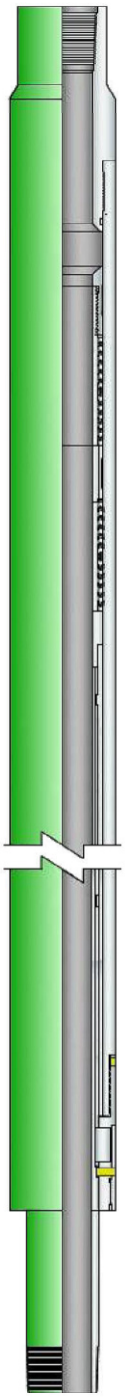
This Retainer Production Packer is large bore version of Retainer Production Packer. They combine the features of the model "WC-WSSDP with the largest bore through any drillable Packer.

Features/Benefits:

- Solid, slim-line construction and a packing element system that resists swab-off. This provides a faster run-in time without fear of impact damage or premature setting, yet packs-off securely and permanently when the Packer is set.
- Two opposed sets of full-circle; full strength slips assure that the Packer will stay where it is set.
- Unique interlocked, expandable metal back-up rings contact the casing and create a positive barrier to Packing Element extrusion.
- The largest possible opening through a drillable Packer.

Specification Guide:

Casing				Packer			Seal Assembly	
Size	Weight	Min. ID	Max. ID	Size	OD	Seal Bore	Size	Min Bore Thru Seals
inch mm	lb/ft	inch mm	inch mm		inch mm	inch mm		inch mm
4 1/2	11.6 - 16.6	3.781 96,04	4.000 101,60	22-23	3.593 91,26	2.390 60,71	20-23	1.703 43,26
	9.5 - 11.6	4.000 101,60	4.126 104,80	24-23	3.781 96,04		21-23	1.807 45,90
5 1/2 139,70	20-23	4.625 117,48	4.811 122,20	43-30	4.437 112,70	3.000 76,20	42/62-30 or 40/60-30	2.375 60,33 or 1.970 50,04
	14-17	4.812 122,22	5.012 127,30	45-30	4.562 115,87			
	13-14	4.976 126,39	5.126 130,20	47-30	4.750 120,65			
7 177,80	32-38	5.875 149,23	6.094 154,79	83-40	5.687 144,45	4.000 101,60	80-40	2.985 75,82
	26-32	6.094 154,79	6.276 159,41	85-40	5.875 149,23			
	20-23	6.276 159,41	6.456 163,98	87-40	6.000 152,40			
	17-20	6.456 163,98	6.765 171,83	89-40	6.250 158,75			
9-5/8 244,48	40-58.4	8.435 214,25	8.835 224,41	192-60	8.218 208,74	6.000 152,40	190-60	4.750 120,65
	36-47	8.681 220,50	8.921 226,59	194-60	8.438 214,33			



SPLINED EXPANSION JOINT

MODEL: WC-SEP
PRODUCT NO.: WC-22203

Splined Expansion Joint is designed to be used in single and dual string completions to accommodate changes in tubing length caused by variations in temperature. They are capable of maintaining the pressure integrity of the tubing while allowing the string to safely expand and contract, and can be run above rotational release or straight pickup release packers.

It may be shear pinned at one-foot intervals along its entries stroke length, allowing the operator to select the proper expansion and/or contraction stroke that will be required after the splined expansion joint has been installed. The splines allow for torque through the joint.

Features/Benefits:

- Rotationally locked at all times for transmitting torque when required.
- Multi-spline design for high torque load.
- Maximized tension carrying capability.
- ID compatible with tubing ID.
- Tool can be pinned at one foot spacing from closed to fully stroked position.
- Shear value can be adjusted by varying the number of shear screws.
- Torsional Rating 10,000 ft-lb Standard Service application at 110,000 psi material yield. 5,500 ft-lb for Sour Service application at 80,000 psi material yield.
- Pressure rating 10,000 psi for Standard Service application at 110,000 psi material yield.
- 7,500 psi for Sour Service application at 80,000 psi material.

DOUBLE CHEVRON SEAL

SINGLE CHEVRON SEAL

V-RYTE SEAL

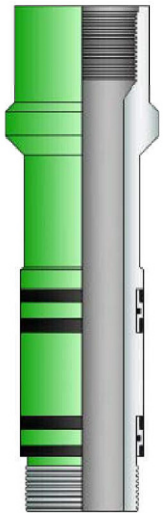
Specification Guide:

Size inch	OD inch	ID inch	Length
2 3/8	3.688	1.995	6 ft Or 10 ft
2 7/8	4.360	2.441	
3 1/2	5.250	2.992	
4 1/2	6.406	3.989	

NOTE: All feasible distinct sizes of Splined Expansion Joint could be provided with specific grades of material and end connections; standard or premium thread, as per the customer's requirement.

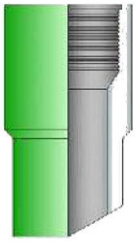
LOCATOR SEAL ASSEMBLY

MODEL: WC-LSA
PRODUCT No.: WC-22104
Locator Seal Assembly is used in installations which require floating seals. Once landed, the seal locator prevents downward movement of the tubing while allowing the seal to move with tubing contraction.



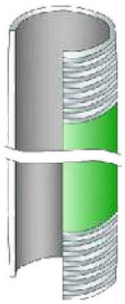
HALF MULE SHOE GUIDE

MODEL: WC-MG
PRODUCT No.: WC-22105
Half Mule Shoe Guide is standard with the seal assembly to allow for easy entry into the packer bore.



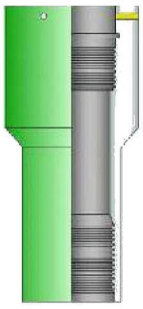
MILL-OUT EXTENSION

MODEL: WC-MOE
PRODUCT No.: WC-22106
Mill-Out Extension is used in installations where floating seals are required due to tubing contractions. In addition, this packer accessory provides a larger ID between a packer bore and a seal bore extension allowing a packer to be milled out.



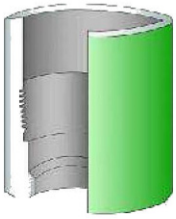
MILL OUT BOTTOM

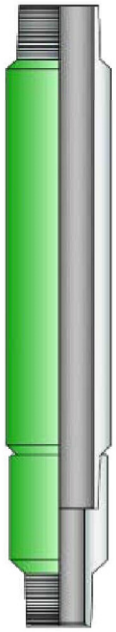
MODEL: WC-MOB
PRODUCT No.: WC-22107
Mill-Out Bottom is used to connect a mill-out extension to a packer.



KNOCK-OUT PLUG BOTTOM

MODEL: WC-KOP
PRODUCT NO.: WC-22108
Knock-Out Bottom runs below the packer to recess the knock-out plug so as to convert a packer as a bridge plug holding pressure from above and below.

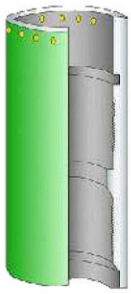




SEAL BORE EXTENSION

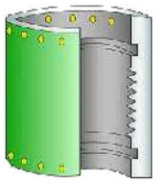
MODEL: WC-SBE-1
PRODUCT NO.: WC-22301

Seal Bore Extension runs below a drillable or retrievable seal bore packers. Seal Bore Extension is run to provide additional sealing bore when a long Seal Bore Assembly is run to accommodate considerable tubing movement. The Seal Bore Extension has the same ID as the corresponding Packer seal bore it is run with. Thus all seals of a long Seal Assembly seat off in the Seal Bore Extension. If the top set of seal normally sealing in the Packer bore should get damaged, the Seal Bore Extension still provide a sealing surface for the lower seat.



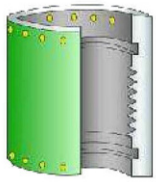
SEAL BORE TO MILL-OUT COUPLING

MODEL: WC-SBMC
PRODUCT No.: WC-22302
Seal Bore to Mill-Out Coupling is used to connect mill-out extensions to seal bore extensions.



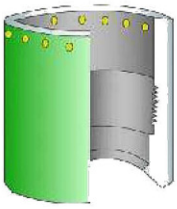
CONCENTRIC BOTTOM

MODEL: WC-SBCB
PRODUCT No.: WC-22303
Concentric Bottom is used to connect seal bore extensions to a packer.



CONCENTRIC COUPLING

MODEL:WC-SBCC
PRODUCT No.: WC-22304
Concentric Coupling is used to connect seal bore extensions to increase length.



WIRELINE RE-ENTRY BOTTOM

MODEL: WC-SBRB
PRODUCT No.: WC-22305
Wireline Re-Entry Bottom is used as the packer bottom when an extension below a packer is not required.

NOTE: Feasible distinct sizes of all the above accessories could be provided with specific grades of material and end connections; standard or premium thread, as per the customer's requirement.

WIRELINE ADAPTER KIT

MODEL:WC-W

PRODUCT No.: WC-21601

The Wireline Adapter Kit is used to set permanent/retrievable packers and bridge plugs with the aid of appropriate wire line string or pressure setting assembly else with hydraulic setting tool as per varying requirement/operations. In its most common use with a wireline setting tool, the system allows for a substantial reduction in rig time over setting on tubing with a hydraulic setting tool.

This kit is provided with release/shear stud of different shear values e.g.: 35,000lbf 55,000 lbf, 83,000 lbf etc. as per the setting mechanism and requirements.

Features/Benefits:

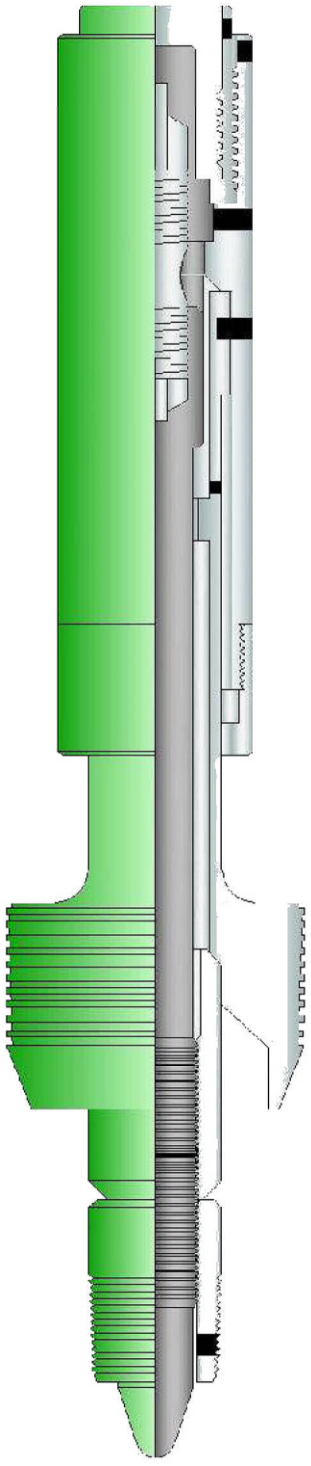
- Substantial rig time saving over hydraulically setting packer.
- Mates to size 10 or 20 wireline pressure setting assembly.
- Mates to hydraulic-setting tool.
- Long field life & Rugged design.

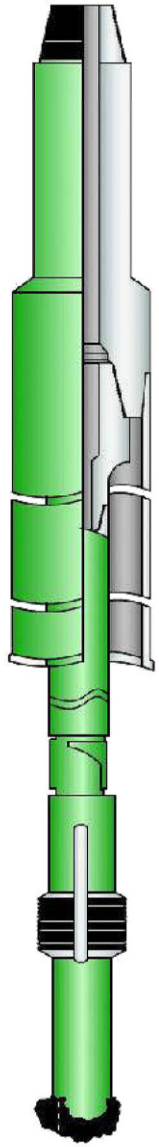
Application:

- Cased hole.
- Deviations to 65°.
- Wireline-set tools.

Specification Guide:

Sizes	LH SQ. THD. OD	BODY LENGTH	ADAPTER SLEEVE LENGTH	MANDREL LENGTH
22-23	2.875	11.562	18.562	18.000
24-23				
32-30	3.250	11.750	27.812	
43-30	3.500	11.812	24.312	
45-30				
47-30				
45-36	4.000		32.250	
47B-36				
83-40	4.500	12.812	29.375	
85-40				
87-40				
83	5.125	13.437	36.937	
85-47			37.000	
87-47				
89-40	4.50	12.812	28.187	
91-40				
89-44	5.250	11.875		
91-44				
89-52	5.250		35.375	
91-52	5.750			
194-60	6.500	11.343	27.687	
190-75	7.625	11.000	36.687	
192-60	6.500	11.343	27.687	





PACKER MILLING & RETRIEVING TOOL

MODEL:WC-CJ

PRODUCT No.: WC-21306

This packer milling & retrieving tool is an internally engaging fishing tool designed for the partially milling & retrieving of permanent production packers. This tool is a combination of mill and spear that recovers drillable packers in one trip. It is ideal for high angle holes.

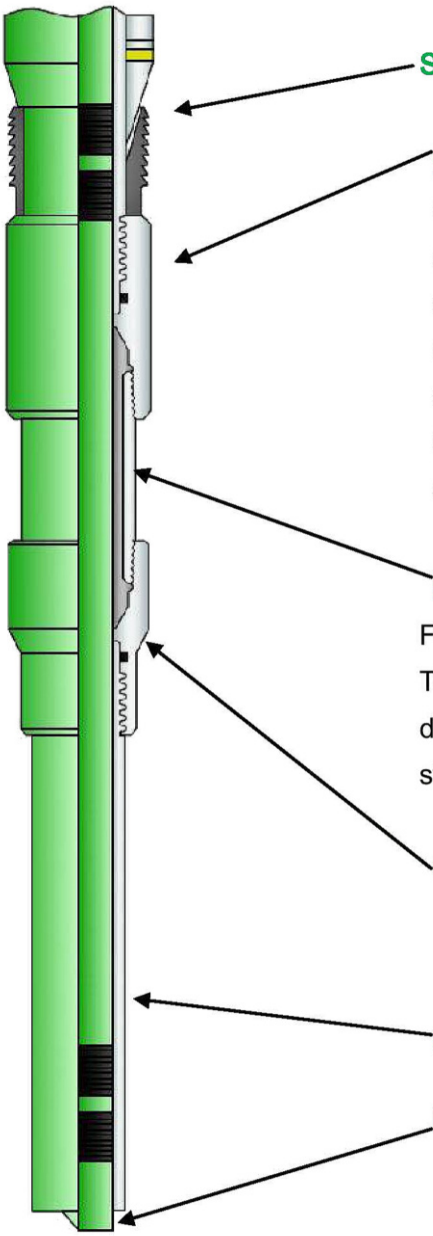
Specification Guide:

Casing		Packer Size	Tool Size	Shoe Size	Packer Milling Tool				Tool Joint (C) Thread
					Shoe OD		Shoe ID		
OD	T&C Weight				Max	Min	Max	Min	
In. *mm*	Lb/ft				In. *mm*	In. *mm*	In. *mm*	In. *mm*	
4-1/2 *114.30*	11.5.16.5	22-19	20.19	22	3.618 91.90	3.603 91.52	2.625 66.68	2.531 64.29	2-3/8 API Reg.
		22-25							
		22-30	20-23	22	3.618 *9,90*	3.603 91,52	2.961 *75,39*	2.937 *74,60*	
		22-23							
	10.5-13.5	23-26	20-26	23	3.718 *94.44*	3.703 *94.06*	3.250 *82.55*	3.125 *79.38*	
	9.5-11.6	24-19	20-19	24					
		24-25							
		24-19							
		24-30	20-23	24					
		24-23							
	9.5-16.6	28-19	20-19	22	3.618 *91.90*	3.603 *41.52*	2.625 *66.68*	2.531 *64.29*	
5 127.00	15-21	32-30	30-30X19	32	4.046 *102.77*	4.030 *102.36*	3.187 *60.95*	3.125 *74,37*	
		32-19	30-19						
		32-25	30-25						
		32-26	30.26						
	11.5-13	34-19	30.19	34	4.250 *107.95*	4.234 *107,54*	3.187 *60.95*	3.125 *79,37*	
		34-26	30-26						
		34-25	30-25						
5-1/2 *139.70*	*23-26*	34-19	30-19	34	4.250 *15755*	4.234 *147.54*	3.187 *80.95*	3.125 *79.37*	
		34-25	30-25						
		34-26	30-26						
	20-23	46-36	40-26	42	4.515 *114.56*	4.484 *113.89*	3.500 *88.90*	3.437 *87.30*	2-7/8 API Reg.
		42-19	40-19						
		42-26	40-26						
		42-32							
		43-32	40-30	43					
		43.30							
	13-17	44-19	48-19	44	4.755 *121.03*	4.734 *120,24*	3.509 *88.90*	3.437 *87,30*	
		44-25	40-25						
		44-32							
		44-26	48-26						
	14-17	45-30		45	4.755 *171.03*	4.734 *120.24*	3.750 *95,25*	3.625 *92,07*	
		44-36	40-30						
	13-14	44-16	40-19	46 (A)	4.890 124.21	4.859 123.42	3.500 88.9	3.437 87.30	
		44-26	40-26						
		44-32							
		47-30	46-38	47	4.890 *124.21*	4,859 *123,42*	3.750 *95,25*	3.625 *92,07*	
		47-36							
6 152.4	14-26	64-30	40-30	49	5.000 *127.00*	4.984 *126.59*	3.785 *95,63*	3.750 *95,25*	
		54-36							
6-5/8 *158.28*	17-32	82-40	60-32	82	5.546 *140.87*	5.531 *140,49*	4.187 *146.35*	4.125 *104,77*	3-1/2 API Reg.
			80-32						
		82-32	60-32						
			80-32						
		82-26	60-25						
7 *177.80*	32-44	82-40	60-32	82	5.765 149,43	5.734 *145,64*	4.625 *117.417*	4.500 *114,30*	
		82-32							
		82-40							
		82-32							
		82-26	80-26						
6-5/8 *168.28*	20-24	82-47	80-40	83	5.705 *146.43*	5.734 *14864*	4.875 *123.83*	4.812 *122.22*	
		83-40							
7 *177.80*	32-38	83-47							
		83-40							
6-5/8 *168.28*	17-20	84-32	80-32	82	5.765 *146.43*	5.734 *145.64*	4.625 *117,48*	4.500 *114.30*	
		84-40							
		84-26	80-26						
7 *177.80*	20-32	84-32	80-32	84	5.968 151.59	5.937 150.80	4.625 117.48	4.500 114.30	
		84-40							
	23-32	84-40							
		84-32							
		84-25	80.26						

Casing		Packer	Packer Milling Tool						
OD	T&C Weight	Size	Tool Size	Shoe Size	Shoe OD		Shoe ID		Tool Joint (C) Thread
					Max	Min	Max	Min	
in. mm	Lb/ft				in mm	in mm	in mm	in mm	
7 177.80	23	84-40	80-32	86 (A)	6.203 157,56	6.171 156,74	4.625 117,48	4.500 114,30	3-1/2 API Reg.
		84-32							
		04-25	80-26						
	17.29	84-32	80-32	84	5.968 151,59	5.937 150,80	4.825 117,48	4.500 114,30	
	17-32	84-40							
5-5/8 165.28	17	85-47	80.45	85	5.000 152,40	5.948 151,08	4.906 124,61	4.812 122,22	
		85-40							
		85-47	80-47x38						
7 177.80	26-29	85-47	83.40						
		85-40							
		85-47	80-47x38						
	20-23	87-47	80-40	87	6.203 157.56	6.171 106.74	4.906 124,61	4.812 122,22	
		87-40							
	17	89-52	80-44	89	6.390 162,31	8.359 161,52	5.437 136,10	5.375 136,52	
		89-44							
		89-40	80-40						
	17-20	85-32	80-32						
		88-40							
7-518 193,68	33.7-39	89-52	80-44	89	6.390 162.31	5.359 161,52	5.437 136,15	5.375 136,52	
		89-44							
		89-40	80-40						
		88-40	80-32	88	6.300 160.02	5.281 159,54	4.625 117.48	4.500 114,30	
		80-32							
		68-26	80-26						
7 177.80	17-20	88-26							
		80-32	80-32						
		88-40							
7-5/8 193,68	33.7-39	88-32	80-32	89	6.390 162,31	6.359 161,52	5.437 138,10	5.375 135,52	
		88-40							
	29.7-39	89-52	80-52x40						
	24.33.7	91-52	130-44	91	6.540 168,65	6.609 167,87	5.437 138,10	5.375 136,52	
		91-44							
		91-40	80-40						
		91-47	80.47938						
		91-52	80.52x41 3						
	24-39	92-40	80-32	92	6.640 168.66	6.600 167,87	4.625 117.48	4.500 114,30	
		92-32							
		92-40		88(B)	6.300(B) 160.02	5.281(B) 159,54	4.625(B) 117,48	4.500(B) 114,30	
		92-26	80-26						

Casing		Packer	Packer Milling Tool						
OD	T&C Weight	Size	Tool Size	Shoe Size	Shoe OD		Shoe ID		Tool Joint (C) Thread
					Max	Min	Max	Min	
in. mm	Lb/ft				in mm	in mm	in mm	in mm	
8-5/8 219,08	36-49	126-47	125-38	126	7.328 186,13	7.296 185,32	5.375 136,53	5.250 133,35	4-1/2 API Reg.
		126-38							
		120-47							
	24-35	128-40	120-40	128	7.640 194.06	7.609 193,27	5.375 139.53	5.250 133,35	
		128-47							
		128-52	128-52x48		7.640 194.06	7.609 193,27	5.906 150,01	5.875 149,22	
		128-60	120-511x47						
		128-48	120-60050						
		128-47	120-38		7.640 194.06	7.609 193,27	5.375 136,53	5.250 133,35	
		128-38							
9-5/8 244,48	40-53.5	194-75	190-75050	194	8.328 211,53	8.296 210,72	5.096 154,84	6.875 174,62	
		192-60	160-80		8,328 211,53	8.296 210,72	7.562 192,08	7.437 188,90	
	36-47	194-50							
		194-75							
		194-75	190-75060		8.238 211,53	8.296 210,72	6.281 159,54	6.250 158,75	
		194-60	190-60047						
		1940-60	190-47						
	32.3-58.4	194-47							
		194-60							
		194-32	190-32						
10-3/4 273,05	60.7-81	212-26	200-26	212	9.031 229,39	8.894 225.91	7.625 19346	7.500 190,50	6-5/8 API Reg.
		212-32	200-32						
		212-38	200-38						
		212-47	200-47						
	32.75-60.7	214-25	200-26	214	9.468 240,0	6.400 238,91	7.625 193,68	7.500 190,50	
		214-32	200-32						
		214-38	200-38						
		214-47	200-47						
		214-75	200-75		9.531 242,09	6.403 237,04	7.625 193,68	7.500 190,50	
	32.75-45.5	214-75							
11.3/4 29545	39-60	220-26	220-25	220	10.406 264.31	10.343 252,71	8.468 215,09	8,406 213,51	
		220-32	220-32						
		220-38	220-38						
		220-47	220-47						
13-3/8 339,73	08-102	230-25	230-26	230	11.531 292,88	11.468 291,29	9.843 250,01	9.781 248.44	
		230-32	230-32						
		230.38	230-38						
		230-47	230-47						
		230-50	230-60						
	48-72	240-26	240-25	240	12.156 308,76	12.093 397,16	9.843 250,01	9.781 248,44	
		240-32	240-32						
		240-38	240-38						
		240-47	243-47						
		240-59	245-50						
	102	240-93	230-93	230	11.531 292,89	11.458 291,29	9.843 750,01	9.701 248,44	

TYPICAL HOOK-UP OF SEAL BORE PACKER WITH MILLOUT EXTENSION AND SEAL BORE EXTENSION



Seal Bore Packer

Guide

Guides are threaded bottom subs for Seal Bore Packers, and can be ordered separately or as an integral part of the Packer. They are available as box thread down to accommodate Mill out Extensions or Seal Bore Extensions or pin thread down to make up with tail-pipe or other accessories down the line. Mill out Extensions are furnished with the standard API tapered thread connections. Other threads are available on request.

Mill out Extension

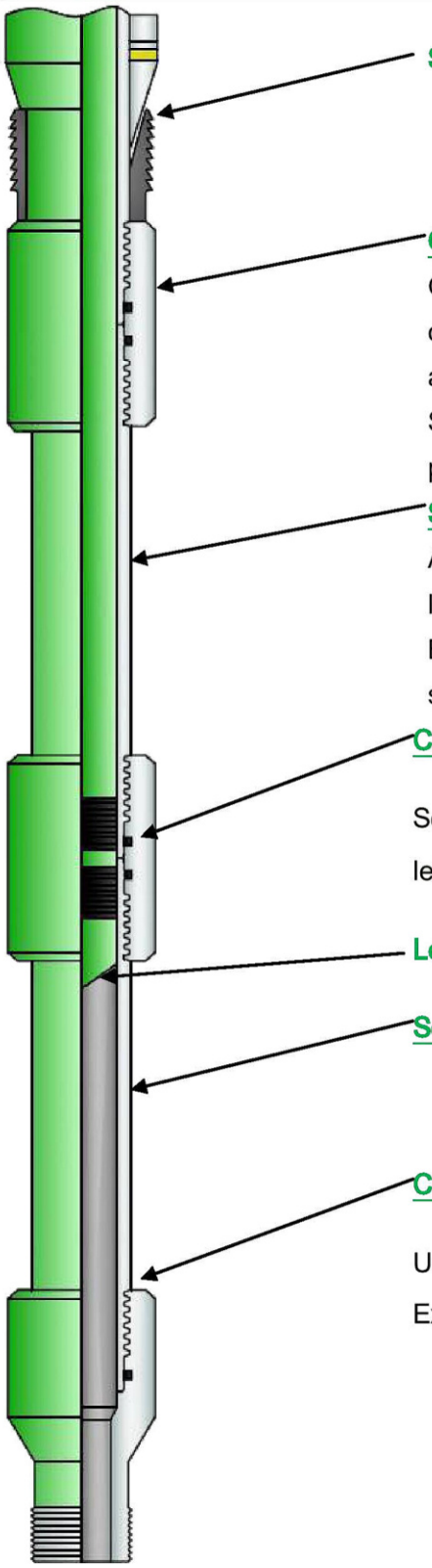
For Packers that will eventually be milled out using the Packer Milling Tool, the Mill out Extension is used to provide the length and inside diameter necessary to accommodate the Mandrel and Catch sleeve of a standard Milling Tool.

Connector Sub

Seal Bore Extension with Blank Bottom

Locator Tubing Seal Assembly

TYPICAL HOOK-UP OF PERMANENT SEAL BORE PACKER WITH SEAL BORE EXTENSION



Seal Bore Packer

Guide

Guides are threaded bottom subs for Seal Bore Packers, and can be ordered separately or as an integral part of the Packer. They are available as box thread down to accommodate Mill out Extensions or Seal Bore Extensions or, as pin thread down to Crossover to other tail-pipe.

Seal Bore Extension

A Seal Bore Extension is used to provide additional sealing bore when a long seal assembly is run to accommodate Tubing movement. The Seal Bore Extension has the same ID as the Packer. Packer with continuous seal bores are milled out and retrieved with the Packer Milling Tool.

Concentric Coupling

Seal Bore Extensions can be joined using this coupling to achieve any length required.

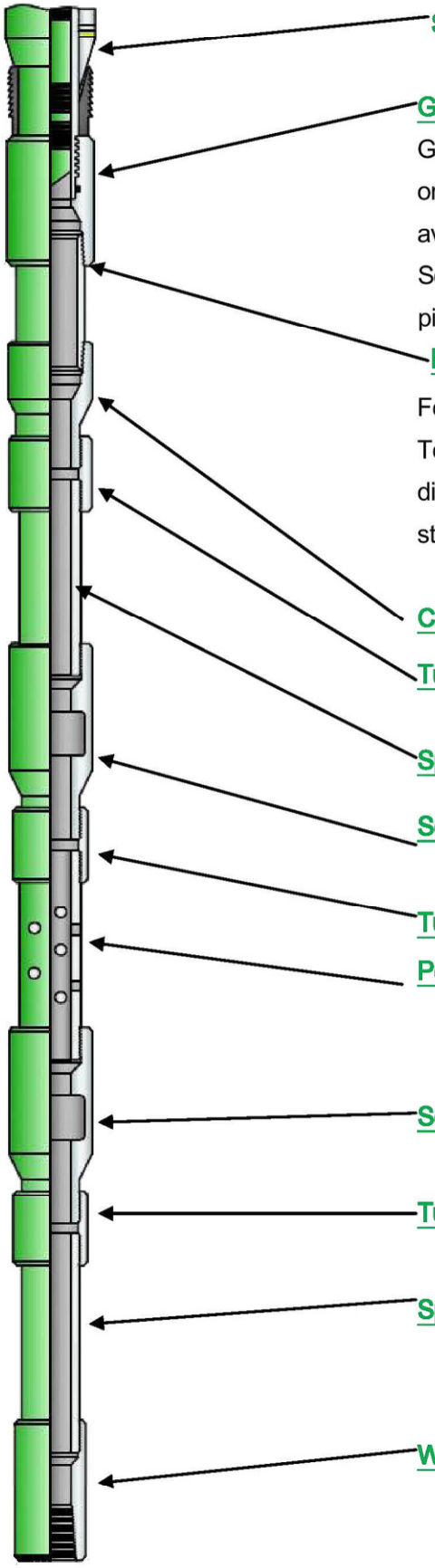
Locator Tubing Seal Assembly

Seal Bore Extension

Crossover Sub-Seal Bore Extension-To-Tailpipe

Using this sub tail-pipe or other accessories can be run below Seal Bore Extension as required.

TYPICAL HOOK-UP OF SEAL BORE PACKER WITH MILL OUT EXTENSION AND FLOW CONTROL ACCESSORIES



Seal Bore Packer

Guide

Guides are threaded bottom subs for Seal Bore Packers, and can be ordered separately or as an integral part of the Packer. They are available as box thread down to accommodate Mill out Extensions or Seal Bore Extensions or, as pin thread down to Crossover to other tail-pipe.

Mill-out Extension

For Packers that will eventually be milled out using the Packer Milling Tool, the Mill-out Extension is used to provide the length and inside diameter necessary to accommodate the Mandrel and Catch sleeve of a standard Milling Tool.

Crossover Sub-Mill-out Extension To Tailpipe

Tubing Coupling

Spacer Tube

Setting Nipple

Tubing Coupling

Perforated Spacer Tube

Seating Nipple

Tubing Coupling

Spacer Tube

Wire Line Entry Guide

SNAP LATCH ASSEMBLY

MODEL:WC-SLA

PRODUCT NO.: WC-22101

Snap Latch Seal Assembly latches into the packer upon set down (like our Anchor Latch Seal Assembly). It can be removed with straight pull of 10,000 to 12,000 lbs. above tubing weight. The Snap Latch Seal Assembly is used where a mechanical indication is required to verify the seal assembly is properly positioned in the packer bore.

TUBING SEAL NIPPLE

MODEL:WC-TSN

PRODUCT NO.: WC-21802

Tubing Seal Nipple is used as the lower seal assembly or assemblies in multiple packer installations. With sufficient seal units, mis-measurement or tubing movement can be accommodated.

SEAL UNITS

MODEL: WC-SU

PRODUCT NO.: WC-21803

Seal units are used to add additional seal stacks to Locator Tubing Seal. Assemblies and Tubing Seal Nipples. Number could be chosen to accommodate expected tubing movement

ANCHOR SEAL ASSEMBLY

MODEL: WC-ALA

PRODUCT NO.: WC-22102

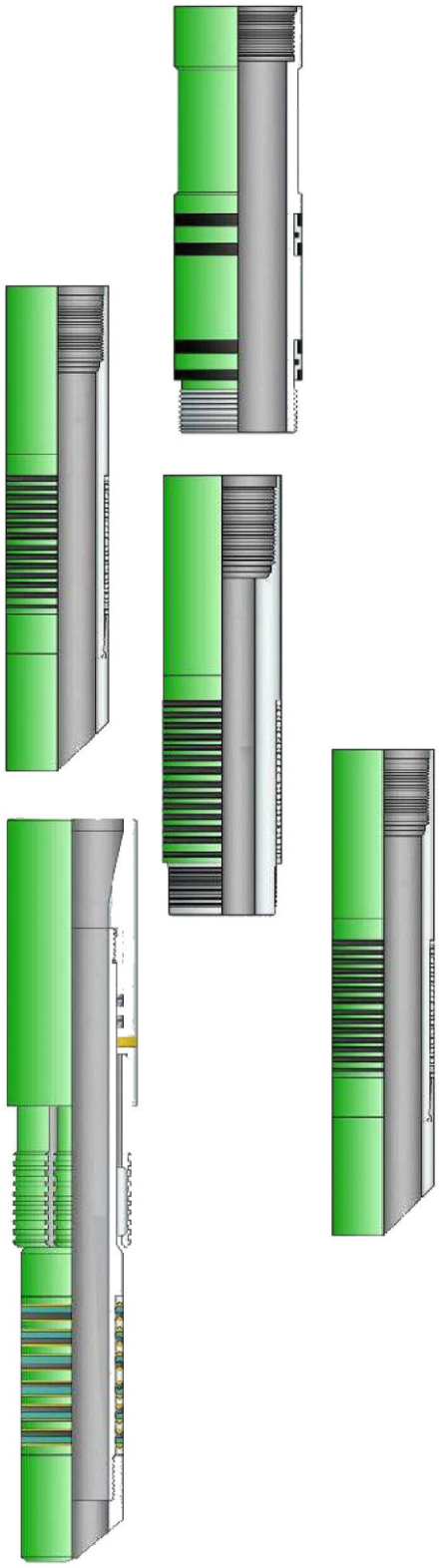
Anchor Seal Nipple is an anchoring and sealing device that connects the retrievable tubing string to the upper bore of the Retainer Production Packers. The latch component of the seal nipple provides positive engagement with the packer. The seal unit maintains the pressure integrity of the connection.

The additional no go shoulder is designed to provide a positive set down shoulder at the top of the packer and secondly to prevent excessive intrusion of debris into the latch to packer body inter-face.

Features / Benefits:

- The anchor seal nipple is available with Chevron seal unit as standard with 4140 Material.
- V-Ryte and A-Ryte seal units with 13% Cr material are optional.
- The WC-ALA anchor latch Seal assembly has a no-go OD which sets down on the top of the packer, rather than at the shoulder at the bottom of the upper seal bore.
- Adequate space is provided for handling purposes on the anchor body.
- Redress of the seal unit may be accomplished quickly and easily.

NOTE: Feasible distinct sizes of all above accessories could be provided with specific grades of material and end connections; standard or premium thread, as per the customer's requirement.



LOCATOR TUBING SEAL ASSEMBLY

MODEL:WC-LTSA

PRODUCT No.: WC-21701

Locator Tubing Seal Assembly is designed for limiting downward movement of the seals in the packer bore. Normally landed with the tubing in compression sufficient to prevent seal movement upward. Any number of seal units can be added for increased length. Standard assembly includes two seal units.

Locator Seal Assembly is designed for hostile environments, high temperatures and high pressures.

It is made up of metal parts that meet the requirements of NACE standard MR-0175 for sulfide stress cracking resistant materials and is suitable for use in H_2S environments. This locator also be used in noncorrosive environments where pressure and temperature requirement warrants.

Features/Benefits:

The standard Seal System consists of three set of seals (bonded, chevron, A-ryte, V-ryte etc) and debris barriers. The seals are arranged so that they are protected by the debris barriers in the event of tubing movement. The two lower debris barriers and two lower seal stacks are the main working seals and should never be allowed to leave the seal bore. The upper debris barrier and seal stack are a back-up and also prevent settings from entering the bore, which could lead to sticking or seal damage.

Specification Guide:

Size	Seal Bore inch mm	Max OD inch mm	Min ID inch mm	Standard Thread Connection (Box Up)
40-26	2.688 68,28	3.062 77,77	1.969 50,00	2 3/8 EU 8 RD
60-30	3.000 76,20	3.156 80,16		
80-32	3.250 82,55	3.460 87,88	2.406 61,11	2 7/8 EU 8 RD
80-40	4.000 101,60	4.218 107,14	3.000 76,20	3 1/2 EU 8 RD
190-47	4.750 120,65	4.875 123,83		
192-47		5.000 127,00	3.875 98,43	4 1/2 EU 8 RD

ON/OFF TOOL:

MODEL: WC-TS10
PRODUCT No.: WC-22601

The On/Off Overshot designed to disconnect and connect the tubing string form a production packer that does not require tension or compression to maintain a pack-off. The profile stingers run with the overshot are available in all variety of profiles types and sizes with different end connections and materials as per customer's requirement.

Features/Benefits:

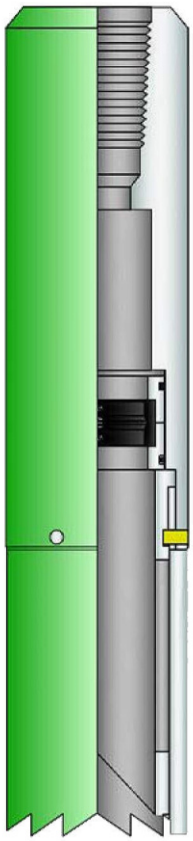
- Proven bonded seal system
- Built for strength and durability
- Variety of profile nipples
- Available in special metallurgy
- Available shear pinned up or down position
- Available in spring loaded design

Applications:

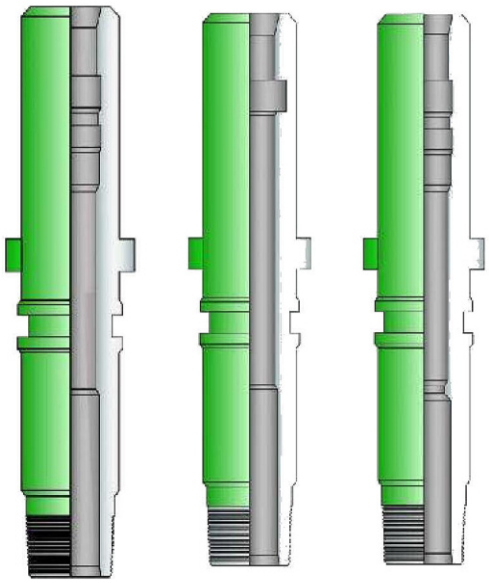
- Treating
- Fracturing
- Testing
- Production Completions etc.

Specification Guide:

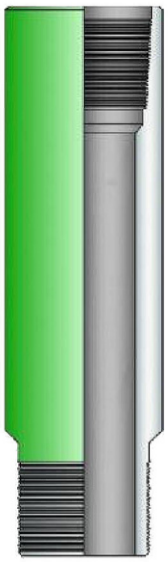
Casing Size		Max. OD		Min. ID		Thread Connection	
inch	mm	inch	mm	inch	mm	inch	mm
2 7/8	73.0	2.250	57.15	1.00	25.4	1.660 EUE	42.2
3 1/2	88.9	2.750	69.85	1.50	38.1	1.900 NUE	48.3
4	101.6	3.250	82.55	1.50	38.1	1.900 EUE	48.3
4 1/2 - 5	114.3-127	3.750	95.25	2.00	50.8	2 3/8 EUE	60.3
4 1/2 - 5	114.3-127	3.750	95.25	2.375	60.3	2 7/8 EUE	73.0
5 1/2 - 6 5/8	139.7-168.3	4.500	114.3	2.00	50.8	2 3/8 EUE	60.3
5 1/2 - 6 5/8	139.7-168.3	4.500	114.3	2.50	63.5	2 7/8 EUE	73.0
7 - 7 5/8	117.8-193.7	5.750	146	2.50	63.5	2 7/8 EUE	73.0
7 - 7 5/8	177.8-193.7	5.750	146	3.00	76.2	3 1/2 EUE	88.9
8 5/8	219.1	6.500	165.1	2.50	63.5	2 7/8 EUE	73.0
8 5/8	219.1	6.500	165.1	4.00	101.6	4 1/2 EUE	114.3
9 5/8	244.5	7.500	190.5	2.50	63.5	2 7/8 EUE	73.0
9 5/8	244.5	7.500	190.5	4.00	101.6	4 1/2 EUE	114.3
10 3/4	273.1	8.500	215.9	2.50	63.5	2 7/8 EUE	73.0
10 3/4	273.1	8.500	215.9	4.00	101.6	4 1/2 EUE	114.3



Overshot



Stingers



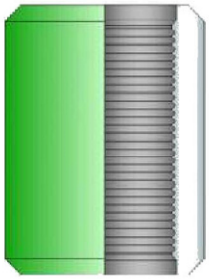
FLOW COUPLING

MODEL: WC-FC

PRODUCT No.: WC-22701

Flow couplings/Blast joints are installed in the tubing opposite perforations in wells with two or more zones. These are heavy walled and are sized to help prevent tubing damage from the jetting action of the zone perforations. It should be installed above and below landing nipples or other restrictions that may cause turbulent flow. Help to extend the life of the well completion. Basic applications are to help inhibit erosion caused by jetting action near perforations, installed opposite perforations in one or more zones.

Furnished in various grades of materials with required end connections and different lengths to meet our customer's as well as API standard requirements.



COUPLING

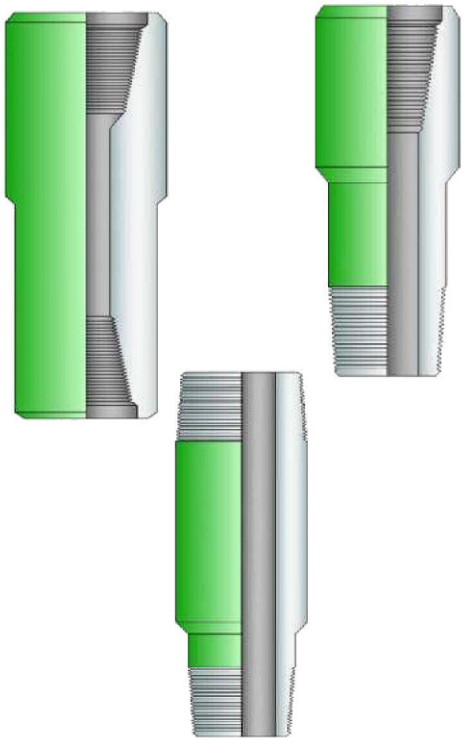
MODEL:WC-C

PRODUCT No.: WC-22702

Couplings are used as connector between casing, tubing, tools or accessories of the strings and hook ups while carrying out drilling, completion or other operations in the well. They are Box X Box threads of same size and type.

The Couplings are manufactured as per customer's specifications. Their chemical/mechanical properties, dimensional and surface condition characteristics inspection meet API 5CT standard requirements.

Furnished in various grades of materials, connection and corresponding lengths to meet our customer's as well as API standard requirements.



CROSSOVERS

MODEL: WC-C88 [Box X Box], WC-C89 [Pin X Box]

& WC-C99 [Pin X Pin],

PRODUCT No.: WC-22704, WC-22705 & WC-22703

The Crossovers are used as connector between casing, tubing, tools or accessories of the strings and hook ups while carrying out drilling, completion or other operations in the well.

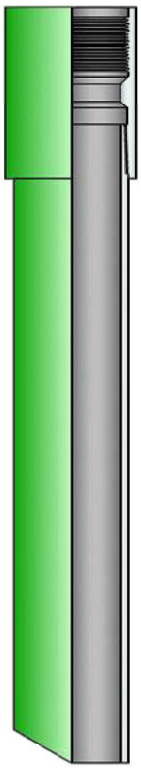
Furnished in various grades of materials with required end connection combinations and different lengths to meet our customer's as well as API standard requirements.

NON PERFORATED PRODUCTION TUBE

MODEL: WC-NPPT

PRODUCT NO.: WC-22801

The Non-Perforated Production Tube is made-up at the bottom of the production string. Its basic purpose is to act as a stinger (or extension) to keep the packer flapper valve open when producing or when working below the packer.



PERFORATED SPACER TUBE

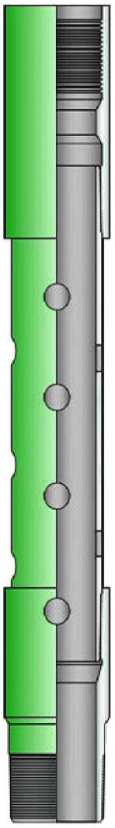
MODEL: WC-PST

PRODUCT NO.: WC-22802

The Perforated Spacer Tube is used at the end of a tubing string to provide an alternate flow path in cases where wire line measuring devices are used.

The Perforated Spacer Tube is made of low grade material and its assembly consists of a perforated nipple with standard tubing thread, a crossover coupling up, and a cross over sub down.

Perforated Spacer Tube are available with special box thread up and pin thread down, upon request.



WIRE LINE ENTRY GUIDE

MODEL: WC-WEG

PRODUCT NO.: WC-22901

The Wire line Entry Guide is designed to be run on the bottom of the tubing string. It will aid wire line tools that have passed out the bottom of the tubing to re-enter without hanging up.

HYDRAULIC SET TUBING ANCHOR CATCHER

MODEL: WC-HTAC

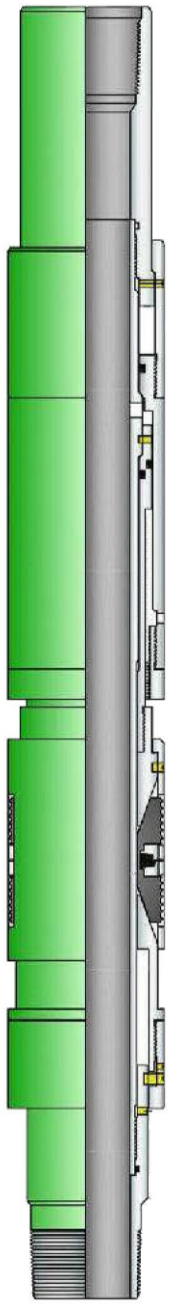
PRODUCT No.: WC-22503

The Hydraulic Set Tubing Anchor Catcher is a pressure actuated, fully retrievable anchor catcher designed to hold the tubing string in tension or compression. No tubing manipulation is required in order to set the anchor. Once set, bi-directional slips anchor the tubing to prevent upward or downward movement during rod pumping and to prevent tubing from falling down. Applying tubing pressure against a temporary tubing plug run below the anchor catcher sets the anchor catcher. The anchor catcher is released by pulling sufficient force to shear the release screws. The number (up to 12) predetermines the shear value (4,000 lb each) of the releasing mechanism.

Increases pump efficiency, improves operating costs by reducing maintenance and down time caused by tubing or sucker rod wear.

Run anchor catcher to desired depth and space out completion using normal procedures. If an expendable seating sub is used to temporarily plug the tubing, drop the bronze setting ball. Allow substantial time for the ball to gravitate to the ball seat.

CAUTION: Do not pump ball into place. Pressure up on the tubing to 1,200 psi minimum above hydrostatic pressure at the anchor. Increase the pressure to the shear value necessary to pump out the ball seat.



Features/Benefits:

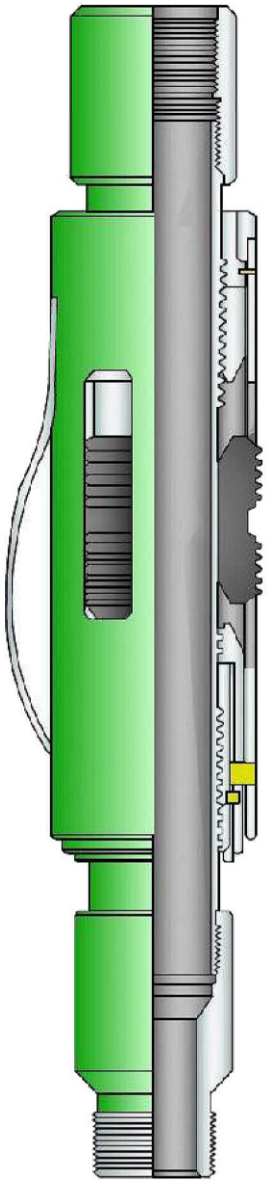
- Provides no-turn feature for Progressive Cavity Pump operations
- Increases pump efficiency and helps prevent the tubing from backing off
- Apply hydraulic pressure to set
- Straight pull shear release system

Applications:

- Completions using Progressive Cavity Pump systems.

Specification Guide:

Casing				Anchor		
Size inch mm	Weight lb/ft	Min. ID inch mm	Max. OD inch mm	Max. OD inch mm	Min. ID inch mm	End Connections
4 1/2 114,30	9.5-13.5	3.920 99,27	4.090 103,89	3.750 95,25	1.937 49,20	2 3/8 EU 8RD
7 177,80	20.0-35.0	6.004 152,50	6.456 163,98	5.375 136,52	3.000 76,20	3 1/2 EU 8RD
				5.719 145,26		
9 5/8 244,48	32.3-47.0	8.681 220,50	9.001 228,63	8.438 214,33	5.750 146,05	6 5/8 LTC



RIGHT HAND SET TUBING ANCHOR CATCHER

MODEL: WC-RTAC

PRODUCT No.: WC-22504

It is a right hand set tool which acts as a tubing anchor to maintain tension in the tubing string and as a tubing catcher to prevent parted pipe from falling to the bottom of the well.

Features/Benefits:

- Provides no-turn feature for Progressive Cavity Pump operations
- Increases pump efficiency and helps prevent the tubing from backing off
- Rotate right to set
- Straight pull release, shear release (primary), left rotation (secondary)

Applications:

- Completions using Progressive Cavity Pump systems.

Setting Procedure:

At the desired setting depth, rotate the tubing to the right with hand wrenches until the slips contact the casing (approximately five to eight turns). Maintain right hand torque while alternately pulling strain and setting down several times.

Releasing Procedure:

An up strain greater than the total shear strength of the shear pins plus the weight of the tubing should release the tool. Optional release procedure, with tubing in slight compression, rotate the tubing to the left (5 to 8 turns at the tool) to retract the cones from the slips and allow the slips to move back into the housing. To insure a complete release, reciprocate the tubing string a few feet while rotating a few more turns to the left before starting out of the hole. Caution: Left-hand rotation may slack-off tubing.

Specification Guide:

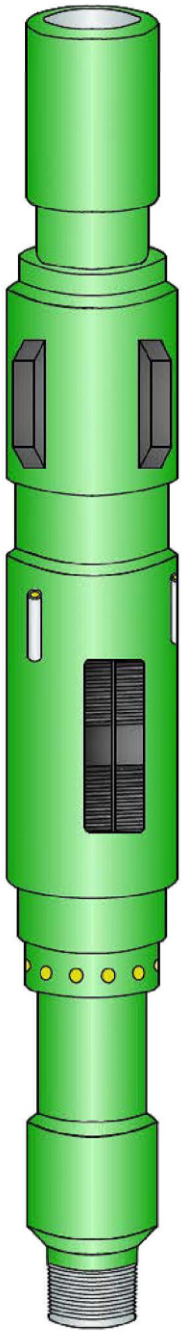
CASING				ANCHOR CATCHER		
Size inch mm	WEIGHT lb/ft	MIN. ID inch mm	MAX. ID inch mm	MAX OD inch mm	Standard Thread Connections	Product Size
4-1/2 114,30	9.5 - 13.5	3.920 99,57	4.090 103,89	3.750 95,25	2-3/8 EU 8RD	43-A
5 127,00	11.5 - 18.0	4.276 108,61	4.560 115,82	4.000 101,60	2-3/8 EU 8RD	43-B
5-1/2 139,70	13.0 - 23.0	4.670 118,62	5.044 128,12	4.500 114,30	2-3/8 EU 8RD or 2-7/8 EU 8RD	45-A
6 152,40	18.0 - 23.0	5.240 133,10	5.424 137,77	4.812 122,22	2-3/8 EU 8RD or 2-7/8 EU 8RD	45-B
6-5/8 168,28	17.0 - 32.0	5.675 144,15	6.135 155,83	5.500 139,70	2-3/8 EU 8RD or 2-7/8 EU 8RD	47-A
7 177,80	20.0 - 38.0	5.920 150,37	6.456 163,98	5.500 139,70	2-3/8 EU 8RD or 2-7/8 EU 8RD	47-A
7 177,80	17.0 - 20.0	6.456 163,98	6.538 166,07	6.250 158,75	2-3/8 EU 8RD or 2-7/8 EU 8RD	47-B
7-5/8 193,68	20.0 - 39.0	6.625 168,28	7.125 180,98	6.250 158,75	2-3/8 EU 8RD or 2-7/8 EU 8RD	47-B
6-5/8 168,28	17.0 - 32.0	5.675 144,15	6.135 155,83	5.500 139,70	3-1/2 EU 8RD	47 X 3.00
7 177,80	17.0 - 38.0	5.920 150,37	6.538 166,07	5.500 139,70	3-1/2 EU 8RD	47 X 3.00
8-5/8 219,08	24.0 - 49.0	7.511 190,78	8.097 205,66	7.000 177,80	3-1/2 EU 8RD	49
9-5/8 244,48	32.3 - 47.0	8.681 220,50	9.001 228,63	8.000 203,20	3-1/2 EU 8RD	51

DRAG BLOCK TUBING ANCHOR CATCHER

MODEL: WC-DBTAC

PRODUCT No.: WC-22501

It is a retrievable positive-action tubing anchor designed to hold the tubing string in tension or compression. It has drag blocks to allow the anchor to run deeper than conventional drag spring anchors. The anchor prevents movement of the tubing during pumping strokes and holds it stationary. The use of a tension tubing anchor increases pump efficiency, reduces tubing wear and prevent it from falling into the well in case of a part.

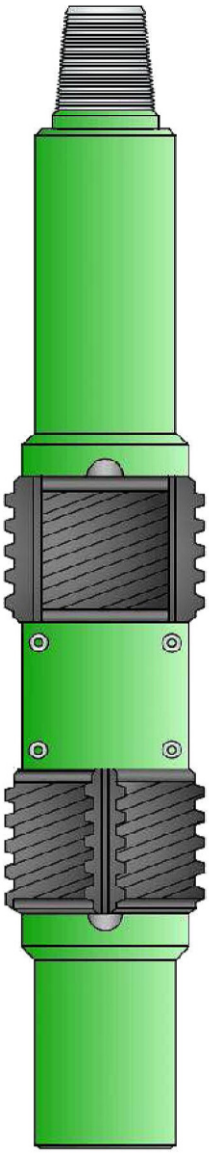


Features/Benefits:

- Enclosed slips.
- Rotational release or shear release.
- Shear release value easily adjusted.

Specification Guide:

Casing		Recommended Hole Size inch mm	Tool OD inch mm	Tool ID inch mm	End Connection Box Up Pin Down
Size inch mm	Weight lb/ft				
4 1/2 114.3	9.5-13.5	3.920-4.090 99.57-103.89	3.750 95.25	1.94 49.28	2 3/8 EUE
5 1/2 139.7	13-20	4.778-5.044 121.36-128.12	4.500 114.30	2.00 50.80	2 3/8 EUE
				2.50 63.50	2 7/8 EUE
7 177.8	17-32	6.094-6.538 154.79-166.07	5.750 146.05	2.50 63.50	2 7/8 EUE
				3.00 76.20	3 1/2 EUE
7 5/8 193.7	24-39	6.625-7.025 168.28-178.44	6.400 162.56	2.50 63.50	2 7/8 EUE
8 5/8 219.1	24-40	7.725-8.097 196.22-205.66	7.500 190.50	4.00 101.60	4 1/2 EUE
9 5/8 244.5	32.3-53.5	8.535-9.001 216.79-228.63	8.250 209.55	4.00 101.60	4 1/2 EUE



CASING SCRAPER

MODEL: WC-CS

PRODUCT No.: WC-20701

This Casing Scraper is designed to remove scale, mud cake, cement sheath, embedded bullets, and other foreign material from the inside of the casing wall. Maintaining a clean casing ID is vital for the efficient operation of down-hole tools used in the well. The resulting smooth surface makes the casing for subsequent down-hole operations such as packer's installation and squeeze tools operations.

Construction:

Manufactured from alloy steel and heat treated to provide strength and durability, each scraper must pass rigid nondestructive testing to ensure the highest quality product. Each tool has six blades specially aligned on the body to provide the maximum cutting surface area for vertical and rotational scraping. The blades are designed to give optimum shearing action with the least amount of restriction to returning well fluid. The splined body provides absolute safety and security by locking each blade onto an integral part of the scraper. This unique body design also allows for ease of maintenance and dressing of the tool. All casing scrapers can be easily set for positive or spring loaded scraping action. Even when set positive to drift, the spring loaded design will effectively scrape multi-weighted casing within the well. All blades are alloy steel and heat treated to provide long lasting service life.

Features/Benefits:

Assembly of the casing scraper is quick and simple and can easily be done in the field. Secure the tool body. Insert springs into the blade body drive. Set blade over body splines at center of tool, compress blade and slide into splines. Install remaining blades in the same manner. Offset the upper blade set from the lower set by one spline. Secure blades to body with split collar ring.

Specification Guide:

Casing				Scraper Specification			
SIZE	Wt. in lbs. T & C	Min ID inch	Max. ID inch	End Connection Thread Pin Up & Box Down	ID inch	Min. Blade OD inch	Max. Blade OD inch
4-1/2	9.5-13.5	3.920	4.090	2-3/8 API IF (NC26)	1-1/8	3-5/8	4-1/4
5	13.0-23.2	4.044	4.494	2-7/8 API Reg. TJ	1-1/4	3-3/4	4-5/8
5-1/2	15.5-23	4.670	4.950	2-7/8 API Reg. TJ	1-1/4	4-3/8	5-1/8
5-1/2	13-14	5.012	5.240	2-7/8 API Reg. TJ	1-1/4	4-3/4	5-3/8
7	35-38	5.920	6.004	3-1/2 API Reg. TJ	1-1/2	5-5/8	6-1/4
7	23-38	5.920	6.366	3-1/2 API Reg. TJ	1-1/2	5-5/8	6-1/2
7	17-32	6.094	6.538	3-1/2 API Reg. TJ	1-1/2	5-7/8	6-5/8
9-5/8	32.0-58.4	8.435	9.001	4-1/2 API Reg. TJ	2-1/4	8-1/4	9-3/8

REVERSE CIRCULATING JUNK BASKET

MODEL: WC-RCB
PRODUCT No.: WC-20702

The Reverse Circulating Junk Basket (WC-RCB) is a junk retrieval tool designed to remove all types of objects from the bottom of the well bore. This superior tool removes such items as slips, hand tools, bit cones, and any other small pieces of junk from the well. The WC-RCB uses reverse circulation to aid junk recovery.

Construction:

The tool consists of a top sub, barrel assembly, catcher, and shoe. The barrel assembly consists of an inner and outer barrel, valve seat, cup, and ball. A lift sub is also provided to assist in handling.

Assembly and Operation:-

Make up the junk basket to the bottom of the string and run into the hole. When the tool is approximately 10 feet from the bottom of the hole, the ball is dropped down the drill pipe. The ball will position itself in the ball seat and reverse circulation will begin. Circulate and begin coring.

Combined with the reverse circulation, this guarantees that any junk on the bottom is pumped into the barrel and caught by the catcher assembly. The tool is removed from the hole after cutting 10 to20 inches of core.

Optional Components and Accessories:-

Shoes -Four types of shoes are available to fit the Reverse Circulating Junk Basket.

Type A mill shoe is supplied as standard equipment with the cutting teeth dressed with hard metal and has side wings. The type A mill shoe is used where the formation is relatively soft and the fish is a loose piece.

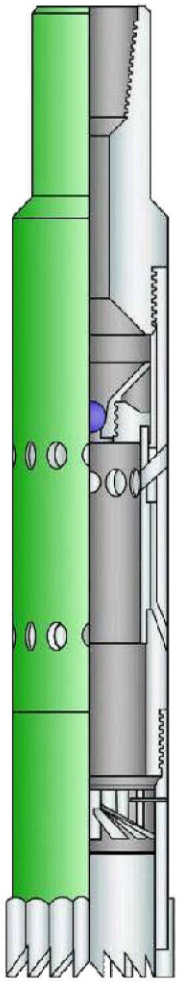
Type B mill shoe is equal in design to the type A shoe, however, it is hard faced with Wellcare lay a sintered tungsten carbide in an extremely tough matrix which will effectively and rapidly mill up junk during the fishing operation. This shoe will cut on OD, ID and bottom.

Type C mill shoe is also hard faced with Wellcare lay, however, is designed with a flat bottom, and the Wellcare lay is placed on the inner face and the outer face. This design is used to mill up junk and is extremely effective for cutting cores.

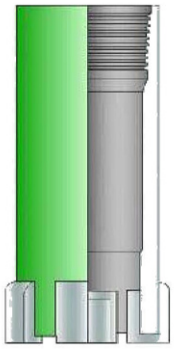
Type B or type C Wellcare lay dressed milling shoes are used if the formation is hard or if the fish is embedded in the formation. Use of these two designs also cuts away protruding excess metal to allow free entry of the junk into the basket.

Finger Shoe - For retrieving loose junk on the bottom of the hole which may exceed the maximum catch of the WC-RCB can be retrieved by use of a finger shoe assembly. The assembly consists of a shoe extension and the finger replacement. The entire assembly is used in place of a mill shoe. The fingers are designed to close in beneath the fish when slowly lowered during rotation. Finger replacements can be replaced easily and are very inexpensive.

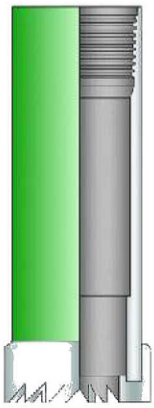
Magnet Inserts -The WC-RCB can be easily converted to a fishing magnet by removing the catcher assembly and replacing it with a magnet insert. The insert still allows direct or reverse circulation and can be used with A, B or C type shoes or special shoes are designed so as to meet customer's specifications. The magnet insert is the same design as the Fishing Magnet and by adding a top sub to the magnet insert; it can be used independently as a fishing magnet.



WC-RCB



TYPE 'A'
MILL SHOE



TYPE 'B'
MILL SHOE

CORE-TYPE JUNK BASKET:

MODEL: WC-CJB

PRODUCT No.: WC-20703

The Core-Type Junk Basket is a junk retrieval tool designed to retrieve all types of objects from the bottom of the well bore. This easy-to-use tool removes such items as slips, hand tools, and bit cones. The basic assembly consists of a top sub, barrel, type A mill shoe, upper and lower catchers.

■ Assembly and Operation:

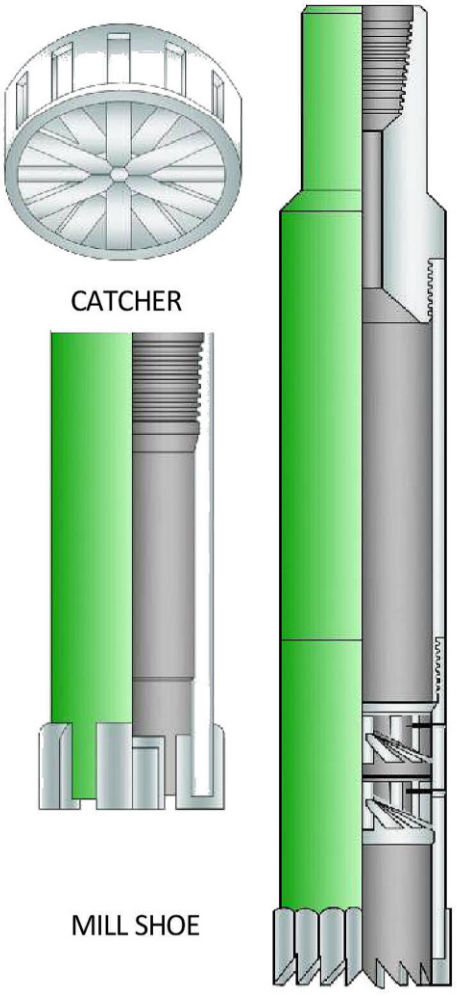
Make up the core basket to the bottom of the string and run it in the hole to a point several feet from the bottom. With direct circulation, the coring action on the junk proceeds until a 24 inch core is cut. The fingers in the upper catcher break the core when an upward strain is applied to the string. The lower catcher fingers then form a close-fitting basket that traps the core with its retrieved junk. As in the other junk basket designs, they are free to revolve within the shoe, thus eliminating finger breakage.

Optional Components and Accessories:-

Three types of milling shoes are available for all core-type basket systems: Type A shoe with side wings, Type B shoe with hard-faced Wellcare lay sintered tungsten carbide, and Type C shoe with flat bottom and Wellcare lay on the inner and outer faces.

Magnet Inserts – A magnet insert can be used in place of the catcher assemblies, thus converting the tool to a fishing magnet.

Finger Shoe – A finger shoe is used to retrieve junk that may be too large to enter the catchers.



■ Specification Guide: for WC-RCB & WC-CJB

HOLE DIAMETER	3 3/4 - 4 1/8	4 1/4 – 4 1/2	4 5/8 – 5	4 5/8-5	5 1/8 – 51/2	5 5/8-6	5 5/8-6	6 1/8-61/2	6 1/8-6 5/8
TOOL OD	3 5/8	3 1/4	3 7/8	3 7/8	4 1/4	5 1/8	4 3/4	5 3/4	5 1/8
MAX. FISH DIAMETER	2 23/32	2 31/32	3 9/32	3 3/8	3 9/32	3 25/32	4 1/16	4 3/8	4 5/16
STANDARD SHOE OD	3 5/8 – 4 1/8	4 1/16 – 4 1/2	4 1/2 - 5	4 1/2 - 5	4 7/8 – 5 1/2	5 1/8 – 5 3/4	5 3/8-6	5 3/4-6 1/2	5 7/8-6 5/8

HOLE DIAMETER	6-6 3/8	6 3/4-7 1/4	7 3/8-81/4	8 3/8-91/4	9 3/8-10 1/4	10 3/8-11 7/8	11 3/4-14 1/4	12 5/8-15	14 3/8-18
TOOL OD	5 1/8	5 3/4	6 1/2	7 1/2	8 1/2	9 3/8	10 3/8	11 3/8	13 3/4
MAX. FISH DIAMETER	4 1/2	4 3/16	5 7/16	6 3/16	7 3/16	8 1/16	9 1/16	10 1/16	12 1/16
STANDARD SHOE OD	5 7/8-6 3/8	6 1/4-7 1/4	7 1/8-81/4	8 1/8-9 1/4	9 1/8-10 1/4	10 1/8-11 7/8	11 1/4-14 1/4	12 1/4-15	14 1/2-18

IMPRESSION BLOCK

MODEL: WC-IB

PRODUCT No.: WC-20704

The Wellcare Impression Block is an accessory tool used to accurately determine the dimensions and configuration of the upper end of a fishing item as well as to check its condition and position in the well bore. The soft lead lower end of the impression block captures an impression of the fish upon making contact. Impression blocks are manufactured with a connection (pin up) and a layer of soft lead on the lower end of the tool. Circulation holes will be provided on request. End connection is furnished as per customer requirement.

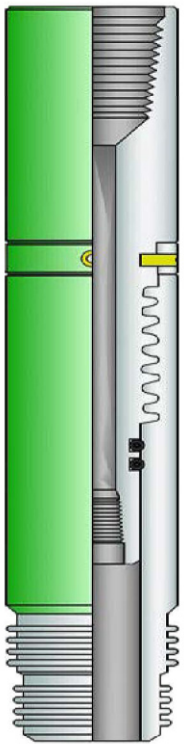
Assembly and Operation:

Make up the impression block to the bottom of the fishing string. Run into hole until impression block is near top of fish. Slowly lower pipe until making contact with fish. Do not rotate. Apply weight to impression block and then pull out of hole. The impression made will assist the operator in determining what tools are needed to prepare and retrieve the fish.

Specification Guide:

OD inch	1 5/8	2 1/4	2 3/4	4 3/4	5 1/2	5 3/4
LENGTH inch	12	12	12	15	15	15

OD inch	8	8 1/2	11	11 1/2	11 3/4	12
LENGTH inch	19	19	20	20	20	20



Specification Guide:

Pipe Size	OD & ID	Pipe Size	OD & ID
3 1/2	Vary As per End thread connections	3 3/4	Vary As per End thread connections
4		4 1/2	
4 3/4		5	
5 3/8		5 1/2	
5 3/4		6	
6 1/4		6 3/8	
6 5/8		6 3/4	
7		7 3/8	
7 5/8		8	
8 1/8		8 5/8	
9		9 3/16	
9 5/16		9 1/2	
9 5/8		10 3/4	
11 3/4		13 3/8	
16			

WASHOVER SAFETY JOINT

MODEL: WC-WSJ

PRODUCT No.: WC-20707

This Wash over Safety Joint is manufactured to provide safe and easy release and make-up whenever disengagement from the wash over string becomes necessary. This dependable, field tough tool is designed to transmit torque in either direction when placed in the was hover string.

Construction – The Wash over Safety Joint consists of a pin section, a box section, and a friction ring. The internal connection of the safety joint is a coarse acme thread used to facility at easy pack-off and re-engagement. A knurled release ring between the box and pin sections maintain torsion integrity until back-off procedure is initiated. An O-ring seal contains pressure while the safety joint is made up.

Assembly – To assemble, install the safety joint in the drill string and make up the service connection to a torque of approximately60 to 75% of the string connections.

In wash over strings, the safety joint should be located between the drill pipe and the wash over pipe. Wash over Safety Joints are provided with a tool joint box thread up and awash over pipe pin thread down.

To disengage the safety joint while down-hole, place pipe intension and apply left-hand torque. Hold torque while slowly lowering pipe until safety joint breaks. Continue to unscrew safety joint to the left. To re-engage the safety joint, lower pipe until pin section of safety joint land son box section. Apply one point of weight. Rotate to the left one or two turns. Then rotate to the right until torque builds up, indicating safety joint is made up.

BOOT BASKET (JUNK SUB)

MODEL: WC-BB

PRODUCT No.: WC-20705

This is an accessory to be used in milling or drilling operations. It is designed to prevent cuttings that are too heavy to be circulated from settling to the bottom of the hole. End connection are furnished as per customer requirement.

Construction:

Boot baskets are manufactured from high-strength heat treated alloy steel to withstand wear. Heavy-duty ribs are attached to the cup to prevent it from being crushed and to guide the tool through tight places while tripping out of the hole. These ribs are not welded to the main body of the tool, further enhancing its strength.

Assembly and Operation:

Boot baskets are used directly above the mill or drill bit. On severe milling jobs, it is customary to run two or three baskets in tandem above the mill. This tandem running not only increases the capacity to remove the cuttings, but also provides extra stabilization for the mill. Boot baskets can be run in either open hole or inside casing. When the basket is working inside a casing, hard faced pads, dressed to the same O.D. as the mill or bit, should be used.

Optional Components and Accessories:

The standard boot basket is a welded assembly with a 10 inch deep cup. Long and extra long baskets are available; these provide a 20 or 30 inch deep cup.

Specification Guide:

Hole Size	4 1/4-4 5/8	4 5/8-4 7/8	5 1/8-5 7/8	6-6 3/8	6 1/2-7 1/2
API Connection	2 3/8	2 7/8	3 1/2	31/2	3 1/2
Body OD (Top Conn.)	3 1/8	3 3/4	4 1/4	4 1/4	4 1/4
Body OD (Under Cup)	2	2 5/8	3 1/8	3 1/4	3 ¼
Cup OD	3 11/16	4	4 1/2	5	5 ½
Cup ID	3 5/8	3 5/8	4 1/4	4 9/16	4 7/8
Dia. Of Bore	3/4	1 1/4	1 1/2	1 1/2	1 1/2

STANDARD TYPE BOOT BASKET

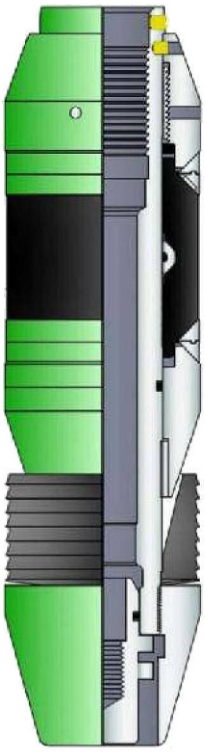
Length of Cup	10	10	10	10	10
Total Length	29	29 1/2	30 1/2	30 1/2	30 1/2

LONG TYPE BOOT BASKET

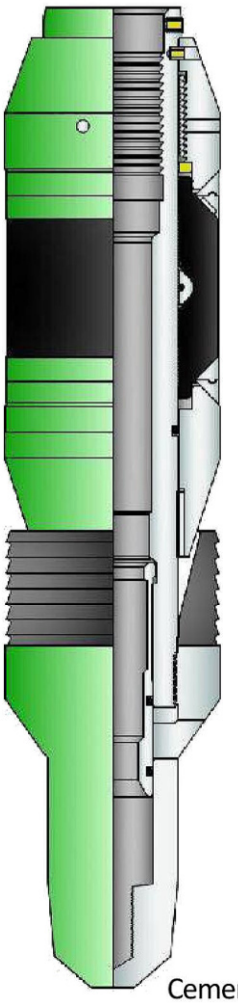
Length of Cup	20	20	20	20	20
Total Length	43 1/2	44	45	45	45

LONG TYPE BOOT BASKET

Length of Cup	30	30	30	30	30
Total Length	53 1/2	54	55	55	55



Bridge Plug



Cement Retainer

DRILLABLE BRIDGE PLUGS & CEMENT RETAINER S

MODEL: WC-WLBP[Wire line set] & WC-MBP [Mechanical set]
PRODUCT No.:WC-21501&WC-21502
MODEL: WC-WLCR [Wire line set] &WC-MCR [Mechanical set]
PRODUCT No.: WC-23201& WC-23202

These are field-proven modular designed high performance drillable bridge plugs, commonly used for zonal isolation during stimulation or cementing jobs, or for temporary and permanent abandonments.

This can easily be converted to a Cement Retainer. A modified version of this Bridge Plug is available for use primarily in gas well applications.

Simple design allows the upper portion of the body and the bridging plug to be drilled out, generating pressure equalization across the tool before drilling out the upper slips.

Cement retainer ideal for most remedial cementing applications. It is designed to function as a drillable squeeze packer which after cementing acts as a plug trapping to squeeze pressure on the cement below the retainer and isolating the newly cemented area from the hydrostatic pressures above the cement retainer.

Changing the upper slip enable the bridge plug to be set mechanically or on a wireline setting tool assembly. It is easily converted to a cement retainer.

Features/Benefits:

- Choices in setting such as wireline, mechanical or hydraulic.
- High Performance - 10,000 psi and 400^0 F.
- Superior running characteristic i.e. enormous annulus clearance for faster & safer run-in.
- With simple kit Cement Retainer easily converted to bridge plug.
- Simple conversion to cement retainer, reducing inventory.
- Body Lock Ring: Traps setting force in element to maintain pack-off during pressure reversals.
- The rotationally locked, cast-iron components enable a fast & easy drill out to save rig time.
- Easily PDC drillable.

Applications:

- Temporary and permanent zone isolation
- Well abandonment
- Cementing
- Stimulation

Specification Guide: [WC-WMCR, WC-WMBP, WC-HMBP]

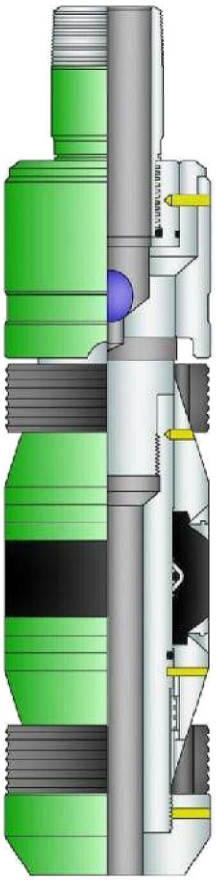
Casing/Tubing				Product			Wireline Adapter Kit Model: WC-WAK
Size	Wt	ID Min.	ID Max.	Size	Max OD	Bore	Size
inch	lbs/ft	inch	inch		inch	inch	
4-1/2	9.5-16.6	3.826	4.090	X1	3.593	1.345	X1-Y1
5	23.2-24.2						
5-1/2	36.4						
5	11.5-20.8	4.154	4.560	Y1	3.937		X1-Y1
5-1/2	26.0-32.3						
	14-23	4.580	5.044	X2	4.312		X2
6	18-26	5.140	5.552	Y2	4.937		Y2
7	49.5						
6-5/8	20-32	5.595	6.135	X3	5.410	2.000	X3
7	32-44						
	17-35	6.000	6.538	Y3	5.687		Y3
7-5/8	45.3						
	20-39	6.625	7.125	X4	6.312		X4
7-3/4	46.1						
8-5/8	24-49	7.511	8.097	X5	7.125		X5
8-3/4	49.7						
9-5/8	29.3-58.4	8.435	9.063	X6	8.125		X6
9-3/4	59.2						
9-7/8	62.8						
10-3/4	60.7-81	9.250	9.660	Y6	9.000		Y6
	32.75-60.7	9.660	10.192	X7	9.437		X7
11-3/4	60.0-83.0	10.192	10.772	Y7	9.937		Y7
	42-60	10.772	11.150	X8	10.437		X8
13-3/8	85-102	11.633	12.159	Y8	11.562		Y8
	48-80.7	12.175	12.715	X9	12.000		X9
13-1/2	81.4						
13-5/8	88.2						
16	109.0-146.0	14.000	14.750	X11	13.915		X11
	55.0-84.0	14.700	15.400	Y11	14.585		Y11

HYDRO MECHANICAL BRIDGE PLUG

MODEL: WC-HMBP

PRODUCT No.:WC-21504

The Hydro-Mechanical Bridge Plug is a drillable bridge plug, which utilizes a built-in hydraulic chamber to begin the setting process.



Features/Benefits:

- Hydraulic actuated mechanical set.
- Slim line design.
- Full tubing ID after releasing, if rotationally released.
- Tubing released by right hand rotation (primary) or shear
- Fast and easy PDC drillable.
- Design based on the dependable PCR product line
- 5 ,000 or 10,000 psi

Application:

- Well abandonment
- Temporary and permanent zone isolation
- Cementing
- Stimulation

COMPOSITE BRIDGE PLUG

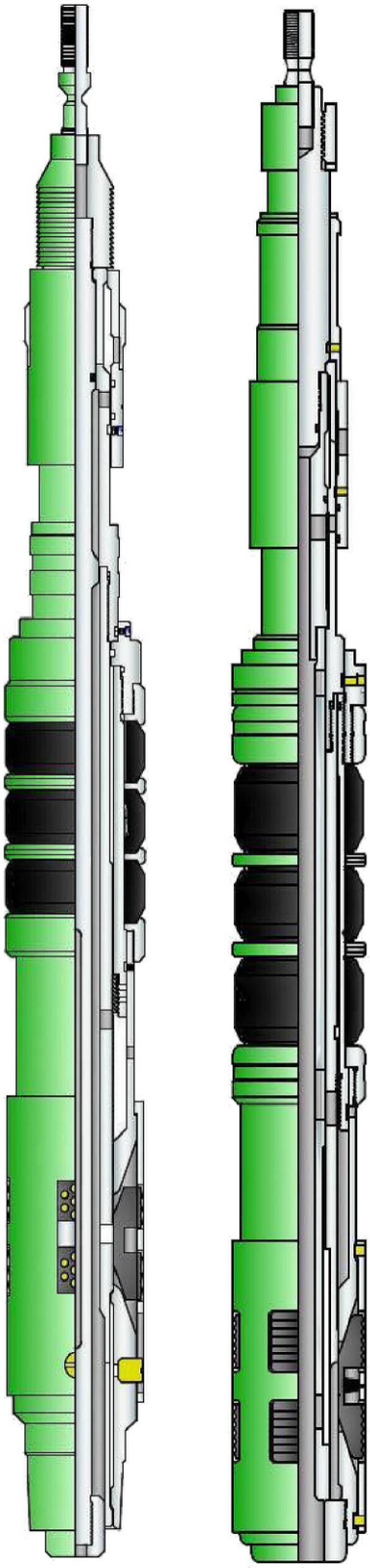
MODEL: WC-CBP

PRODUCT No.: WC-21405

Bridge plug is a wireline set; medium pressure plugs are constructed out of high-tech **composite materials** that are easily drillable even with coiled tubing unit and the cuttings flow back to surface without creating wellbore debris.

Application:

- Well abandonment
- Temporary and permanent zone isolation
- Cementing
- Stimulation



WC-WSRBP-2 WC-WLRBP

WIRE LINE SET RETRIEVABLE BRIDGE PLUG

MODEL:WC-WSRBP-2 &WC-WLRBP

PRODUCT No.:WC-21402 &WC-21403

This is a wireline set, retrievable plug capable of holding differential pressure from above or below. The plug may be set on conventional wireline or hydraulic packer-setting tools. The short design is easy to retrieve on tubing, coil tubing or sandline, using the appropriate retrieval tool.

When the retrieving tool engages the top of the bridge plug, the equalizing valve opens before the bridge plug is released, preventing the bridge plug from moving with differential pressure

Features/Benefits:

- Wireline, hydraulic or coiled tubing set
- Caged bi-directional carbide/carburized slips for long life and durability
- Straight pull and Rotational safety release mechanism
- Optional sand line or coiled tubing retrieval
- Compact design for tight doglegs, short lubricators
- Simple, rig-friendly operation

Application:

- Acidizing, fracturing and cementing
- Casing pressure testing or Zone isolation
- Wellhead repair or replacement

Specification Guide:

Casing				Bridge plug
Size	Weight(lb/ft)	Min.ID	Max.ID	Max. OD
3-1/2	10.2	2.992	2.992	2.781
3-1/2	7.7 - 9.2	2.992	3.068	2.867
4-1/2	9.5 - 13.5	3.910	4.090	3.771
5	15.0 - 18.0	4.250	4.408	4.125
5	11.5 - 15.0	4.408	4.560	4.250
5-1/2	26.0	4.408	4.560	4.250
5-1/2	20.0 - 23.0	4.625	4.778	4.500
5-1/2	15.5 - 20.0	4.778	4.950	4.641
5-1/2	13.5 - 15.5	4.950	5.190	4.781
6	26.0	4.950	5.190	4.781
6-5/8	24.0 - 32.0	5.610	5.921	5.484
6-5/8	24.0	5.830	5.937	5.656
7	38.0	5.830	5.937	5.656
6-5/8	17.0 - 20.0	5.938	6.135	5.812
7	32.0 – 35	5.938	6.135	5.812
7	26.0 – 29.0	6.136	6.276	5.968
7	23.0 – 26.0	6.276	6.366	6.078
7	17.0 – 20.0	6.456	6.578	6.266
7-5/8	33.7 – 39.0	6.579	6.797	6.453
7-5/8	24.0 - 29.7	6.798	7.025	6.672
7-5/8	20.0 - 24.0	7.025	7.125	6.812
8-5/8	20.0-28.0	8.017	8.097	7.781
9-5/8	47.0-53.5	8.343	8.681	8.218
9-5/8	40.0-47.0	8.681	8.835	8.437
9-5/8	29.3-36.0	8.836	9.063	8.593

MECHANICAL SET RETRIEVABLE BRIDGE PLUG

MODEL: WC-MSRBP

PRODUCT No.: WC-21406

This Bridge Plug is a superior, field-proven bridge plug for treating and testing multiple, selected high-pressure zones. The flexible design enables deployment in shallow applications, such as wellhead testing, or in deep, high-pressure environments.

The bridge plug is set in tension or compression, and the large internal bypass prevents swabbing during running and retrieval.

Features/Benefits:

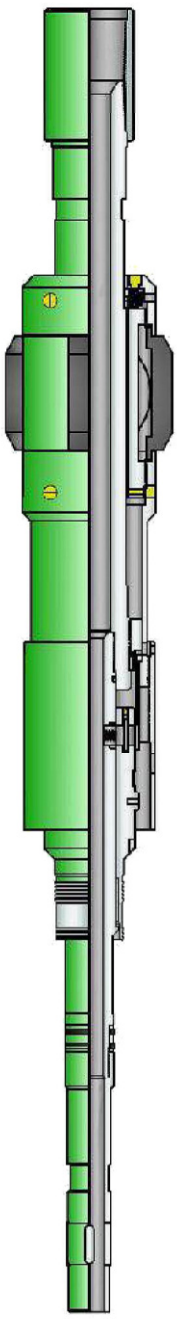
- The one-quarter right turn to set the plug and one-quarter right turn to release it provide reliable operation, especially in applications with limited rotational movement.
- The large, internal bypass equalizes pressure before releasing the upper slips for safe plug retrieval.

Application:

- Wellhead testing, Treating and testing multiple, selected zones
- Deep, high-pressure testing, Fracturing, Temporary zonal isolation

Specification Guide:

Casing				Bridge Plug
Size inch mm	Weight lb/ft	Min. ID inch mm	Max. ID inch mm	OD inch mm
4 1/2 114.3	9.5 to 13.5	3.92 99.57	4.09 103.89	3.75 95.25
5 127.0	11.5 to 15.0	4.408 111.96	4.56 115.82	4.125 104.78
	18.0 to 20.8	4.156 105.56	4.276 108.61	4 101.6
5 1/2 139.7	14.0 to 20.0	4.778 121.36	5.012 127.3	4.625 117.48
	20.0 to 23.0	4.67 118.62	4.778 121.36	4.5 114.3
6 5/8 168.3	24.0 to 32.0	5.675 144.15	5.921 150.39	5.5 139.7
7 177.8	20.0 to 26.0	6.276 159.41	6.456 163.98	5.969 151.61
	26.0 to 32.0	6.094 154.79	6.276 159.41	5.875 149.23
7 5/8 193.7	24.0 to 29.7	6.875 174.63	7.025 178.44	6.672 169.47
	33.7 to 39.0	6.625 168.28	6.765 171.83	6.453 163.91
8 5/8 219.1	28.0 to 40.0	7.725 196.22	8.017 203.63	7.531 191.29
9 5/8 244.5	32.3 to 43.5	8.755 222.38	9.001 228.63	8.5 215.9
	40.0 to 53.5	8.535 216.79	8.835 224.41	8.25 209.55
10 3/4 273.05.	32.75 to 51.0	9.85 250.19	10.192 258.87	9.625 244.47
	51 to 65.7	9.56 242.82	9.85 250.19	9.312 236.52
11 3/4 298.45	42.0 to 71.0	10.586 266.88	11.084 281.53	10.375 263.52
13-3/8 339.72	54.5 to72.0	12.615 320.42	12.347 313.61	12.16 308.86



WC-SLST

WC-MST

SNAP LATCH SETTING TOOL

MODEL: WC-SLST

PRODUCT No.: WC-23301

The Snap Latch Setting Tool is a mechanical setting tool used to set the Bridge Plugs and Cement Retainers.

It possess a built-in snap-latch feature which allows the setting tool to be latched to the product with set-down weight and released with up strain and rotation after setting the product.

This essentially allows the setting tool to function as a snap latch stinger sub which provides an upward stop as the tubing is raised. At this stop the valve is closed but the stinger sub seal is still in the bore of the retainer. At this position in the running string internal pressure test could be carried out.

MECHANICAL SETTING TOOL

MODEL: WC-MST

PRODUCT No.: WC-23302

The Model WC-MST is a mechanical setting tool for drillable cement retainers and bridge plugs.

Applications include: setting cement retainers or bridge plugs on tubing or drill pipe.

Features/Benefits:

- Allows single run for squeeze work
- Locked to cement retainer or bridge plug to avoid premature setting or loss
- Top slips partially covered to protect from accidental damage
- Modular design
- Can set other manufacture cement retainers or bridge plugs

Specification Guide:

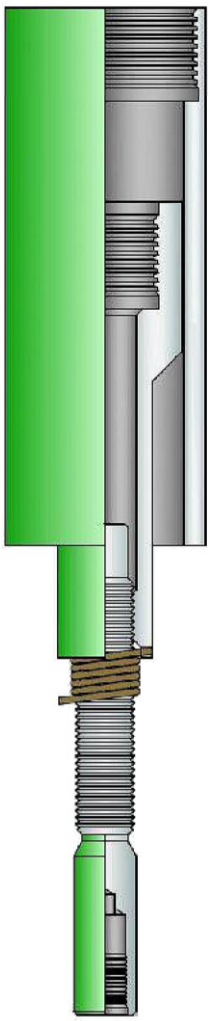
Casing		Tool			Setting Sleeve OD inch	End Connection
Size inch	Weight lb / ft	Size	Seal Bore inch	Max OD inch		
4-1/2	9.5 - 16.6	X1	1.345	3.593	3.594	2 3/8 EU
5	11.5 - 20.8	Y1		3.937		
5-1/2	13 - 23	X2		4.312	4.312	
6	14 -26	Y2		4.937	4.938	2 7/8 EU
	10.5 - 12					
6-5/8	17 - 34	X3	2.000	5.410	5.375	
7	32 - 44					
	17-35	Y3		5.687		
7-5/8	20 - 39	X4		6.312	6.312	
8-5/8	24 - 49	X5		7.125	7.125	
9-5/8	29.3 - 53.5	X6		8.125	8.120	3 1/2 EU
10-3/4	60.7 - 81	Y6		9.000	8.875	
	32.75 - 60.7	X7		9.437	9.437	
11-3/4	60.0 - 83.0	Y7		9.937	9.930	
	38 - 60	X8		10.437	10.438	
13-3/8	85 - 102	Y8		11.562	11.562	4 1/2 EU
	48 - 72	X9		12.000	12.000	
16	109.0 - 146.0	X11		13.915	13.900	
	55.0 - 84.0	Y11		14.585	14.570	

WIRELINE ADAPTER KIT

MODEL: WC-WAK

PRODUCT No.: WC-21602

This Wireline Adapter Kit is used to set bridge plug and cement retainers (WC-WLBP or WC-WLCR) by coupling them with wireline pressure setting assembly while set thru wire line and with hydraulic setting tool while by drill pipe or tubing string in the well bore.

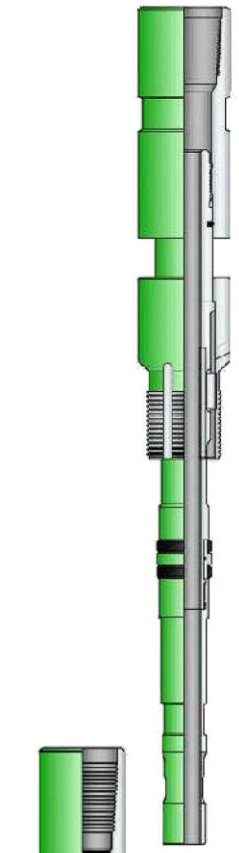


Application:

The Model WC-WAK Wireline Adapter Kit is used to couple a wireline pressure setting assembly or hydraulic setting tool to the WC-WLBP or WC-WLCR.

Specification Guide:

Casing		SIZE
Size inch mm	Weight lb / ft	
4 1/2 114,30	9.5-15.1	43 WAK
5 127,00	11.5-18	45 WAK
5 1/2 139,70	13-23	
6 5/8 168,28	17-34	47 WAK
7 177,80	17-38	
7 5/8 193,68	20-39	48 WAK
8 5/8 219,08	24-29	49 WAK
9 5/8 244,48	29.3-61.1	51 WAK
10 3/4 273,05	32.75-60.7	53 WAK
11 3/4 298,45	38-60	54 WAK
13 3/8 339,78	48-72	55 WAK
16 406.40	65 - 109	75 WAK



SNAP LATCH STINGER SUB

MODEL: WC-SSB

PRODUCT No.: WC-23003

SSB Snap Latch Stinger Sub is used for cementing operation with Cement Retainers

Features/Benefits:

It features a snap-in, snap-out-type latch that provides a surface indication of the stinger being landed in the cement retainer (giving assurance that the sleeve valve is open) or the stinger sub being removed from the cement retainer (and the sleeve valve closed).

Specification Guide:

SIZE	X1-Y2	X3-X9	X11-X11
END CONNCECTION	2 3/8 EU 8 RD	2 7/8 EU 8 RD	3 1/2 EU 8 RD

CONTROL UNIT

MODEL: WC-CU

PRODUCT No.: WC-21417

Application:

The Model WC-CU Control Unit is made up above the stinger sub and provides a centering device for entering the retainer bore.

Specification Guide:

CASING				TOOL	
Size inch mm	WEIGHT lb / ft	Min ID inch mm	Max OD inch mm	SIZE	DRAG SPRING SIZE
4 1/2 114,30	9.5-16.6	3.826 97,18	4.090 103,89	43	10
5 127,00	11.5-18	4.154 105,51	4.560 115,82		
5 1/2 139,70	13-23	4.580 116,33	5.044 128,12	45	20
6 152,40	14-26	5.140 130,56	5.552 141,02		30
	10.5-12	5.595 142,11	6.135 155,83	47	20
6 5/8 168,28	17-34				
7 177,80	32-38				
	17-35	6.004 152,50	6.538 166,07		30
9 5/8 244,48	29.3-53.5	8.435 214,25	9.063 230,20	51	50
11 3/4 298,45	38-60	10.772 273,61	11.150 283,21	53	50
13 3/8 339,73	77-102	11.733 298,02	12.275 311,79	55	
	48-72	12.175 309,25	12.715 322,96		

16 406.40	65 - 109	14.668 372.567	15.250 387.350	65	60

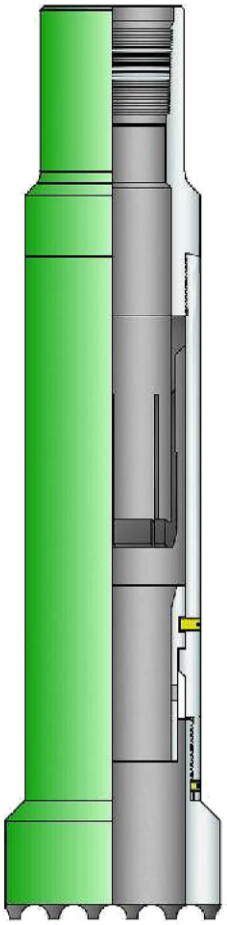
RETRIEVING TOOL WITH WASH OVER SHOE

MODEL: WC-RTRB

PRODUCT No.: WC-21307

This retrieving tool is used to retrieve wireline set retrievable bridge plugs by running sufficient weight above the jars to prevent premature tool release when unloading pressure from below. If high differential pressure from below is expected, retrieval should done thru tubing or drill pile string.

An Emergency Release is also provided for use when retrieving the tool on sand line or wireline in the event the tool will not release in the normal manner. Continued upward jarring will shear 50,000 lb Shear sub and allow retrieval of the tool string and retrieving head.



Specification Guide:

Size inch mm	OD inch mm	Length inch mm	End Connection Specification
4 1/2 114,30	3.750 95.3	24.75 268.7	2-3/8 EU 8 RD
5 127,00			
5 1/2 139.70	4.500 114.3	28.25 717.6	2-7/8 EU 8 RD
7 177.8	5.500 139.7	30.12 765.1	
8 5/8 139.70	7.000 177.8	34.75 882.7	3 1/2 EU 8 RD
9 5/8 244.5	8.200 208.3		

LANDING NIPPLES

MODEL: WC-FLNP [Top No-Go] & WC-RLNP [Bottom No-Go]

PRODUCT No.: WC-60205 & WC-60204

Landing Nipples are of selective, Top No-Go & Bottom No-Go type retaining available for respective model of locking devices.

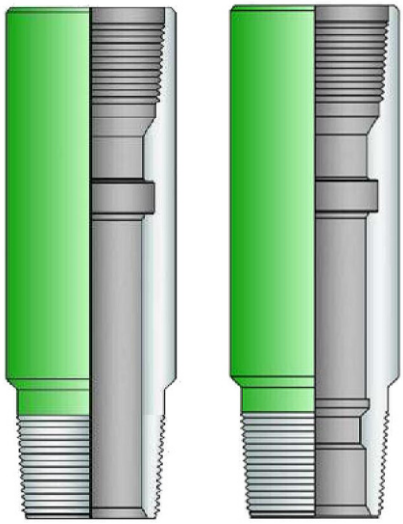
Landing nipples are provided with locking profile and honed seal bore to locate flow control devices such as velocity safety valves, blanking plugs, equalizing check valves and instrument hangers etc.

Numbers & location of landing nipple should be carefully considered in the completion design stage to allow maximum variation in position of various flow control devices.

Landing Nipples are available with high tensile alloy steels or API standard grade of materials with API standard or premium thread end connections to suit customer requirements or well environment (standard or H_2S/CO_2 services). It is available up-to 15,000

- **Specification Guide:**

Tubing Size	Landing Nipple			
inch	Seal Bore inch	Size inch	Min. OD inch	No-Go ID inch
1.900	1.437	1.437	2.109	1.385
	1.500	1.500		1.447
2 1/16	1.562	1.562	2.250	1.510
	1.625	1.625		1.572
2 3/8	1.781	1.781	2.560	1.728
	1.812	1.812		1.760
	1.875	1.875		1.822
2 7/8	2.062	2.062	3.109	1.978
	2.250	2.250		2.197
	2.312	2.312		2.260
3 1/2	2.562	2.562	3.687	2.442
	2.750	2.750		2.697
	2.812	2.812		2.760
4 1/2	3.688	3.688	5.562	3.625
	3.750	3.750		3.700
	3.812	3.812		3.759



WC-FLNP WC-RLNP

"WX" , "WXN", "WR" & "WRN" LANDING NIPPLES

MODEL: WC-LNP-X & WC-LNP-XN

PRODUCT No.: WC-41405 & WC-41406

MODEL: WC-LNP-R & WC-LNP-RN

PRODUCT No.: WC-41407 & WC-41408

LOCK MANDRELS

MODEL: WC-LM-X & WC-LM-XN

PRODUCT No.: WC-41412 & WC-41414

MODEL: WC-LM-R & WC-LM-RN

PRODUCT No.: WC-41413 & WC-41415

Landing nipples are run into the well on the completion tubing to provide a specific landing location for subsurface flow control equipment. The common internal profiles of these Landing Nipples make them universal. WC-LNP-X Landing Nipple is used in standard weight tubing while WC-LNP-R Landing Nipple is typically used with heavy weight tubing.

The completion can have as many selective nipples with IDs in desired sequence on the tubing string. This requires number of positions of Landing Nipples for setting and locking subsurface flow controls. The flow controls required to be placed inside the well is attached to the required lock mandrel and run into the well via the selective running tool on slick line/ Wire-line.

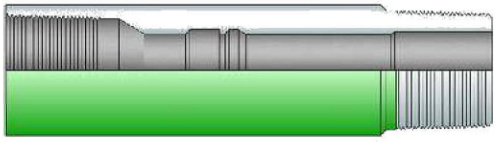
The slick-line operator using the selective running tool can set the flow control in the selective landing nipple at the desired depth. Once location is found to be unsatisfactory or well conditions gets changed, the flow control equipment could be moved up or down the tubing string to another landing nipple location. These operations can be done by Wire-line/slick-line under pressure without killing the well.

Bottom No-Go equipment are designed for use in single nipple installations or as the bottom nipple in a series of selective or Top No-Go landing nipples. These landing nipples have the same packing bore ID for a particular tubing size and weight.

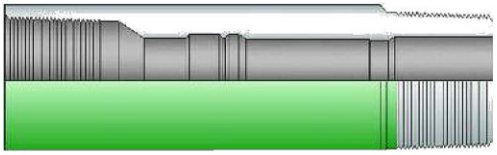
Here N designates Bottom No-Go.

- **Features / Benefits:**

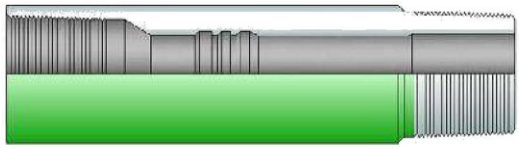
- Large Bore for minimum restriction
- Universal nipple with one internal profile
- Retractable locking Keys
- Locks designed to hold pressure from above or below from sudden reversals
- Optional hold down
- Interference hold-down for smaller locks
- Shear pin hold-down for larger locks



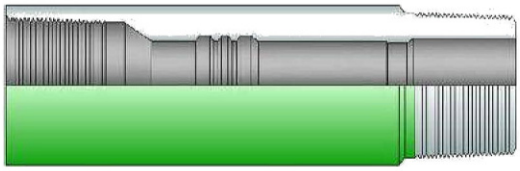
WC-LNP-X



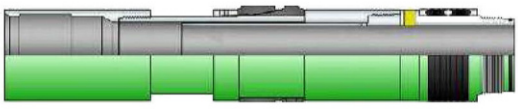
WC-LNP-XN



WC-LNP-R

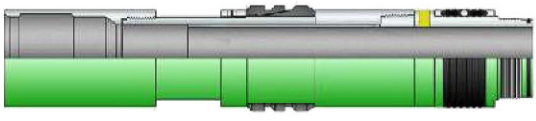


WC-LNP-RN

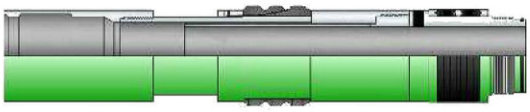


WC-LM-X

WC-LM-XN



WC-LM-R



WC-LM-RN

Specification Guide:

'WX' and 'WXN' LANDING NIPPLES AND LOCK MANDRELS										
TUBING			FOR STANDARD TUBING WEIGHTS							
			WX PROFILE		WXN PROFILE				LOCK MANDREL	
SIZE	WEIGHT	ID	SEALING BORE		SEALING BORE		NO-GO ID		ID	
inch	lb/ft	inch	inch	mm	inch	mm	inch	mm	inch	mm
2 1/16	3.25	1.751	1.625	41.275	1.625	41.275	1.536	39.014	0.75	19.05
2 3/8	4.60	1.995	1.875	47.625	1.875	47.625	1.791	45.491	1.00	25.40
	4.70	1.995	1.875	47.625	1.875	47.625	1.791	45.491	1.00	25.40
2 7/8	6.40	2.441	2.313	58.750	2.313	58.750	2.205	56.007	1.38	35.052
	6.50	2.441	2.313	58.750	2.313	58.750	2.205	56.007	1.38	35.052
3 1/2	9.30	2.992	2.813	71.450	2.813	71.450	2.666	67.716	1.75	44.450
	10.30	2.992	2.750	69.850	2.750	69.850	2.635	66.929	1.75	44.450
4	11.00	3.476	3.313	84.150	3.313	84.150	3.135	79.629	2.12	53.848
4 1/2	12.75	3.958	3.813	96.850	3.813	96.850	3.725	94.615	2.62	66.548
5	13.00	4.494	4.313	109.55	4.313	109.550	3.987	101.269	2.62	66.548
5 1/2	17.00	4.892	4.562	115.87	4.562	115.874	4.455	113.157	3.12	79.248

'WR' and 'WRN' LANDING NIPPLES AND LOCK MANDRELS										
TUBING			FOR HEAVY TUBING WEIGHTS							
			WR PROFILE		WRN PROFILE				LOCK MANDREL	
SIZE	WEIGHT	ID	SEALING BORE		SEALING BORE		NO-GO ID		ID	
inch	lb/ft	inch	inch	mm	inch	mm	inch	mm	inch	mm
2 3/8	5.30	1.922	1.781	45.237	1.781	45.237	1.640	41.656	0.88	22.352
	5.95	1.867	1.710	43.434	1.710	43.434	1.560	39.624	0.75	19.05
	6.20	1.834	1.710	43.434	1.710	43.434	1.560	39.624	0.75	19.05
	7.70	1.678	1.500	38.100	1.500	38.100	1.345	34.163	0.62	15.748
2 7/8	7.90	2.323	2.188	55.575	2.188	55.575	2.010	51.054	1.12	28.448
	8.70	2.259	2.125	53.975	2.125	53.975	1.937	49.1998	0.88	22.352
	8.90	2.236	2.125	53.975	2.125	53.975	1.937	49.1998	0.88	22.352
	9.50	2.196	2.000	50.800	2.000	50.800	1.881	47.7774	0.88	22.352
	10.40	2.109	2.000	50.800	2.000	50.800	1.881	47.7774	0.88	22.352
	11.00	2.065	1.875	47.625	1.875	47.625	1.716	43.5864	0.88	22.352
	11.65	1.998	1.875	47.625	1.875	47.625	1.716	43.5864	0.88	22.352
3 1/2	12.95	2.750	2.562	65.074	2.562	65.074	2.329	59.1566	1.38	35.052
	15.80	2.540	2.313	58.750	2.313	58.750	2.131	54.1274	1.12	28.448
	16.70	2.474	2.313	58.750	2.313	58.750	2.131	54.1274	1.12	28.448
	17.05	2.440	2.188	55.575	2.188	55.575	2.010	51.054	1.12	28.448
4	11.60	3.428	3.250	82.55	3.250	82.55	3.088	78.4352	1.94	49.276
	13.40	3.340	3.125	79.375	3.125	79.375	2.907	73.8378	1.94	49.276
4 1/2	12.75	3.958	3.813	96.850	3.813	96.850	3.725	94.615	2.12	53.848
	13.50	3.920	3.688	93.675	3.688	93.675	3.456	87.7824	2.38	60.452
	15.50	3.816	3.688	93.675	3.688	93.675	3.456	87.7824	2.38	60.452
	16.90	3.748	3.437	87.299	3.437	87.299	3.260	82.804	1.94	49.276
	19.20	3.640	3.437	87.299	3.437	87.299	3.260	82.804	1.94	49.276
5	15.00	4.408	4.125	104.77	4.125	104.77	3.913	99.3902	2.75	69.85
	18.00	4.276	4.000	101.60	4.000	101.60	3.748	95.1992	2.38	60.452
5 1/2	17.00	4.892	4.562	115.874	4.562	115.874	4.455	113.157	2.85	72.39
	20.00	4.778	4.562	115.874	4.562	115.874	4.455	113.157	2.85	72.39
	23.00	4.670	4.313	109.550	4.313	109.550	3.987	101.2698	2.62	66.548
6	15.00	5.524	5.250	133.35	5.250	133.35	5.020	127.508	3.50	88.9
	18.00	5.424	5.250	133.35	5.250	133.35	5.020	127.508	3.50	88.9
6 5/8	24.00	5.921	5.625	142.875	5.625	142.875	5.500	139.7	3.50	88.9
	28.00	5.791	6.625	168.275	6.625	168.275	5.500	139.7	3.50	88.9
7	17.00	6.538	5.962	151.434	5.962	151.434	5.750	146.05	3.75	95.25
	20.00	6.456	5.962	151.434	5.962	151.434	5.750	146.05	3.75	95.25
	23.00	6.366	5.962	151.434	5.962	151.434	5.750	146.05	3.75	95.25
	26.00	6.276	5.962	151.434	5.962	151.434	5.750	146.05	3.75	95.25
	29.00	6.184	5.962	151.434	5.962	151.434	5.750	146.05	3.75	95.25
	32.00	6.094	5.962	151.434	5.962	151.434	5.750	146.05	3.75	95.25
	35.00	6.004	5.875	149.225	5.875	149.225	5.750	146.05	3.75	95.25
8 5/8	36.00	7.825	7.450	189.23	7.450	189.23	7.325	186.055	5.250	133.35
	36.00	7.825	7.250	184.15	7.250	184.15	7.125	180.975	5.250	133.35
	36.00	7.825	7.050	179.07	7.050	179.07	6.925	175.895	5.250	133.35

"WX" & "WXN" BLANKING PLUGS

MODEL: WC-BPL-X & WC-BPL-XN

PRODUCT No.: WC-41403 & WC-41409

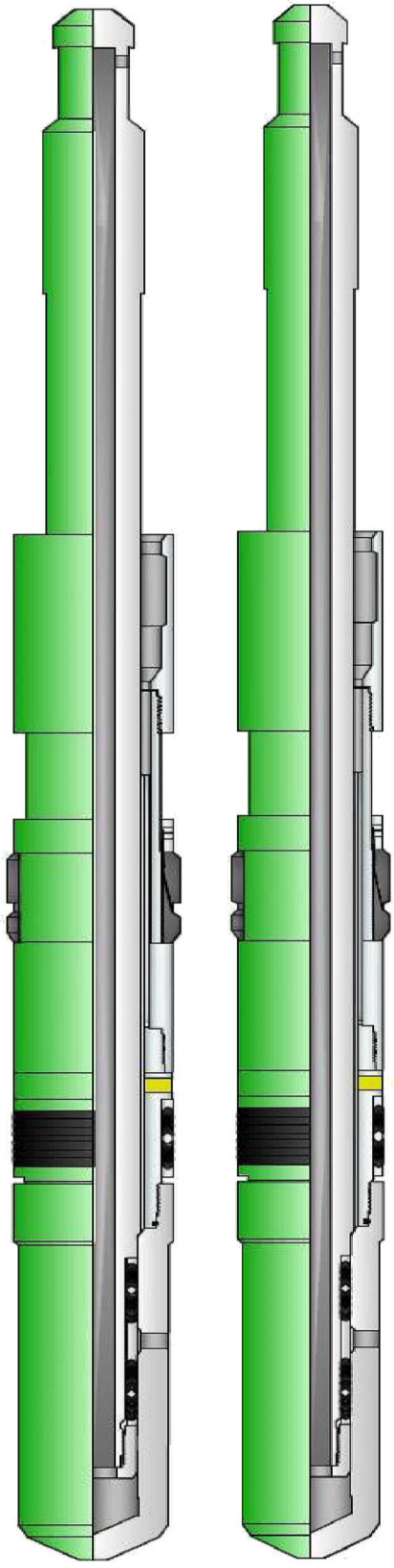
These are Wire-line operated combination tool of Lock mandrel, Equalizing prong and Equalizing sub, set in respective landing nipple of corresponding size and type, in the flow path to plug the tubing, used as flow control devices. Plugs are utilized for holding pressure differentials from above or below when set at relevant profile of Landing Nipples.

Features/Benefits:

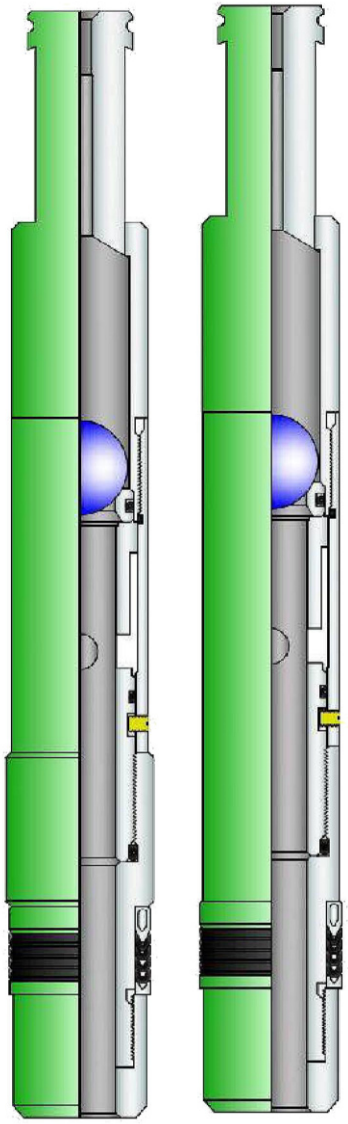
- Maximum versatility reducing completion and production maintenance costs.
- Allows for repositioning of flow controls as well conditions change.
- Keys of locking mandrel retracted into assembly while running and retrieving.
- Running tool allows selection of nipple to land and set the lock.
- Maximum flow capacity from large, straight-through bore of locking mandrel.
- Nipples installed in tubing string in any order- reducing work over risk
- Provides unlimited number of positions to set.
- Same ID in all nipples reducing flowing pressure loss and minimizing turbulence.

Applications:

- Selected zones can be produced or shut in.
- To pressure test tubing.
- To isolate tubing for wellhead repair or removal
- To set hydraulic actuated packers.
- To snub tubing in or out of the well.



WC-BPL-X WC-BPL-XN



WC-ECV-F WC-ECV-R

EQUALIZING CHECK VALVES

MODEL: WC-ECV-F [Run in all Model: WC-FLNP Landing Nipple & L Sliding Sleeve]

WC-ECV-R [Run in all Model: WC-RLNP Landing Nipple]

PRODUCT No.: WC-23417 & WC-23416

Equalizing Check Valves are complete equipment units, without any Locking Device. They are utilized in the respective tubing mounted equipments.

Both models are run into a landing nipple or sliding sleeves profile through Wire-line operated tools to hold pressure from above only. 'WC-ECV-F' model check valve lands on the top of a 'WC-FLNP' landing nipple profile while the 'WC-ECV-R' model seats on the Bottom No-Go shoulder of a 'WC-RLNP' landing nipple.

A 'WC-C1' Running Tool is used to run both valve assemblies.

Both models can be equalized prior to retrieval, by shifting open the Equalizing Mandrel Ports. Standard Pulling Tool is utilized for retrieval of these valves.

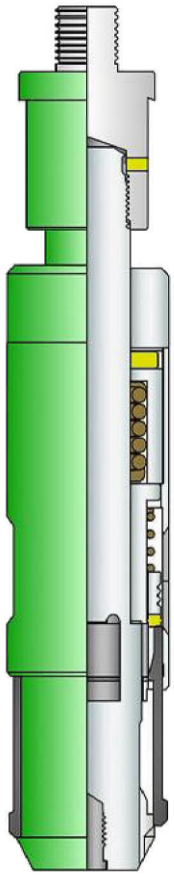
Equalizing Check Valves are manufactured for Standard, H_2S and CO_2 service conditions.

Applications:

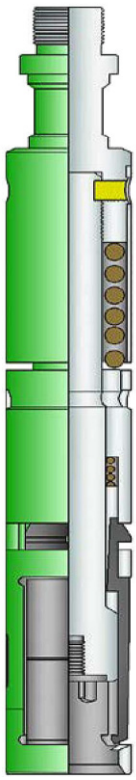
- Can be used as a plugging device for pressure testing of tubing.
- To set hydraulically actuated packer with the check valve at down.
- For gas lift operations.
- To be used as a standing valve in wells with down-hole Electric pumps.

Specification Guide:

Tubing Size	Nipple Seal Bore Size	Check Valve Size	To Run 'WC-C1' Running Tool	To Pull S' Pulling Tool (Jar Down)	ECV Max. OD	ECV-N Max. OD
inch	inch		Size Inches	Size Inches	inch	inch
2 1/16	1.562	1.56	2 1/16	1 1/2	1.615	1.552
	1.625	1.62			1.672	1.615
2 3/8	1.781	1.78	2 3/8	2	1.865	1.771
	1.812	1.81			1.865	1.802
	1.875	1.87			1.905	1.865
2 7/8	2.250	2.25	2 7/8	2 1/2	2.302	2.240
	2.312	2.31			2.364	2.302
3 1/2	2.750	2.75	3 1/2	3	2.802	2.740
	2.812	2.81			2.865	2.802
4 1/2	3.688	3.68	4 1/2	4	3.740	3.678
	3.750	3.75			3.802	3.740
	3.812	3.81			3.875	3.802



WC-PTGS



WC-PTR

'GS' PULLING TOOL

MODEL: WC-PTGS

PRODUCT No.: WC-41404

The Model: WC-GS Pulling Tool is a wireline service tool designed to retrieve flow control devices from well bore. Pulling Tool is designed to engage an internal type fishing neck. The tool is available in a wide range of sizes for standard, H_2S or CO_2 service well conditions.

The Pulling Tool is designed to be released from the down-hole device by downward jarring.

'GR' PULLING TOOL

MODEL: WC-PTGR

PRODUCT No.: WC-41417

A shear up adapter is available for converting a 'GS' Type Pulling Tool into 'GR' pulling tool. The shear pin on the 'GS' Pulling Tool must be removed. The complete assembly, now a Type 'GR' Pulling Tool will operate with a shear-up to release action instead of a shear down.

Conversion adapters are available to suit all sizes of 'GS' Pulling Tool

'R' PULLING TOOL

MODEL: WC-PTR

PRODUCT No.: WC-41418

The "R" Pulling Tool is a wireline service tool designed to remove retrievable subsurface devices with external fishing necks from a well. This tool utilizes a set of three dogs to engage the fishing neck.

The "R" Pulling Tool is available in a wide range of sizes, with three reaches in each sizes. All tools can be supplied for standard or H2S service.

- **Specification Guide:**

SIZE	TO ENGAGE	REACH	MAX O.D.	TOP THREAD
1 1/2"	1.187"	1.297"	1.437"	15/16-10
1 1/2"	1.187"	1.781"	1.437"	15/16-10
2"	1.375"	1.219"	1.770"	15/16-10
2"	1.375"	2.031"	1.770"	15/16-10
2 1/2"	1.750"	1.281"	2.180"	15/16-10
2 1/2"	1.750"	2.000"	2.180"	15/16-10
3"	2.312"	1.500"	2.740"	1 1/16"-10
3"	2.312"	2.219"	2.740"	1 1/16"-10
4"	3.125"	1.800"	3.718"	1 1/16"-10

'S' PULLING TOOL

MODEL: WC-PTS

PRODUCT No.: WC-41401

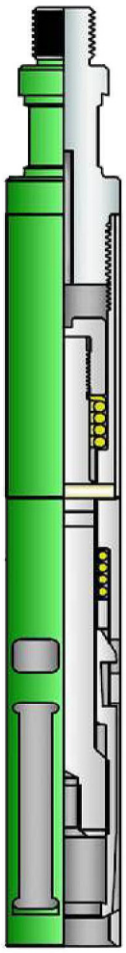
The 'S' Pulling Tool is a wireline service tool designed to retrieve retrievable subsurface devices with external fishing necks from a well. This tool utilizes a set of three dogs to engage the fishing neck.

This Pulling Tool is available in a wide range of sizes, with three reaches in each size. The tools can be supplied for standard or H2S service.

By changing only the core of the 'S' Pulling Tool, it is possible to obtain 'SB', 'SS' or 'SJ' types Pulling Tools.

The "WC-PTS" Pulling Tool is designed to be released from the down-hole device by downward jarring. Therefore the "WC-PTS" Pulling Tool is particularly suited for use as a pulling tool when extensive jarring is required.

Because of the downward shear release of the "WC-PTS" Pulling Tool, it is particularly useful as a running tool for collar stops, pack-off anchor stops, and other subsurface devices landed against a positive no-go.



WC-PTS

Specification Guide:

SIZE	TYPE	TO ENGAGE	REACH	MAX O.D.	TOP THREAD
1 1/2"	SB	1.187"	1.297"	1.437"	15/16-10
1 1/2"	SS	1.187"	1.781"	1.437"	15/16-10
2"	SB	1.375"	1.219"	1.770"	15/16-10
2"	SS	1.375"	2.031"	1.770"	15/16-10
2 1/2"	SB	1.750"	1.281"	2.180"	15/16-10
2 1/2"	SS	1.750"	2.000"	2.180"	15/16-10
3"	SB	2.312"	1.500"	2.740"	1 1/16"-10
3"	SS	2.312"	2.219"	2.740"	1 1/16"-10
4"	SB	3.125"	1.800"	3.718"	1 1/16"-10

'X LINE' RUNNING TOOL

MODEL: WC-RTX

PRODUCT No.: WC-41402

The 'X Line' Selective Running Tool is designed to install subsurface control equipments using a type WC-LM-X Locking Mandrel. The selective features of the WC-RTX Line Running Tool allow the operator to install the down-hole device in a pre-determined WC-LNP-X Landing Nipple by adjusting the tool into the selective position. If the subsurface control is to be installed in the upper most landing nipple, the locking mandrel may be run with the keys in the control or location position.

In addition to setting the WC-LM-X Locking Mandrel, the Running Tool may be used to locate WC-LNP-X Landing Nipples.

The 'R Line' Selective Running Tool, similar in design, is also available in a wide range of sizes to install Type WC-LM-R Locking Mandrels in heavy weight tubing.

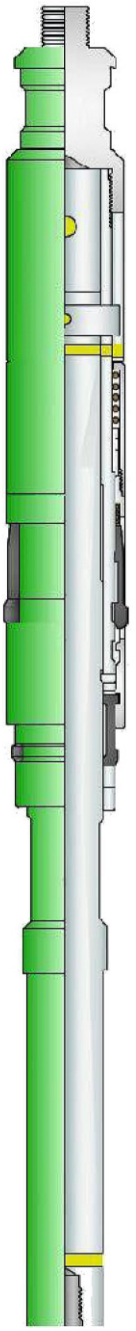
'C1' RUNNING TOOL

MODEL: WC-C1

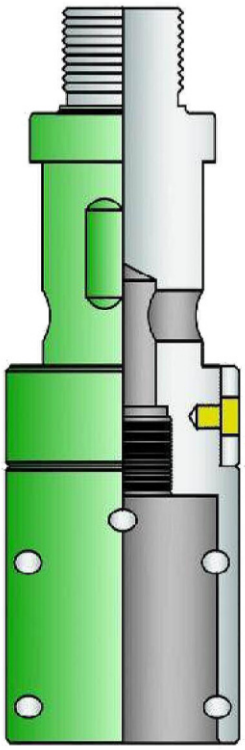
PRODUCT No.: WC-24001

The model 'WC-C1' running tool runs flow Control devices into the well those have external fishing neck locks. A thread protector, which has the same OD as the tool body, makes selective setting possible. A seal bore locating ring provides Top No go setting.

The 'C1' running tool has box-down connection to make up with 'A' or 'N1' type shanks as required.



WC-RTX

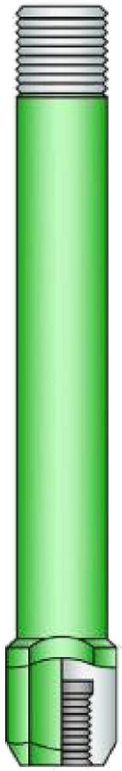


WC-C1

Specification Guide:

Tubing Size	Nipple Seal Bore Size	Accessory Size	Running Tool Size	Locating Ring Size	Top Thread Connection	Fish Neck Size	Shear Pin Diameter
inch	inch	inch		OD inch	Size inch	OD inch	OD inch
2 1/16	1.562	1.56	2 1/16	1.593	15/16-10	1.188	1/8
	1.625	1.62		1.656			
2 3/8	1.781	1.78	2.3/8	1.807	15/16-10	1.375	3/16
	1.812	1.81		1.843			
	1.875	1.87		1.906			
2 7/8	2.062	2.06		2.093			
	2.250	2.25	2.7/8	2.281	15/16-10	1.750	3/16
	2.312	2.31		2.343			
3 1/2	2.562	2.56		2.593			
	2.750	2.75	3.1/2	2.781	1 1/16-10	2.312	3/16
	2.812	2.81		2.843			
4 1/2	3.688	3.68	4.1/2	3.718	1 1/16-10	3.125	3/16
	3.750	3.75		3.802			
	3.812	3.81		3.835			

WC-A



WC-N1

'A' SHANK

MODEL: WC-A

PRODUCT No.: WC-23904

'A' shank is used with the 'C1' running tool to run lock mandrels into the well (keeping dogs retracted during running in). It can also be used as a probe carrier when probes are required during running in operations.

- **Specification Guide:**

Shank Size	Accessory Size	Shank Length		
		Standard Locks	No-Go Locks	
		Dogs Trailing	Dogs Retracted	Dogs Trailing
inch	inch	inch	inch	inch
2 1/16	1.43	4 3/4	5 7/8	4.00
	1.50			
	1.56			
	1.62			
2 3/8	1.78	5	6 1/8	4.00
	1.81			
	1.87			
2 7/8	2.06			
	2.25	4 11/16	6 3/32	4.00
	2.31			
3 1/2	2.56			
	2.75	5 5/16	6 11/16	4.00
	2.81			
4 1/2	3.68	7	6 1/2	4.75
	3.75			
	3.81			

'N1' SHANK

MODEL: WC-N1

PRODUCT No.: WC-23905

'N1' shank is used in conjunction with the 'C1' running tool to run and land flow control equipments such as lock mandrels, blanking plugs, etc into landing nipples.

- **Specification Guide:**

Size inch	Max. OD inch	Top Connection	Bottom Connection	Length inch
2 3/8	0.938	3/4 - 16	1/2 - 13	10 7/8
2 7/8	1.235	1 - 14	1/2 - 13	10 13/16

'N1' PROBE

MODEL: WC-N1-P

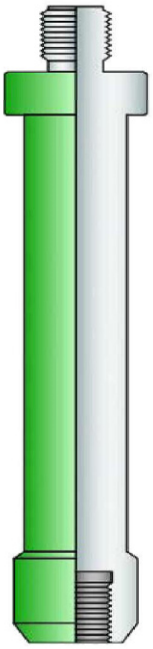
PRODUCT No.: WC-23903

This probe is used to retrieve lock mandrels.

It is used with standard pulling tools.

Specification Guide:

Size inch	Max. OD inch	Bottom Connection	Length inch
2 3/8	0.938	1/2 - 13	10 7/8
2 7/8	1.235	1/2 - 13	10 13/16



WC-N1-P

'A' PROBE

MODEL: WC-A-P

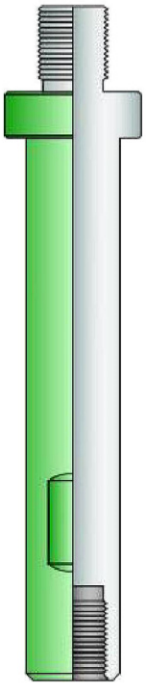
PRODUCT No.: WC-23902

These probes are widely used in running, equalizing and pulling operations of various flow control devices.

- **Specification Guide:**

Accessory Size	Probe Size Major OD	Top Connection
inch	inch	inch
1.43 – 1.62	7/16	7/16 – 14
1.78 -2.06	1/2	1/2 - 14
2.25 – 2.56	1/2	1/2 -14
2.75 – 2.81	5/8	5/8 – 11
3.68 – 3.81	5/8	5/8 - 11

WC-A-P



WC-B-P

'B' PROBE

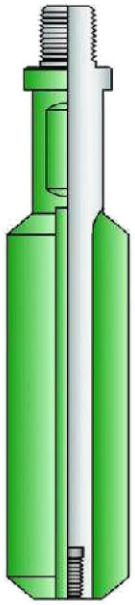
MODEL: WC-B-P

PRODUCT No.: WC-23901

These are used with a standard pulling tools to retrieve lock mandrels.

- **Specification Guide:**

Lock Size	Probe Size	Length	Top Connection	Bottom Connection
inch	inch	inch	inch	inch
1.43 – 1.62	2 1/16	6.28	1/2 – 13	7/16 – 14
1.78 -2.06	2 3/8	7.09	1/2 – 13	1/2 - 14
2.25 – 2.56	2 7/8	7.22	1/2 – 13	1/2 -14
2.75 – 2.81	3 1/2	7.75	5/8 -11	5/8 – 11
3.68 – 3.81	4 1/2	8.50	1 1/4 -12	5/8 - 11



WC-A-G

'A' GUIDE

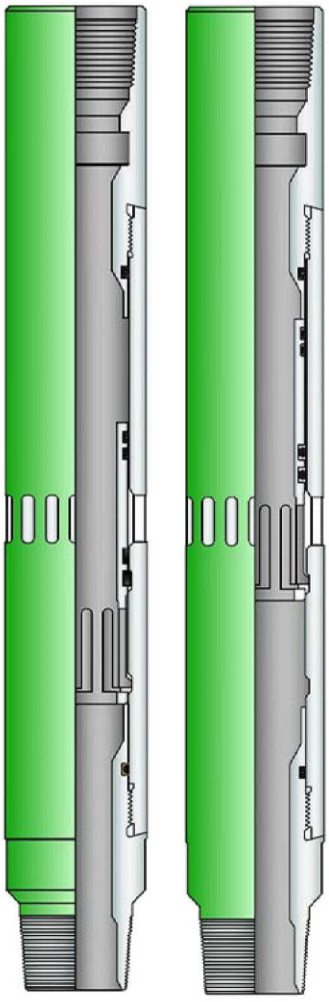
MODEL: WC-A-G

PRODUCT No.: WC-23906

The Model 'WC-A-G' Guide is basically a prong carrier. It centers and limits the probe penetration during equalizing operations. The Guide is manufactured with vertical slots to allow fluid bypass when equalizing taking place.

- **Specification Guide:**

Accessory Size	Guide Size	Fish Neck Size	Top Thread Connection	Maximum Tool OD
inch	inch	inch	inch	inch
1.56 – 1.62	2 1/16	1.188	15/16 - 10	1 1/2
1.78 -2.06	2 3/8	1.375	15/16 - 10	1 3/4
2.25 – 2.56	2 7/8	1.750	15/16 - 10	2 3/16
2.75 – 2.81	3 1/2	2.312	1 1/16 – 10	2 11/16
3.68 – 3.81	4 1/2	3.125	1 1/16 – 10	3 9/16



CLOSE OPEN

'L' SLIDING SLEEVE

'L' SLIDING SLEEVE

MODEL: WC-L

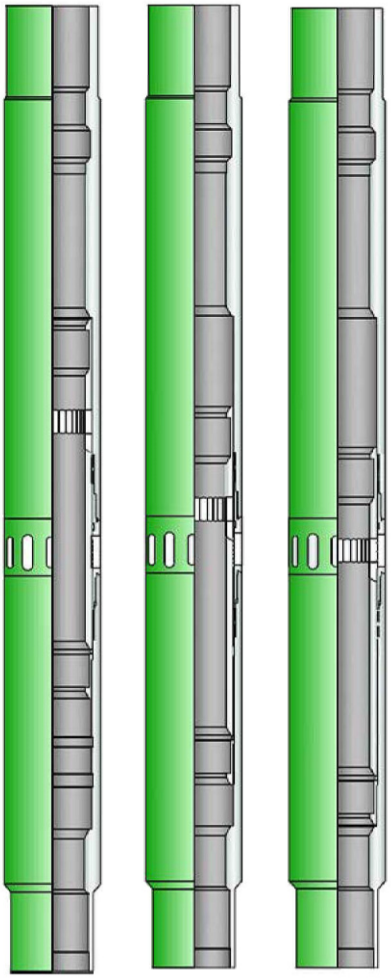
PRODUCT No.: WC-23604

The WELLCARE Model 'WC-L' sliding sleeve is a downhole tool used to establish communication, when desired, between the tubing and annulus. Selective and or top No-Go locking devices are available for use with the sleeve. It has Seal bores above and below the ports, and a top No-Go shoulder and locking groove.

The 'WC-L' sliding sleeve locates seals and retains flow control accessories that have either top No-Go or selective locks. WELLCARE Model 'WC-L' sliding sleeve is manufactured for standard H_2S & H_2S-CO_2 services.

- **Specification Guide:**

TUBING Size	SLIDING SLEEVE		
inch	SEAL BORE inch	Size inch	OD inch
1.900	1.437	1.437	2.375
	1.500	1.500	
2 1/6	1.562	1.562	2.500
	1.625	1.625	
2 3/8	1.781	1.781	2.910
	1.812	1.812	
	1.875	1.875	
2 7/8	2.250	2.250	3.410
	2.312	2.312	
3 1/2	2.750	2.750	4.500
	2.812	2.812	
4 1/2	3.688	3.688	5.500
	3.812	3.812	
5 1/2	4.313	4.313	6.500
	4.562	4.562	



'CMD' SLIDING SLEEVE

SLIDING SLEEVES

MODEL: WC-CMD [Down Shift] & WC-CMU [Up Shift]

PRODUCT No.: WC-23601 & WC-23602

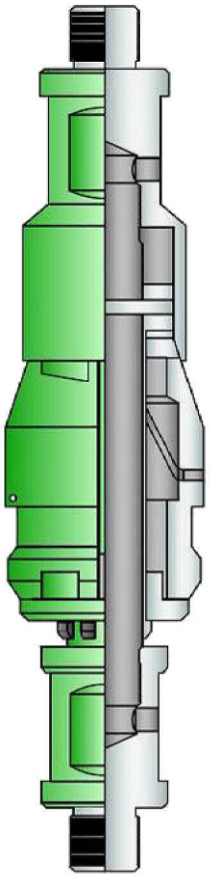
These Sliding Sleeves are high performance, equalizing sliding sleeves which allow communication between the tubing and annulus for circulation or selective-zone production. When desired, the sleeve can be shifted open or closed using standard wireline methods and Wellcare Model "WC-BO" shifting tool. The tool is designed such that any lock profile and compatible seal bores can be specified to accept a wide range of Wireline Locks. and accessories. The sleeve is available in "WC-CMD- downshift-to-open or "WC-CMU" upshift-to-open versions.

'CMD' sliding sleeve can be converted to 'CMU' type or vice-versa by changing the upper and lower subs.

The nominal working specifications for the sleeve, in most cases, are burst, collapse and tensile equal to N-80 tubing, 375°F service temperature with a 1500 psi maximum shifting differential. The sleeves have been designed in four standard materials; 4140, 9Cr-1Mo. 13% Cr and Inconel 718 for a wide range of services.

Specification Guide:

TUBING SIZE inch	SEAL BORE inch	MAX. OD inch	MIN. ID inch	LENGTH inch
2 3/8	1.813	3.090	1.830	47.88
	1.875	3.080	1.900	48.99
2 7/8	1.813	3.750	1.830	48.63
	2.313	3.750	2.375	48.63
3 1/2	2.563	4.280	2.610	59.08
	2.750	4.280	2.775	52.37
	2.813	4.280	2.825	50.01
4	3.313	5.250	3.395	55.25
4 1/2	3.563	5.500	3.785	58.05
	3.750	5.500	3.895	54.89
5	3.813	5.619	3.895	60.26
5 1/2	4.563	6.500	4.677	57.98



WC-BO

'BO' SHIFTING TOOL

MODEL: WC-BO

PRODUCT No.: WC-23702

The 'BO' Shifting Tool is used to move the inner sleeve to its open or closed position in sliding sleeves circulating devices.

The shifting tool engages the recess in the upper (or lower) end of the inner sleeve to permit the sleeve to be shifted by a jarring action. The tool is designed to release itself only after the sleeve reaches its fully open or closed position. This automatic-releasing feature incorporates a releasing profile on the key itself that acts to compress the key spring and release the positioning tool. A shear pin is an added feature designed to release the tool in the event well conditions make it impossible to shift the sleeve.

- **Specification Guide:**

SLIDING SIDE DOOR ID inch	FISH NECK inch	KEYS OD EXPENDED inch	KEYS OD RETRACTED inch	END CONNECTION THREADS	LENGTH
1.500	1.187	1.69	1.49	15/16–10 UN	12.44
1.625	1.187	1.89	1.62	15/16–10 UN	12.75
1.710	1.187	1.89	1.69	15/16–10 UN	12.75
1.781	1.375	2.07	1.75	15/16–10 UN	12.50
1.875	1.375	2.11	1.84	15/16–10 UN	13.30
2.125	1.375	2.35	1.97	15/16–10 UN	13.30
2.313	1.750	2.59	2.16	15/16–10 UN	13.94
2.562	1.750	3.00	2.53	15/16–10 UN	13.94
2.750	2.313	2.9	2.73	11/16–10 UN	14.19
2.813	2.313	3.01	2.72	11/16–10 UN	14.19
3.688	3.125	4.13	3.66	11/16–10 UN	15.75
3.813	3.125	4.09	3.12	11/16–10 UN	13.88

'D2' SHIFTING TOOL

MODEL: WC-D2

PRODUCT No.: WC-23701

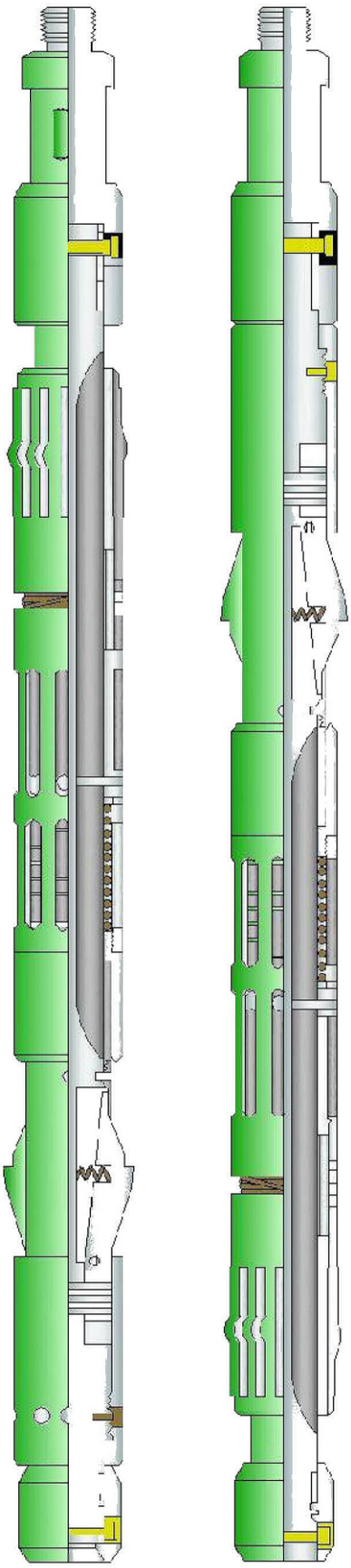
The 'D2' shifting tool is used to provide a safe, Selective and controlled method of opening and closing Model 'L' Sliding sleeve.

Features / Benefits:

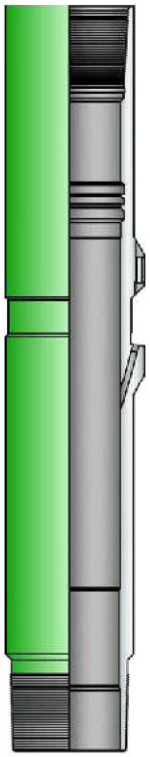
- Automatic Locating Collet- Flags the operator when a sleeve is reached. It also indicates when the tool passes through a sleeve or nipple.
- Proof of Completed Shift- As soon as a shift-either Open or Close is completed, an attempt to repeat the operation will give a positive indication that the shift was performed.
- Safety Feature- If the sleeve is opened in the presence of a differential pressure in favor of the annulus, the release mechanism is held inoperative by the flow until the pressure is balanced to allow safe removal.
- Open and Close Sleeves in one Trip- Run shifting tools in tandem if required to both open and close sleeves on the same run in well. Run tool with collect up to open sleeves or with collect down (Inverted position) to close sleeves.
- Deliberate Release- Even after the shifting tool is seated in the sleeve; it can be released without shifting the closing sleeve.

Specification Guide:

'WC-L' Sliding Sleeve Size inch	Shifting Tool Collet Size inch	Top Thread Connection	Fishing Neck Size inch
1.43	1.468	15/16 - 10	1.188
1.50	1.531	15/16 – 10	1.188
1.56	1.593	15/16 – 10	1.188
1.62	1.656	15/16 - 10	1.188
1.78	1.807	15/16 – 10	1.375
1.81	1.843	15/16 – 10	1.375
1.87	1.906	15/16 – 10	1.375
2.25	2.281	1 1/16 - 10	1.750
2.31	2.343	1 1/16 – 10	1.750
2.75	2.781	1 1/16 – 10	2.312
2.81	2.843	1 1/16 - 10	2.312
3.68	3.743	1 1/16 – 10	2.312
3.81	3.867	1 1/16 - 10	2.312



'D2' SHIFTING TOOL



WC-SVLNP

SAFETY VALVE LANDING NIPPLE

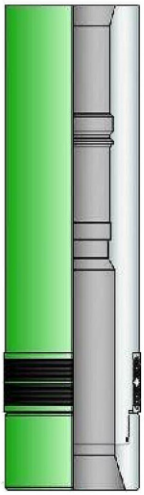
MODEL: WC-SVLNP

PRODUCT No.: WC-41419

Safety Valve Landing Nipples are used to accommodate WELLCARE model "WC-SSSV" Wireline retrievable sub surface safety valves. These nipples have a locking recess and a hydraulic communication port located between the two polished bore. This nipple features an integral control line connection port which operates sub surface safety valves.

- **Specification Guide:**

Tubing Size		Landing Nipple Seal Bore		Working Pressure
inch	mm	inch	mm	Psi
2 3/8	60.33	1.710	43.43	5,000 6,000 7,500 10,000
		1.875	47.63	
2 7/8	73.03	2.125	53.98	
		2.188	55.58	
		2.313	58.75	
3 1/2	88.90	2.562	65.07	
		2.750	69.85	
		2.813	71.45	
4	101.60	3.313	84.15	
4 1/2	114.30	3.437	87.30	
		3.688	93.68	
		3.813	96.85	
5	127.0	4.125	104.78	
5 1/2	139.70	4.562	115.87	
7	177.80	5.750	146.05	
		5.875	149.23	
		5.963	151.46	



WC-SSVS

SEPARATION SLEEVE

MODEL: WC-SSVS

PRODUCT No.: WC-41420

WELLCARE Separation Sleeve, when attached to an appropriate lock is a wire-line retrievable tool, used to isolate the control line port of Safety Valve Landing Nipples (WC-SVLNP).

SURFACE CONTROLLED SUBSURFACE SAFETY VALVES

MODEL: WC-SSSV

PRODUCT No.: WC-41421

Surface Controlled Subsurface Safety valves are installed in the upper wellbore to provide emergency closure of the producing conduits in the events of an emergency. This safety valve system is designed to be fail safe, so that the wellbore is isolated in the event of any system failure or damage to the surface production control facilities. WELLCARE Safety valve is a self equalizing, Wireline retrievable, surface controlled and flapper type.

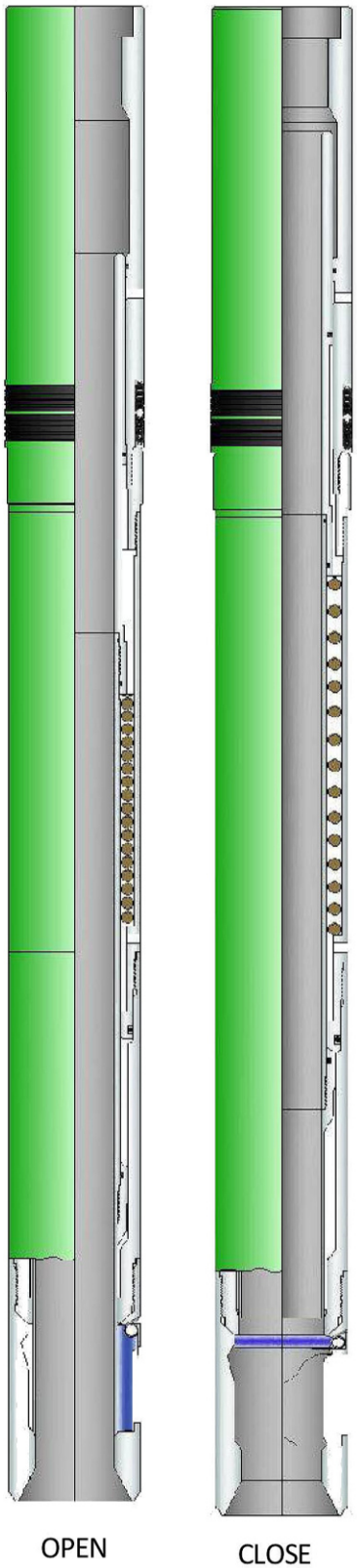
WELLCARE model Safety valve is installed in respective Landing Nipples.

Features/Benefits:

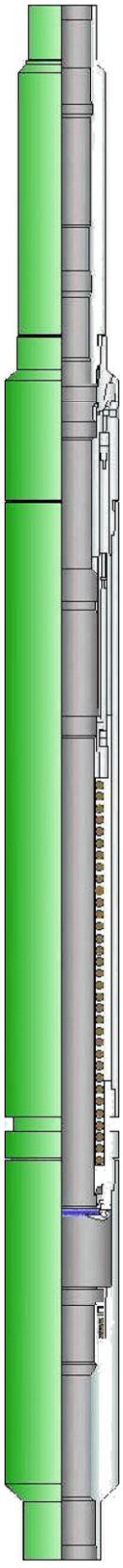
- Self equalizing type
- Working pressure up to 10,000 psi
- Sealing and sealing surfaces are out of flow path, when valve is in the open position
- Solid construction of flapper made from bar stock.

Specification Guide

Tubing Size		Landing Nipple Seal Bore		Valve ID		Working Pressure
inch	mm	inch	mm	inch	mm	Psi
2 3/8	60.33	1.710	43.43	0.625	15.75	5,000 6,000 7,500 10,000
		1.875	47.63	0.750	19.05	
2 7/8	73.03	2.125	53.98	0.812	20.57	
		2.188	55.58	0.812	20.57	
		2.313	58.75	1.125	28.45	
3 1/2	88.90	2.562	65.07	1.000	25.40	
		2.750	69.85	1.500	38.10	
		2.813	71.45	1.500	38.10	
4	101.60	3.313	84.15	1.750	44.45	
4 1/2	114.30	3.437	87.30	1.750	44.45	
		3.688	93.68	1.875	47.50	
		3.813	96.85	2.125	53.85	
5	127.0	4.125	104.78	2.375	57.15	
5 1/2	139.70	4.562	115.87	2.562	65.02	
7	177.80	5.750	146.05	3.375	85.85	
		5.875	149.23	3.500	88.90	
		5.963	151.46	3.500	88.90	



WC-SSSV



WC-TRSV

TUBING RETRIEVABLE SAFETY VALVE

MODEL: WC-TRSV

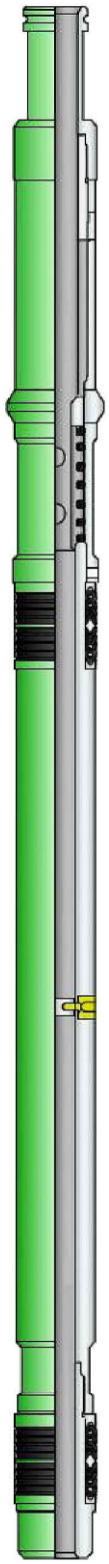
PRODUCT No.: WC-41422

Tubing Retrievable Surface Controlled Sub Surface Safety Valves form part of production string. Hydraulic control line extending from the valve to the wellhead connects to a part on the outside of the valve. The opposite end of the control line connects to the wellhead. Hydraulic pressure applied through this control line acts on hydraulic pistons within the valve. The force generated moves the flow tube down against a power spring and tubing pressure, causing the flapper to open. Maintaining this hydraulic pressure causes the flow tube to move up by the action of the closed position.

The Tubing Retrievable Surface Controlled Sub Surface Safety Valves have been designed in standard materials; Inconel and Incoloy for a wide range of services.

Specification Guide:

Tubing Size		Max. OD		Min. ID		Working Pressure
inch	mm	inch	mm	inch	mm	PSI
2 7/8	73.0	5.453	138.5	2.224	56.9	5,000 / 10,000
3 1/2	88.9	5.750	146.1	2.625	66.8	
4 1/2 X 3 1/2	114.3 X 88.9	5.945	151.0	2.562	65.0	
4 1/2	114.3	7.875	200.0	3.812	96.8	
5 1/2	139.7	8.375	212.7	4.562	115.9	5,000
7	177.8	9.437	239.7	6.000	152.4	



WC-SS

'LGE' SEPARATION SLEEVE

MODEL: WC-SS

PRODUCT No.: WC-23605

This Separation Sleeve is a Top No-Go device which is run on wireline and designed to be landed and set in the 'L' Type sliding sleeve. These are equipped with two packing assemblies those seal the upper and lower seal bore of sliding sleeve, therefore isolating the sleeve ports. Production can be maintained by producing the well through the inside diameter of the tool. The separation Sleeve is also designed with an internal equalizing plug to equalize pressure before retrieving.

- **Specification Guide:**

Size Inches	Seal Bore Size	Size	Max OD Inches	To Run		To Equalize		To Pull	
				'C1' Running Tool	'N1' Shank	'A' Guide	'A' Probe	'S' Pulling Tool	"WC-N1-P" Probe
2 3/8	1.780	1.780	1.865	2 3/8		2 3/8	1/2	2	2 3/8
	1.812	1.812							
	1.875	1.875	1.928						
2 7/8	2.250	2.250	2.302	2 7/8		2 7/8	1/2	2 1/2	2 7/8
	2.310	2.310	2.365						
3 1/2	2.750	2.750	2.802	3 1/2		3 1/2	5/8	3	3 1/2
	3.812	3.812	2.865						
4 1/2	3.688	3.688	3.740	4 1/2		4 1/2	5/8	4	4 1/2
	3.812	3.812	3.875						

NON ROTATING HYDRAULIC LINER HANGERS

MODEL: WC-NRHLH-1 (Single Cone) & WC-NRHLH-2 (Double Cone)

PRODUCT No.: WC-10103 & WC-10109

The Hydraulic Set Liner Hanger is an economical, medium duty hanger that is ideal for deviated or horizontal wells. This is set hydraulically by applying pressure through the running string. A setting ball is circulated or dropped to a ball seat built in the landing collar. Applied pressure acts on the internal piston, moving slips up the cone to the set position.

The piston seals are glass-filled Teflon for higher pressure and temperature ratings. A high-strength alloy hydraulic cylinder is used to provide high burst/collapse rating to meet the customer's requirement/demand. The Hanger provides full bypass in the set position during cementing operations. The hydraulic cylinder is safety pinned to actuate at a controlled or predetermined setting force.

The hanger body is furnished with higher group of API 5CT standard materials as well as with the end connections in compliance to API standards or any premium threads as per the customer's requirement/demand. Materials suited for H2S or CO2 service are available on request.

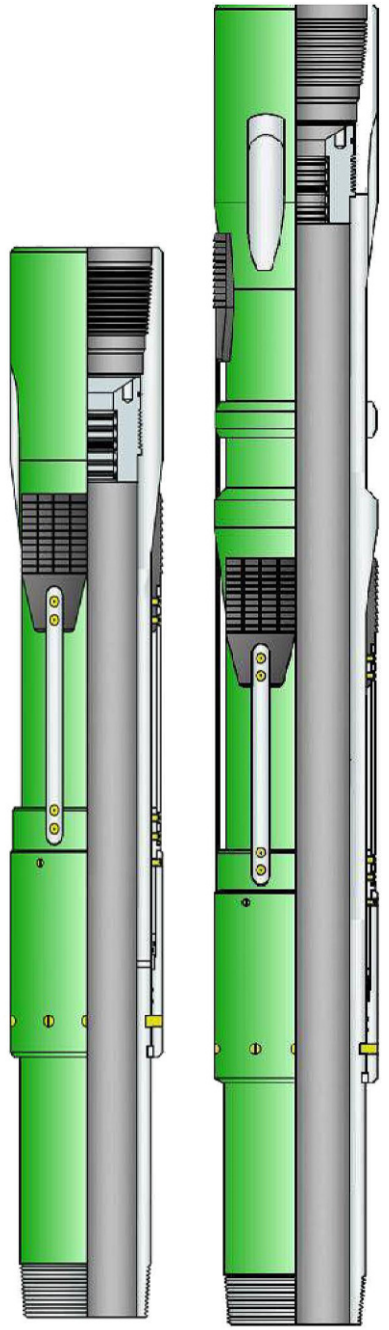
Features / Benefits:

- Multi-cone design provides maximum bypass area.
- No casing manipulation required to set hanger.
- Hanger sets with applied hydraulic pressure.
- Premium Teflon seals for high temperature/pressure applications.
- Large slip area supports long/heavy liner loads.
- Shear mechanism pretested for down-hole reliability.
- Ideal for highly deviated or horizontal applications.

Applications:

Non Rotational Hydraulic Liner Hanger is used to hang a liner in well without rotating the work string to set the hanger. The hydraulic liner hanger is recommended for applications such as setting new liner through existing liners or on floating rigs. Few more applications of liner hanger as here under:

- Case off open hole more rapidly and easily.
- Deepening of old wells.
- Drilling with tapered drill string.
- To accomplish a sidetrack from vertical hole.
- Testing of lower zone of new well before plugging back to primary pay.
- Flexibility to place slotted liner in open hole or horizontal wells.



WC-NRHLH-1 WC-NRHLH-2

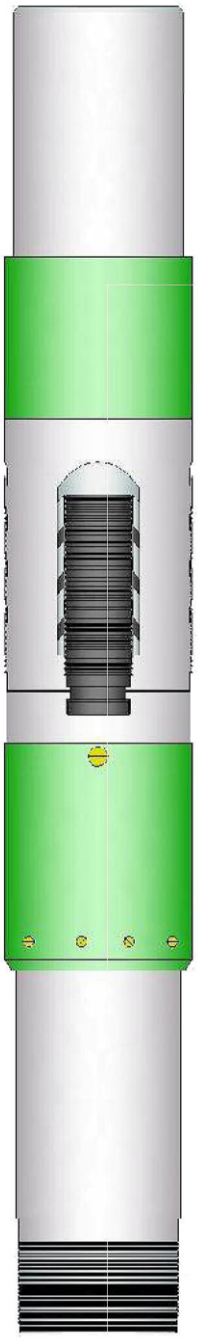
Specification Guide:

Liner (inch)	Casing (inch)	Weight (lbs/ft)	Cone OD (inch)	Bypass Flow Area (inch²)		Hanging Capacity Based on Casing Weight (lbs)			
				Unset	Set	J-55/K-55	N-80/L-80	P-110	Q-125
2 7/8	4 1/2	10.50	3.750	3.75	2.88	42,340	61,610	84690	96,270
		11.60		3.43	2.7	56,180	81,690	1,12,250	1,27,580
		12.60		3.16	2.56	60,900	88,520	1,21,700	1,38,290
	5	23.20		3.7	2.85	72,040	1,04,770	1,44,070	1,63,730
3 1/2	5	13.00	4.188	3.81	2.83	45,100	65,560	90,190	1,02,510
		15.00		3.21	2.5	66,350	96,500	1,32,700	1,50,740
		18.00	4.062	2.79	2.09	81,130	1,18,030	1,62,260	1,84,380
3 1/2	5 1/2	14.00	4.625	5.91	4.59	58,070	84,460	1,16,140	131.92
		15.50		5.42	4.31	64,450	93,800	1,29,040	1,46,600
		17.00	4.500	5.5	4.17	70,760	1,02,940	141510	1,60,800
		20.00	4.375	5.14	3.78	81,530	1,18,550	1,63,060	1,85,240
		23.00		4.34	3.33	92200	134110	184530	209680
	5 5/8	26.70		4.35	3.34	102000	148380	204000	231880
	5 3/4	21.80	4.625	5.81	4.54	74100	107730	148090	168390
		24.20		5.11	4.13	87880	127880	175750	199750
4 1/2	6 5/8	28.00	5.375	6.45	4.57	82420	119820	164830	187270
		32.00		5.4	4.03	143520	208830	287040	326140
4 1/2	7	23.00	6.000	8.64	6.98	75430	109680	150860	171440
		26.00	5.875	8.44	6.62	106570	154940	213140	242030
		29.00		7.54	6.13	128470	186860	256940	291980
		32.00		6.67	5.66	142670	207470	285330	324260
		35.00	5.750	6.49	5.32	152070	221110	304140	345430
		38.00	5.625	6.36	5.01	162720	236520	325220	369670
		41.00		5.44	4.54	180040	261960	360310	409370
4 1/2	7 5/8	39.00	6.250	9.87	8.16	112950	164320	225900	256690
		42.80		8.59	7.44	157400	229100	315020	357860
		45.30		7.92	7.06	161470	234780	322930	367010
	7 3/4	46.10		9.19	7.78	137450	199950	274910	312290
5	7	23.00	6.000	7.1	5.44	75,430	1,09,680	1,50,860	1,71,440
		26.00	5.875	6.9	5.08	73,210	1,06,430	1,46,410	1,66,260
		29.00		6	4.59	1,14,440	1,66,460	2,28,890	2,60,100
		32.00		5.13	4.12	1,38,310	2,01,130	2,76,610	3,14,350
		35.00	5.800	4.68	3.74	1,52,070	2,21,110	3,04,140	3,45,430
		38.00	5.625	4.82	3.47	77,270	1,12,320	1,54,440	1,75,550

Liner (inch)	Casing (inch)	Weight (lbs/ft)	Cone OD (inch)	Bypass Flow Area (inch²)		Hanging Capacity Based on Casing Weight (lbs)			
				Unset	Set	J-55/K-55	N-80/L-80	P-110	Q-125
5	7 5/8	24.00	6.688	9.99	8.31	1,30,000	1,88,990	2,59,650	2,95,320
		26.40		9.37	7.97	1,41,590	2,05,880	2,83,180	3,21,820
		29.70	6.500	9.5	7.64	1,58,930	2,31,500	3,18,190	3,61,540
		33.70		8.32	7	1,79,730	2,61,490	3,59,470	4,08,450
		39.00	6.375	7.6	6.34	2,04,440	2,97,430	4,08,890	4,64,620
		42.80	6.250	7.05	5.79	2,23,340	3,25,080	4,46,990	5,07,780
		45.30		6.38	5.45	2,36,570	3,43,980	4,73,130	5,37,710
	7 3/4	46.10	6.375	6.92	5.99	2,32,790	3,38,630	4,65,570	5,28,890
5 1/2	7	23.00	6.125	4.71	3.6	78040	113490	156090	177390
		26.00		3.81	3.11	89140	129600	178280	202450
5 1/2	7 5/8	24.00	6.688	8.29	6.61	71,630	1,04,140	1,43,070	1,62,730
		26.40		7.68	6.27	77,000	1,11,970	1,54,010	1,75,030
		29.70	6.500	7.8	5.94	87,510	1,27,470	1,75,200	1,99,060
		33.70		6.63	5.3	98,280	1,42,990	1,96,570	2,23,350
		39.00	6.375	5.9	4.65	1,12,950	1,64,320	2,25,900	2,56,690
		42.80	6.250	5.35	4.2	90,040	1,31,060	1,80,210	2,04,720
		45.30		4.68	3.83	1,21,660	1,76,900	2,43,320	2,76,530
	7 3/4	46.10	6.375	5.23	4.3	1,32,280	1,92,430	2,64,560	3,00,540
5 1/2	8 5/8	24.00	7.750	13.9	11.93	1,36,590	1,98,630	2,72,710	3,10,210
		28.00		12.88	11.36	1,55,260	2,25,790	3,10,520	3,53,120
		32.00	7.562	13.02	10.99	1,79,990	2,61,520	3,59,990	4,08,990
		36.00		11.83	10.34	2,01,590	2,93,350	4,03,640	4,58,330
		40.00	7.375	11.91	9.93	2,23,890	3,25,580	4,47,780	5,08,890
		44.00		10.71	9.28	2,45,520	3,57,280	4,91,040	5,57,920
6 5/8	8 5/8	32.00	7.562	8.63	6.6	79,780	1,15,910	1,59,560	1,81,280
		36.00		7.44	5.95	1,21,310	1,76,530	2,42,900	2,75,810
		40.00	7.375	7.52	5.57	1,01,400	1,47,460	2,02,810	2,30,480
		44.00		6.31	4.92	1,51,780	2,20,860	3,03,550	3,44,900
7	9 5/8	32.30	8.500	14.33	11.03	1,04,830	1,52,540	2,09,660	2,38,220
		36.00		13.21	10.42	1,35,170	1,96,610	2,70,340	3,07,200
		40.00	8.375	12.99	9.96	1,81,700	2,64,500	3,63,400	4,13,080
		43.50		11.88	9.37	2,04,450	2,97,510	4,08,900	4,64,830
		47.00		10.87	8.84	2,17,120	3,16,020	4,34,240	4,93,580
		53.5SD		8.9	7.82	2,39,800	3,48,920	4,79,600	5,45,160
		47.00	8.313	11.35	8.91	1,93,520	2,81,670	3,87,040	4,39,930
		53.50		9.38	7.89	2,50,700	3,64,780	5,01,400	5,69,940
			8.125	10.82	8.13	1,53,690	2,23,630	3,07,380	3,49,400

Liner (inch)	Casing (inch)	Weight (lbs/ft)	Cone OD (inch)	Bypass Flow Area (inch²)		Hanging Capacity Based on Casing Weight (lbs)			
				Unset	Set	J-55/K-55	N-80/L-80	P-110	Q-125
7	9 5/8	58.40	8.125	9.48	7.44	2,20,150	3,20,050	4,40,300	5,00,240
		59.40		9.11	7.25	2,17,410	3,16,300	4,34,830	4,94,090
		61.10		8.69	7.04	2,35,000	3,41,780	4,70,000	5,33,920
7	9 3/4	59.20	8.313	9.71	8.07	2,58,280	3,75,760	5,17,000	5,87,400
			8.375	9.23	7.99				
	9 7/8	62.80	8.313	10.59	8.52	2,63,700	3,83,640	5,27,390	5,99,270
			8.375	10.11	8.44	2,67,960	3,89,840	5,35,920	6,08,960
7	10 3/4	45.50	9.500	20.07	16.83	1,52,870	2,22,470	3,05,730	3,47,580
		51.00		18.51	15.98	1,91,020	2,77,760	3,82,040	4,34,180
		55.50		17.13	15.24	2,09,980	3,05,730	4,19,960	4,77,320
		60.70	9.250	17.79	14.83	2,16,180	3,14,530	4,32,370	4,91,290
		65.70		16.28	14.03	2,52,640	3,67,350	5,04,810	5,74,010
		71.10		14.64	13.18	2,75,870	4,01,480	5,51,740	6,27,100
7 5/8	9 5/8	43.50	8.437	8.47	6.38	1,01,360	1,47,490	2,02,710	2,30,440
		47.00		7.45	5.85	1,10,450	1,60,760	2,20,900	2,51,080
		53.5SD		5.48	4.83	1,27,530	1,85,560	2,55,060	2,89,930
		53.50	8.313	6.45	5.03	1,01,370	1,47,500	2,02,740	2,30,450
	9 3/4	59.20	8.437	5.82	5	1,37,360	1,99,840	2,74,950	3,12,390
	9 7/8	62.80		6.69	5.45	1,41,900	2,06,440	2,83,790	3,22,470
7 5/8	10 3/4	45.50	9.500	17.14	13.9	1,61,100	2,34,450	3,22,200	3,66,300
		51.00		15.58	13.05	2,02,710	2,94,760	4,05,420	4,60,750
		55.50		14.2	12.31	2,21,500	3,22,500	4,43,000	5,03,500
		60.70	9.375	13.77	11.71	2,41,560	3,51,450	4,83,120	5,48,960
		65.70	9.188	13.88	11.2	2,60,100	3,78,200	5,19,720	5,90,970
		71.10		12.24	10.34	2,82,270	4,10,800	5,64,540	6,41,660
		73.20	9.125	12.12	10.09	2,85,350	4,14,750	5,70,220	6,47,960
7 5/8	11 3/4	60.00	10.375	22.4	19.19	216540	314820	432540	491400
		65.00		20.89	18.39	235980	343440	472500	536760
		66.70		20.45	18.16	241920	352080	483840	549720
7 5/8	11 7/8	71.80		21.38	18.65	254880	370440	509220	578880
8 5/8	10 3/4	32.75	9.750	13.52	10.34	31,250	45,380	62,500	71,000
		40.50		11.27	9.09	82,320	1,19,930	1,64,900	1,87,260
		45.50	9.500	11.94	8.7	37,590	54,710	75,180	85,470
		51.00		10.38	7.85	81,410	1,18,370	1,62,810	1,85,030
		55.50		9	7.11	1,28,030	1,86,410	2,56,050	2,91,020
		60.70	9.400	8.35	6.47	1,38,590	2,01,640	2,77,180	3,14,960
9 5/8	11 3/4	60.00	10.438	10.77	8.09	105060	152750	209860	238420
		65.00		9.25	7.28	156880	228320	314130	356850
		66.70		8.81	7.06	170690	248410	341380	387860
9 5/8	11 7/8	71.80		9.74	7.54	150570	218830	300820	341970

Liner (inch)	Casing (inch)	Weight (lbs/ft)	Cone OD (inch)	Bypass Flow Area (inch²)		Hanging Capacity Based on Casing Weight (lbs)			
				Unset	Set	J-55/K-55	N-80/L-80	P-110	Q-125
9 5/8	13 3/8	61.00	11.875	27.67	21.73	2,16,300	3,15,000	4,33,300	4,92,100
		68.00		25.71	20.68	2,38,050	3,46,380	4,76,790	5,41,650
		72.00	11.750	25.77	20.22	2,51,600	3,65,840	5,03,200	5,71,880
		77.00		24.38	19.49	2,73,240	3,97,440	5,46,480	6,21,000
		80.70		23.22	18.88	2,82,310	4,10,940	5,65,300	6,42,470
		85.00		22.15	18.32	2,96,530	4,30,570	5,92,380	6,72,940
		86.00		21.5	17.99	3,01,500	4,38,180	6,03,000	6,84,740
	13 1/2	81.40		25.63	20.15	2,76,550	4,01,470	5,52,440	6,27,920
	13 5/8	88.20		26.31	20.51	2,82,880	4,10,880	5,65,120	6,41,920
9 7/8	13 3/8	61.00	11.875	26.11	20.18	199000	289800	398640	452730
		68.00		24.16	19.13	233570	339850	467810	531450
9 5/8	13 1/2	81.40		22.7	18.35	280280	406880	559880	636380
	13 5/8	88.20		23.38	18.71	296140	430140	591610	672010
10 3/4	13 3/8	61.00	12.125	17.56	13.9	1,83,240	2,66,850	3,67,070	4,16,880
		68.00		15.6	12.87	2,04,590	2,97,690	4,09,760	4,65,510
		72.00	12.000	15.69	12.43	2,22,740	3,23,880	4,45,480	5,06,280
		77.00		14.3	11.71	2,37,200	3,45,020	4,74,410	5,39,100
	13 1/2	81.40		15.55	12.36	2,14,450	3,11,320	4,28,390	4,86,920
	13 5/8	88.20		16.23	12.72	2,13,490	3,10,090	4,26,490	4,84,450
11 3/4	16	84.00	14.375	36.45	29.43	2,37,800	3,45,530	4,75,610	5,40,250
		95.00		33.12	27.64	2,71,320	3,95,010	5,43,440	6,17,650
		97.00		32.7	27.42	2,76,110	4,01,390	5,52,220	6,27,230
		109.00	14.125	32.27	26.03	3,15,210	4,58,050	6,29,620	7,15,810
		118.00		29.56	24.61	3,43,140	4,99,550	6,86,280	7,80,440
		128.00		26.55	23.06	3,75,060	5,45,030	7,50,120	8,52,260
13 3/8	16	84.00	14.700	19.05	15.48	1,43,040	2,07,840	2,86,080	3,24,960
		95.00	14.625	16.74	13.94	1,84,960	2,69,280	3,70,460	4,21,060
		97.00		16.32	13.73	1,94,520	2,82,790	3,89,040	4,41,890
		109.00	14.437	15.12	12.23	2,07,770	3,01,920	4,15,010	4,71,820
16	18 5/8	87.50	17.375	25.03	19.75	1,81,130	2,63,240	3,62,250	4,11,360
		94.50		23.19	18.83	2,11,990	3,08,350	4,23,980	4,81,800
16	20	131.00	18.000	43.2	32.45	2,63,070	3,82,810	5,26,150	5,97,820



COVERED SLIP HYDRAULIC LINER HANGER

MODEL: WC-SHLH [Rotational] & WC-CSLH-N [Non rotational]
PRODUCT No.-WC-10102 & WC-10130

This unique compact design liner hanger could be installed in highly deviated or horizontal wells with the liner string by mounting the hanger directly into a Casing. The hanger is provided with premium O-rings and glass-filled Teflon back-up rings to seal in the hydraulic cylinder. Sealing system has a pressure rating of 10,000 psi at 400^0 F. A high-strength alloy cylinder provides maximum burst and collapse rating.

The hydraulic version is ideal for liner applications where corrosion-resistant alloys are incorporated in the liner casing. This could be installed on the CRA casing, which results in a huge cost savings when compared to a solid-body type hanger.

The hanger is set by applying pressure through the run-in string. A setting ball is circulated or dropped to a ball seat in the landing collar. Applied pressure acts on an internal piston/setting collar, moving the slips up on the cone to the set position.

The Hydraulic Set Rotating Liner Hanger incorporates a tapered roller bearing assembly which allows the liner to be rotated in the set position while cementing the liner.

The hanger body is furnished with higher group of API 5CT standard materials as well as with the end connections in compliance to API standards or any premium threads as per the customer's requirement/demand. Materials suited for H_2S or CO_2 service are available on request.

Features / Benefits:

- Unique slip design provides more slip contact area and uniform loading in the casing.
- Tapered roller bearings allow liner to be rotated in set position.
- Slip and cone designed for minimum casing stress levels.
- Capable of hanging long and heavy liners.
- Hardened slips bite and hold in all standard casing grade.
- Hydraulic cylinder stays stationary with respect to the body, ensuring all seals remain static during rotation.
- Large annular flow area in set position ensures minimum pressure drop during cementing.
- The liner hanger body and cylinder have burst and collapse ratings equal to or greater than the API spec. for relevant grade of casing, unless otherwise stated.
- Large range of applications depending on type of running tool and wiper plug system selected.

Applications:

- Case off open hole more rapidly and easily.
- Deepening of old wells.
- Drilling with tapered drill string.
- To accomplish a sidetrack from vertical hole.
- Flexibility to place slotted liner in open hole or horizontal wells.
- Liner hanger features, protected slips, and a heavy-duty tapered roller bearings.

Specification Guide:

Liner	Casing				Liner Hanger							
OD (inch)	OD (inch)	Casing Weight Range (lbs/ft)	ID Range		Max OD (inch)	Mechanical Properties						
			Min (inch)	Max (inch)		Casing Weight (lbs/ft)	Circulation Area (inch²)	Maximum Liner Hanging Capacity (10^3 Lbs)					
Liner Hanger								K55/J55	C75	L80/	C95	P110	Hanger
3-1/2"	5"	18	4.226	4.326	4.12	18	1.04	155	155	155	155	155	155
		11.5-15	4.408	4.56	4.24	15	1.47	195	265	285	335	345	345
						13	2.07	170	230	250	280	280	280
						11.5	2.54	150	200	220	230	230	230
3-1/2"	5-1/2"	32.3	4.25	4.309	4.12	32.3	1.04	155					
		26-29.7	4.376	4.545	4.24	29.7	1.25	235	320	340	400		
						28.4	1.69	230	310	330	385		
						26.8	2.11	220	305	325	370		
						26	2.45	215	295	315	360		
		14-23	4.67	5.012	4.5	23	2.23	225	310	330	390	455	545
						20	3.04	210	280	300	350	410	480
						17	3.9	180	245	260	310	360	400
						15.5	4.35	165	225	240	285	330	355
						14	4.83	150	205	220	260	300	305
4"	5-1/2"	20	4.728	4.828	4.618	20	1.97	180					
		14-17	4.892	5.012	4.732	14	3.25	140	190	205	235		
						15.5	2.77	155	210	225	265	285	
						17	2.3	165	225	240	285	320	
4-1/2"	7"	42.7	5.766	5.875	5.56	42.7	1.69	-	-	-	-	-	
		32-41	5.82	6.094	5.625	41	1.75	400	545	580	695	695	
						38	2.67	380	520	555	585	585	
						35	3.46	360	495	495	495	495	
						32	2.57	315	430	455	545	630	940
		20-29	6.184	6.456	6	29	3.44	290	400	425	505	580	850
						26	4.34	265	360	385	460	530	745
						23	5.23	240	325	345	410	480	690
						20	6.14	210	280	305	365	420	520
5"	7"	38-41	5.82	5.92	5.675	41	1.31	See Engineering					
						38	2.23						
		35-38	5.92	6.004	5.775	38	1.33	250					
						35	2.12	200					
		32-35	6.004	6.094	5.82	35	1.71	200					
						32	2.56	255	350	375	380		
		26-29	6.184	6.276	6	29	2.47	240	320				
						26	3.37	220	255				
		17-26	6.276	6.536	6.106	26	1.65	205	280	300	350	410	645
						23	2.55	185	250	265	320	370	585
						20	3.45	165	225	240	285	330	515
						17	4.29	100	195	210	245	290	445

Liner	Casing				Liner Hanger								
OD (inch)	OD (inch)	Casing Weight Range (lbs/ft)	ID Range		Max OD (inch)	Mechanical Properties							
			Min (inch)	Max (inch)		Casing Weight (lbs/ft)	Circulation Area (inch²)	Maximum Liner Hanging Capacity (10^3 Lbs)					
Liner Hanger								K55/J55	C75	L80/	C95	P110	Hanger
5"	7-5/8"	47.1	6.325	6.425	6.215	47.1	3	180					
		42.8-45.3	6.435	6.501	6.275	45.3	3	240					
						42.8	3.6	200					
		29.7-39	6.625	6.875	6.455	39	3.3	285	385	410	440		
						33.7	4.8	260	350				
						29.7	5.9	235	270				
		24-33.7	6.765	7.02	6.595	33.7	3.7	245	335	360	425	490	590
						29.7	4.7	225	305	325	385	445	515
						26.4	5.7	205	275	295	350	405	445
						24	6.3	190	260	275	325	380	400
5-1/2"	7-5/8"	47.1	6.325	6.425	6.215	47.1	3	180					
		42.8-45.3	6.435	6.501	6.275	45.3	3	240					
						42.8	3.6	200					
		29.7-39	6.625	6.875	6.455	39	3.3	285	385	410	440		
						33.7	4.8	260	350				
						29.7	5.9	235	270				
		24-33.7	6.765	7.02	6.595	33.7	3.7	245	335	360	425	490	590
						29.7	4.7	225	305	325	385	445	515
						26.4	5.7	205	275	295	350	405	445
						24	6.3	190	260	275	325	380	400
6 5/8"	9-5/8"	58.4	8.435	8.535	8.135	58.4	3.9	290	395	425	505		530
		40-53.5	8.535	8.835	8.334	47	4.64	290	395	425	505		530
						43.5	5.45	275	375	400	475		
						40	6.76	260	350	375	415		
7"	9-5/8"	43.5-	8.435	8.755	8.234	58.4	2.63	335	460	490	580	615	
						53.5	3.96	320	4435	465	550	625	
						47	5.94	290	395	425	505	530	
						43.5	6.95	275	375	400	475		
		40-53.5	8.535	8.835	8.334	53.5	2.66	320	435	465	550	625	
						47	4.64	290	395	425	505	530	
						43.5	5.45	275	375	400	475		
						40	6.76	260	350	375	415		

Liner	Casing				Liner Hanger							
OD (inch)	OD (inch)	Casing Weight Range (lbs/ft)	ID Range		Max OD (inch)	Mechanical Properties						
			Min (inch)	Max (inch)		Casing Weight (lbs/ft)	Circulation Area (inch²)	Maximum Liner Hanging Capacity (10^3 Lbs)				
Liner Hanger								K55/J55	C75	L80/ N80	C95	P110	Hanger Limit
7"	10-3/4"	32.75-85.3	9.17	10.19	8.955	85.3	4	460	635	675	800	925	1250
						79.2	6.7	460	630	670	790	915	
						73.2	8.5	440	600	645	755	875	
						71.1	9.2	435	590	635	745	860	
						65.7	10.8	410	560	600	710	820	
						60.7	12.3	390	530	565	675	780	
						55.5	13.8	365	500	535	630	730	1160
						51	15.2	345	465	495	590	680	1050
						45.5	16.8	310	425	455	540	625	930
						40.5	18.3	280	385	410	485	560	800
						32.75	20.6	230	315	335	400	465	590
7-5/8"	9-5/8"	53.5	8.485	8.585	8.359	53.5	4.5	430	475				
						53.5SD	5.6		500				
		43.5-47 & 53.5 SD	8.681	8.755	8.48	53.5SD	4	410	560	600	710	825	980
						47	5	375	510	545	650	750	
						43.5	6	350	480	515	610	635	
		32.3-40	8.835	8.984	8.634	40	5	310	425	455	540	630	1225
						36	6.2	285	390	415	495	565	1080
						32.3	7.4	260	355	380	450	525	930
7-5/8"	10-3/4"	32.75-55.5	9.76	10.19	9.46	32.75	11.3	H40 190	-				
						40.5	9.04	320	430	465	550	640	1080
						45.5	7.47	350	485	515	615	710	
						51	5.91	390	530	565	670	775	
						55.5	4.53	415	565	600	720	830	
		51-73.2	9.41	9.85	9.152	51	10.42	425	580	620	740	850	1080
						55.5	9.03	460	630	670	800	925	
						60.7	7.51	495	675	720	850	990	
						65.7	6	525	720	765	910	1050	
						71.1	4.35	540	740	790	945		
						73.2	3.7	570	775	825	985		
9-5/8"	11-3/4"	71	10.536	10.636	10.41	71	5.7	460					
		65-66.7	10.65	10.682	10.475	66.7	5.9	435	585				
						65	6.3	430					
		60-65	10.767	10.772	10.48	60	4.87	375	560	700			
						65	3.36	410		600	710	825	
		54-60	10.772	10.88	10.571	60	6.2	390	540	570	680	785	820
						54	8.1	360	490	520	620	665	665
		42-54	10.88	11.084	10.679	54	6.3	350	475	510	600	695	1150
						47	8.4	310	425	450	540	620	950
						42	9.8	285	385	415	490	565	810

Liner	Casing				Liner Hanger							
OD (inch)	OD (inch)	Casing Weight Range (lbs/ft)	ID Range		Max OD (inch)	Mechanical Properties						
			Min (inch)	Max (inch)		Casing Weight (lbs/ft)	Circulation Area (inch²)	Maximum Liner Hanging Capacity (10^3 Lbs)				
Liner Hanger								K55/J55	C75	L80/ N80	C95	P110	Hanger Limit
9-5/8"	13-3/8"	48-98	12.695	12.715	11.718	98	7.3	440	600	640	760	885	1250
						92	9.1	425	580	620	735	855	
						86	10.8	410	560	600	705	825	
						85	11.5	400	550	590	695	815	
						80.7	12.6	390	535	570	675	790	1235
						77	13.7	375	515	555	655	765	1195
						72	15.1	360	495	530	625	730	1135
						68	16.4	345	470	505	600	700	1080
						61	18.4	320	435	465	555	645	990
						54.5	20.4	290	400	425	505	585	890
						48	22.3	260	355	380	450	525	780
9-7/8"	13-3/8"	48-72	12.347	12.715	12.05	72	9.5	330	450	480	570	655	1250
						68	10.8	315	425	460	540	625	
						61	12.8	290	400	420	500	580	
						54.5	14.8	270	365	385	455	530	1245
						48	16.7	240	325	345	410	480	1165
10-3/4"	13-3/8"	48-72	12.347	12.715	12.146	72	7.8	300	410	440	520	600	640
						68	9.2	290	400	420	500	580	610
						61	11.1	245	370	400	470	540	560
						54.5	13.1	240	340	360	430	490	500
						48	15.1	215	305	325	380	435	
13-3/8"	16"	75-84	15.01	15.124	14.7	84	7	410	560	600	710	820	
						75	9.9	380	520	550	670	750	
		97	14.839	15.081	14.562	97	6.7	475	655	700	790	915	
		109	14.638	14.738	14.375	109	7.14	See Engineering for Load Capacities					
13-3/8"	20"	94-169	18.376	19.124	18.063	169	75	910	1240				1250
						163	76	880	1200	1250			
						133	85	780	1060	1130	1250	1250	
						131	86	760	1040	1110			
						106.5	93	650	870	940	1100		
						94	97	575	790	840	1000	1150	
16"	20"	163-187	18.194	18.435	17.4	187	22	1100	1250	1250			
						175	25	1050					
						169	27.4	910	1240				
						163	29.2	880	1200				
		131-169	18.376	18.75	17.687	169	19.5	910	1240				
						163	21.3	880	1200	1250	1250		
						133	29.8	780	1060	1130			
						131	30.4	760	1040	1110			
		131-133	18.73	18.75	17.5	133	35	780	1060	1130	1250		
						131	35.5	760	1040	1110			
		94-169	18.376	19.124	18.063	169	15	910	1240	1250			
						163	16	880	1200				
						133	25	780	1060	1130	1250	1250	
						131	26	760	1040	1110			
						106.5	33	650	870	940	1100		
						94	37	575	790	840	1000	1150	

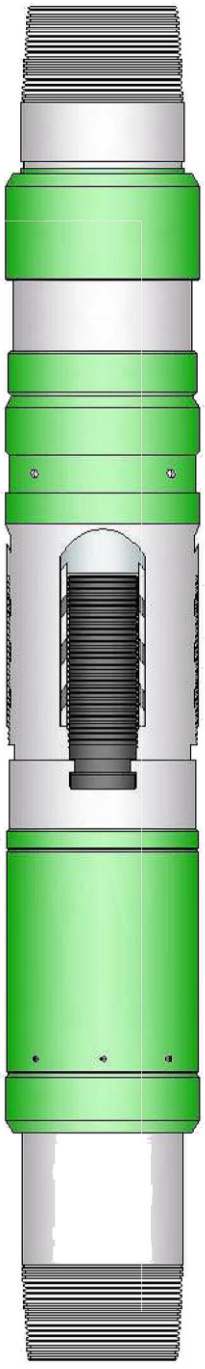
HYDRAULIC SET FURL-LOCK LINER HANGER

MODEL: WC-HFLH & WC-RHFLH

PRODUCT No.-WC-12801 & WC-12802

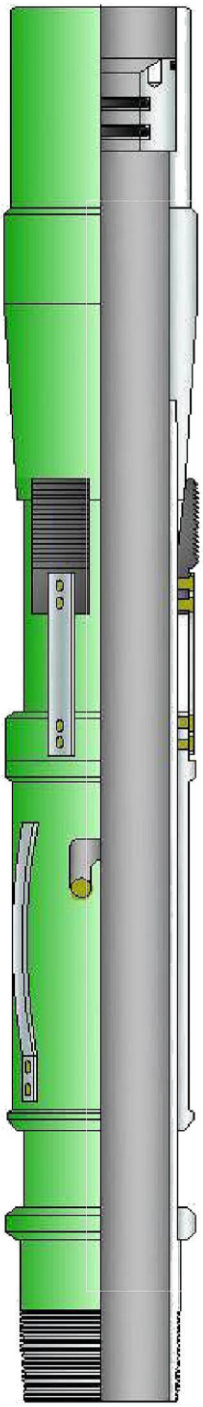
The Hydraulic Set FURL-lock Liner Hangers provide a method for suspending a liner off bottom and in tension by anchoring, or hanging, the top of the liner in existing casing

The FURL-lock is high performance kit type hanger which utilizes the liner pipe for a body.



Features/Benefits:

- Independent of Liner Threads, Weights and Grades- The FURL-LOCK hanger mounts on the outside of the liner pipe; therefore, it is compatible with and independent of liner threads, weight and grades.
- No Weld Construction- The slip-seat design provides a weld free assembly to transmit the liner load to the casing.
- No Special Materials- the FURL-LOCK is made from commonly available steels.
- Inventory Simplicity- For a given liner/casing size, the same FURL-LOCK can be run on the most exotic or elementary hook-up.
- Distribution of Radial Slip Load- By optimizing the slip/seat bearing surfaces, the radial slip/ casing load is circumferentially distributed by the slip to the seat. This type of hanger loading protects the liner pipe from collapse loads.
- Slips Protected- While running in, the hanger slips are mechanically contained under tool OD and protected in the Cone.
- No Casing Damage- At rated load capacities, the FURL-LOCK causes no plastic deformation of the pipe in which it is set.
- Both ends of the FURL-LOCK body have a full pipe OD, which allows for cutting most premium or API threads.



MECHANICAL LINER HANGER

MODEL: WC-MLH-1 [Type-I] & WC-MLH-2 [Type-II]

PRODUCT No.: WC-10104 & WC-10105

This Liner Hanger is set mechanically with either right or left- hand rotation, depending on the type of setting tool or design. Staggered cone design gives maximum bypass area to ease running in and circulation. Automatic J-cage allows hanger to return to the run-in position, should the hanger set prematurely while running in the well. The slip cage contains a "J" slot and high strength drag springs to manage the movement of the slips into contact with the cones. Mechanical Set Liner Hanger are set through manipulation of the work string (pick-up & 1/4 right hand turn) line up the cones and the slips, and a further slack off sets the slips onto the casing wall. In liner hanger we have four versions e.g.: Type-I [Double Cone & Non rotational], Type-II [Single Cone & Non rotational], to suit various applications.

The hanger body is furnished with higher group of API 5CT standard materials as well as with the end connections in compliance to API standards or any premium threads as per the customer's requirement/demand. Materials suited for H_2S or CO_2 service are available on request.

Features / Benefits:

- Open-bottom J-cage, available in right or left-hand set.
- Automatic J-cage, allows hanger to return to run-in position constraining hanger preset while running in.
- Large bypass area in run-in and set position.
- T-slot bow springs eliminate use of set screws.
- Slips profile provide more biting area to increase hanging capacity and reduce the possibility of damage while running in.
- Single or multiple cone designs available to match hanging capacity with liner strength, minimizing stress in supporting casing.
- Complete wells with less weight landed on wellheads.
- Give rise to improved cementing jobs.
- Prevent lost circulation.
- Provide good well control while drilling and completing.
- Impart more completion flexibility.
- Afford low-cost liner on appraisal wells.
- Liner Hangers are available with all API and premium thread connections.

Applications:

- Case off open hole more rapidly and easily.
- Deepening of old wells.
- Drilling with tapered drill string.
- To accomplish a sidetrack from vertical hole
- Testing of lower zone of new well before plugging back to primary pay.
- Flexibility to place slotted liner in open hole or horizontal wells.

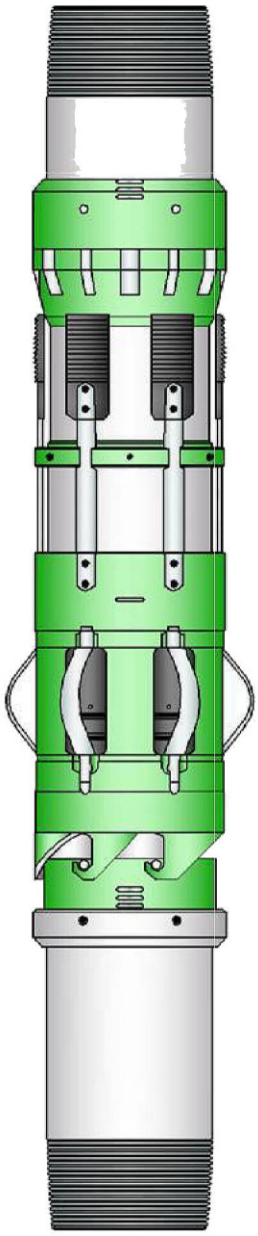
MECHANICAL LINER HANGER

MODEL: WC-MLH-5 [Type-V]

PRODUCT No.: WC-10120

This mechanical liner hanger features a right-hand setting mechanism with single or double cone also without or with a bearing that makes it non-rotational or rotational type after the hanger is set. Staggered cone design gives maximum bypass area to ease running in and circulation. Automatic J-cage allows hanger to return to the run-in position, should the hanger set prematurely while running in the well. In liner hanger we have four versions e.g.: Type-V [Single Cone & Non rotational], Type-VI [Double Cone & Non rotational], Type-VII [Single Cone & rotational] and Type-VIII [Double Cone & rotational] to suit various applications. It is easy to operate and has adequate hanging capacity for medium to long liners.

The hanger body is furnished with higher group of API 5CT standard materials as well as with the end connections in compliance to API standards or any premium threads as per the customer's requirement/demand. Materials suited for H_2S or CO_2 service are available on request.

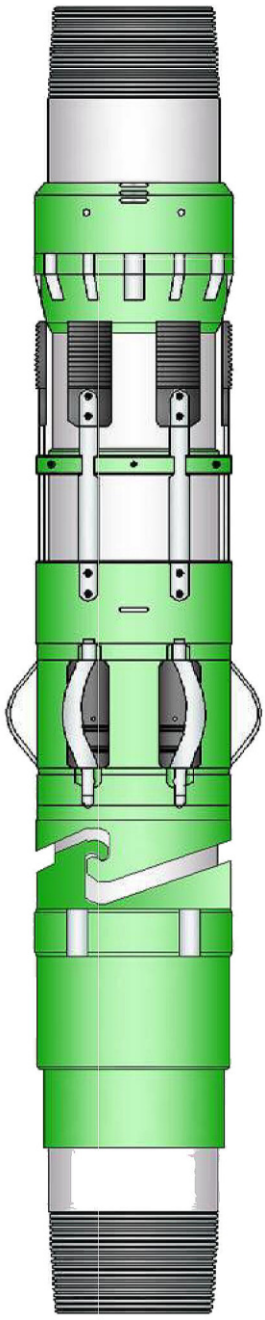


Features / Benefits:

- Open-bottom J, available in right set.
- Large bypass area in run-in and set position
- Slips profile provide more biting area to increase hanging capacity and reduce the possibility of damage while running in.
- Single or multiple cone designs available to match hanging capacity with liner strength, minimizing stress in supporting casing.
- Complete wells with less weight landed on wellheads.
- Give rise to improved cementing jobs.
- Liner Hangers are available with all API and premium thread connections.

Applications:

- Case off open hole more rapidly and easily.
- Deepening of old wells.
- Drilling with tapered drill string.
- To accomplish a sidetrack from vertical hole
- Testing of lower zone of new well before plugging back to primary pay.
- Flexibility to place slotted liner in open hole or horizontal wells
- Liner hanger features tandem cones, protected slips, and a heavy-duty bearing.



MECHANICAL LINER HANGER

MODEL: WC-MLH-3 [Type-I] & WC-MLH-4 [Type- II]

PRODUCT No.: WC-12503 & WC-12504

WELLCARE Mechanical Liner Hanger with jay to jay latching mechanism which set by giving right-hand rotation; with single or double cone also without or with a bearing that makes it non-rotational or rotational type after the hanger is set. Staggered cone design gives maximum bypass area to ease running in and circulation. Automatic Jay to jay cage allows hanger to return to the run-in position, should the hanger set prematurely while running in the well. In liner hanger we have two versions e.g.: Type-I [Single Cone & Non rotational] & Type-II [Single Cone & Rotational], to suit various applications. It is easy to operate and has adequate hanging capacity for medium to long liners.

The hanger body is furnished with higher group of API 5CT standard materials as well as with the end connections in compliance to API standards or any premium threads as per the customer's requirement/demand. Materials suited for H2S or CO2 service are available on request.

Features / Benefits:

- Automatic Jay-jay latch provides Faster and Safer run in and eliminates risk of premature setting due to poorly cleaned casing
- Large distributed slip contact area reduces stress in the supporting casing.
- Tapered roller bearing allows liner to be rotated in the set position for improved cement jobs.
- T-slots design in Bow Springs eliminates the use of flat head cap screws that are prone to shearing off under stress.
- The Hanger mounts on the outside of the liner pipe which provides high burst/collapse rating to meet a liner rating.

MECHANICAL FURL-LOCK LINER HANGER

MODEL: WC-MFLH [NON-ROTATIONAL], WC-RMFLH [ROTATIONAL]

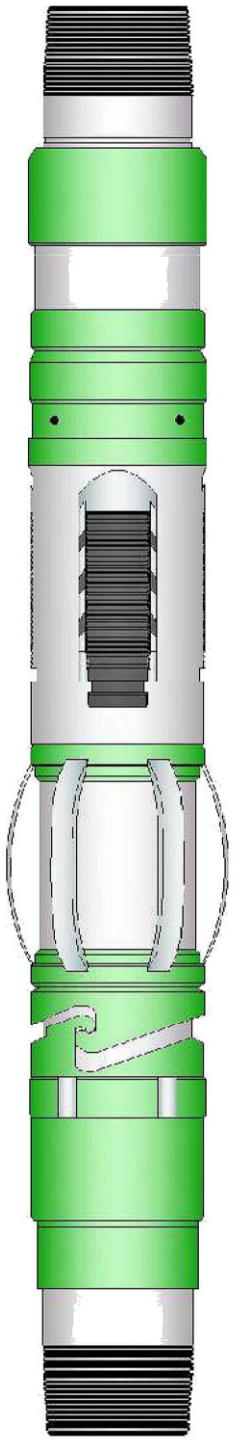
PRODUCT No.: WC-12501 & WC-12502

WELLCARE Mechanical Liner Hanger with jay to jay latching mechanism which set by giving right-hand rotation; with fully protected slips enclose in pocket of cone also without or with a bearing that makes it non-rotational or rotational type after the hanger is set. Staggered cone design gives maximum bypass area to ease running in and circulation. Automatic Jay to jay cage allows hanger to return to the run-in position, should the hanger set prematurely while running in the well.

The hanger body is furnished with higher group of API 5CT standard materials as well as with the end connections in compliance to API standards or any premium threads as per the customer's requirement/demand. Materials suited for H2S or CO2 service are available on request.

Features / Benefits:

- Minimizes risk for damaging slips during run in or setting.
- Automatic Jay-jay latch provides Faster and Safer run in and eliminates risk of premature setting due to poorly cleaned casing
- Large distributed slip contact area reduces stress in the supporting casing.
- Tapered roller bearing allows liner to be rotated in the set position for improved cement jobs.
- Distribution of Radial Slip Load- By optimizing the slip/seat bearing surfaces, the radial slip/ casing load is circumferentially distributed by the slip to the seat. This type of hanger loading protects the liner pipe from collapse loads.
- Slips Protected- While running in, the hanger slips are mechanically contained under tool OD and protected in the Cone.
- No Casing Damage- At rated load capacities, the FURL-LOCK causes no plastic deformation of the pipe in which it is set.
- Both ends of the FURL-LOCK body have a full pipe OD, which allows for cutting most premium or API threads.



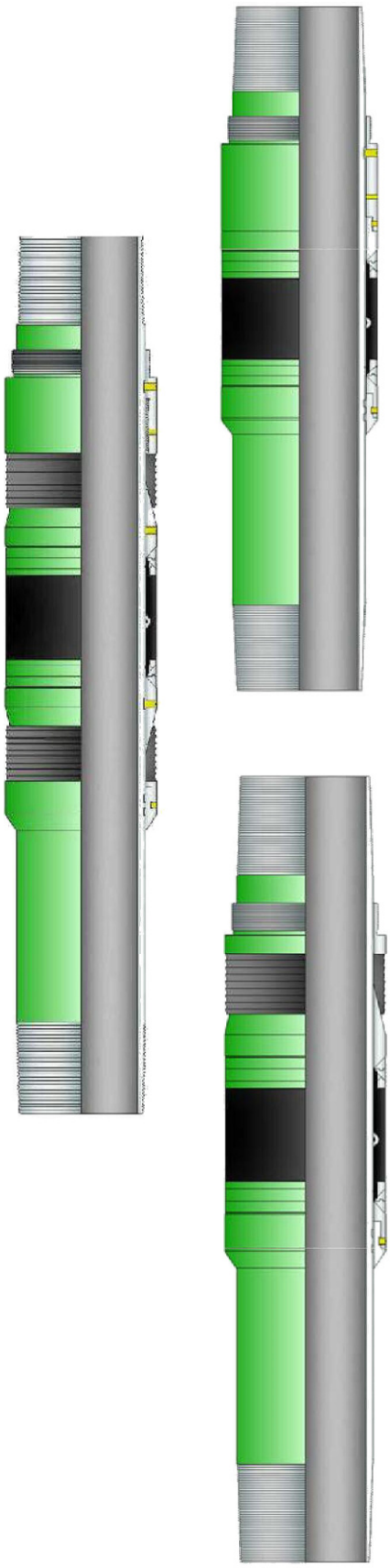
Specification Guide: [WC-MLH-1 & WC-MLH-2]:

Liner (inch)	Casing (inch)	Weight (lbs/ft)	Cone OD (inch)	Bypass Flow Area (inch²)		Hanging Capacity Based on Casing Weight (lbs)			
				Unset	Set	J-55/K-55	N-80/L-80	P-110	Q-125
2 7/8	4 1/2	10.50	3.750	3.75	2.88	42,340	61,610	84690	96,270
		11.60		3.43	2.7	56,180	81,690	1,12,250	1,27,580
		12.60		3.16	2.56	60,900	88,520	1,21,700	1,38,290
	5	23.20		3.7	2.85	72,040	1,04,770	1,44,070	1,63,730
3 1/2	5	13.00	4.188	3.81	2.83	45,100	65,560	90,190	1,02,510
		15.00		3.21	2.5	66,350	96,500	1,32,700	1,50,740
		18.00	4.062	2.79	2.09	81,130	1,18,030	1,62,260	1,84,380
3 1/2	5 1/2	14.00	4.625	5.91	4.59	58,070	84,460	1,16,140	131.92
		15.50		5.42	4.31	64,450	93,800	1,29,040	1,46,600
		17.00	4.500	5.5	4.17	70,760	1,02,940	141510	1,60,800
		20.00	4.375	5.14	3.78	81,530	1,18,550	1,63,060	1,85,240
		23.00		4.34	3.33	92200	134110	184530	209680
	5 5/8	26.70		4.35	3.34	102000	148380	204000	231880
	5 3/4	21.80	4.625	5.81	4.54	74100	107730	148090	168390
		24.20		5.11	4.13	87880	127880	175750	199750
4 1/2	6 5/8	28.00	5.375	6.45	4.57	82420	119820	164830	187270
		32.00		5.4	4.03	143520	208830	287040	326140
4 1/2	7	23.00	6.000	8.64	6.98	75430	109680	150860	171440
		26.00	5.875	8.44	6.62	106570	154940	213140	242030
		29.00		7.54	6.13	128470	186860	256940	291980
		32.00		6.67	5.66	142670	207470	285330	324260
		35.00	5.750	6.49	5.32	152070	221110	304140	345430
		38.00	5.625	6.36	5.01	162720	236520	325220	369670
		41.00		5.44	4.54	180040	261960	360310	409370
4 1/2	7 5/8	39.00	6.250	9.87	8.16	112950	164320	225900	256690
		42.80		8.59	7.44	157400	229100	315020	357860
		45.30		7.92	7.06	161470	234780	322930	367010
	7 3/4	46.10		9.19	7.78	137450	199950	274910	312290
5	7	23.00	6.000	7.1	5.44	75,430	1,09,680	1,50,860	1,71,440
		26.00	5.875	6.9	5.08	73,210	1,06,430	1,46,410	1,66,260
		29.00		6	4.59	1,14,440	1,66,460	2,28,890	2,60,100
		32.00		5.13	4.12	1,38,310	2,01,130	2,76,610	3,14,350
		35.00	5.800	4.68	3.74	1,52,070	2,21,110	3,04,140	3,45,430
		38.00	5.625	4.82	3.47	77,270	1,12,320	1,54,440	1,75,550

Liner (inch)	Casing (inch)	Weight (lbs/ft)	Cone OD (inch)	Bypass Flow Area (inch²)		Hanging Capacity Based on Casing Weight (lbs)			
				Unset	Set	J-55/K-55	N-80/L-80	P-110	Q-125
5	7 5/8	24.00	6.688	9.99	8.31	1,30,000	1,88,990	2,59,650	2,95,320
		26.40		9.37	7.97	1,41,590	2,05,880	2,83,180	3,21,820
		29.70	6.500	9.5	7.64	1,58,930	2,31,500	3,18,190	3,61,540
		33.70		8.32	7	1,79,730	2,61,490	3,59,470	4,08,450
		39.00	6.375	7.6	6.34	2,04,440	2,97,430	4,08,890	4,64,620
		42.80	6.250	7.05	5.79	2,23,340	3,25,080	4,46,990	5,07,780
		45.30		6.38	5.45	2,36,570	3,43,980	4,73,130	5,37,710
	7 3/4	46.10	6.375	6.92	5.99	2,32,790	3,38,630	4,65,570	5,28,890
5 1/2	7	23.00	6.125	4.71	3.6	78040	113490	156090	177390
		26.00		3.81	3.11	89140	129600	178280	202450
5 1/2	7 5/8	24.00	6.688	8.29	6.61	71,630	1,04,140	1,43,070	1,62,730
		26.40		7.68	6.27	77,000	1,11,970	1,54,010	1,75,030
		29.70	6.500	7.8	5.94	87,510	1,27,470	1,75,200	1,99,060
		33.70		6.63	5.3	98,280	1,42,990	1,96,570	2,23,350
		39.00	6.375	5.9	4.65	1,12,950	1,64,320	2,25,900	2,56,690
		42.80	6.250	5.35	4.2	90,040	1,31,060	1,80,210	2,04,720
		45.30		4.68	3.83	1,21,660	1,76,900	2,43,320	2,76,530
	7 3/4	46.10	6.375	5.23	4.3	1,32,280	1,92,430	2,64,560	3,00,540
5 1/2	8 5/8	24.00	7.750	13.9	11.93	1,36,590	1,98,630	2,72,710	3,10,210
		28.00		12.88	11.36	1,55,260	2,25,790	3,10,520	3,53,120
		32.00	7.562	13.02	10.99	1,79,990	2,61,520	3,59,990	4,08,990
		36.00		11.83	10.34	2,01,590	2,93,350	4,03,640	4,58,330
		40.00	7.375	11.91	9.93	2,23,890	3,25,580	4,47,780	5,08,890
		44.00		10.71	9.28	2,45,520	3,57,280	4,91,040	5,57,920
6 5/8	8 5/8	32.00	7.562	8.63	6.6	79,780	1,15,910	1,59,560	1,81,280
		36.00		7.44	5.95	1,21,310	1,76,530	2,42,900	2,75,810
		40.00	7.375	7.52	5.57	1,01,400	1,47,460	2,02,810	2,30,480
		44.00		6.31	4.92	1,51,780	2,20,860	3,03,550	3,44,900
7	9 5/8	32.30	8.500	14.33	11.03	1,04,830	1,52,540	2,09,660	2,38,220
		36.00		13.21	10.42	1,35,170	1,96,610	2,70,340	3,07,200
		40.00	8.375		9.96	1,81,700	2,64,500	3,63,400	4,13,080
		43.50		11.88	9.37	2,04,450	2,97,510	4,08,900	4,64,830
		47.00		10.87	8.84	2,17,120	3,16,020	4,34,240	4,93,580
		53.5SD		8.9	7.82	2,39,800	3,48,920	4,79,600	5,45,160
		47.00	8.313	11.35	8.91	1,93,520	2,81,670	3,87,040	4,39,930
		53.50		9.38	7.89	2,50,700	3,64,780	5,01,400	5,69,940
			8.125	10.82	8.13	1,53,690	2,23,630	3,07,380	3,49,400

Liner (inch)	Casing (inch)	Weight (lbs/ft)	Cone OD (inch)	Bypass Flow Area (inch²)		Hanging Capacity Based on Casing Weight (lbs)			
				Unset	Set	J-55/K-55	N-80/L-80	P-110	Q-125
7	9 5/8	58.40	8.125	9.48	7.44	2,20,150	3,20,050	4,40,300	5,00,240
		59.40		9.11	7.25	2,17,410	3,16,300	4,34,830	4,94,090
		61.10		8.69	7.04	2,35,000	3,41,780	4,70,000	5,33,920
7	9 3/4	59.20	8.313	9.71	8.07	2,58,280	3,75,760	5,17,000	5,87,400
			8.375	9.23	7.99				
	9 7/8	62.80	8.313	10.59	8.52	2,63,700	3,83,640	5,27,390	5,99,270
			8.375	10.11	8.44	2,67,960	3,89,840	5,35,920	6,08,960
7	10 3/4	45.50	9.500	20.07	16.83	1,52,870	2,22,470	3,05,730	3,47,580
		51.00		18.51	15.98	1,91,020	2,77,760	3,82,040	4,34,180
		55.50		17.13	15.24	2,09,980	3,05,730	4,19,960	4,77,320
		60.70	9.250	17.79	14.83	2,16,180	3,14,530	4,32,370	4,91,290
		65.70		16.28	14.03	2,52,640	3,67,350	5,04,810	5,74,010
		71.10		14.64	13.18	2,75,870	4,01,480	5,51,740	6,27,100
7 5/8	9 5/8	43.50	8.437	8.47	6.38	1,01,360	1,47,490	2,02,710	2,30,440
		47.00		7.45	5.85	1,10,450	1,60,760	2,20,900	2,51,080
		53.5SD		5.48	4.83	1,27,530	1,85,560	2,55,060	2,89,930
		53.50	8.313	6.45	5.03	1,01,370	1,47,500	2,02,740	2,30,450
	9 3/4	59.20	8.437	5.82	5	1,37,360	1,99,840	2,74,950	3,12,390
	9 7/8	62.80		6.69	5.45	1,41,900	2,06,440	2,83,790	3,22,470
7 5/8	10 3/4	45.50	9.500	17.14	13.9	1,61,100	2,34,450	3,22,200	3,66,300
		51.00		15.58	13.05	2,02,710	2,94,760	4,05,420	4,60,750
		55.50		14.2	12.31	2,21,500	3,22,500	4,43,000	5,03,500
		60.70	9.375	13.77	11.71	2,41,560	3,51,450	4,83,120	5,48,960
		65.70	9.188	13.88	11.2	2,60,100	3,78,200	5,19,720	5,90,970
		71.10		12.24	10.34	2,82,270	4,10,800	5,64,540	6,41,660
		73.20	9.125	12.12	10.09	2,85,350	4,14,750	5,70,220	6,47,960
7 5/8	11 3/4	60.00	10.375	22.4	19.19	216540	314820	432540	491400
		65.00		20.89	18.39	235980	343440	472500	536760
		66.70		20.45	18.16	241920	352080	483840	549720
7 5/8	11 7/8	71.80		21.38	18.65	254880	370440	509220	578880
8 5/8	10 3/4	32.75	9.750	13.52	10.34	31,250	45,380	62,500	71,000
		40.50		11.27	9.09	82,320	1,19,930	1,64,900	1,87,260
		45.50	9.500	11.94	8.7	37,590	54,710	75,180	85,470
		51.00		10.38	7.85	81,410	1,18,370	1,62,810	1,85,030
		55.50		9	7.11	1,28,030	1,86,410	2,56,050	2,91,020
		60.70	9.400	8.35	6.47	1,38,590	2,01,640	2,77,180	3,14,960
9 5/8	11 3/4	60.00	10.438	10.77	8.09	105060	152750	209860	238420
		65.00		9.25	7.28	156880	228320	314130	356850
		66.70		8.81	7.06	170690	248410	341380	387860
9 5/8	11 7/8	71.80		9.74	7.54	150570	218830	300820	341970

Liner (inch)	Casing (inch)	Weight (lbs/ft)	Cone OD (inch)	Bypass Flow Area (inch²)		Hanging Capacity Based on Casing Weight (lbs)			
				Unset	Set	J-55/K-55	N-80/L-80	P-110	Q-125
9 5/8	13 3/8	61.00	11.875	27.67	21.73	2,16,300	3,15,000	4,33,300	4,92,100
		68.00		25.71	20.68	2,38,050	3,46,380	4,76,790	5,41,650
		72.00	11.750	25.77	20.22	2,51,600	3,65,840	5,03,200	5,71,880
		77.00		24.38	19.49	2,73,240	3,97,440	5,46,480	6,21,000
		80.70		23.22	18.88	2,82,310	4,10,940	5,65,300	6,42,470
		85.00		22.15	18.32	2,96,530	4,30,570	5,92,380	6,72,940
		86.00		21.5	17.99	3,01,500	4,38,180	6,03,000	6,84,740
	13 1/2	81.40		25.63	20.15	2,76,550	4,01,470	5,52,440	6,27,920
	13 5/8	88.20		26.31	20.51	2,82,880	4,10,880	5,65,120	6,41,920
9 7/8	13 3/8	61.00	11.875	26.11	20.18	199000	289800	398640	452730
		68.00		24.16	19.13	233570	339850	467810	531450
9 5/8	13 1/2	81.40		22.7	18.35	280280	406880	559880	636380
	13 5/8	88.20		23.38	18.71	296140	430140	591610	672010
10 3/4	13 3/8	61.00	12.125	17.56	13.9	1,83,240	2,66,850	3,67,070	4,16,880
		68.00		15.6	12.87	2,04,590	2,97,690	4,09,760	4,65,510
		72.00	12.000	15.69	12.43	2,22,740	3,23,880	4,45,480	5,06,280
		77.00		14.3	11.71	2,37,200	3,45,020	4,74,410	5,39,100
	13 1/2	81.40		15.55	12.36	2,14,450	3,11,320	4,28,390	4,86,920
	13 5/8	88.20		16.23	12.72	2,13,490	3,10,090	4,26,490	4,84,450
11 3/4	16	84.00	14.375	36.45	29.43	2,37,800	3,45,530	4,75,610	5,40,250
		95.00		33.12	27.64	2,71,320	3,95,010	5,43,440	6,17,650
		97.00		32.7	27.42	2,76,110	4,01,390	5,52,220	6,27,230
		109.00	14.125	32.27	26.03	3,15,210	4,58,050	6,29,620	7,15,810
		118.00		29.56	24.61	3,43,140	4,99,550	6,86,280	7,80,440
		128.00		26.55	23.06	3,75,060	5,45,030	7,50,120	8,52,260
13 3/8	16	84.00	14.700	19.05	15.48	1,43,040	2,07,840	2,86,080	3,24,960
		95.00	14.625	16.74	13.94	1,84,960	2,69,280	3,70,460	4,21,060
		97.00		16.32	13.73	1,94,520	2,82,790	3,89,040	4,41,890
		109.00	14.437	15.12	12.23	2,07,770	3,01,920	4,15,010	4,71,820
16	18 5/8	87.50	17.375	25.03	19.75	1,81,130	2,63,240	3,62,250	4,11,360
		94.50		23.19	18.83	2,11,990	3,08,350	4,23,980	4,81,800
16	20	131.00	18.000	43.2	32.45	2,63,070	3,82,810	5,26,150	5,97,820



COMPRESSION SET LINER TOP PACKERS

MODEL: WC-LTP [Without Slip], WC-LTP-S1 [Single Slip]
& WC-LTP–S2 [Double Slip]

PRODUCT No.: WC-10201, WC-10202 & WC-10203

This Liner Top Packer is a high performance packer that suited for most applications set by applying set-down weight by the setting dogs of the packer setting tool through the setting collar or Tie Back receptacle. The packer provides an effective annular seal between the top of the liner and the casing, preventing formation breakdown, loss of cement slurry and gas migration above the liner top during cement curing. This packer features hold down slips, making it suitable for use in deviated or horizontal wells. The packer have integral setting collar to rotate the Liner Hanger during running in and cementing.

The packer is furnished with higher group of API 5CT standard materials as well as with the end connections in compliance to API standards or any premium threads as per the customer's requirement/demand. Materials suited for H_2S or CO_2 service are available on request.

Features / Benefits:

- High performance compression set liner top packer
- Provides effective annular seal at the liner top
- Prevents formation breakdown, loss of cement slurry and gas migration
- Integral body lock ring holds a positive set in the seal elements
- Tieback receptacles are honed for tie- back seals
- Hold down slips prevent light liners from moving up and down.

Applications:

- Isolate the liner top after the hanger is set and cementing operations are completed
- Isolate of formation pressure below the liner-top from the casing ID above
- Isolate of treating pressures below the liner-top during fracture or acid work
- Isolation of formation fluids while the cement sets, helping to stop gas migration
- Isolation of lost-circulation zones
- The only isolation above the production zone in un-cemented liners
- The liner-top packer can also be used as a tie-back completion or production packer.

Specification Guide:

Liner Size (inch)	Casing Size (inch)	Casing Weight Range	Gauge OD (inch)	Element OD (inch)	Min Setting Force lb
4	5.5	15.5-17	4.678	4.648	30,000
		20	4.563	4.533	
4.500	7	23-26	6.061	6.001	30,000
		29-32	5.879	5.819	
		35-38	5.705	5.615	
		38-41	5.605	5.545	
5	7	23-26	6.061	6.001	30,000
		26-29	5.969	5.908	
		29-32	5.879	5.85	
		35	5.789	5.675	
		38	5.705	5.675	
	7.625	29-7-33.7	6.55	6.518	30,000
		39	6.41	6.380	30,000
5.5	7.625	24-26.4	6.754	6.692	40,000
		29.7-33.7	6.55	6.518	
		39	6.41	6.38	
6.625	9.625	36	8.440	8.315	
		40-47	8.334	8.209	
7		40-47	8.334	8.209	
		47-53.5	8.250	8.125	
	10.750	55.5-60.7	9.429	9.253	40,000
7.625	9.625	43.5-47	8.435	8.405	40,000
		53.5	8.319	8.289	
7.625	10.75	55.5-60.7	9.429	9.253	60,000
9.625	11.75	60-65	10.375	10.315	
9.625	13.375	61-72	12	11.91	
10.75	13.375	68-72			
		61-72			
13.375	16	75-84	14.7	14.605	
		97	14.562	14.445	
		109	14.375	14.285	

SWAB CUP PACKER

MODEL: WC-SWCP

PRODUCT No.: WC-11601

This is a moderate performance packer suit for many applications at low cost to hold pressure from below and simultaneously provides an unrestricted liner top at the end of cementing operations. It has two wire meshed Swab Cup Element. This provides extra sealing during setting of liner hanger and cementing job. End connections are furnished with standard or premium connections in compliance with the API standard or as per customer requirements for successful run and installation in the Liner Hanger System.

Specification Guide:

Casing		Gage Ring or Thimble OD	ID	Thread Specs Box Up Pin Down
OD	Wt. in lbs T & C			
4-1/2	9.5 - 13.5	3.771	2.000	2-3/8 EU 8 Rd.
5	18	4.062		
	15	4.140		
	11.5 - 13	4.250		
5-1/2	20 - 23	4.500		
	15.5 - 17	4.641		
	13 - 14	4.781		
6-5/8	32	5.406		
	28	5.484		
	24 - 29	5.588		
7	24	5.656	2.750	3-1/2 EU 8 Rd.
	38			
6-5/8	20	5.812		
7	32 - 35			
6-5/8	17	5.968		
7	29			
	23 - 26	6.078		
	20	6.266		
	17			
7-5/8	33.7 - 39	6.453		
	26.4 - 29.7	6.672 6.672		
8 5/8	28-36	7.735		
9 5/8	40-47	8.450		
10 3/4	40.5-55.5	9.710	3.750	4-1/2 EU 8 Rd

LINER TIEBACK PACKER

MODEL: WC-TSNP

PRODUCT No.: WC-10301

The Liner Tieback Packer is a liner top packer that is most frequently run on drill pipe using a mechanical setting tool and a tie back receptacle liner setting sleeve with tieback extension. The packer is run to the top of an existing liner tieback extension, and the seal stem is inserted until seated and pressure tested down the drill pipe. Additional set-down weight shears the release pins and sets the packer seal. The setting tool is released with right hand rotation.

The tieback stem on the Tieback Packer has three sets of glass-filled Teflon Chevron seals for severe pressure and temperature applications. It features ratchet lock in the setting shoulder to prevent premature setting while running in. Maximum seal integrity is assured by a three-piece rubber sealing element contained by metal back-up rings. Hold down slips and an internal body-lock ring maintains seal compression and prevents floating of short liners.

The Tieback Packer can be released by cutting the inside mandrel in the designated area.

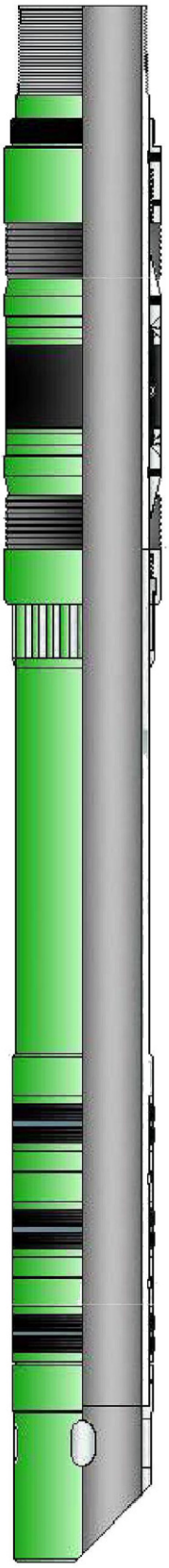
Tieback receptacles are available with this packer in different lengths e.g.: 6 ft, 10 ft, 15 ft, 20 ft etc as per requirements or demand from customers.

Available in rotating or non-rotating configuration with retrievable or no cementing bushing profile running and setting, this assembly may be configured with conventional mechanical right hand release running tool, rotating mechanical running tool or hydraulic release running tool.

The packer is furnished with higher group of API 5CT standard materials as well as with the end connection in compliance to API standards or any premium threads as per the customer's requirement/demand. CRA materials suited for H_2S or CO_2 service are available on request.

Features / Benefits:

- Liner top packer run on drill pipe after the liner is cemented.
- Used to prevent micro-annular gas leak at liner top.
- 3-Piece seal element provides high pressure/temperature.
- Integral body lock ring holds a positive set in the seal elements.
- Ratchet lock feature prevents premature set while running in the hole.
- Glass filled Teflon Chevron seals provide high temperature/pressure tie-back capabilities.



Specification Guide:

Liner Size (inch)	Casing Size (inch)	Casing Weight Range	Gauge OD (inch)	Body OD (inch)	Minimum Setting Force (lbs)
4.000	5.500	15.5-17	4.678	4.000	30,000
4.5	7.000	23-26	6.061	4.500	30,000
		29-32	5.879		
		35-38	5.705		
		38-41	5.605		
5		23-26	6.061	5.000	30,000
		26-29	5.969		
		29-32	5.879		
		35	5.789		
		38	5.705		
	7.625	29.7-33.7	6.410		30,000
		39	6.550		
5.5	7.625	24-26.4	6.754	5.500	30,000
		29.7-33.7	6.410	5.000	
		29.7-33.7	6.550	5.500	
		39	6.410		
7	9.625	40-47	8.435	7.000	40,000
		47-53.5	8.312		
	10.750	55.5-60.7	9.429		
7.625	9.625	43.5 - 47	8.435	7.625	40,000
		53.5	8.319		
	10.750	55.5 - 60.7	9.429	7.000	50,000
9.625	11.750	60-65	10.375	9.625	50,000
9.625	13.375	54.5	12.250		55,000
		67 - 72	12.000		
10.750	13.375	68-72		10.750	50,000
		61-72			
13.375	16.000	75-84	14.700	13.375	60,000
		97	14.562		
		109	14.375		

TIEBACK SEAL NIPPLE

MODEL: WC-TSN

PRODUCT No.: WC-11202

The Tieback Seal Nipple with Chevron seal is designed for high pressure liner tieback completions. one-piece mandrel is constructed of AISI 4140 alloy for high strength.

Tieback seal nipple allows for future extension of the liner casing string to surface for production, testing or remedial operations during the life of the well. Manufactured from the material that matches the grade of the liner casing, it is landed provides a continuous bore diameter to that of the liner. This provides mono bore access to the reservoir.

It may be used temporarily or permanently. To facilitate both ease of entry and cementing operations. It is equipped with a standard mule guide nose with circulations ports. Standard seal configurations is four units in fabric reinforced NBR with optional seals in HNBR as per well environment & customer requirement.

Nipples are designed with ODs compatible for Liner Tieback Packers and Tieback Receptacles with varying in lengths form 6 feet to 40 feet depending on the applications. On an optional basis, the tieback seal nipple may be provided with a latch assembly for production applications where it is appropriate to land the tieback casing in tension. Configured with a box top design, the tieback seal nipple will directly connect to the tieback casing string or to other components.

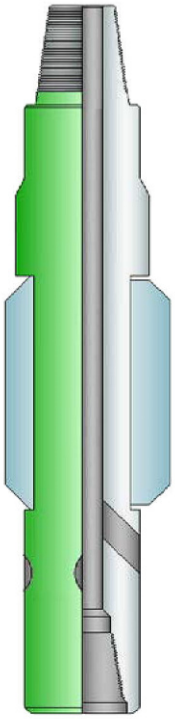
The Tieback Nipple is furnished with higher group of API 5CT standard materials as well as with the end connection in compliance to API standards or any premium threads as per the customer's requirement/demand. CRA materials suited for H_2S or CO_2 service are available on request.

Features / Benefits:

- One-piece mandrel for high burst and collapse properties.
- Glass filled chevron seals rated at 10,000 PSI at 400^0 F
- Available in lengths from 6 ft to 40 ft.
- Optional seal packages available for severe well conditions.

WC-TDM

WC-STB



WC-CBM

CLEAN OUT TRIP

TOP DRESS MILL

MODEL: WC-TDM

PRODUCT No.: WC-11901

The Top dress mill is designed to dress or return the top edge of the receptacle to an acceptable condition and configuration to allow entry of the seal nipple without damaging the seal units. The polishing mill is a soft-bodied mill that vibrates inside the receptacle, removing deposited material from its highly polished surface to allow optimal contact with the seal nipple

SPACER TUBE

MODEL: WC-STB

PRODUCT No.: WC-22803

Spacer Tube is used for maintain the distance between Top dress mill and Clean out blade mill as per TBR length.

CLEAN OUT BLADE MILL / POLISHING MILL

MODEL: WC-CBM

PRODUCT No.: WC-11903

Liner tieback top dress and polishing mills are run prior to tying back into the tieback seal receptacle with a seal nipple or seal nipple packer assembly. The purpose of running the mills is to ensure the liner top has not been damaged since installation, and to remove any scale or other foreign material from the polished seal bore.

For seal nipple packer applications, the mills are run in with a casing scraper to ensure a properly prepared area for the packer to set and seal in.

Both mills are provided with drill-pipe connections and are sized for specific lengths by the use of a spacer nipple. Detailed procedures for dressing and polishing are available.

TOP SET COUPLING

MODEL: WC-TSC

PRODUCT No.: WC-12001

It is being used in conventional liner hanger with the liner top packer and other end threaded connection as per the liner running tools.

TIE BACK RECEPTACLE

MODEL: WC-TBR

PRODUCT No.: WC-10302

The Tie-Back Receptacle provides a high integrity honed seal bore above a liner Hanger which permits landing, sealing and extending additional liner to a point further up the hole, or the surface.

Specification Guide:

TBR Size inch	Max. OD inch	Max. ID inch	Honed Length ft
7 X 4 1/2	5.500	5.000	6 ~ 10
7 X 5	5.875	5.250	6 ~ 10
			6 ~ 15
	6.000	5.250	6 ~ 15
9 5/8 X 6 5/8	8.250"	7.375"	6 ~ 15
9 5/8 X 7			6 ~ 15
	8.375"	7.375"	6 ~ 15
13 3/8 X 9 5/8	11.750"	10.625"	6 ~ 10

LINER SWIVEL SUB

MODEL: WC-LSS

PRODUCT No.: WC-12101

The liner Swivel Sub is normally used when running mechanical set liners in highly deviated wells in which rotating to set the liner may be a problem. The swivel allows rotation of the hanger without rotating the total liner. A clutch system in the swivel (feature may be detected if required) allows easy release of running nut from the liner, if the liner has to be set on bottom.

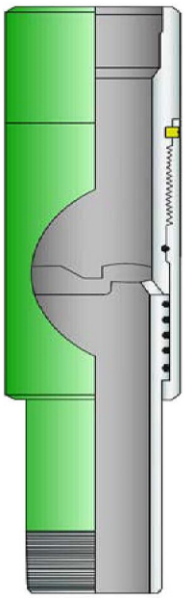
Features / Benefits:

- ID of the Swivel is equal to or larger than API drift diameter.
- Premium Box and Pin connections.
- Can be run in any casing/hole larger than the Swivel OD.
- Incorporates axial (compression and tension) and radial slide bearings.

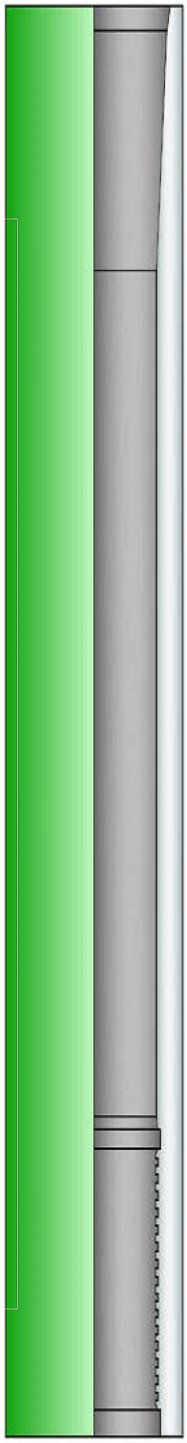
Specification Guide:

Size inch	Max. OD inch	Length (ft.)
4 1/2"	5.875"	3'~4'
5"	5.875"	3'~4'
5 1/2"	6.750"	3'~4'
7"	8.250"	3'~4'
9 5/8"	11.000"	3'~4'

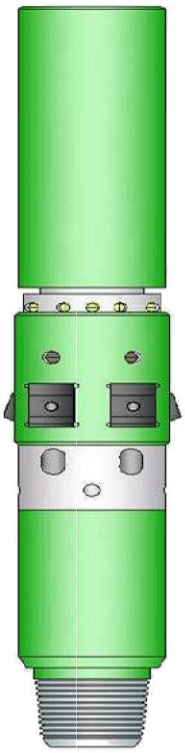
WC-TSC



WC-LSS



WC-TBR



ROTATING PACKER SETTING TOOL

MODEL: WC-RPST

PRODUCT No.: WC-11106

WELLCARE Rotating Packer Setting Tool is designed to apply set down weight to Compression set liner top packers (WC-TSNP, WC-MLTP-S2, WC-LTP-S2, etc.). A set of spring loaded dogs are used to transfer the set down weight from the drill string to the Tie Back Receptacle on the liner Top packer. A bearing assembly in the RPST allows the drill pipe to be rotated while slacking off weight to the liner top. The rotation of the drill pipe will break the static friction between the drill pipe and casing and allow additional weight to be transferred to the liner top. This is especially useful when running liners in highly deviated and dog-leg wells.

Applied load value for setting of Liner Top Packer indication will be observed at the rig floor once the tool has been pulled out.

ROTATING CIRCULATING PACKER SETTING TOOL

MODEL: WC-RPST-1

PRODUCT No.: WC-11107

The Rotating Circulating Packer Setting Tool is placed between the running tool and the Handling Nipple / lift sub. It is designed to apply set down weight to compression set liner top packers. A set of spring loaded dogs are used to transfer set down force from the drill string to the Setting Sleeve on the liner packer .The drill string can be rotated. Thi s tool has a indicating mechanism that when during the application of set down force to help work the force down to the packer shear pinned for a certain load can ensure that a certain force was actually applied to the packer. After the indicating mechanism is sheared flow ports are opened between the drill string and annulus at the top of the packer. This allows circulation at the liner top to remove any cement that was displaced past the liner top.

Specification Guide:

SIZE	4 1/2"	5"	5 1/2"	7" ~ 7 5/8"	9 5/8"	11 3/4"
MAX OD	5.750"	5.750"	6.375"	8.250"	10.375"	12.088"
Min. ID	2.000"	2.000"	2.000"	2.750"	2.750"	2.750"
CONN-ECTION	3 1/2 IF	3 1/2 IF	3 1/2 IF	4 1/2 IF	4 1/2 IF	4 1/2 IF

MECHANICAL RELEASE RUNNING TOOL

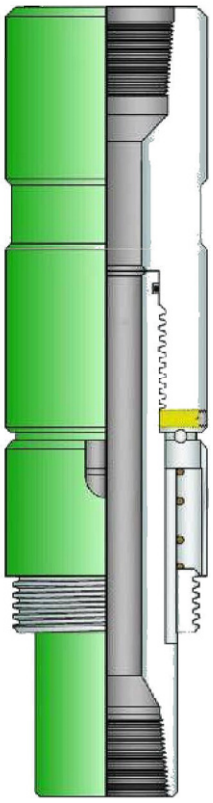
MODEL: WC –RTRM

PRODUCT No.: WC-11001

Mechanical release running tool is an industry-standard rotational release running tool. With no rotational drive capability, this tool simply conveys the liner assembly and then is released with right-hand rotation after the hanger has been set. Designed to release in compression, this tool may be run in vertical, high-angle or horizontal wells with a high degree of confidence.

As a service tool, the mechanical release running tool is a heavy duty design and construction ensures a long, usable service life. Standard configuration is with an API drill pipe box cementing seal joint box for direct connection to a retrievable seal joint, drillable seal joint, solid bushing or inverted cup tool.

It may be run in conjunction with various setting tools to run liner top packers or tieback seal nipple packers.



WC-RTRM

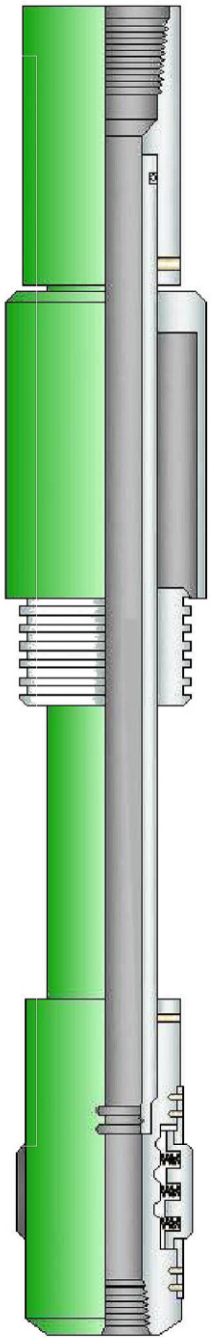
ROTATING LINER HANGER SETTING TOOL

MODEL: WC-STLH

PRODUCT No.: WC-11104

Setting tool is used to set the rotating liner hanger. The setting tool is provided with top sub with tool joint connection, Rotating Dog Sub, Kelly and Setting Nut.

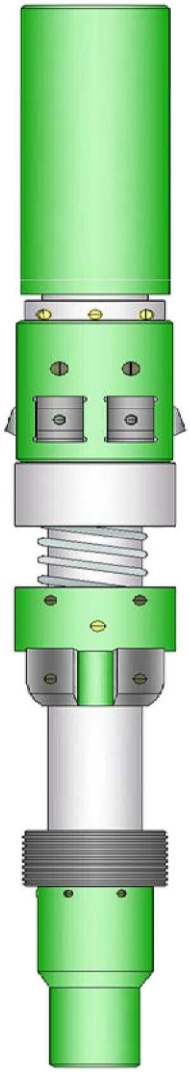
This tool is compatible to be used in high angle as well as in straight well with very easy and comfortably.



WC-STLH

Specification Guide:

SIZE	4 1/2"	5"	5 1/2"	7" ~ 7 5/8"	9 5/8"	11 3/4"
MAX OD	4.750"	5.000"	5.250"	6.500"	9.750"	10.625"
Min. ID	2.000"	2.000"	2.000"	2.750"	2.750"	2.750"
TOP END	3 1/2 IF	3 1/2 IF	3 1/2 IF	4 1/2 IF	4 1/2 IF	4 1/2 IF
BOTTOM END	2 3/8 EU	2 3/8 EU	2 3/8 EU	3 1/2 EU	3 1/2 EU	3 1/2 EU



WC-RHRT-1

WC-HRT-E

RH RUNNING TOOL

MODEL: WC-RHRT-1

PRODUCT No.: WC-11007

WELLCARE WC-RHRT-1, Liner Running Tool is designed to set a liner hanger and release the setting tool using right hand rotation.

The bottom of the tool has an adapter connection to which any of the four types of pack-off assemblies (Seal joint and Swab Cups) will attach.

A floating nut above the pack-off with left-hand threads is made up in the liner setting Collar and carries the liner assembly into the hole. A set of three lugs on the setting tool latches into the setting Collar, preventing premature rotation and release of the float nut. A ball bearing swivel above the float nut supports the weight of the running string while the setting tool is being released from the setting Collar.

HYDRAULIC RELEASE RUNNING TOOL

MODEL: WC-HRT-E

PRODUCT No.: WC-11006

Hydraulic Running Tool is used to run and set the liner hanger with or without Liner Top Packer. The Running Tool is made with Setting Sleeve & assembly is run on drill string to the bottom. The Hydraulic Release Drilldown Liner Setting Tool connects to the Liner Setting Sleeve profile provides a means to carry a liner down hole, set a liner hanger and release from the liner prior to or, if desired, after cementing.

The primary releasing mechanism is hydraulic with an emergency mechanical back-up release system. This tool carries the weight of the liner on a fully supported Collets assembly with no threads that could back off and drop the liner while running in the hole. High torque ratings of the Hydraulic release Running Tool system allow aggressive rotation if required to work a liner to bottom.

Specification Guide:

SIZE	4 1/2"	5"	5 1/2"	7" ~ 7 5/8"	9 5/8"	11 3/4"
MAX OD	4.875"	5.000"	5.650"	7.250"	9.625"	10.875"
Min. ID	2.000"	2.000"	2.000"	2.750"	2.750"	2.750"
TOP END	3 1/2 IF	3 1/2 IF	3 1/2 IF	4 1/2 IF	4 1/2 IF	4 1/2 IF
BOTTOM END	2 3/8 EU	2 3/8 EU	2 3/8 EU	3 1/2 EU	3 1/2 EU	3 1/2 EU

SETTING COLLAR (FOR STLH RUNNING TOOL)

MODEL: WC-SC-8

PRODUCT No.: WC-10411

Setting collar can be provided with upper & lower slots for Kelly stroke of the WC-STLH running tool, setting collar having Internal Receptacle profile for retrievable pack off bushing.

SETTING COLLAR (FOR STLH RUNNING TOOL)

MODEL: WC-SC-9

PRODUCT No.: WC-10419

Setting collar is derived from the model WC-SC-8 with only upper slot for Kelly stroke of the WC-STLH running tool, setting collar having Internal Receptacle profile for retrievable pack off bushing.

SETTING COLLAR (FOR HRT-E RUNNING TOOL)

MODEL: WC-SC-HR

PRODUCT No.: WC-10412

Setting collar can be provided with HR Profile to run the string with WC-HRT-E running tool, setting collar having Internal Receptacle profile for retrievable pack off bushing.

SETTING COLLAR (FOR RH RUNNING TOOL)

MODEL: WC-SC-RH

PRODUCT No.: WC-10413

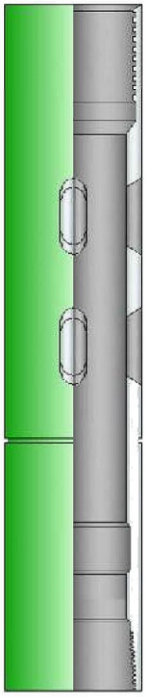
Setting collar can be provided with RH Profile to run the string with WC-RHRT-1 running tool, setting collar having Internal Receptacle profile for retrievable pack off bushing.

SETTING COLLAR (FOR RTRM RUNNING TOOL)

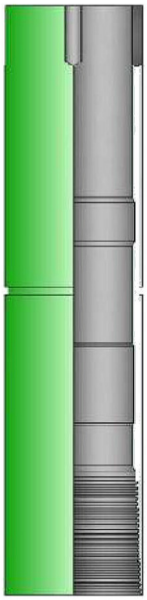
MODEL: WC-SC-A

PRODUCT No.: WC-10401

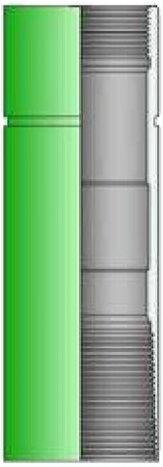
Setting collar can be provided with running thread to run the string with WC-RTRM running tool, setting collar having Internal Receptacle profile for retrievable pack off bushing.



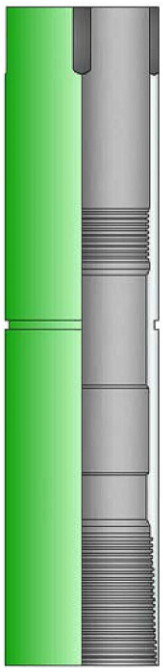
WC-SC-8



WC-SC-HR



WC-SC-A



WC-SC-RH

WC-CBDL

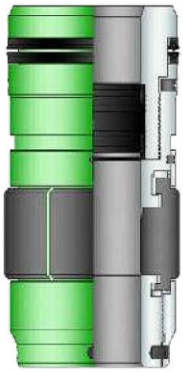
CEMENTING BUSHING DRILLABLE TYPE

MODEL: WC-CBDL

PRODUCT No.: WC-12202

It provides a superior liner to work string seal that is run with the liner system as a separate component or, integrally in running tool sub, liner top packer or tieback seal nipple packer. A close tolerance seal against drillable cementing seal joint ensures no communication between the liner casing and upper annular areas. All seals are HNBR material. It is designed for easy removal with tooth of bits and its unique cutaway design ensures that no residual bushing material will be left after drill out to interfere with re-entry into, or passage through, the liner assembly. Cementing seal joint is available in a variety of lengths to meet the most demanding well conditions it features a separate, replaceable plug adapter Sub.

WC-CBRL



WC-RPOB-1

RETRIEVABLE PACK OFF CEMENTING BUSHING (WITHOUT LOCATOR)

MODEL: WC-CBRL & WC-RPOB-1

PRODUCT No.: WC-12201 & WC-12207

It provides a superior liner to work string seal that retrieves with removal of the liner running/setting tools, and eliminates any bushing drill-out.

It is pressure-balanced assembly that does not exert any damaging loads onto the polished cementing seal joint. All seals are provided in material. Locking-dog assemblies are spring-loaded to insure positive engagement, particularly in high-angle or horizontal applications. It is easily installed in the field and requires no special handling or assembly tools.

It is of heavy-duty design and construction, ensuring a long, usable service life. Standard configurations allows for slip on installation over a retrievable cementing seal joint. It may be run in conjunction with any running tool sub, liner top packer, or tieback seal nipple packer equipped with its profile.

Features / Benefits:

- Positive locking dogs
- HNBR internal & external seals
- Pressure loading on support sleeve not cementing seal joint
- Easy field installation

RETRIEVABLE PACK OFF BUSHING (WITH LOCATOR)

MODEL: WC-RPOB

PRODUCT No.: WC-12206

WELLCARE RPOB is the device that provides a two way seal during cementing operations. It has Moly-glass V-ring packing both inside and out. The V-ring packing on the outside will seal off in the upper seal bore of the RPB Nipple. The V-ring packing on the inside will seal off on the OD of the Seal Joint. The locking dogs on the RPOB lock into the profile of the RPB Nipple. When pressure is applied from below, the locking dogs will take the load caused by hydraulics. When pressure is applied from above, either the no-go will take the load, or in the case of a RPOB without a no-go, the locking dogs will take the load. Because of this, the hydraulic forces that are placed upon the setting equipment during cementing operations are significantly reduced.

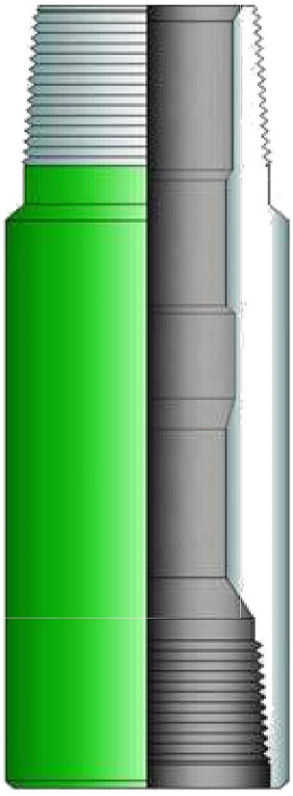
WC-RPOB

RETRIEVABLE PACK OFF BUSHING NIPPLE

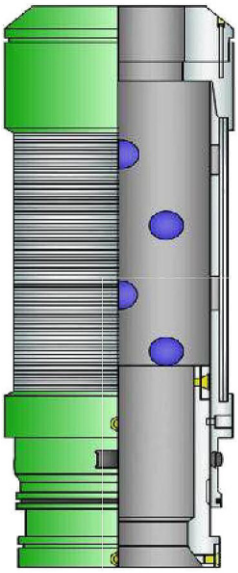
MODEL: WC-RPBN

PRODUCT No.: WC-12205

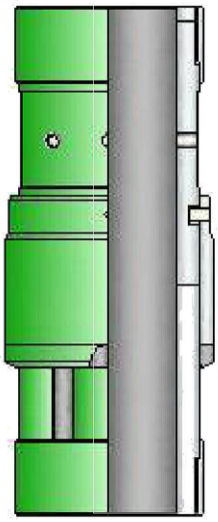
WELLCARE RPB Nipple is run integral to the liner hanger assembly. It has a polished bore for the RPOB Pack off to seal into, and it has a locking profile for the RPOB Dogs to lock into such that it will not move until the setting tool is pulled free. The RPB Nipple is normally run below a Setting collar or liner top packer and above the liner hanger with the pin end pointing up. The nipple comes standard with pin up, box down



WC-RPBN



WC-DSC-1



WC-JCR

DEBRIS SCREEN & JUNK COVER

MODEL: WC-DSC-1 & WC-JCR

PRODUCT No.: WC-11302 & WC-11304

Its locking style debris screen eliminates associated problems of debris entering the tieback seal receptacle during the running and releasing of the liner assembly. Traditional style, insert type debris screens are prone to moving during run-in, particularly during verification of release form the liner or when setting a liner top packer. When moved from the liner top, debris is allowed to enter into an extremely close tolerance annular space between the running/setting tools and the tieback seal receptacle which may result in the tools being permanently or temporarily stuck. In a permanent situation, free point, back-off and milling operations are required to remedy the situation. In a temporary situation, potential loss of the liner during retrieval and its unplanned return to the bottom of the well usually result in a costly fishing operation as well as damage to the liner casing.

It has a locking dog assembly that prevents movement of the debris screen until the running/setting tools physically release the assembly. A machined profile is provided in the tieback seal receptacle. A stainless steel well screen section provides a barrier to smaller debris during the running of the liner.

Unlike fluid cushion junk system offered by other companies, it is easily installed in the field and requires no special handling or assembly tools.

It is of heavy duty design and construction, ensuring a long, usable service life. Standard configuration is for slip on installation over. API IF tool joints provided on all drill pipe handling nipples run with the liner running/setting tools assembly. It may be run in conjunction with all tieback seal receptacles, liner top packers and tieback seal nipple packers.

Features / Benefits:

- Positive locking dogs
- Stainless steel screen
- Wiper ring
- Easy field installation

JUNK SCREEN:

MODEL: WC-DSC

PRODUCT No.: WC-11301

The liner hanger junk screen should be run as part of the setting tool assembly to prevent debris from damaging the polished bore of Tieback Receptacle.

HANDLING NIPPLE

MODEL: WC-HN

PRODUCT No.: WC-11201

The Handling Nipple is a Drill pipe Pup joint, which makes handling of the Liner hanger assembly easier. Upper connection connects with drill pipe and lower connection connects with running tool. Junk screen install over handling nipple to prevent debris from damaging the polished bore of Tieback Receptacle.

DRILLING SAFETY JOINT

MODEL: WC-DSJ

PRODUCT NO.: WC-11802

Drilling Safety Joint provides safe and easy release make-up as require. This tool is designed to transmit torque in either direction when placed in the drilling, fishing or wash over strings.

The safety joint consists of a pin section, a box section, and a friction ring. The internal connection of the safety joint is a coarse acme thread used to facilitate easy pack-off and re-engagement.

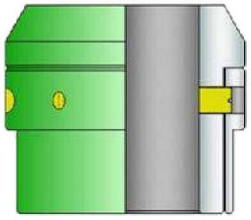
A knurled release ring between the box and pin sections maintain torsion integrity until back-off procedure is initiated. An O-ring seal contains pressure while the safety joint is made up.

Assembly and Operation:

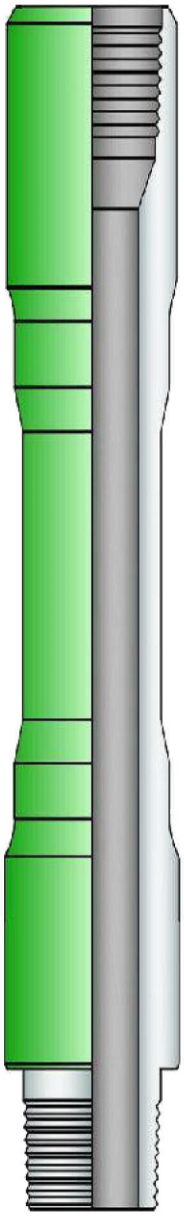
To assemble, install the safety joint in the drill string as indicated below. Make up the service connection to a torque of approximately 60 to 75% of the drill string connections.

- In drill strings, the safety joint should be located above the drill collars to avoid compression.
- In fishing strings, the safety joint should be located directly above the fishing tool but below the jar or bumper sub.
- In wash over strings, the safety joint should be located between the drill pipe and the wash over pipe. Wellcare Wash over Safety Joints is provided with a tool joint box thread and a wash over pipe pin thread.

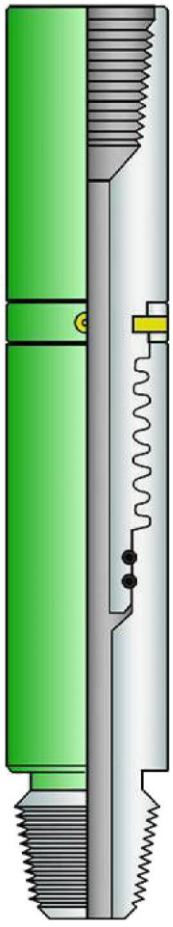
To disengage the safety joint while down-hole, place pipe in tension and apply left-hand torque. Hold torque while slowly lowering pipe until safety joint breaks. Continue to unscrew safety joint to the left. To re-engage the safety joint, lower pipe until pin section of safety joint lands on box section. Apply one point of weight. Rotate to the left one or two turns. Then rotate to the right until torque builds up, indicating safety joint is made up.



WC-DSC



WC-HN



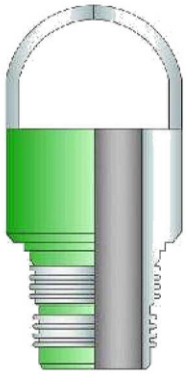
WC-DSJ

Specification Guide:

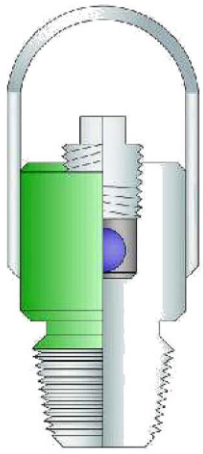
Connection	2 3/8 EUE	2 3/8 REG	2 3/8 IF	2 7/8 EUE	2 7/8 REG.	2 7/8 IF	3 1/2 REG	3 1/2 FH
Tool OD	3 1/16	3 1/8	3 3/8	3 21/32	3 3/4	4 1/8	4 1/4	4 1/2
Tool ID	1 3/4	1	1 3/4	2 7/16	1 1/4	2 1/8	1 1/2	2 1/16

Connection	3 1/2 FH	3 1/2 IF	3 1/2 IF	4 IF	4 1/2 IF	4 1/2 IF	4 1/2 IF	5 1/2 REG
Tool OD	4 5/8	4 3/4	5	5 3/4	6 1/8	6 1/4	6 1/2	6 3/4
Tool ID	2 7/16	2 11/16	2 11/16	3 1/4	3 3/4	3 3/4	3 3/4	2 3/4

Connection	5 1/2 FH	6 5/8 REG	6 5/8 REG	6 5/8 REG	6 5/8 IF	7 5/8 IF	7 5/8 REG	8 5/8 REG
Tool OD	7	7 3/4	8	8 1/4	8 1/2	9	9 1/4	10
Tool ID	4	3 1/2	3 1/2	3 1/2	5 29/32	4	4	4 3/4



WC-LP



WC-ELS

LIFT PLUGS

MODEL: WC-LP

PRODUCT NO.: WC-11501

Wellcare Lift Plugs are designed to provide an economical method of handling wash-over strings. They are available in all thread types and sizes, have sufficient shoulder diameter to support handling the wash-over string, and can be ordered with or without lifting bail.

Wash-Pipe	4 1/2	4 3/4	5	5 1/2	5 3/4	6
Plain Length	6	6	6	6	6	6
With Bail Length	12	12 1/2	13	13 1/2	13 3/4	14
Shoulder F.J.W.P	5	5 3/8	5 9/16	6 1/8	6 1/2	6 5/8
Maximum ID	3 7/8	4	4	4 5/8	4 7/8	5 1/8

Wash-Pipe	6 5/8	7	7 5/8	8 1/8	8 5/8	9
Plain Length	6	6	6	6	7	7
With Bail Length	14 1/2	14 13/16	17	18	19	19 ½
Shoulder F.J.W.P	7 7/16	8	8 5/8	9 3/32	9 5/8	10
Maximum ID	5 5/8	6	6 5/8	7 1/8	7 5/8	8

Wash-Pipe	9 5/8	10 3/4	11 3/4
Plain Length	7	7	7
With Bail Length	20	21	21
Shoulder F.J.W.P	10 5/8	11 3/4	12 3/4
Maximum ID	8 5/8	9 5/8	

ELEVATOR LIFT SUBS

MODEL: WC-ELS

PRODUCT NO.: WC-11502

Wellcare Elevator Lift Subs are used to handle the wash-over string and have an upper shoulder as well as reduced neck for securing in the elevator.

DRIVE SUBS

MODEL: WC-DS

PRODUCT No.: WC-11503

Wellcare Drive Subs provide the crossover connection between the drill pipe string and the wash-over string. Each is machined from high-grade alloy steel and heat treated to provide maximum strength and durability.

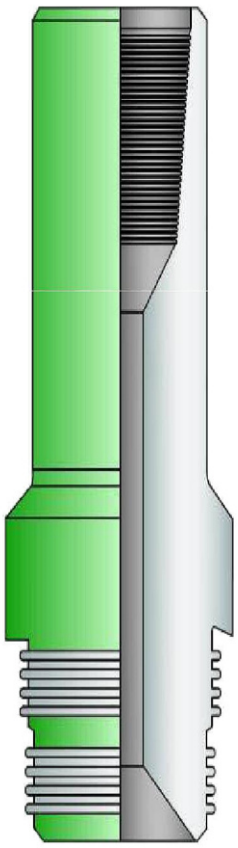
Drive subs are provided with a box connection up, cut to customer specifications, for make-up with the fishing string. A pin connection down is also cut to customer specification and will match the wash-over string connections. A fishing neck is provided for ease of handling. A long type drive sub with extra long fishing neck is also available.

Specification Guide:

Wash Pipe Size	4 1/2	4 3/4	5	5 1/2	5 3/4	6
Short Type Length, inch	16	16	16	16	18	18
Long Type Length , inch	46	46	46	46	46	46

Wash Pipe Size	6 5/8	7	7 5/8	8 1/8	8 5/8	9
Short Type Length, inch	18	19	19	19	20	20
Long Type Length , inch	46	48	48	48	50	50

Wash Pipe Size	9 5/8	10 3/4	11 3/4
Short Type Length , inch	20	20	20
Long Type Length , inch	50	54	



WC-DS

DRILL PIPE WIPER PLUG

MODEL: WC-DWP

PRODUCT No.: WC-10901

It is designed to wipe clean the work string after cementing operations; the drill pipe wiper plug is designed to latch and seal into the liner wiper plug. When latched together, the plugs provide isolation between the liner cement and displacement fluid. When landed and latched into the appropriate landing collar, they provide a redundant back pressure valve to the floats in the shoe, landing collar and float collar.

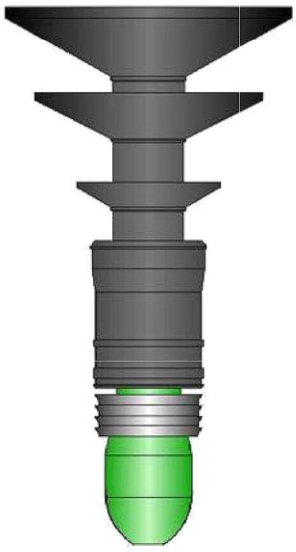
The cup style design of the wiper fins provides a positive seal for activation of any hydraulic components and does not rely on an interference type seal like other plug systems. The wipers and molded seals are standard HNBR material.

A robust anti rotation nose latch and clutch profile prevents rotation of the plugs during drill out operations.

Available in a tandem plug configuration, the wiper system allows for wiping of the work string and liner casing in advance of the cementing operation.

Features:

- Positive anti-rotation clutch profile
- Robust anti-rotation latch assembly
- Standard HNBR molded seals and wiper fins.
- Available with multi plug configuration to suit any tapered drill pipe/work string.

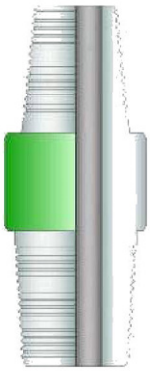


WC-DWP

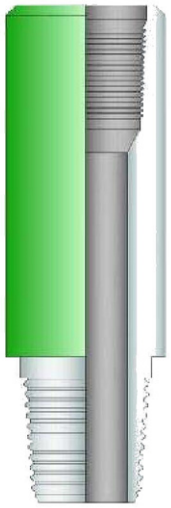
CROSS-OVER SUB (Rotary Sub)

Wellcare manufactures a wide range of rotary subs used as a connector of different size or type, in drilling, wash-over or tubing strings. It is used in applications where it is necessary to have frequent disconnection points. These are manufactured from higher group of API 5CT standard materials as well as furnished with the end connections in compliance to API standards or any premium threads as per the customer's requirement/demand. Materials suited for H_2S or CO_2 service are available on request.

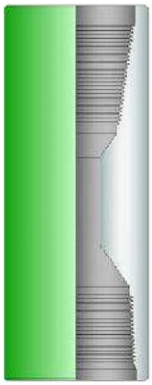
Subs are available pin-to-pin, box-to-box or box-to-pin thread connections and of different lengths up to 96 inches. Right or left-hand threads can be provided.



Cross-over Sub
(Pin x Pin)
Model: WC-COS99
Product: WC-10701



Cross-over Sub (Box x Pin)
Model: WC-COS89
Product No.: WC-10702



Cross-over Sub (Box x Box)
Model: WC-COS88
Product No.: WC-10703

Specification Guide:

Largest OD inch	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2
Length inch	10	10	10	10	10	10	10	10	10

Largest OD inch	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2	5 3/4
Length inch	10	10	10	10	12	12	12	12	12

Largest OD inch	6	6 1/4	6 1/2	6 3/4	7	7 1/4	7 1/2	7 3/4	8
Length inch	12	12	12	12	12	14	14	14	14

Largest OD inch	10 1/2	10 3/4	11	11 1/4	11 1/2	11 3/4	12	12 1/4	12 1/2
Length inch	16	16	16	16	16	16	16	16	16

Largest OD inch	12 3/4	13	13 1/4	13 1/2	13 3/4	14
Length inch	16	16	16	16	16	16

LINER WIPER PLUG

MODEL: WC-LWP

PRODUCT No.: WC-10801

Liner wiper plug means to clean the liner casing after cementing operations. Its upper inner latch is to accept the external latch of Drill Pipe wiper plug while lower outer latch component is there to get latched with the landing collar at down the string.

When latched together, these plugs provide isolation between the liner cement and displacement fluid. When landed and latched into the appropriate landing collar, they provide a redundant back pressure valve to the floats in the shoe, landing collar and float collar.

The integral molded design of the wiper fins provides a positive seal for activation of any hydraulic components. With distinguished diameters of fins are designed for specific purpose such as one will be wiping off inside of the liner while other fin will be holding the up or back pressure. These plugs are made up of elastomeric material as per rated or required applications.

A robust anti rotation nose latch and clutch profile prevents rotation of these plugs during drill out operations.

Available in a tandem plug configuration, the wiper system allows for wiping of the work string and liner casing in advance of the cementing operation.

Features / Benefits:

- Positive anti-rotation clutch profile & latch assembly.
- Easy and fast drill out.
- Standard HNBR molded seals and wiper fins.
- Available with multi plug configuration to suit any tapered drill pipe/work string.

WC-LWP

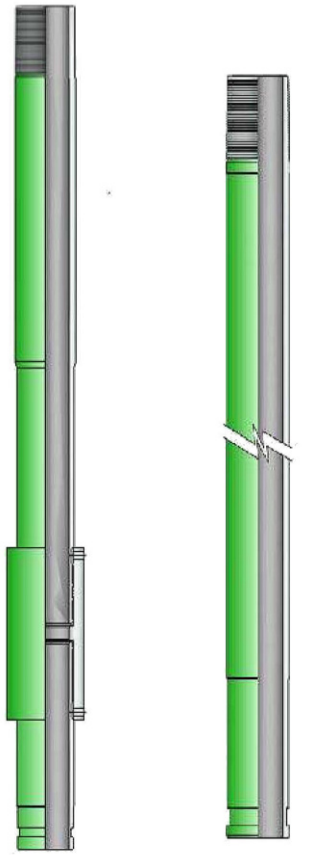
SEAL JOINT/ POLISH STINGER/ SLICK JOINT

MODEL: WC-SJT (FOR RPOB) & WC-SJT-1 (FOR DPOB)

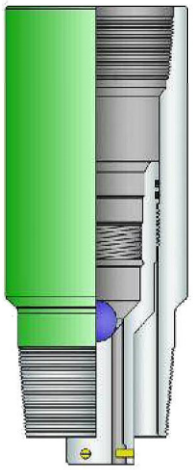
PRODUCT No.: WC-11801 & WC-11803

Seal Joint with grounded ODs is to provide a sealing surface for the retrievable/drillable Pack-off Bushing. These are manufactured from higher group of API 5CT standard materials as well as furnished with end connections in compliance to API standards or any premium threads as per the customer's requirement/demand. CRA materials suited for H_2S or CO_2 service are available on request. A groove is provided at the bottom end to attach the Liner Wiper Plug.

Our seal joint manufactured from high grade alloy material and surface would be chrome platted so as to possess resistance for corrosive environments.



WC-SJT WC-SJT-1



WC-LCB

WC-LHA

LANDING COLLAR

MODEL: WC-LCB

PRODUCT No.: WC-10501

Landing Collar is used when setting liner hanger prior to cementing. A setting ball seat in the shear seat allowing pressure to be applied to the hanger to set the slips. Increasing the pressure after setting the hanger shears the ball seat allowing full circulation for cementing operations. The shear rating of the ball seat is adjustable to meet the requirements of the hanger.

It incorporates a latch with Non- rotational Mechanism to accept, lock and seal the Liner Wiper Plug upon completion of cementing.

HYDRAULIC ACTIVATED LANDING COLLAR

MODEL: WC-LHA

PRODUCT No.: WC-10502

Hydraulically activated landing collar is used when running hydraulic set liner hangers or other hydraulic components run in a liner string. Shear setting of the assembly is field adjustable by the addition or removal of batch tested and matched shear screws.

Internal components are constructed for wrought aluminum and are compatible for drill out. We retained ball seat design prevents the sheared out cage and ball assembly from interfering with float equipment run below the landing collar. Large, milled slots provide an unrestricted flow area while cementing. Shears/setting balls are available in bronze, aluminum or phenolic materials of varying specific gravity for use in vertical, high angle or horizontal wells or for specific cement weights. All seals are of standard HNBR material.

A robust anti-rotation profile and latch assembly is designed to receive the liner wiper plug. When latched. These plugs provide a redundant seal to those of the float equipment.

The body of the landing collar is manufactured of material matching the grade of the liner casing, which provides performance equal to or greater than that of the liner casing.

Features / Benefits:

- Positive anti-rotation profile for liner wiper.
- Robust latch assembly for liner wiper.
- Standard HNBR molded seals.
- Available with anti-wear coating.

LATCH TYPE LANDING COLLAR

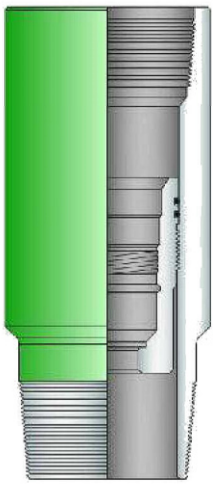
MODEL: WC-LCL

PRODUCT No.: WC-10503

Latch type landing collar is used when running mechanical set liner hangers. It is designed to provide a latch-and-seal area for the liner wiper plug.

A robust anti-rotation profile and latch assembly is designed to receive the liner wiper plug. When latched. These plugs provide a redundant seal to those of the equipment.

The body of the landing collar is manufactured of material matching the grade of the liner casing, which provides performance equal to or greater than that of the liner casing.



WC-LCL

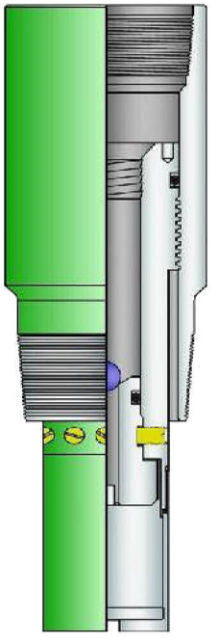
HYDRAULIC LANDING COLLAR WITH CATCHER SUB

MODEL: WC-LCS

PRODUCT No.: WC-10504

Landing collar with catcher sub is used when setting liner hanger prior to cementing. A setting ball seats in the shear seat allowing pressure to be applied to the hanger to set the slips. Increasing the pressure after setting the hanger shears the ball seat allowing full circulation for cementing operations. The shear rating of the ball seat is adjustable to meet the requirements of the hanger.

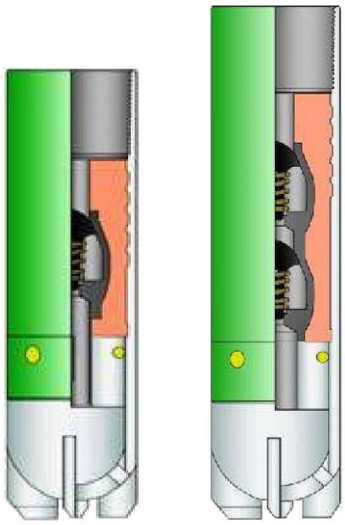
The collar incorporates a latch with non-rotational mechanism to accept, lock and seal the liner wiper plug upon completion of cementing. The catcher is provided to collect the ball seat with ball after shear.

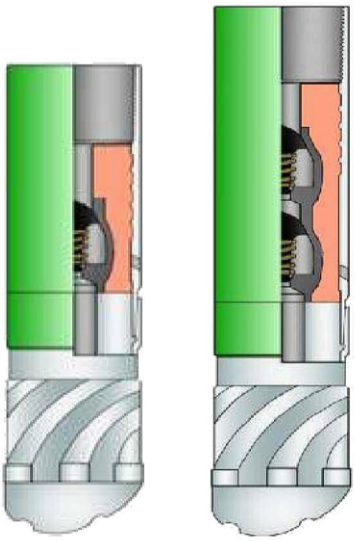


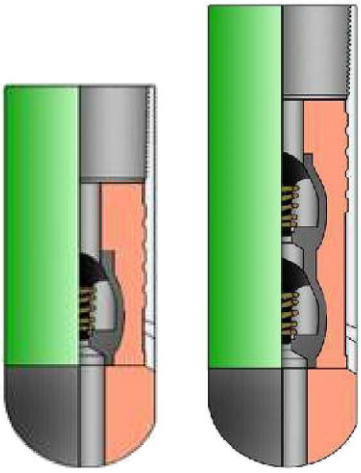
WC-LCS

- **Specification Guide:**

Size	OD inch	Ball size inch
4 ½	5.000	1 1/4
5	5.563	
5 ½	6.050	
7	7.875	1 3/4
9 5/8	10.625	
13 3/8	14.375	
16	17.000	







DOUBLE / SINGLE VALVE BOTTOM SET JET SWIRL SHOE

MODEL: WC-DBJS & WC-SBJS

PRODUCT No.: WC-10601 & WC-10611

Double / Single valve bottom set jet swirl shoe is designed for running and cementing liner assemblies with the contingent ability to be set on bottom in the event the liner does not hang. Specifically, there are features not present in more conventional primary cementing shoes. These features include:

- Spade nose with anti-rotation fins which allow the liner to remain stationary while the work string is rotated to release from the liner assembly.
- Since and down circulation ports. In many cases, the liner is set close to the bottom of the hole and may encounter cuttings and other well debris. The side and down ports aid in the flow of cement in these debris filled applications. This is of particular importance when the liner is set on bottom.

Internal components are constructed of cement, thermo-plastic, and rubber, compatible for fast and easy PDC drillable. The float assemblies are tested and rated to API recommended practice 10F. The unique design of the molded rubber seal prevents impingement and erosion of the seals by the circulating fluids, ensuring a positive seal at conclusion of the liner installation.

The body of the jet swirl is manufactured of material matching the grade of the liner casing, which provides performance equal to or greater than that of the liner casing.

REAMER SHOE WITH DOUBLE / SINGLE VALVE

MODEL: WC-RSDV & WC-RSSV

PRODUCT No.: WC-10602 & WC-10605

Reamer Shoe with double / Single valve has reaming capacity to drill through difficulties during lowering of liner. Tungsten Carbide composite facing is provided to negotiate drilling and reaming. Also Aluminum guide is provided.

Internal components are constructed of cement, thermo-plastic, and rubber compatible for fast and easy PDC drillable. The float assemblies are tested and rated to API recommended practice 10F. The unique design of the molded rubber seal prevents impingement and erosion of the seals by the circulating fluids, ensuring a positive seal at conclusion of the liner installation.

DOUBLE / SINGLE VALVE JET SWIRL SHOE

MODEL: WC-DJSS & WC-SJSS

PRODUCT No.: WC-10604 & WC-10606

Double / Single valve jet swirl is designed for running and cementing liner assemblies with the contingent ability to be set on bottom in the event the liner does not hang. Specifically, there are features not present in more conventional primary cementing shoes.

Internal components are constructed of cement, thermo-plastic, and rubber, compatible for fast and easy PDC drillable. The float assemblies are tested and rated to API recommended practice 10F. The unique design of the molded rubber seal prevents impingement and erosion of the seals by the circulating fluids, ensuring a positive seal at conclusion of the liner installation.

The body of the jet swirl is manufactured of material matching the grade of the liner casing, which provides performance equal to or greater than that of the liner casing.

ORIFICE FLOAT COLLAR

MODEL: WC-OFC

PRODUCT No.: WC-30221

A Liner Extension Assembly allows an existing Liner with a receptacle to be extended to the surface or farther up hole. The assembly consists of a seal Nipple and an Orifice Collar. The Seal Nipple is run at the bottom of the Extension casing.

The Tieback Receptacle (TBR) is usually run as an integral part of the liner top packer or Setting Collar and at Liner top. It has special surface finish so as to provide a positive sealing bore for the seal nipple assembly during tubing string expansion and/or contraction in response to pressure and temperature.

The Polish Bore Receptacle provides the maximum integral opening through the production tubing and sealing system.

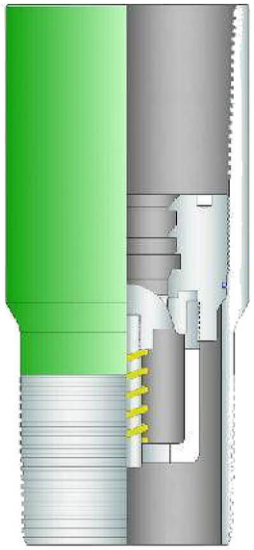
The TBR Seal Nipple is the second part of the Tie back system and provides a unitized seal assembly on a stem which connects to the end of tubing or casing string and to successfully create a packer less free end tubing to casing seal.

When used in un-cemented or frac applications the seal integrity is maintained allowing tubing to expand and contract in response to pressure and temperature differences without affecting the integrity of the tubing to casing seal. Typically a series V-ring (or Chevron) seal stacks are assembled on the seal nipple mandrel and separated by spacer rings.

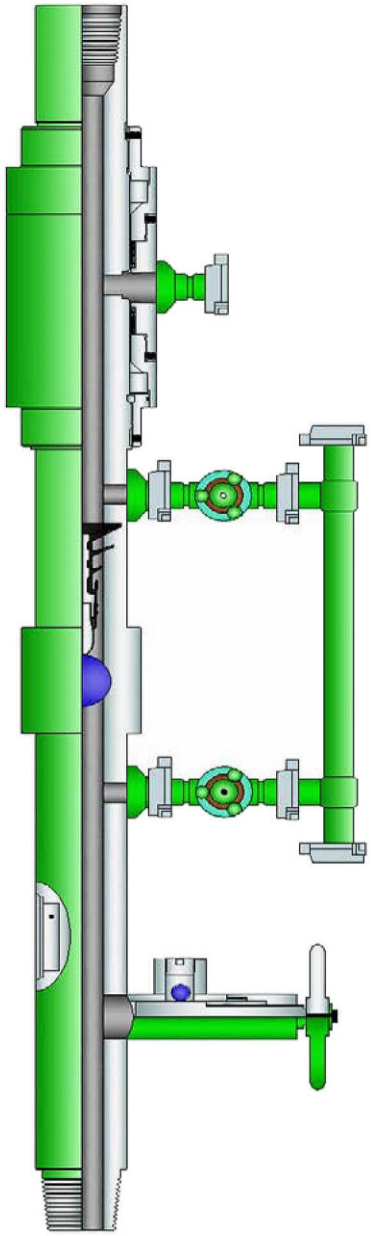
A Polish Mill is run before to clean out TBR. For cemented Tieback applications, the TBR Seal Nipple is combined with a stage collar or ported put and an orifice float collar.

The orifice float Collar is designed with small diameter drilled hole through the float valve to allow fluid by-pass and preventing hydraulic lock as the seal nipple stabs into the TBR after cement is in place. Orifice Collar is positioned one joint above the Seal Nipple. This prevents hydraulic blockage as the seal is engaged in the receptacle and allows the Liner Extension to fill at a predetermined rate as it is run.

The Orifice Collar also serves as a stopper for the cement plug. Designed to match the size, weight and grade of the liner tieback string. Incorporates a conventional Super Seal II valve assembly with a poppet valve that incorporates an orifice flow port that allows pre-cementing pressure test to be performed on the TBR and stinger.



WC-OFC



TOP DRIVE CEMENTING HEAD

MODEL: WC-TDCH

PRODUCT No.: WC-11702

Top Drive Cementing Head having 4-1/2" I.F. Box up and Pin down connections for 10,000 PSI Cementing Line and Tensile Strength of 400 Ton. The integral body of Cementing Head removed all internal connection and easy to use. Top Drive Cementing Head comprises with Flag sub and Ball dropping sub.

The Positive Ball Dropping Sub is used to release varied sizes of setting balls to a ball seat down hole. This can be accomplished without breaking a drill pipe connection at the surface or by removing a hammer union cap. The ball is enclosed in a recess unaffected by the flow of fluids and is released with a simple turn of the handle. The handle is locked during the circulation period thus preventing possible premature release of setting ball. The sub is designed to drop varied sizes of ball, ranging from 1.25" to 2.25"diameter.

- Provides "positive" means to release a setting ball down.
- Ball is protected from fluids while conditioning the liner.
- Simple operation.
- Drops various sizes of balls.

Flag sub is placed immediately below the plug dropping head and swivel. The position of the Flag indicates that the pump down plug has been released from the head and has moved down the drill pipe.

- Positive indication that plug has left the cementing head.
- High tensile strength.
- Drill pipe connection standard.

The integral Body Cementing Manifold suspends drill pipe weight from the rig elevators while retaining the plug so that it can be released after cementing has been completed. The IBCM also connects the cementing lines to the running string during liner operations, and includes a heavy-duty swivel for easy string manipulation with the cementing lines in place. This swivel mechanism and drill pipe plug retainer are built in below the elevators for unobstructed operation. A ball drop assembly is integral with the plug dropping manifold for use with hydraulic-set liner systems.

Features and Benefits:

- Maximum strength and toughness from quenched and tempered alloy steel construction.
- Displacement fluid and cement are diverted below or above the plug through an external manifold.
- Manifold rated to 10,000 PSI working Pressure.
- Cementing flag sub for visual indication of drill pipe wiper plug release is integral with the Plug Dropping Manifold.
- Heavy duty swivel permits easy manipulation of the string without having to break down the cementing lines.

Specification Guide:

SIZE	2 7/8"	3 1/2"	4 1/2"
CONNECTION BOX UP X PIN DOWN	2 7/8 IF	3 1/2 IF	4 1/2 IF

CONVENTIONAL CEMENTING MANIFOLD

MODEL: WC-CEMF

PRODUCT No.: WC-11701

It is designed for use with conventional land based drilling and service rigs, as well as with offshore rigs not equipped with a top drive or using a conventional manifold.

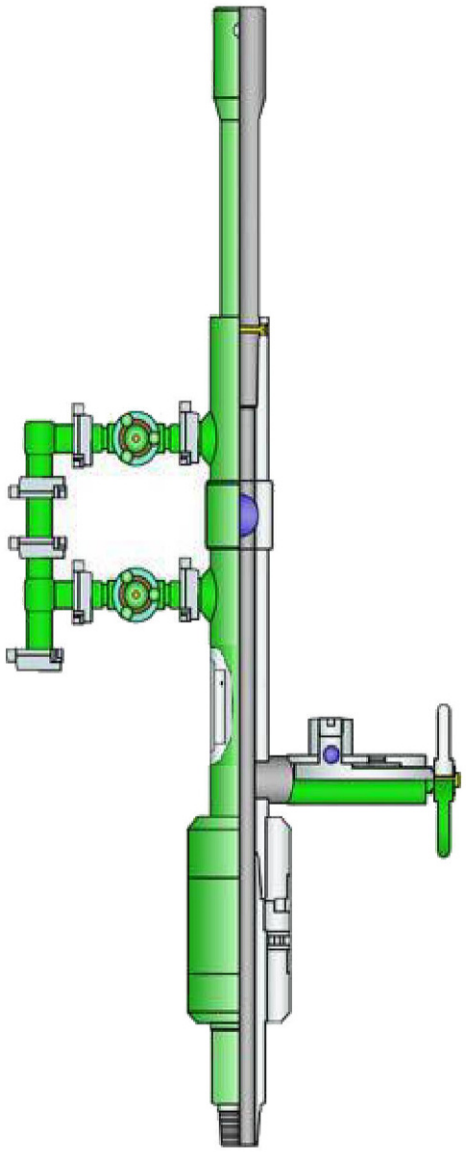
The heavy duty design and construction of this assembly easily handles the tensile loads seen in deep drilling liner applications with sufficient capacity to handle any problems like stuck pipe that could occur while running a liner assembly.

Cementing Manifold is a robust cementation device which allows you to hang drill pipe weight by the rig elevators meanwhile retaining the plug to be released at will, once cementing is complete.

The Cementing Manifold also connects the cementing lines to the running string during liner operations, and includes a heavy duty swivel for easy drill pipe string manipulation with the cementing lines still connected to the manifold.

The swivel mechanism and drill pipe plug retainer are built in below the elevators for unobstructed operation.

Cementing Manifold is available with single or multi plug drop capabilities.

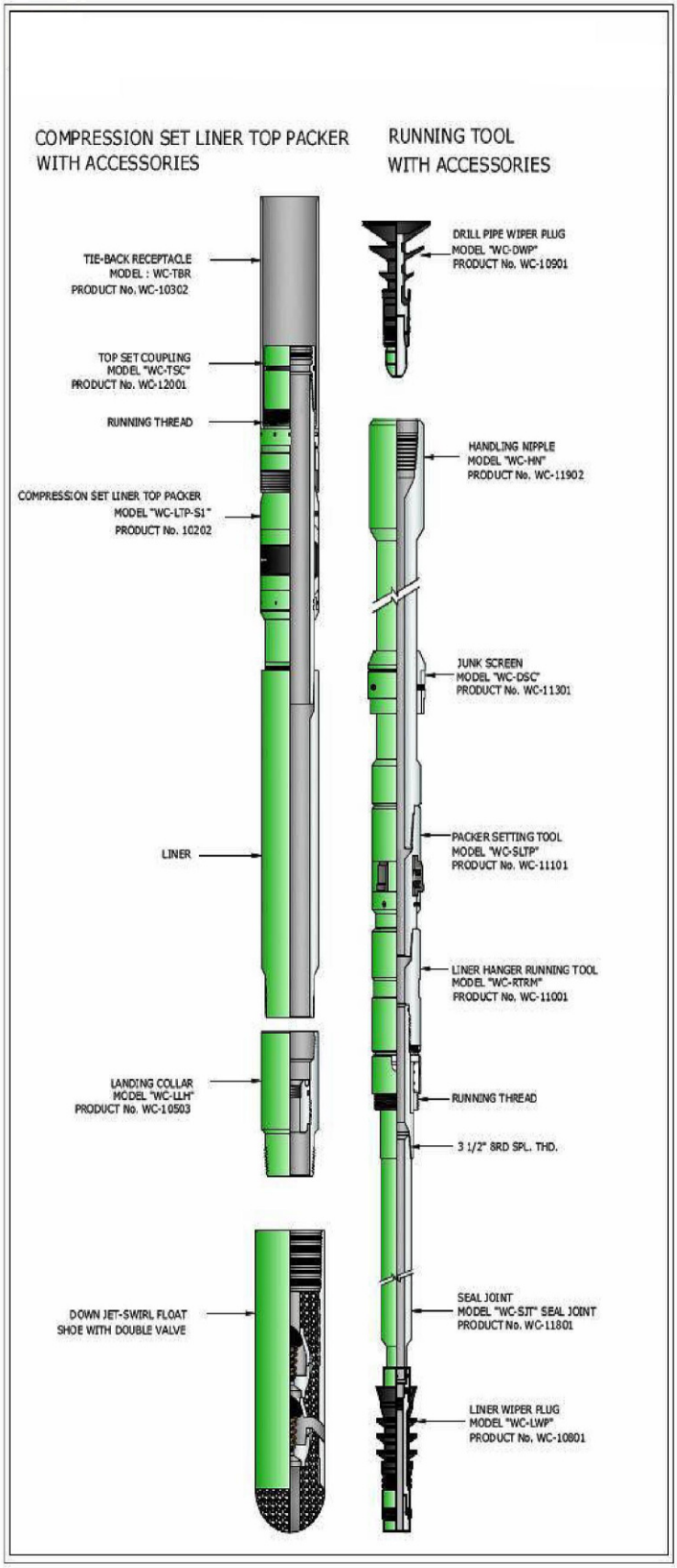


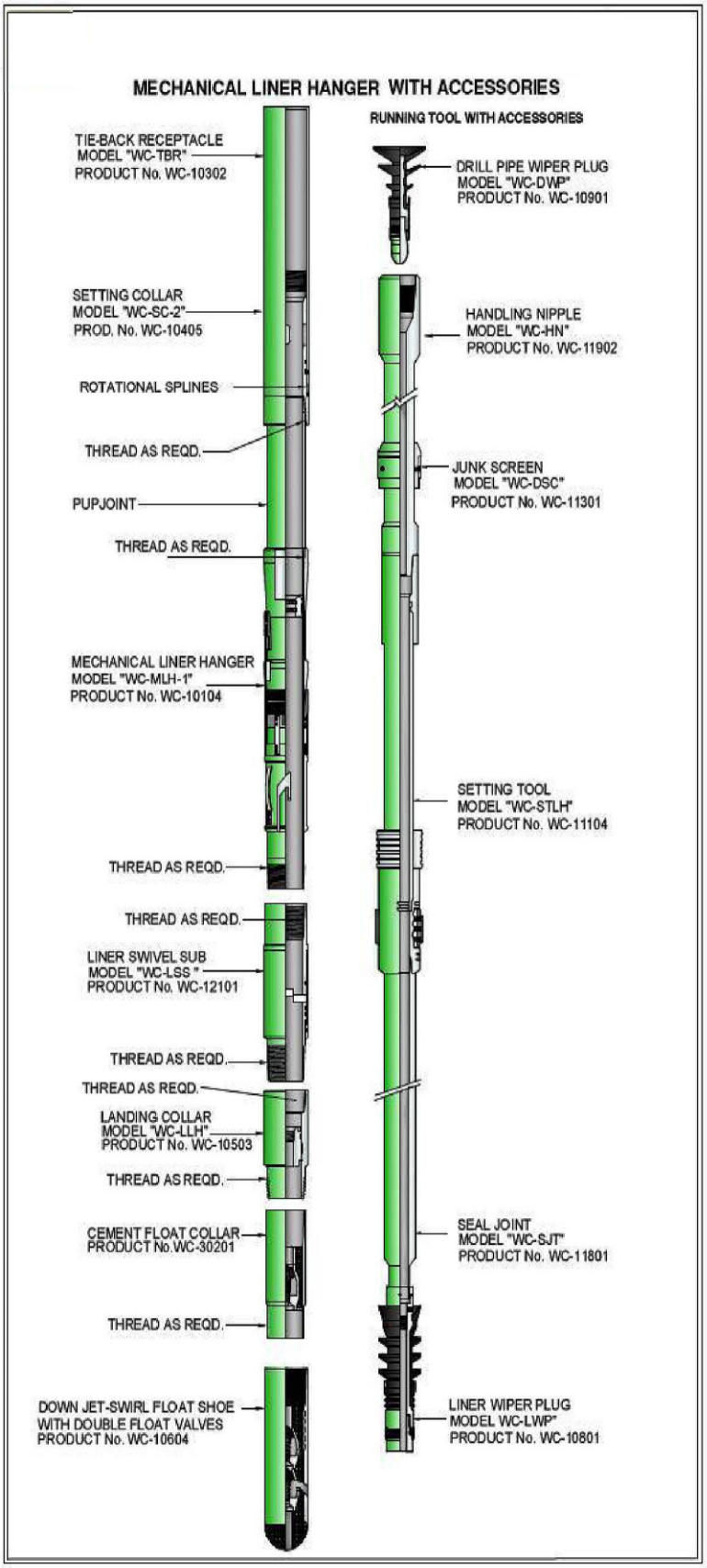
Features and Benefits:

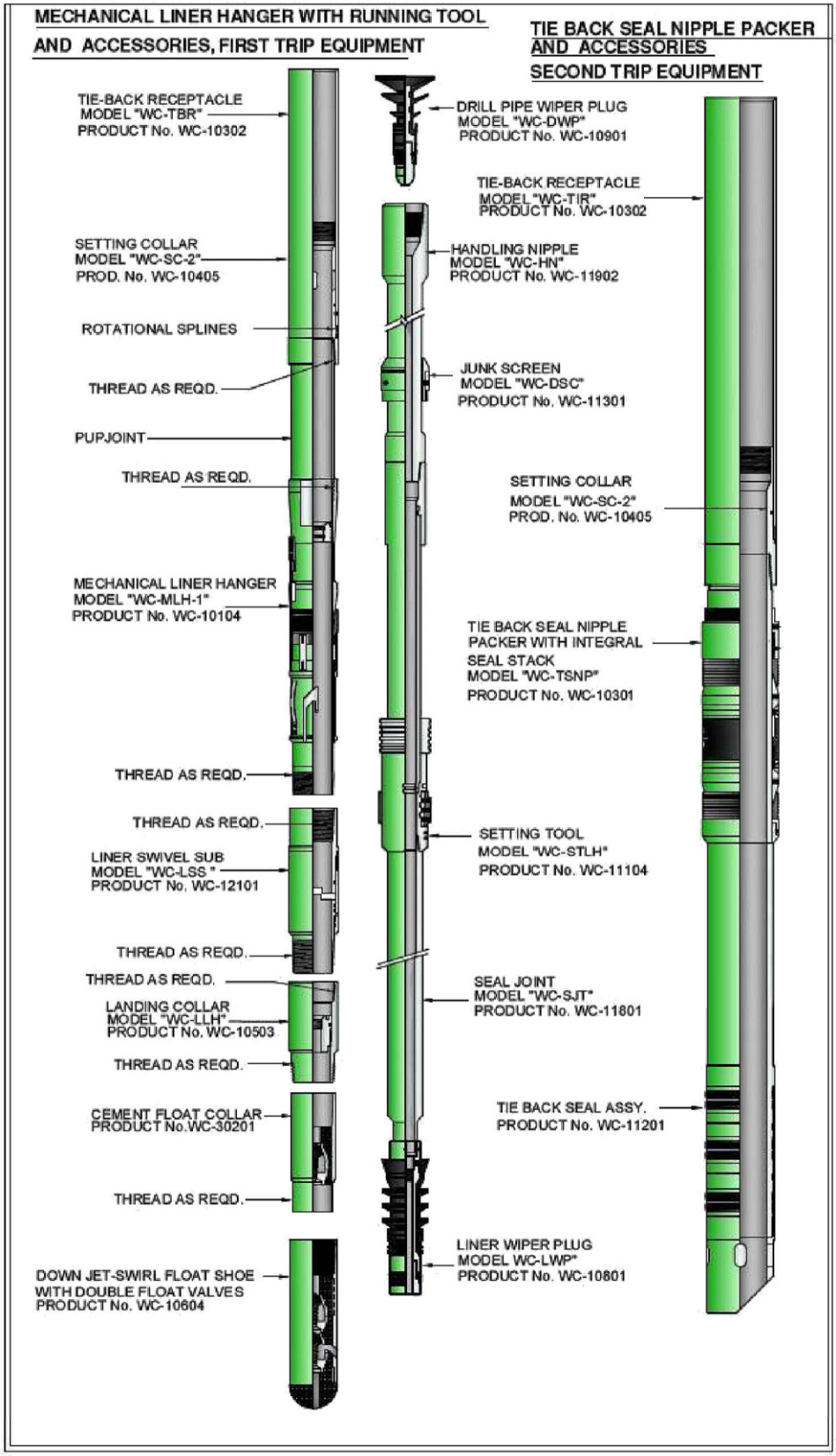
- High strength Q&T 4145 alloy steel construction.
- Displacement fluid and cement can be diverted below or above the plug through an external manifold.
- Manifold rated to 10,000 PSI working pressure Wiper plug release tell tale visual confirmation possible.
- Cementers most respected cementing manifold design.

Specification Guide:

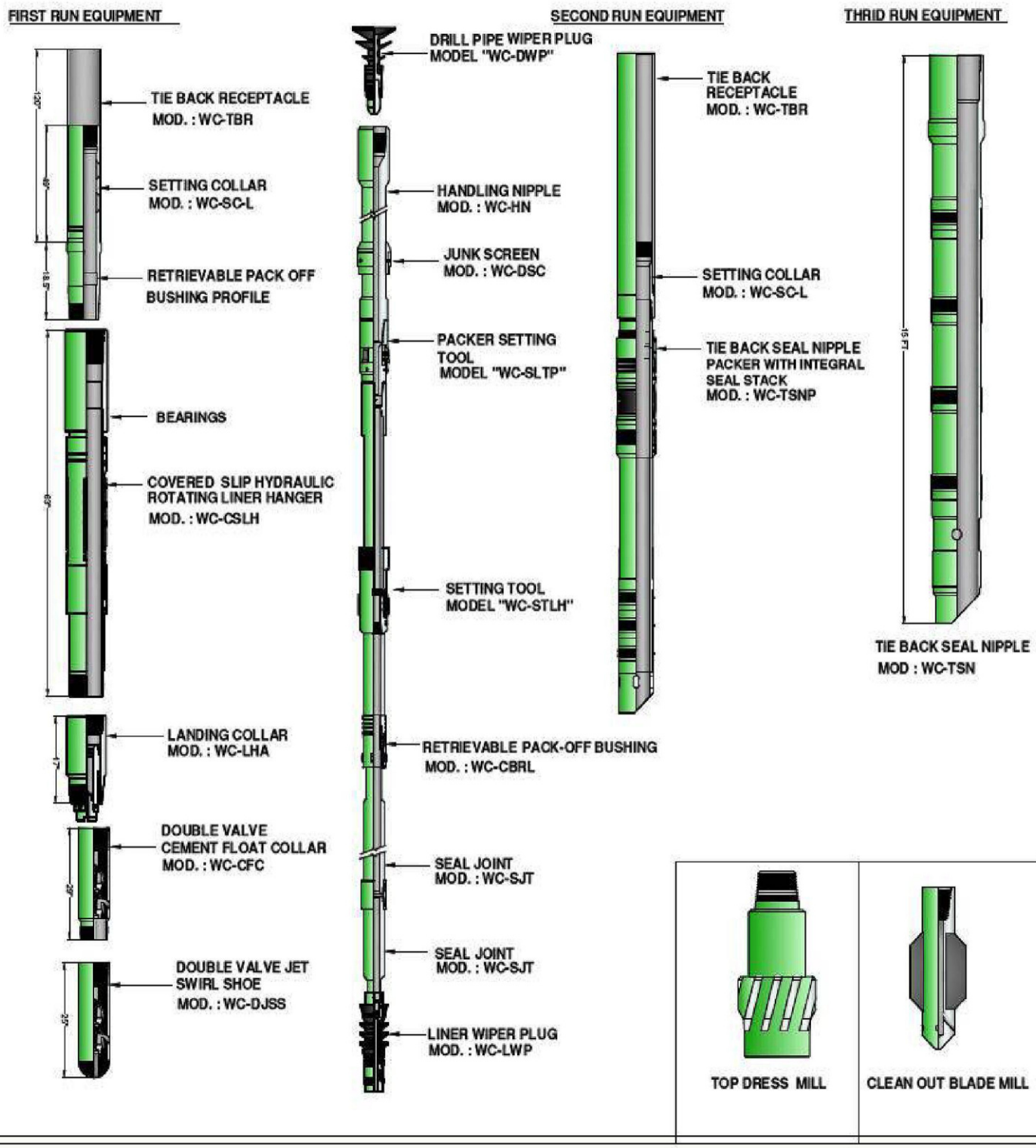
SIZE	2 7/8"	3 1/2"	4 1/2"
CONNECTION BOX UP X PIN DOWN	2 7/8 IF	3 1/2 IF	4 1/2 IF

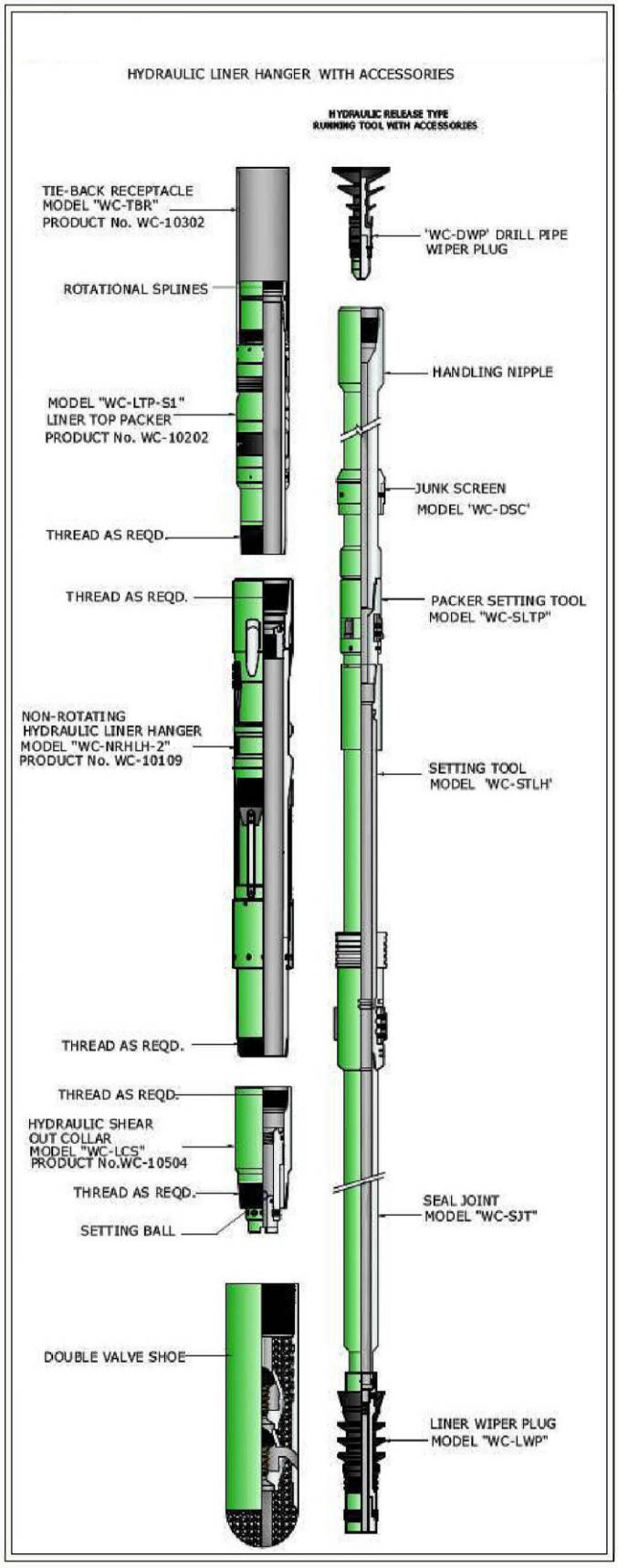

COMPRESSION SET LINER TOP PACKER
WITH ACCESSORIES
RUNNING TOOL
WITH ACCESSORIES
TIE-BACK RECEPTACLE
MODEL : WC-TBR
PRODUCT No. WC-10302
TOP SET COUPLING
MODEL "WC-TSC"
PRODUCT No. WC-12001
RUNNING THREAD
COMPRESSION SET LINER TOP PACKER
MODEL "WC-LTP-S1"
PRODUCT No. 10202
LINER
LANDING COLLAR
MODEL "WC-LLH"
PRODUCT No. WC-10503
DOWN JET-SWIRL FLOAT
SHOE WITH DOUBLE VALVE
DRILL PIPE WIPER PLUG
MODEL "WC-DWP"
PRODUCT No. WC-10901
HANDLING NIPPLE
MODEL "WC-HN"
PRODUCT No. WC-11902
JUNK SCREEN
MODEL "WC-DSC"
PRODUCT No. WC-11301
PACKER SETTING TOOL
MODEL "WC-SLTP"
PRODUCT No. WC-11101
LINER HANGER RUNNING TOOL
MODEL "WC-RTRM"
PRODUCT No. WC-11001
RUNNING THREAD
3 1/2" 8RD SPL. THD.
SEAL JOINT
MODEL "WC-SJT" SEAL JOINT
PRODUCT No. WC-11801
LINER WIPER PLUG
MODEL "WC-LWP"
PRODUCT No. WC-10801

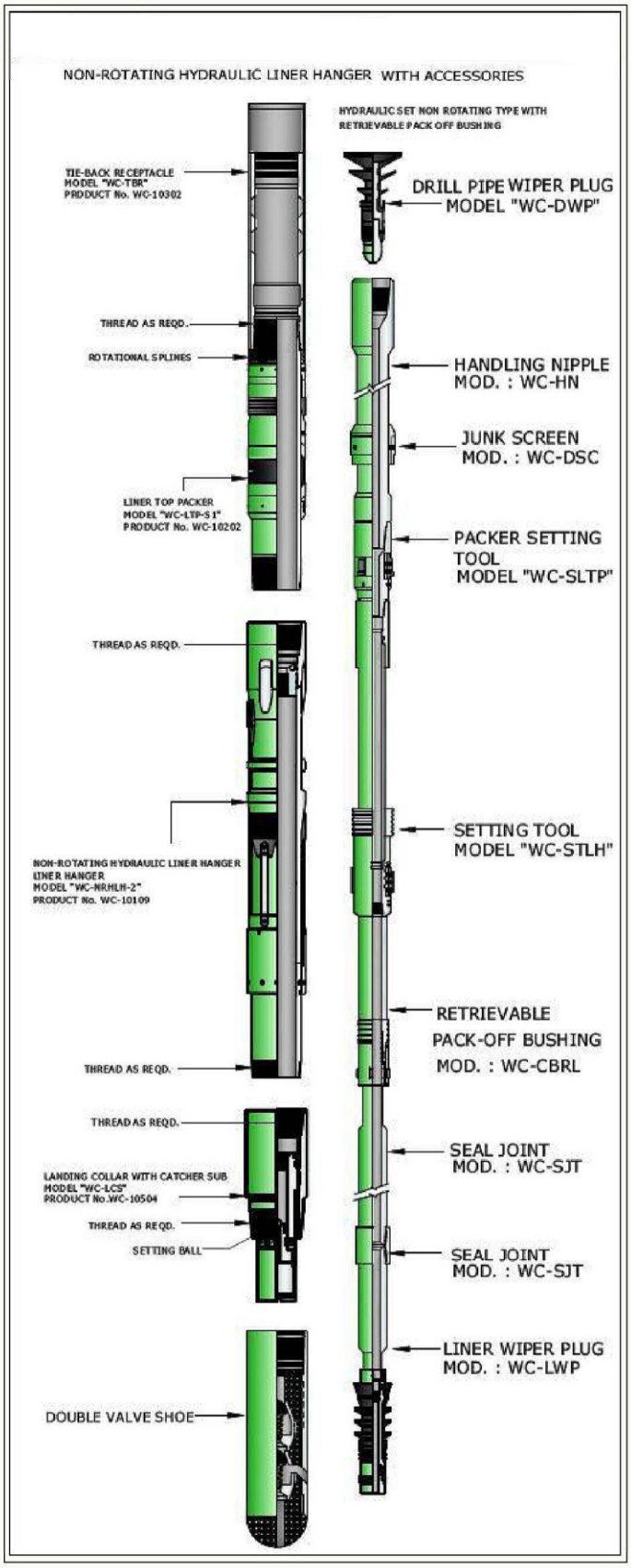

MECHANICAL LINER HANGER WITH ACCESSORIES
RUNNING TOOL WITH ACCESSORIES
TIE-BACK RECEPTACLE
MODEL "WC-TBR"
PRODUCT No. WC-10302
SETTING COLLAR
MODEL "WC-SC-2"
PROD. No. WC-10405
ROTATIONAL SPLINES
THREAD AS REQD.
PUPJOINT
THREAD AS REQD.
MECHANICAL LINER HANGER
MODEL "WC-MLH-1"
PRODUCT No. WC-10104
THREAD AS REQD.
THREAD AS REQD.
LINER SWIVEL SUB
MODEL "WC-LSS"
PRODUCT No. WC-12101
THREAD AS REQD.
THREAD AS REQD.
LANDING COLLAR
MODEL "WC-LLH"
PRODUCT No. WC-10503
THREAD AS REQD.
CEMENT FLOAT COLLAR
PRODUCT No.WC-30201
THREAD AS REQD.
DOWN JET-SWIRL FLOAT SHOE
WITH DOUBLE FLOAT VALVES
PRODUCT No. WC-10604
DRILL PIPE WIPER PLUG
MODEL "WC-DWP"
PRODUCT No. WC-10901
HANDLING NIPPLE
MODEL "WC-HN"
PRODUCT No. WC-11902
JUNK SCREEN
MODEL "WC-DSC"
PRODUCT No. WC-11301
SETTING TOOL
MODEL "WC-STLH"
PRODUCT No. WC-11104
SEAL JOINT
MODEL "WC-SJT"
PRODUCT No. WC-11801
LINER WIPER PLUG
MODEL WC-LWP"
PRODUCT No. WC-10801


MECHANICAL LINER HANGER WITH RUNNING TOOL
AND ACCESSORIES, FIRST TRIP EQUIPMENT
TIE BACK SEAL NIPPLE PACKER
AND ACCESSORIES
SECOND TRIP EQUIPMENT
TIE-BACK RECEPTACLE
MODEL "WC-TBR"
PRODUCT No. WC-10302
SETTING COLLAR
MODEL "WC-SC-2"
PROD. No. WC-10405
ROTATIONAL SPLINES
THREAD AS REQD.
PUPJOINT
THREAD AS REQD.
MECHANICAL LINER HANGER
MODEL "WC-MLH-1"
PRODUCT No. WC-10104
THREAD AS REQD.
THREAD AS REQD.
LINER SWIVEL SUB
MODEL "WC-LSS "
PRODUCT No. WC-12101
THREAD AS REQD.
THREAD AS REQD.
LANDING COLLAR
MODEL "WC-LLH"
PRODUCT No. WC-10503
THREAD AS REQD.
CEMENT FLOAT COLLAR
PRODUCT No.WC-30201
THREAD AS REQD.
DOWN JET-SWIRL FLOAT SHOE
WITH DOUBLE FLOAT VALVES
PRODUCT No. WC-10604
DRILL PIPE WIPER PLUG
MODEL "WC-DWP"
PRODUCT No. WC-10901
TIE-BACK RECEPTACLE
MODEL "WC-TIR"
PRODUCT No. WC-10302
HANDLING NIPPLE
MODEL "WC-HN"
PRODUCT No. WC-11902
JUNK SCREEN
MODEL "WC-DSC"
PRODUCT No. WC-11301
SETTING COLLAR
MODEL "WC-SC-2"
PROD. No. WC-10405
TIE BACK SEAL NIPPLE
PACKER WITH INTEGRAL
SEAL STACK
MODEL "WC-TSNP"
PRODUCT No. WC-10301
SETTING TOOL
MODEL "WC-STLH"
PRODUCT No. WC-11104
SEAL JOINT
MODEL "WC-SJT"
PRODUCT No. WC-11601
TIE BACK SEAL ASSY.
PRODUCT No. WC-11201
LINER WIPER PLUG
MODEL WC-LWP"
PRODUCT No. WC-10801

COVERED SLIP HYDRAULIC ROTATING LINER HANGER WITH DOUBLE VALVE SHOE AND RUNNING TOOL ACCESSORIES




HYDRAULIC LINER HANGER WITH ACCESSORIES
HYDRAULIC RELEASE TYPE
RUNNING TOOL WITH ACCESSORIES
TIE-BACK RECEPTACLE
MODEL "WC-TBR"
PRODUCT No. WC-10302
ROTATIONAL SPLINES
MODEL "WC-LTP-S1"
LINER TOP PACKER
PRODUCT No. WC-10202
THREAD AS REQD.
THREAD AS REQD.
NON-ROTATING
HYDRAULIC LINER HANGER
MODEL "WC-NRHLH-2"
PRODUCT No. WC-10109
THREAD AS REQD.
THREAD AS REQD.
HYDRAULIC SHEAR
OUT COLLAR
MODEL "WC-LCS"
PRODUCT No.WC-10504
THREAD AS REQD.
SETTING BALL
DOUBLE VALVE SHOE
'WC-DWP' DRILL PIPE
WIPER PLUG
HANDLING NIPPLE
JUNK SCREEN
MODEL 'WC-DSC'
PACKER SETTING TOOL
MODEL "WC-SLTP"
SETTING TOOL
MODEL 'WC-STLH'
SEAL JOINT
MODEL "WC-SJT"
LINER WIPER PLUG
MODEL "WC-LWP"

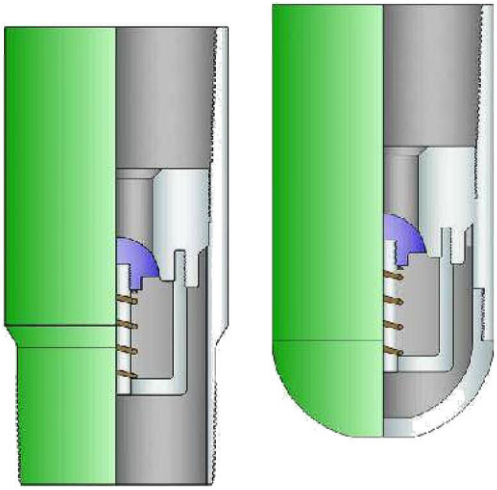

NON-ROTATING HYDRAULIC LINER HANGER WITH ACCESSORIES
HYDRAULIC SET NON ROTATING TYPE WITH
RETRIEVABLE PACK OFF BUSHING
TIE-BACK RECEPTACLE
MODEL "WC-TBR"
PRODUCT No. WC-10302
THREAD AS REQD.
ROTATIONAL SPLINES
LINER TOP PACKER
MODEL "WC-LTP-S1"
PRODUCT No. WC-10202
THREAD AS REQD.
NON-ROTATING HYDRAULIC LINER HANGER
LINER HANGER
MODEL "WC-NRHLH-2"
PRODUCT No. WC-10109
THREAD AS REQD.
THREAD AS REQD.
LANDING COLLAR WITH CATCHER SUB
MODEL "WC-LCS"
PRODUCT No.WC-10504
THREAD AS REQD.
SETTING BALL
DOUBLE VALVE SHOE
DRILL PIPE WIPER PLUG
MODEL "WC-DWP"
HANDLING NIPPLE
MOD. : WC-HN
JUNK SCREEN
MOD. : WC-DSC
PACKER SETTING
TOOL
MODEL "WC-SLTP"
SETTING TOOL
MODEL "WC-STLH"
RETRIEVABLE
PACK-OFF BUSHING
MOD. : WC-CBRL
SEAL JOINT
MOD. : WC-SJT
SEAL JOINT
MOD. : WC-SJT
LINER WIPER PLUG
MOD. : WC-LWP

CEMENT FLOAT COLLAR & SHOE WITH ALUMINUM PLUNGER VALVE

MODEL: WC-CFC-AL & WC-CFS-AL

PRODUCT No.: WC-30218 & WC-30118

The WELLCARE APV (Aluminum Plunger Valve) Float Collar run in a casing assembly, usually several joins above the Float Shoe. It serves as an extra back pressure from blow while running the assembly and after the cementing job. Internal latch and valve are readily drillable. Its capability of back-pressure is over 10,000 PSI.



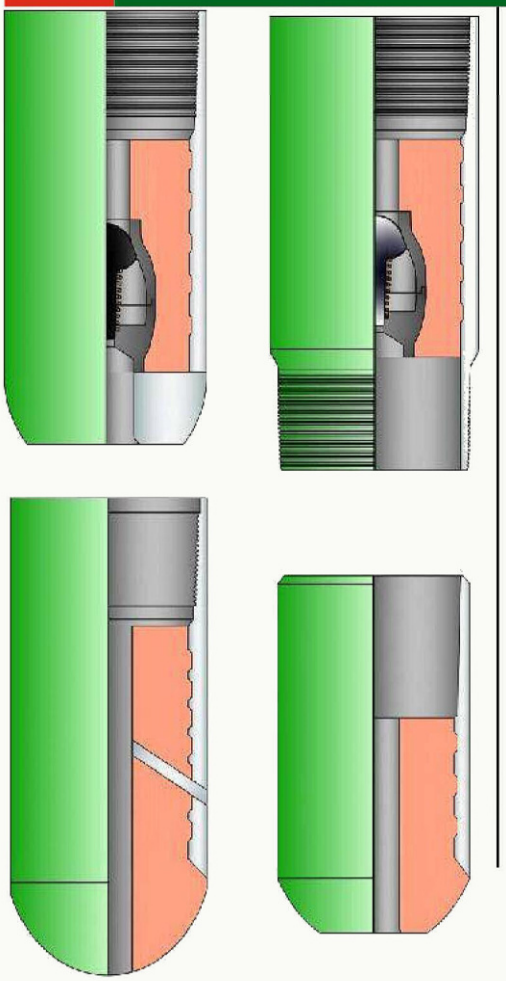
Features/Benefits:

- Very fast PDC drillable half of the time in compare to conventional poppet positive valve avail in the market.
- Excellent leak resistive because of metal to metal seal.
- Magnificent in flow rate is speciality of this model.
- Distinguished performance in accordance to API RP 10F for pressure and temperature cycle.
- Distinct wear resistance and any other effects during cementing circulation as plunger/ball is made up of special alloy.
- Could be used in the role of NRV purpose as per requirements.

Specification Guide:

Casing Size in	Wt lbs/ft	OD in	ID in	L80		P110		K55	
				Burst (psi)	Collapse (psi)	Burst (psi)	Collapse (psi)	Burst (psi)	Collapse (psi)
2 7/8	6.5-9.45	3.668	2.691	17047	18471	23439	25397	11720	12699
3 1/2	9.3-12.95	4.500	3.242	17892	19238	24601	26453	12300	13226
4 1/2	9.5-13.5	5.000	4.281	9203	10368	12654	13276	6327	7340
5	11.5-21.0	5.563	4.689	10055	11581	13826	15603	6913	7962
5 1/2	14.0-23.0	6.050	5.2	8992	9962	12364	12698	6182	7184
7	23.0-38.0	7.656	6.526	9446	10834	12989	13940	6494	7519
7 5/8	20.0-39.0	8.500	7.219	9645	11148	13262	14483	6631	7664
8 5/8	24.0-44.0	9.625	8.267	9030	10035	12416	12802	6208	7213
9 5/8	32.3-53.5	10.625	9.171	8758	9514	12043	12060	6021	7012

NOTE: Float Equiments could be furnished with various grades of material with end connections standard or premium thread as per the customer's demand or requirement.



CEMENT FLOAT SHOE

MODEL: WC-CFS, PRODUCT No.: 30101

CEMENT FLOAT COLLAR

MODEL: WC-CFC, PRODUCT No.: 30201

Cement/Poppet-type Float equipment offers dependable performance for all classes oil and gas wells. The valves prevent cement backflow, provide casing buoyancy during run in, and act as internal BOP's during the process of running and cementing the casing.

Float equipment is manufactured to match customer casing specification. All Poppet type cement float collars are PDC drillable.

Features/Benefits:

- Fast drill-out
- No metal parts-will not damage PDC bits.
- Free-floating ball abrades evenly.
- Operator-controlled buoyancy-regulated by
- Filling casing at surface.
- Cost effective.

CEMENT DOWN-JET SWIRL GUIDE SHOE

MODEL- WC-CDGS, PRODUCT No.- WC-30301

This Shoe is used to provide turbulent flow at the shoe and where obstructions are expected while running in, the Down-Jet Swirl ports allow operator to “wash” casing down.

CEMENT GUIDE SHOE

MODEL- WC-CGS, PRODUCT No.- WC-30701

This Cement Guide Shoe may be used in combination with any type of collar. It efficiently guides casing past sidewall irregularities.

NOTE: Float Equiments could be furnished with various grades of material with end connections standard or premium thread as per the customer's demand or requirement.

Specification Guide:

Normal Casing Size (In.)	Wt. Range (Lbs/Ft)	OD (In.)	ID (In.)	L80		P110	
				Burst (psi)	Collapse (psi)	Burst (psi)	Collapse (psi)
4 ½	9.5-13.5	5.000	4.281	9203	10368	12654	13276
5	11.5-21.0	5.563	4.689	10055	11581	13826	15603
5 ½	14.0-23.0	6.050	5.2	8992	9962	12364	12698
7	23.0-38.0	7.656	6.526	9446	10834	12989	13940
7 5/8	20.0-39.0	8.500	7.219	9645	11148	13262	14483
8 5/8	24.0-44.0	9.625	8.267	9030	10035	12416	12802
9 5/8	32.3-53.5	10.625	9.171	8758	9514	12043	12060
10 ¾	32.7-55.5	11.750	10.3	7898	7863	10860	9708
11 ¾	38.0-65.0	12.750	11.25	7529	7156	10353	8701
13 3/8	48.0-72.0	14.375	12.86	6723	5608	9244	6497
16	65.0-109.0	17.000	15.5	5647	3580	7765	4185
18 5/8	87.5-117.5	20.000	18.00	6384	4958	8778	5571
20	94.0-133.0	21.000	19.37	4952	2712	6810	2946

CIRCULATING DIFFERENTIAL FILL-UP COLLAR

MODEL: WC-CDFC, PRODUCT No.: WC-30203

CIRCULATING DIFFERENTIAL FILL-UP SHOE

MODEL: WC-CDFS, PRODUCT No.: WC-30103

DIFFERENTIAL FILL-UP DOWN JET SWIRL SHOE

MODEL- WC-DFDS, PRODUCT No.- WC-30303

Differential Fill-up Float Equipment allows 90 per cent casing fill-up during run-in, reducing surge pressures caused by the piston effect of running casing in restricted IDs. Use of Differential Collar with Shoe provides additional buoyancy by allowing only 81 per cent casing fill-up further enhancing draw works efficiency.

Circulation can be established at any time while running in. Dropping a ball converts the Differential Valve to a regular Back-Pressure Valve. When Collar and Shoe are run together, dropping one ball converts both units.

CEMENT FLOAT COLLAR WITH ANTI-ROTATIONAL PLUG

MODEL- WC-CFC-AR, PRODUCT No.- WC-30204

Cement/Poppet type float equipment offers dependable performance for all classes of oil and gas wells. The valves prevent cement back-flow and provide casing buoyancy during run in

Float Collar is Non-Rotational type pressure and Cementing Plug activated. Plugs feature the latch-down type anti-rotational feature which is compatible with the Float Collar and eliminates rotation during drilling.

Float Equipment is manufactured to match customer casing specification. All Poppet type Cement Float Collars are PDC drillable.

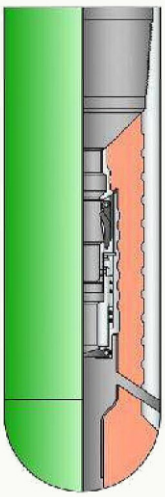
DUPLEX CEMENT FLOAT SHOE

MODEL- WC-DCFS, PRODUCT No.- WC-30105

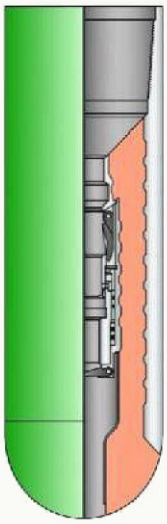
DUPLEX CEMENT FLOAT COLLAR

MODEL- WC-DCFC, PRODUCT No.- WC-30205

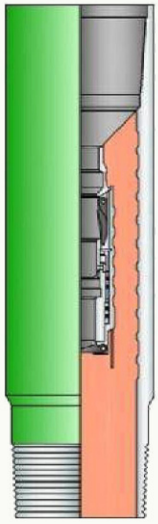
Duplex Shoes and Collars sizes 6 5/8" to 30" are furnished with heavy duty duplex connection. These heavy duty connections have 4" OD left hand threads and 3¼" seal bores and are capable of carrying 100,000 lbs. with a minimum safety factor 2. Special accessory products are available for use with this large Duplex Equipment. The Tubing Seal Nipple has field proven Chevron Seals for positive sealing of the nipple in the seal bore. It features an expandable left hand latch mechanism, allow the nipple to be "stabbed" into the duplex connection, and when up-strain is applied the latch is expanded to provide full engagement in duplex assembly. The nipple is released by rotating to the right unscrewing the latch mechanism of the duplex connection. Left hand square thread subs with 4" OD left hand threads are also available for use with Large Duplex Equipment



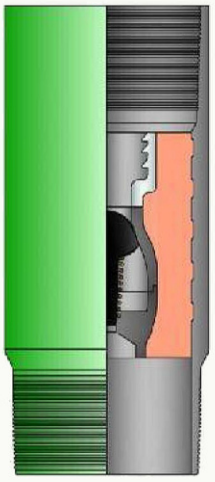
WC-CDFS



WC-DFDS



WC-CDFC



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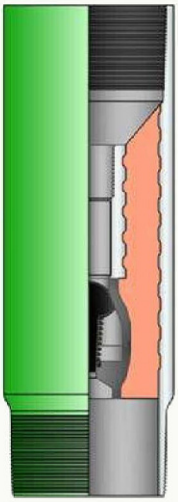

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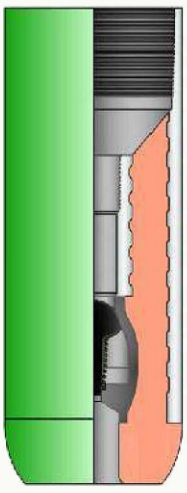
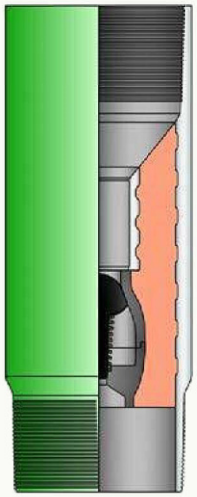
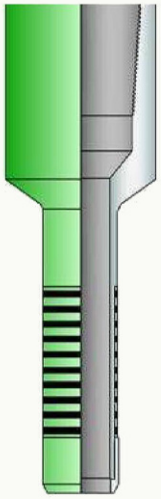


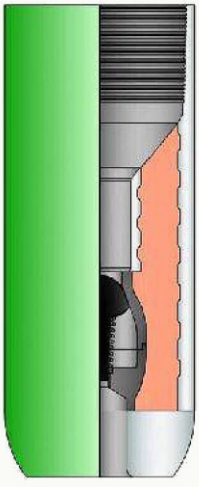
WC-DCFS



Stab in Float Collar



Stab in Seal Sub



Stab In Float Shoe

STAB-IN FLOAT COLLAR

MODEL: WC-SIFC, PRODUCT No.: WC-30206

STAB-IN SEAL SUB

MODEL: WC-SISS, PRODUCT No.: WC-30306

STAB-IN FLOAT SHOE

MODEL: WC-SIFS, PRODUCT No.: WC-30106

Stab-In cementing is an improved method for cementing large diameter casing. Conventional methods require excessive amounts of cement to ensure cement circulation to surface because of open hole volume, losses to the formation, or mud displacement efficiency that cannot be determined with sufficient accuracy. In addition, large plugs must be used to separate the cement from the mud and have to be drilled out, along with any cement in the casing. With stab-in cementing, the Drill Pipe is stabbed directly into the Float Shoe or Collar and cement is pumped through the drill pipe until returns reach surface. Cement is then displaced to the bottom of the Drill Pipe — a wiper dart can be used. The drill pipe is then picked up, circulated, and pulled out of the hole.

Use:

The WELLCARE Stab In Float Equipments are used for cementing large diameter casings lowered on drill pipe. The string presents special cementing consideration due to high displacement volume of large diameter casing. Problem with high displacement are overcome by using Stab in Cementing Equipment to allow cementing through drill pipe.

Features:

- Small diameter inner string off drill pipe is used to displace cement which minimizes displacement volume behind cement and there by reduces contamination and save time.
- Drill out of cement inside large casing is minimized by controlling cement top with displacement fluid in drill pipe and Poppet valve in Stab in Shoe.

Advantages:

- Improve displacement accuracy — cement mixing and pumping continues until cement returns reach surface.
- Get better cement quality — the reduced cement/mud interface area and high velocity of flow in the Drill Pipe minimize cement contamination while the short pumping time eliminates the need for cement retarders.
- Reduce cement volume — conventional displacement requires calculation of excess cement factor, whereas with stab-in methods excess cement need be no greater than the volume of the drill pipe. No large plugs are needed.
- Reduce net rig time — circulating, pumping, and drill-out times are minimized.
- Protect casing — cementing pressures are confined to the drill pipe as in a squeeze job.

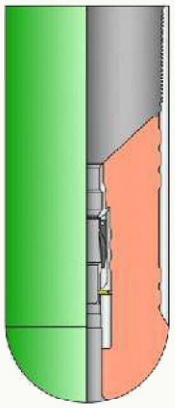
AUTO FILL CEMENT FLOAT SHOE

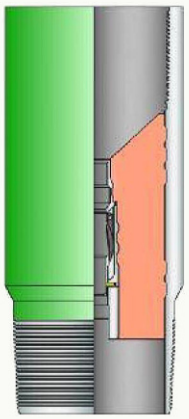
MODEL- WC-CFS-A, PRODUCT No.- WC-30107

The Auto Fill Cement Float Shoe permits the casing to fill automatically while being run into the hole. The valve is in the open position while running in allowing maximum filling of the casing as it is lowered into the well bore.

This is especially effective on liner jobs and sensitive whole conditions.

The circulation may be established at any time during or after casing is run. The flapper type back pressure valve does not become operative until the drop ball is dropped or pumped down. From this point on like Differential Fill-up Shoe, this model Auto Fill Cement Float Shoe acts as conventional Floating Equipment. All Auto fill Cement Float Shoes are PDC drillable.





AUTO FILL CEMENT FLOAT COLLAR

MODEL: WC-CFC-A, PRODUCT No.: WC-30207

The Auto Fill Cement Float Collar permits the casing to fill automatically while being run into the hole. The valve is always in the open position allowing maximum filling of the casing as it is lowered into the well bore.

This is especially effective on liner jobs and sensitive hole conditions.

The circulation may be established at any time during or after casing is run. The flapper type back pressure valve does not become operative until the drop ball is dropped or pumped down. Like Differential Fill-up Equipment, the Collar is activated by the same ball.

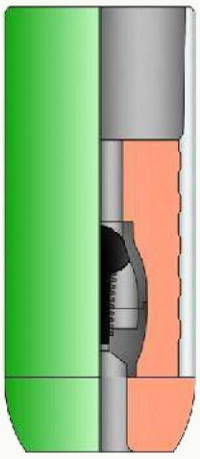
From this point on, like Differential Fill-up Collar, this Auto Fill Cement Float Collar acts as conventional Floating Equipment. All Auto Fill Cement Float Collars are PDC drillable.

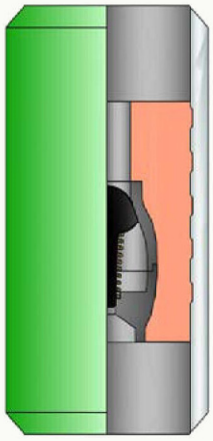
CEMENT BASKET

MODEL: WC-CBT, PRODUCT No.: WC-31101

The Cementing Basket is designed to run on the casing string or liner to support a cement column to prevent contamination of a lower zone or to keep hydrostatic head of a column from breaking down a weak formation.

The Basket consists of flexible steel springs that support overlapping rubber liners. The Basket is placed on the casing with movement limited by pipe couplings or by welding the ring of the basket directly to the casing. Stop rings may also be used to selectively space the Baskets between Collars without welding.





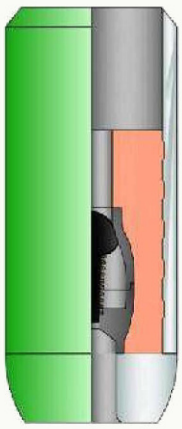
BUTT-WELD CEMENT FLOAT COLLAR & SHOE

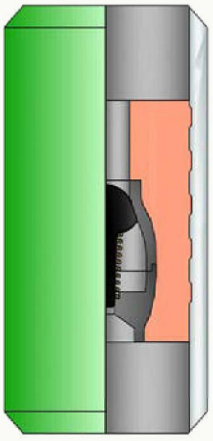
MODEL: WC-BCFC & WC-BCFS

PRODUCT No.: WC-30208 & WC-30108

Cement/Poppet-type Float equipment offers dependable performance for all classes oil and gas wells. The valves prevent cement backflow, provide casing buoyancy during run in, and act as internal BOPs during the process of running and cementing the casing.

Float equipment is manufactured to match customer casing specification. All ball type cement float collars are PDC drillable. Butt-Weld Casing Collar O.D. matches with the casing O.D. and upper end is only beveled, not recessed for directly welding to the Casing pipe.





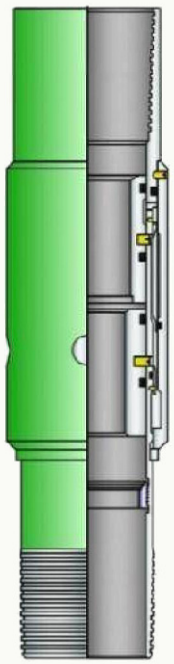
SLIP-ON CEMENT FLOAT COLLAR & SHOE

MODEL: WC-SCFC & WC-SCFS

PRODUCT No.: WC-30209 & WC-30109

Cement/Poppet-type Float equipment offers dependable performance for all classes oil and gas wells. The valves prevent cement backflow, provide casing buoyancy during run in, and act as internal BOPs during the process of running and cementing the casing.

Float equipment is manufactured to match customer casing specification. All poppet type cement float collars are PDC drillable. Slip-ON Casing Collar O.D. matches with the casing O.D. and upper end is only beveled, not recessed for directly welding to the Casing pipe



STAGE CEMENTING COLLAR

MODEL: WC-SCCJ

PRODUCT No.: WC-30210

The Model WC-SCCZ Stage Cementing Collar is used to cement casing in two or more stages and allows operators great flexibility in controlling flow theology, cement chemistry, and down hole hydrostatic pressures. Typically this Stage Collar is used where a single stage cement job would result in breakdown of a weak formation causing cement losses and or contamination of the producing zone.

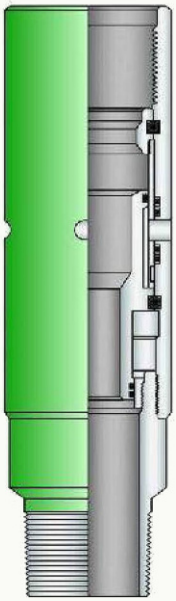
Operation:

The operation of the Stage Collar requires only the Plugs that come with the Collar and the manipulation of casing pressure. A rubber seal-off plate is also provided to place in the top Float Collar only when the plug bumping surface is flat. The nose of the Model: WC-DFFP, Flexible Wiper Plug is tapered to guide it through the stage collar and needs a beveled surface on which to seat and seal.

The Model: WC-SCCJ Stage Collars are available for casing sizes 4½ inch through 9-5/8 inch with diversified thread connections and material grades to meet customer's casing program.

Features/Benefits:

- Strong one-piece body construction.
- Protected closing sleeve.
- Inner sleeves locked against rotation.
- Full, smooth bore after drill out.
- No internal threaded or welded pieces to leak or fail
- Nothing to snag Packers or Running Tools run subsequently.
- Easily drilled out-sleeves and plugs are rubber and aluminum.
- Simple hydraulic operation.
- Shut-off sleeve cannot be accidentally reopened.



STAGE CEMENTING COLLAR [HYDRAULIC]

MODEL: WC-SCCH

PRODUCT No.: WC-30211

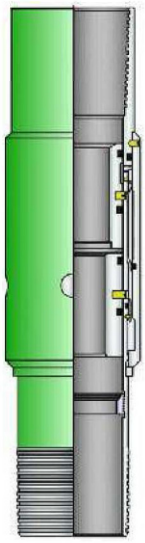
This Stage-collar features an opening sleeve with area differences on opposite ends that allow it to be manipulated hydraulically. The hydraulic-opening feature makes this tool's use very practical in horizontal well.

STAGE CEMENTING COLLAR [THREE STAGE]

MODEL: WC-SCCJB

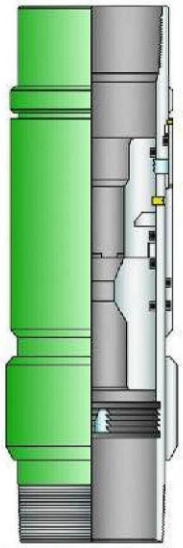
PRODUCT No.: WC-30212

Three Stage Cementing collar is used to place a long column of cement about a weak zone. The Model: WC-SCCJB Stage Collar is located a short distance about the weak zone. The First Stage is cemented by pumping cement up to the WC-SCCJB Collar. The WC-SCCJB Collar is then opened using the Trip Plug and then the Second and Third Stages are cemented.



Specification Guide: [Model- WC-SCCJ & WC-SCCJB]

Casing SIZE in	Weight (lb/ft) Threaded & Coupled	Size Stage Collar	Tensile Strength (lb)	Drilled Out ID	Max OD of Tool	For Model: WC-SCCJ Only				
						Min ID Lower Inner Sleeve	Max OD of Trip Plug	Min ID upper inner Sleeve	Max OD Shut-off Plug Nose	WC-DFFP Indicating Plug Nose OD
5- 1/2	13.0~15.5	51/2 13-15.5 J-55	164,000	4.919	6.625	3.620	3.781	3.870	4.281	2.906
	17.0 20.0	5 1/2 17-20 N-80 & 17 P-110	277,000	4.812						
	20.0 23.0	5 1/2 20-23 P-110	462,000	4.710						
7	17.0~23.0	7 17-23 N-80	264,000	6.415	8.281	4.495	4.687	4.935	5.656	
	26.0~29.0	7 26-29 N-80	457,000	6.200						
	26.0~38.0	7 32-38 N-80 &26-29 P-110	622,000	6.200						
	32.0~38.0	7 32-38 P-110	918,000	6.020						
9- 5/8	29.3~40.0	9 5/8 29.3-40 J-55	422,000	8.906	11.141	6.495	6.687	6.870	7.656	5.031
	40.0~47.0	9 5/8 40-47 N-80 & 43.5 P-110	701,000	8.730						
	47.0~53.5	9 5/8 47-53.5 P-110	1,170,000	8.580						



STAGE CEMENTING COLLAR [LARGER]

MODEL: WC-SCCG

PRODUCT No.: WC-30213

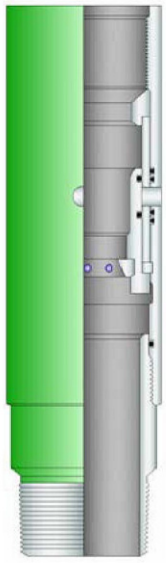
The Model: WC-SCCG Stage Cementing Collar covers sizes larger than 9- 5/8 inch. It offers operators all of the benefits of the Model: WC-SCCJ Stage Collar (Sizes 9-5/8 inch and smaller) and also features an outer closing sleeve which cannot be accidentally reopened. Non-API threads require the use of special casing sub.

Specification Guide: [Model- WC-SCCG & WC-SCCGB]

Casing to be Run				Stage Collar Specification							
							Model: WC-SCCG Only				
OD	Weight Range	Grade	Thread	Tensile Strength (lb)	Drilled Out ID	Max Collar OD	Min ID Lower Inner Sleeve	Max OD Trip Plug	Min ID Upper Inner Sleeve	Max OD Shut-off Plug Nose	WC-DFFP Indicating Plug Nose OD
13-3/8	48-61	H-40, J-55	8 RD Short	491,000	12.687	15.060	8.000	8.625	9.234	11.375	7.000
			Buttress	661,000							
	48-61	N-80	8 RD Short	659,000							
			Buttress	961,000							
	48-61	S-95, P-110	8 RD Short	887,000							
			Buttress	1,332,000							
	68-77	H-40, J-55	8 RD Short	786,000	12.343						
			Buttress	928,000							
	68-77	N-80	8 RD Short	1,054,000							
			Buttress	1,350,000							
	68-77	S-95, P-110	8 RD Short	1,420,000							
			Buttress	1,856,000							
	80.7-86	C-95, S-95	8 RD Short	1,548,000	12.090	15.094					
		P-110	Buttress	1,938,000							

STAGE CEMENTING COLLAR [MECHANICAL AND HYDRAULIC]

MODEL: WC-SCCMH
PRODUCT No.: WC-31301



Features:

- The circulation ports can be hydraulically opened, eliminating the need to use a free-fall opening plugs. Therefore, it is not restricted to well inclination.
- Internal closing structure and anti-rotation mechanism protect the closing sleeve from damage while drilling out the opening and closing seats.
- All internal parts are made of easily drillable material.
- Opening pressure adjustable upon customer request.

Specification Guide:

Casing Size	Casing Weight		Maximum OD		Drill-out ID		Over All Length	
in	kg/m	lb/ft	mm	in	mm	in	mm	in
5 /2	25,30	17.00	172	6.772	124	4.882	780	30.709
	29.76	20.00			121	4.764		
	34.23	23.00			119	4.685		
7	38 69	26.00	210	8.268	159	6 260	930	36.614
	43.16	29.00			157	6.181		
	47.62	32.00			155	6.102		
7-5/8	44.20	29.70	230	9.055	175	6.890	1120	44.094
	50.15	33.70			172	6.772		
	58 04	39.00			168	6.614		
9-5/8	59.53	40.00	282.5	11.122	224	8.819	1170	46 063
	64.74	43.50			222	8.740		
	69.94	47.00			221	8 701		
10 1/4	75.90	51.00	302	11.890	250	9.843	1210	47.992
	82.59	55.50			248	9.764		
	90.33	60.70			245	9.646		

STAGE CEMENTING COLLAR AND PLUG SYSTEM

Our Stage Collars are proven design available in sizes 4-1⁄2" through 20", incorporates two internal sleeves that are shifted down to open and close the cementing ports. The opening and closing seats that catch the plugs feature a wide seating area to ensure excellent seating with the opening bomb and closing plug. Seats are short in length reducing drill out time. Double locking mechanisms are used on the closing sleeve that locks the sleeve in position both during the closing movement and after it has been fully closed. The closing procedure incorporates a system for allowing trapped fluid between the sleeves to be dissipated and permits the closing sleeve to fully lock in the down position.

TWO STAGE THREE PLUG CEMENTING

The standard two stage cementing operation uses conventional floating equipment, either standard valve or filling float valves on the bottom of the casing string. The rubber baffle plate is installed on top of the float collar. The stage collar is installed in the casing string at the position where second stage cement is to be pumped into the annulus. If a casing packer is being used the stage collar will be located above the packer. The operation of the stage collar is illustrated in sequence.

1. Running In and First Stage Cementing, Flexible First Stage Plug will pass through stage collar while displacing first stage cement, landing on Baffle Plate located in Float Collar.
2. Second Stage Cement Opening Trip Bomb has landed in and opened Stage Cementing Collar allowing second stage cement to be displaced.
3. Second Stage Cement complete, Second Stage Closing / Displacement Plug landed in Stage Collar. Application of pressure will close the Stage Collar Ports. Two Stage Cementing job is complete.

FOUR PLUG TWO STAGE CEMENTING

The two stage four plug cementing procedure is used where a lead plug is required to be run prior to first stage cement. Where there is no requirement for applying pressure to the casing after first stage cement displacement, a Type Flexible By-pass Plug is run in front of first stage cement. First stage cement is then run as usual with the Flexible First Stage Plug pumped on top of the cement. Upon completion of displacement no pressure indication will be obtained. Second stage cementing is performed in the manner described under Two Stage Three Plug Cementing. Where it is required to obtain a pressure indication upon displacement of first stage cement as may be the case when a casing packer is being run a Landing Collar should be run above the float collar. The landing collar will allow Type Flexible By-Pass plug to be pumped through the landing collar to the float collar. On Landing the plug in the float collar the cement is Displaced, by-passing the flexible plug. Flexible Shut-Off Plug is used instead of Plug to displace first stage cement. This plug will land in the landing collar allowing for an indication that the plug has been displaced. Pressure inside the casing can now be increase casing packer and test the casing.

LANDING COLLAR
MODEL: WC-LDC
PRODUCT No.WC-31501

FLEXIBLE BY-PASS PLUG
MODEL: WC-JFBP
PRODUCT No. : WC-30902

FLEXIBLE FOLLOW PLUG
MODEL: WC-DFFP
PRODUCT No.: WC-30903

STAGE COLLAR TRIP PLUG
Model: WC-JSTP
PRODUCT No. : WC-30904

STAGE COLLAR CLOSING PLUG
MODEL: WC-JSCP
PRODUCT No.:WC-30901

TAPERED NOSE

MODEL: WC-NST

PRODUCT No.: WC-31201

OFFSET TAPERED NOSE

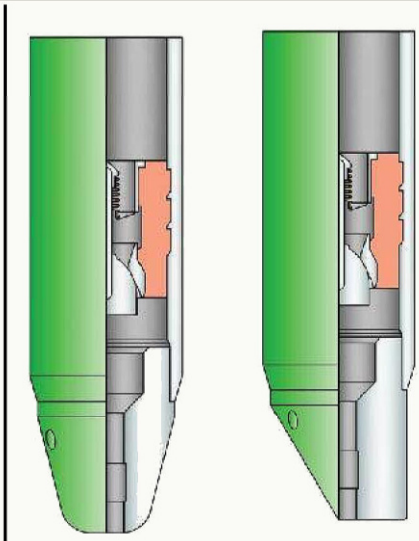
MODEL: WC-NSOT

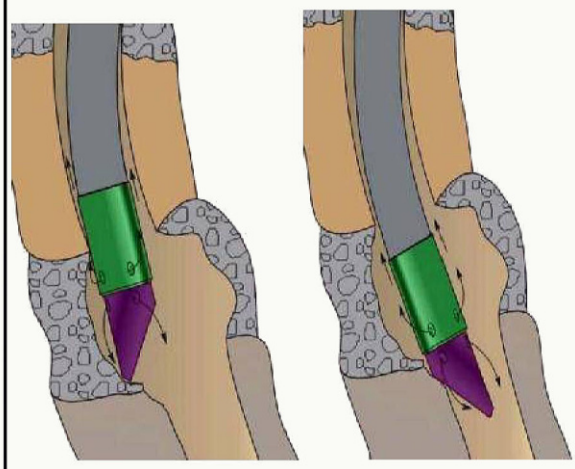
PRODUCT No.: WC-31202

These Tapered and Offset Tapered Nose float equipmemts help casing to pass easily through severe ledges, obstructions, high angles and previous sidetracks. These noses also help protect the float valves from being damaged from debris while running in the hole.

Features/Benefits:

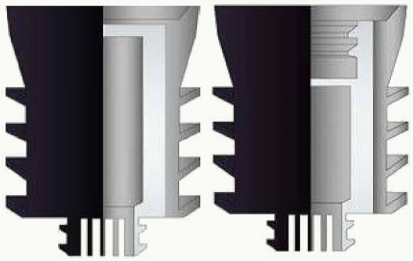
- Enables a one trip to bottom target depth casing run.
- With the high-port up-jet (HPUJ) or down-jet nose, cement bonding can be improved, to clean wellbore and to aid in circulating past tight spots.
- Available in all sizes with various grades of material and end connections float equipment.
- Available in aluminum and composite material noses (PDC drillable).
- Available in standard design, HPUJ, and down-jet configurations.
- Enclosed down-jet option is available with molded nose, which passes 60% of flow through the nose and 40% through the down-jet ports.

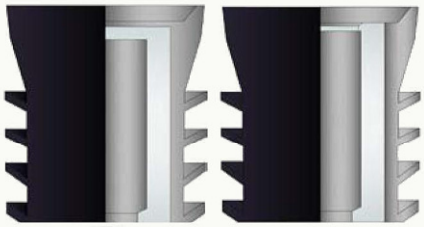




Tapered Offset Nose

For Better Travel in Deviated hole Section





TOP FLEXIBLE COMBINATION PLUG
MODEL: WC-PCC-1
PRODUCT No.: WC-30802

COMBINATION TOP PLUG
MODEL: WC-PCC-3
PRODUCT No. : WC-30804

TOP PLUG
MODEL: WC-PCC-2
PRODUCT No. : WC-30803

PLUGS

ANTI-ROTATION TOP & BOTTOM PLUGS

MODEL: WC-TP-AR & WC-BP-AR
PRODUCT No.: WC-30501 & WC-30601

Top & Bottom Cementing Plugs are designed to decrease drill out time. This series of cementing plugs use reinforced locking teeth built into the plugs, which lock together between the plugs and the float equipment to eliminate rotation of the plugs during drill out. The body of the plugs is manufactured using a plastic core which eliminates aluminum and large mass of rubber found in conventional cementing plugs. No metal parts are used and the plugs are completely PDC (polycrystalline diamond compact) drillable.

STANDARD TOP & BOTTOM PLUGS

MODEL: WC-TP & WC-BP
PRODUCT No.: WC-30502 & WC-30602

Top Cementing Plug and Bottom Cementing Plug are designed to replace conventional cementing plug systems. By replacing the aluminum and rubber core material in conventional plugs with a large crushable plastic core most of the rubber is eliminated, allowing the drill bit to fracture the plastic rather than tear the rubber and aluminum thus significantly reducing drill out times. These plugs are PDC drillable.

TOP & BOTTOM PLUGS WITH ALUMINIUM CORE

MODEL- WC-TP-AC & WC-BP-AC
PRODUCT No.- WC-30503 & WC-30603

Top Plug Aluminum Core and Bottom Plug Aluminum Core are manufactured with an aluminum insert and are rubber coated. The plugs are available in 4 1⁄2" to 20". The top plug is manufactured in black natural rubber and the bottom plug in orange with rupture diaphragm at 300 psi differential. Operating range is up to 275^0 F. Plugs can be ordered in Viton allowing for higher operating temperatures and are operational in either synthetic or mud fluids.

LATCH DOWN WIPER PLUG & RECEIVER PLATE

MODEL: WC-WPLD & WC-RPE
PRODUCT No.: WC-30801 & WC-31002

Latch down Wiper Plug and Receiver Plate is an effective method of providing a positive sealing check valve in combination with a displacement plug. The receiver plate is designed to screw into a short 8 round threaded casing coupling and receive the latch-in plug after displacement has been completed. The receiver plate features a unique check valve to allow for trapped fluid which normally causes a hydraulic lock to be dispersed during the latch-in procedure. The plug and receiver plate are manufactured from drillable materials. Receiver plates can also be ordered for threaded casing collars is available in casing sizes 4 1⁄2" through 13 3⁄8" and tubing sizes 2 3⁄8" through 4 1⁄2".

COMBINATION CEMENTING PLUGS

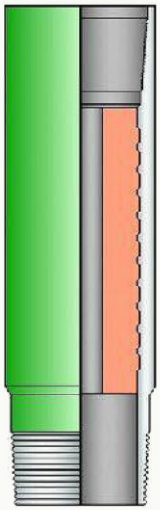
Top and bottom cementing plugs are manufactured for use in combination casing strings where two or more different casing or tubing strings must be wiped by the cementing plugs during the displacement of fluids. Plugs for sizes from 2 3⁄8" through 13 3⁄8" available. Illustrations of some of the styles of plugs are shown

BAFFLE COLLAR

MODEL: WC-BCR

PRODUCT No.: WC-31401

Baffle Collar is an effective method for landing cementing plugs at specific points in the casing string. Useful in situations such as liner cementing and where no float collar or float shoe is being run. Cement filled collar that is easily drillable



BAFFLE PLATE

MODEL: WC-BPE

PRODUCT No.: WC-31001

Baffle Plate is used for landing cementing plugs and is designed to be installed in the centre of a casing coupling. These units are available in both aluminium and plastic materials, and come in threaded and flush outside diameter configurations. Baffle Plates are available in sizes 4 1⁄2" / 114.3mm through 13 3⁄8" / 339.7mm.

THREAD LOCK COMPOUND

PRODUCT No. : WC-31402

Thread Lock Compound is a thread compound formulated for locking of casing threads. This compound is used for locking float equipment and casing joints on the bottom of the casing to prevent unscrewing of the threads during drill-out operations. The two part compound provides superior strength and works in adverse temperature conditions.

API MODIFIED PIPE COMPOUND

PRODUCT No.: WC-31403

API modified pipe compound is a thread lubricant, protecting and sealant that is manufactured according to the specifications of API Bulletin 5A2. The compound contains rust and oxidation inhibitors and is formulated to ensure brush ability over a wide temperature range. The pipe compound will seal and withstand pressures up to 10,000 PSI / 69 Mpa and will not harden and dry. Available in 9 and 15 kilogram pails.

PRIMARY CEMENTING PRODUCTS
CENRALIZERS & STOP COLLARS

The primary cementing equipment should be closely monitored to achieve a good primary cement job and to eliminate the need for a secondary cementing operation. Some casing attachments are used for primary cementing of the well, these attachments are items attached to the casing OD as the casing is run in the wellbore. These items are designed to contribute to a successful primary cementing job. Over time, numerous casing attachments have been developed for use in primary cementing operations. The type of primary cementing equipment used depends on individual well requirements and may vary widely with geographical areas and from field to field. Effective proper placement is as important as the correct product selection.

The main objective for utilizing these equipment are:

• A need to get tubulars to Target Depth (TD) of a well design

• Help achieve optimum circulation and zonal isolation

• Help reduce chances of differential sticking

This section of cataloge contains information about the following casing attachments:

• **Centralizers**

– Provide uniform annular clearance and reduce drag when running casing.

• **Stop collars**

– Secures placement and limits travel on attachments to casing string

• **Scratchers and wipers**

– Remove mudcake on the wellbore

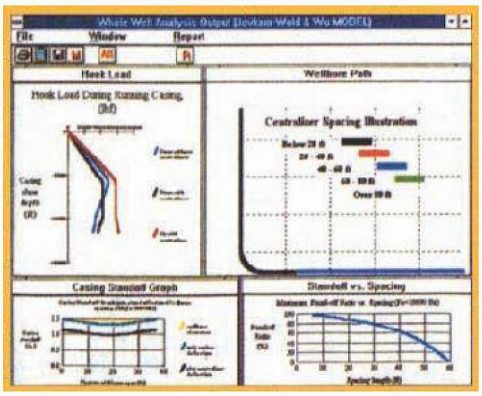
• **Cement baskets**

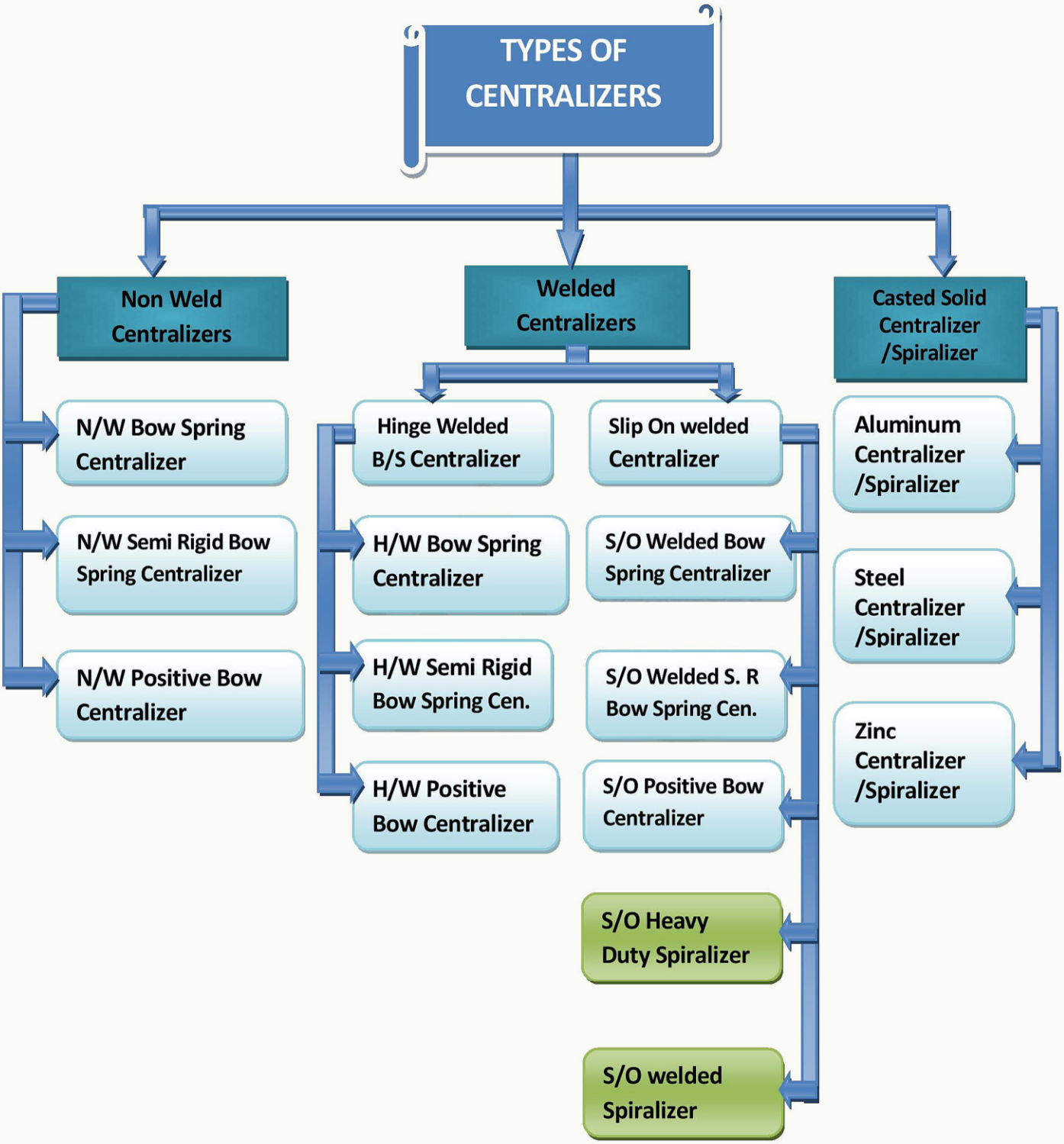
– Helps support cement in the annulus

Cementing products installation design should be based on individual well conditions and operating objectives. WELLCARE Centralizer Software program provides optimum deployment (minimum strategic deployment for maximum output) of cementation products in the well.

The Program works with the actual well data, including well profiles and pipe data to calculate the down hole forces. It then analyses actual WELLCARE Centralizer performance data to determine where to place specific equipment so that a minimum standoff is maintained throughout the string.

The Program is sophisticated enough to devise a complete equipment installation design by taking pay zone area or other specialized areas into the account. While WELLCARE Centralizers give perfect bore performance, the Centralizer Software Program confirms it before application.




TYPES OF CENTRALIZERS
Non Weld Centralizers
Welded Centralizers
Casted Solid Centralizer /Spiralizer
N/W Bow Spring Centralizer
N/W Semi Rigid Bow Spring Centralizer
N/W Positive Bow Centralizer
Hinge Welded B/S Centralizer
H/W Bow Spring Centralizer
H/W Semi Rigid Bow Spring Cen.
H/W Positive Bow Centralizer
Slip On welded Centralizer
S/O Welded Bow Spring Centralizer
S/O Welded S. R Bow Spring Cen.
S/O Positive Bow Centralizer
S/O Heavy Duty Spiralizer
S/O welded Spiralizer
Aluminum Centralizer /Spiralizer
Steel Centralizer /Spiralizer
Zinc Centralizer /Spiralizer

PERFORMANCE OF BOW SPRING CENTRALIZER

STARTING FORCE

Starting force represent the Maximum force required to insert a centralizer into a specified wellbore diameter. This test is done as -

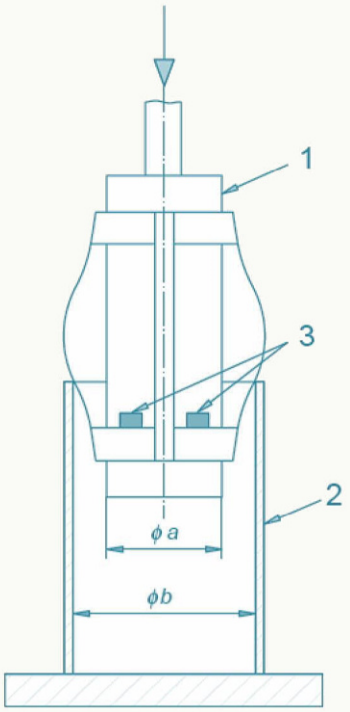
1. A fully assembled centralizer is installed over four equally spaced lugs (3 on the inner pipe-1) as shown in Fig-1.
2. The test assembly is held within 5 degrees of the vertical with the centralizer resting on the edge of the outer pipe-2
3. Load is applied on the inner pipe to pull the centralizer into the outer pipe-2.
4. Starting force equals the maximum force required to put centralizer inside the outer pipe-2.
5. The starting force should be less than the weight of 40ft. (12.2mtrs.) of medium weight casing.

RUNNING FORCE

The running force represent the maximum force required to slide the inner pipe inside the outer pipe once the force reading has become steady (after compensating for the weight of the inner pipe end attachment.)

The running force test may be perform with the starting force test or carried out separately.

Readings of force used from the time, the centralizer is inside the outer pipe until the inner pipe is completely in place being recorded and the maximum force reported as the running force after compensation.



Key

1	Inner pipe	*a*	Casing diameter
2	Outer pipe	*b*	Hole diameter
3	Equally spaced lugs		

Figure 1 — Example of casing centralizer starting-force test equipment

RESTORING FORCE TEST

Restoring force is the force exerted by a centralizer against the casing to keep it away from the bore wall. This Test is done as follows:

1. The test is performed with pipe-1 and pipe-2 as shown in Fig. 2, within 5 degrees inclination to the horizontal.
2. All Bows are flexed/comprssed 12 times.
3. External force is applied to the outer pipe-2 which is transferred to the centralizer.
4. Load is then applied and load v/s deflection readings are recorded for 3 times when the minimum restoring force has been obtained.
5. Each bow spring is tested and the final load deflection curve is prepared using the arithmetic average of the force readings at corresponding deflections.
6. Restoring force is determined from this curve at 67% stand-off ratio.

Field experience shows that stand-off values of 75-90% are adequate even in horizontal wells.

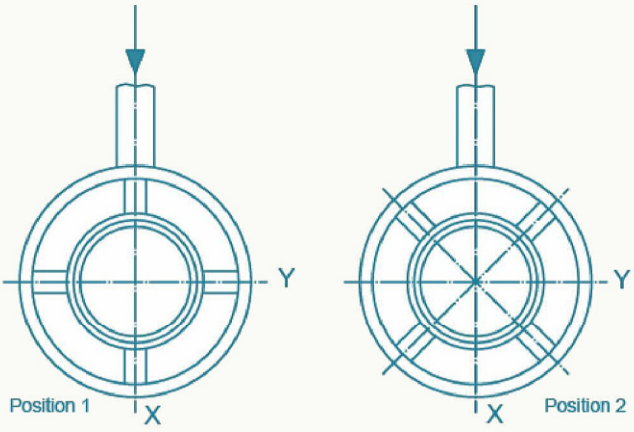
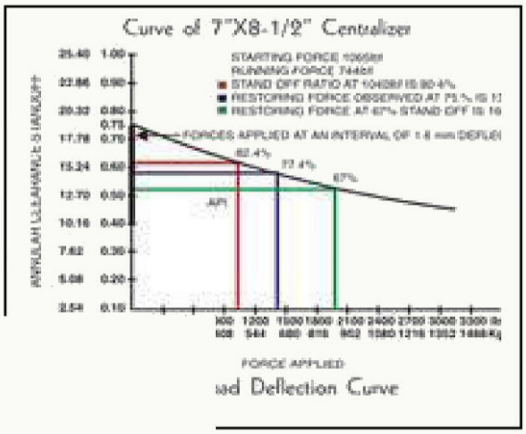
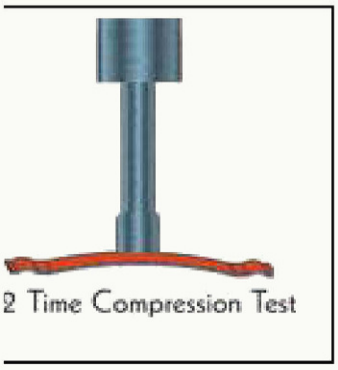
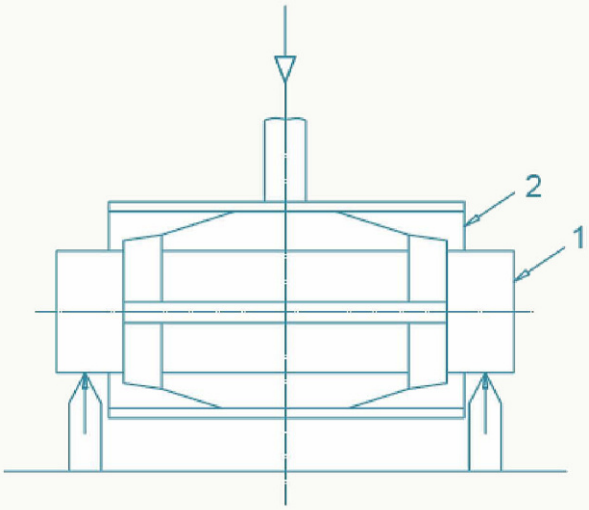


Figure 3 — Casing centralizer test positions

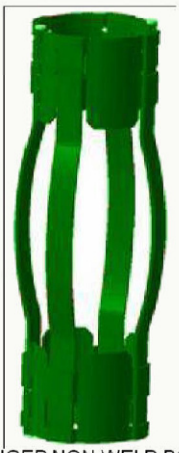




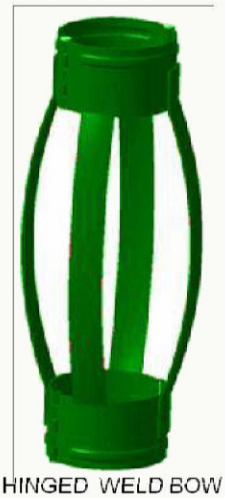


Key
1 Inner pipe
2 Outer pipe

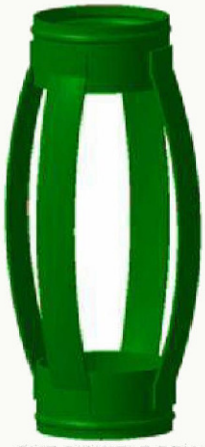
Figure 2 — Example of casing centralizer restoring-force test equipment



HINGED NON WELD BOW SPRING CENTRALIZER



HINGED WELD BOW SPRING CENTRALIZER



SLIP ON WELD BOW SPRING CENTRALIZER

HINGED NON WELD BOW SPRING CENTRALIZER

MODEL: WC-HNBSC
PRODUCT No.: WC-40301

HINGED WELDED BOW SPRING CENTRALIZER

MODEL: WC-HWBSC
PRODUCT No.: WC-40302

SLIP ON WELDED BOW SPRING CENTRALIZER

MODEL: WC-SWBSC
PRODUCT No.: WC-40303

WELLCARE Bow Spring Centralizers are high in quality, developed to comply API 10D specifications for use in the most demanding conditions. These centralizers combine the highest restoring force with the lowest starting force.

Premium quality bows which are made of special alloy steel with uniform hardness provide optimum performance. The bows with extended profile prevent their hitting against casing collars. The bows are available in a range to accommodate any well profile.

Quality steel and non weld design ensure extra strong grip while integral hinges folded on the inside are connected by high strength locking pin for maximum structural robustness.

WELLCARE Bow Spring Centralizers are used to position the casing in the centre of the wellbore in vertically, deviated and horizontal wells.

High restoring force combined with low starting force is achieved with all bow heights. Their installation on the casing pipe is very convenient. It requires only the placement of the two assembled halves on the pipe and inserting the pin in the end collar hinge. The centralizer when unassembled makes a compact package, reducing the shipping cost. Assembly at site is conveniently done.

Welded bow-spring centralizers are available in two styles: slip-on and hinged. Slip-on centralizers are manufactured with solid end rings, requiring the centralizer to be slipped on the casing OD during installation. Hinged centralizers are manufactured in segments allowing the centralizer to be installed easily around the casing OD. Hinge pins hold the segments together during installation. All welded bow-spring centralizers are manufactured to API 10D Specification.

The welded construction provides for superior strength with destructive tensional force up to 3-4 times higher than nonweld centralizer products. Designed to be installed over stop collars or casing couplings, this type is available in a wide range for casing and hole sizes.

Specification Guide: [Model: WC-HNBSC]

Casing Size in	Hole Size in	Nos. of Bows	Maximum OD in	Maximum Compressed OD In
4-1/2	6	4	7.165	5.409
	6-1/4	4	7.165	5.409
	6-1/2	4	7.638	5.409
	7-7/8	4	9.055	5.409
5	6-1/2	4	7.677	5.921
	6-3/4	4	7.677	5.921
	7-7/8	4	9.094	5.921
	8-1/2	4	10.118	5.921
5-1/2	7-7/8	4	9.134	6.433
	8-1/2	4	10.079	6.433
	8-3/4	4	10.079	6.433
	9-7/8	4	11.102	6.433
6-5/8	8-1/2	4	9.331	7.575
7	8-1/2	4	9.724	7.969
	8-3/4	4	10.197	7.969
	9-7/8	4	11.614	7.969
7-5/8	9-7/8	4	10.846	8.598
8-5/8	10-5/8	6	11.831	9.583
	11-5/8	6	13.799	9.583
	12-1/4	6	14.272	9.583
9-5/8	11-5/8	6	13.819	10.626
	12-1/4	6	14.291	10.626
	13-3/4	6	15.315	10.626
9-7/8	11-5/8	6	13.602	10.882
	12-1/4	6	14.075	10.882
	13-3/4	6	15.098	10.882
10-3/4	12-1/4	6	13.583	11.807
	13-3/4	6	15.472	11.807
	14-3/4	6	16.024	11.807
11-3/4	13-3/4	8	15.492	12.772
	14-3/4	8	16.437	12.772
	15-1/2	8	17.461	12.772
13-3/8	16	8	18.642	14.425
	17-1/2	8	19.114	14.425
13-5/8	16	8	18.366	14.681
	17-1/2	8	18.917	14.681
14	16	8	18.740	15.055
	17-1/2	8	19.291	15.055
16	20	10	21.791	17.083
	22	10	24.075	17.083
18-5/8	22	10	23.425	19.740
	24	10	26.732	19.740
20	24	10	25.827	21.118
	26	10	28.110	21.118
Note: Any other standard sizes can be manufactured as per customer demand.				

Specification Guide: [Model: WC-HWBSC & WC-SWBSC]

Casing Size in	Hole Size in	Nos. of Bows	Maximum OD in	Maximum Compressed OD in
4-1/2	6	4	7-1/8	5.25
	6-1/4	4	7-1/8	5.25
	6-1/2	4	7-5/8	5.25
	7-7/8	4	9-1/8	5.25
5	6-1/2	4	7-5/8	5.76
	6-3/4	4	7-7/8	5.76
	7-7/8	4	9-1/8	5.76
	8-1/2	4	10-1/8	5.76
5-1/2	7-7/8	4	9-1/8	6.28
	8-1/2	4	10-1/4	6.28
	8-3/4	4	10-1/4	6.28
	9-7/8	4	11-1/4	6.28
6-5/8	8-1/2	4	9-5/8	7.42
7	8-1/2	4	9-5/8	7.81
	8-3/4	4	10-1/8	7.81
	9-7/8	4	11-5/8	7.81
7-5/8	9-7/8	4	10-3/4	8.44
8-5/8	10-5/8	6	11-3/4	9.43
	11-5/8	6	13-7/8	9.43
	12-1/4	6	14-1/4	9.43
9-5/8	11-5/8	6	13-7/8	10.47
	12-1/4	6	14-1/4	10.47
	13-3/4	6	15-3/4	10.47
9-7/8	11-5/8	6	13-5/8	10.72
	12-1/4	6	14-1/4	10.72
	13-3/4	6	15-1/4	10.72
10-3/4	12-1/4	6	13-3/8	11.65
	13-3/4	6	15-5/8	11.65
	14-3/4	6	16-1/8	11.65
11-3/4	13-3/4	8	15-3/8	12.61
	14-3/4	8	16-3/8	12.61
	15-1/2	8	17-3/8	12.61
13-3/8	16	8	18-5/8	14.27
	17-1/2	8	19-1/8	14.27
13-5/8	16	8	18-5/8	14.52
	17-1/2	8	19-1/8	14.52
14	16	8	18-5/8	14.90
	17-1/2	8	19-1/8	14.90
16	20	10	21-5/8	16.93
	22	10	24-1/8	16.93
18-5/8	22	10	23-1/4	19.58
	24	10	26-3/4	19.58
20	24	10	25-5/8	20.96
	26	10	21-1/8	20.96

Note: Any other standard sizes can be manufactured as per customer demand.

HINGED NON WELD SEMI- RIGID BOW SPRING CENTRALIZER

MODEL: WC-HNSRC, PRODUCT No.: WC-40401

HINGED WELDED SEMI- RIGID BOW SPRING CENTRALIZER

MODEL: WC-HWSRC, PRODUCT No.: WC-40402

SLIP ON WELDED SEMI RIGID BOW SPRING CENTRALIZER

MODEL: WC-SWSRC, PRODUCT No.: WC-40403

Available in the size range 4 ½ " to 20", this device ensures high efficiency in casing jobs on deviated and horizontal wells. Combining the features of a standard spring bow and rigid centralizer, it has bows manufactured from alloy steel tempered for exact hardness and a non- weld design to eliminate brittle spots. The spring characteristics of its double crested profile permit compression to facilitate movement through tight spot.

These centralizers are available in threee catagories i.e. Hinged Non weld, Hinged welded & Slip on welded.

Its Performance achieves the highest restoring forces and usually zero to minimum starting force and used in most types of well designs , Most suited for horizontal and directional well designs.

HINGED NON WELD POSITIVE BOW CENTRALIZER

MODEL: WC-HNPBC, PRODUCT No.: WC-40201

HINGED WELDED POSITIVE BOW CENTRALIZER

MODEL: WC-HWPBC, PRODUCT No.: WC-40202

SLIP-ON WELDED POSITIVE BOW CENTRALIZER

MODEL: WC-SWPBC, PRODUCT No.: WC-40203

As per design appearance, Positive bow centralizer is designed with positive steel channel bow which provides positive casing stand off. Positive centralizers are of three types hinged non weld , hinge welded, slip on welded. WELLCARE positive bow centralizers are uniquely designed with flat bottom U profile with different depths permitting maximum fluid passage. The flat U profile is fitted in self locking retaining lips for firm and positive hold.

These centralizers significantly reduce frictional drag while being used in deviated holes. They provide almost 100% standoff when run inside a cased hole. They are supplied 4-8mm less than the inside diameter of the casing or hole size in which the centralizer is to be run.

The non weld design eliminates brittle spots, enhancing durability. WELLCARE positive centralizers are available in a size range of 4 ½ " to 20".

SLIP ON SEMI RIGID NON WELD BOW SPRING CENTRALIZER

HINGED SEMI-RIGID NON WELD BOW SPRING CENTRALIZER

HINGED NON WELD POSITIVE BOW CENTRALIZER

HINGED SEMI RIGID WELD BOW SPRING CENTRALIZER

HINGED WELD POSITIVE BOW CENTRALIZER

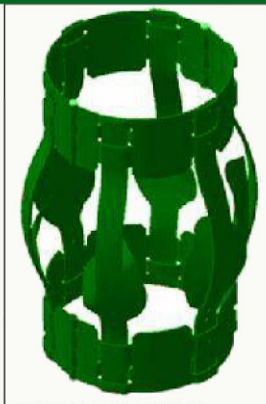
SLIP-ON WELD POSITIVE BOW CENTRALIZER

Specification Guide: [MODEL: WC-HNSRC, WC-HWSRC & WC-SWSRC]

Casing Size in	Hole Size in	Nos. of Bows	Maximum OD in	Maximum Compressed OD in
4-1/2	6	4	6-1/8	5.41
	6-1/4	4	6-3/8	5.41
	6-1/2	4	6-5/8	5.41
	7-7/8	4	8	5.41
5	6-1/2	4	6-5/8	5.92
	6-3/4	4	6-7/8	5.92
	7-7/8	4	8	5.92
	8-1/2	4	8-5/8	5.92
5-1/2	7-7/8	4	8	6.43
	8-1/2	4	8-5/8	6.43
	8-3/4	4	8-7/8	6.43
	9-7/8	4	10	6.43
6-5/8	8-1/2	4	8-5/8	7.57
7	8-1/2	4	8-5/8	7.97
	8-3/4	4	8-7/8	7.97
	9-7/8	4	10	7.97
7-5/8	9-7/8	4	10	8.60
8-5/8	10-5/8	6	10-3/4	9.58
	11-5/8	6	11-3/4	9.58
	12-1/4	6	12-3/8	9.58
9-5/8	11-5/8	6	11-3/4	10.63
	12-1/4	6	12-3/8	10.63
	13-3/4	6	14	10.63
9-7/8	11-5/8	6	12	10.88
	12-1/4	6	12-3/4	10.88
	13-3/4	6	14-1/4	10.88
10-3/4	12-1/4	6	12-3/4	11.81
	13-3/4	6	14-1/4	11.81
	14-3/4	6	15-1/4	11.81
11-3/4	13-3/4	8	14-1/4	12.77
	14-3/4	8	15-1/4	12.77
	15-1/2	8	16	12.77
13-3/8	16	8	16-1/2	14.43
	17-1/2	8	18	14.43
13-5/8	16	8	16-1/2	14.68
	17-1/2	8	18	14.68
14	16	8	16-1/2	15.06
	17-1/2	8	18	15.06
16	20	10	20-1/2	17.08
	22	10	22-1/2	17.08
18-5/8	22	10	22-1/2	19.74
	24	10	24-1/2	19.74
20	24	10	24-1/2	21.12
	26	10	26-1/2	21.12
Note: Any other standard sizes can be manufactured as per customer demand.				

Specification Guide: [Model: WC-HNPBC, WC-HWPBC & WC-SWPBC

CASING SIZE in	HOLE SIZE in	Nos. Of Bows	Maximum OD in
4-1/2	6-1/8	4	5.787
	8-1/2	4	8.141
5	8-1/2	4	8.141
	5-7/8	4	5.512
5-1/2	8-1/2	4	8.228
	9-5/8	4	9.094
6-5/8	8-1/2	4	8.228
	9-5/8	4	9.370
7	8-1/2	4	8.189
	9-5/8	4	9.213
7-5/8	9-5/8	4	9.291
	8-1/2	4	8.150
8-5/8	9-5/8	4	9.252
	12-1/4	4	12.008
9-5/8	12-1/4	6	11.870
	13-3/8	6	13.012
9-7/8	12-1/4	6	11.909
	13-3/8	6	12.736
10-3/4	12-1/4	8	12.008
	13-3/8	8	13.031
11-3/4	12-1/4	8	11.890
	13-3/8	8	13.012
	13-1/2	8	13.128
13-3/8	16	8	15.669
	17-1/2	8	17.126
13-5/8	16	8	15.689
	17-1/2	8	17.067
14	16	8	15.768
	17-1/2	8	16.909
16	18-1/2	8	18.227
	20	8	19.625
18-5/8	22	10	21.585
	24	10	24.646
	26	10	25.585
20	22	10	21.625
	24	10	23.514
	26	10	25.625
Note: Any other standard sizes can be manufactured as per customer demand.			



HINGED NON WELD BOW SPRING TURBOLIZER

SLIP ON WELD BOW SPRING TURBOLIZER

HINGED WELD BOW SPRING TURBOLIZER

HINGED NON WELD BOW SPRING TURBOLIZER

MODEL: WC-HNBST, PRODUCT No.: WC-40501

HINGED WELDED BOW SPRING TURBOLIZER

MODEL: WC-HWBST, PRODUCT No.: WC-40502

SLIP ON WELDED BOW SPRING TURBOLIZER

MODEL: WC-SWBST, PRODUCT No.: WC-40503

Centralizers with turbo-fins attached to each bow spring called as Turbolizer are designed to create localized turbulent fluid flow at the point of instalation. The turbofins divert the fluid flow to more evenly distributing the cement around the casing. All welded and nonwelded bowspring centralizers are available in the most common hole/casing sizes.

Available in the size range from 4 1/2 " up to 20", this sturdy device induces a spiral flow pattern in the slurry thereby increasing displacement efficiency. Fitted with specially designed multi-direction turbo fins, made of alloy steel in annealed state. This device improves the cleaning action of drilling fluids, distributes the cement slurry into wellbore irregularities and minimizes channeling.

Refer to Specification Guide of Bow Spring Centralizers.

HEAVY DUTY WELD SPIRALIZER- L

HEAVY DUTY WELD SPIRALIZER- R

HEAVY DUTY WELD ED SPIRALIZER -L

MODEL: WC-HVS-L, PRODUCT No.: WC-40701

HEAVY DUTY WELDED SPIRALIZER -R

MODEL: WC-HVS-R, PRODUCT No.: WC-40702

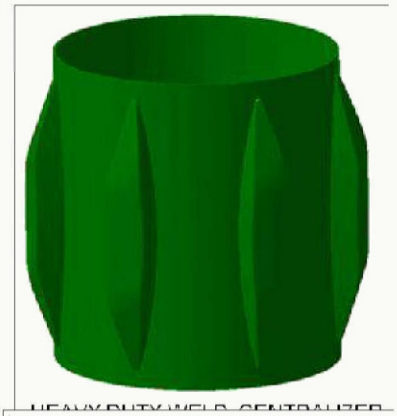
WELLCARE Heavy Duty Welded Spiralizers are high quality welded product which meets the specification. These have boat type bows which are welded with the end collars or pipe in controlled temperature conditions making use of correct grade electrodes. These are made in variety of catagories such as have curved vanes with right or left orientation. They can be secured to the casing OD, or they can float between casing stop collars if the well casing is to be rotated during cementing.

- Reduce friction between the casing and the hole, allowing the casing to be inserted more easily into the wellbore.
- Help centralize casing in the hole, allowing an even distribution of cement around the casing during cementing operations.
- Improve cement bonding to the casing.
- Prevent the casing string from becoming differentially stuck.
- Break up gel pockets in the wellbore while casing is being run, improving drilling-fluid displacement during cementing.
- Increase fluid turbulence, removing filter cake on the wellbore face.

HEAVY DUTY WELDED CENTRALIZER

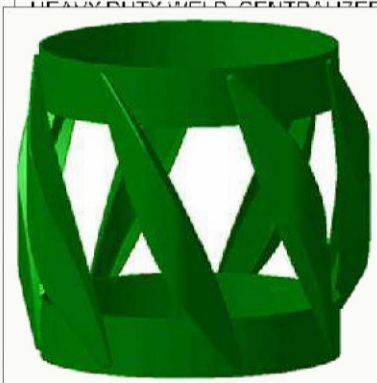
MODEL: WC-HVC
PRODUCT No.: WC-40703

The straight-vane rigid centralizer is used during operations in which casing centralization is a primary objective. The centralizer can be attached to the casing with set screws located between each vane, preventing casing rotation or reciprocation during cementing operations. If the casing will be rotated or reciprocated during cementing operations, the centralizer can float on the casing joint between the stop rings. A flexible ceramic coating can be applied to the entire turbulator to reduce friction. Th e rigid centralizer is normally 10" long, but it can be manufactured to any length as per the customer requirement. The vane ODs are typically ¼" less than the bit size used to drill the well. The centralizers are available in 2-7/8 " to 20".



SLIP-ON WELDED SPIRALIZER-L

MODEL: WC-SWS-L
PRODUCT No.: WC-40801



SLIP ON WELD SPIRALIZER- L

SLIP-ON WELDED SPIRALIZER-R

MODEL: WC-SWS-R
PRODUCT No.: WC-40802

SLIP ON WELD SPIRALIZER- R

SLIP-ON WELDED CENTRALIZER

MODEL: WC-SWC
PRODUCT No.: WC-40803

WELLCARE Slip–On Welded Spiralizers and centralizers are high quality welded product which meet the specifications. These have boat type bows which are welded with the end collars in controlled temperature conditions making use of correct grade electrodes. The end collars are available in slip-on design with high strength steel.

These centralizers have boat type bow, strongly welded to the end slip on collars under required temperature conditions with correct grade electrodes. These are made in a variety of catagories, such as straight or curved vanes with right or left orienation. They can be secured to the casing OD, or they can float between casing stop collars if the well casing rotates during cementing.

These are available in spiral and straight blades which resist high side loads. While giving maximum standoff these blades create vortex flow to optimize mud displacement. These are available in sizes raging from 2-7/8" up to 20" casing sizes with the combination of hole sizes as shown in specification guide.

SLIP ON WELD CENTRALIZER

Specification Guide: [Heavy Duty & Slip-On Spiralizer & Centralizer]

Casing Size in	Hole Size in	Nos. of Bows	Maximum OD in
4-1/2	6	4	5-3/4
	6-1/4	4	6
	6-1/2	4	6-1/4
	7-7/8	4	7-5/8
5	6-1/2	4	6-1/4
	6-3/4	4	6-1/2
	7-7/8	4	7-5/8
	8-1/2	4	8-1/4
5-1/2	7-7/8	4	7-1/2
	8-1/2	4	8-1/8
	8-3/4	4	8-1/4
	9-7/8	4	8-1/2
6-5/8	8-1/2	4	8-1/4
7	8-1/2	4	8-1/4
	8-3/4	4	8-1/2
	9-7/8	4	9-5/8
7-5/8	9-7/8	4	9-5/8
8-5/8	10-5/8	6	10-3/8
	11-5/8	6	11-3/8
	12-1/4	6	12
9-5/8	11-5/8	6	11-3/8
	12-1/4	6	12
	13-3/4	6	13-1/2
9-7/8	11-5/8	6	11-3/8
	12-1/4	6	12
	13-3/4	6	13-1/2
10-3/4	12-1/4	6	12
	13-3/4	6	13-1/2
	14-3/4	6	14-1/2
11-3/4	13-3/4	8	13-1/2
	14-3/4	8	14-1/2
	15-1/2	8	15-1/4
13-3/8	16	8	15-3/4
	17-1/2	8	17-1/4
13-5/8	16	8	15-3/4
	17-1/2	8	17-1/4
14	16	8	15-3/4
	17-1/2	8	17-1/4
16	20	10	19-3/4
	22	10	21-3/4
18-5/8	22	10	21-3/4
	24	10	23-3/4
20	24	10	23-3/4
	26	10	25-3/4

Note: Any other standard sizes can be manufactured as per customer demand.

CASTED SPIRALIZER [LEFT & RIGHT] [STEEL/ALLUMINUM/ZINC]

MODEL: WC-CSP-SL, WC-CSP-AL & WC-CSP-ZL
PRODUCT No.: WC-40104, WC-40102 & WC-40106
MODEL: WC-CSP-SR, WC-CSP-AR & WC-CSP-ZR
PRODUCT No.- WC-40108, WC-40107 & WC-40109

WELLCARE manufactures spiral blade solid spiralizers. These are made of one piece high grade corrosion resistant cast iron, aluminum alloy and non sparking metal-zinc alloy. They are high impact and shock resistant, possess high tensile and yield strengths and are wellhead friendly.

They provide maximum casing or wellbore standoff, the prime requisite of an excellent primary cement job. This is irrespective of lateral loads. The straight blades are self cleaning in nature and designed to enhance flow. They endure steep temperatures in the wellbore, friction factor is minimum, with reduced drag and torque, ensuring maximum fluid passage.

Spiralizers provide the almost wall contact and fluid swirl. They give optimum flow area in highly deviated and horizontal wells. The casing effectively reaches TD due to the sloping rare ends reducing drag. The slope also ensures that no balling between the vanes takes place, as scraping, gouging or digging into the formation is eliminated.

WELLCARE Spiralizers are developed in response to the need for better cementing in highly deviated and horizontal wells. These are designed to provide optimum flow area. The 360 degrees over lapping solid vane provide maximum wall contact and fluid swirl.

Reduced flow area between the spiral blades produces a vortex motion of the fluids for more fluid velocity with direction. These are made of high strength corrosion resistant cast aluminum and also non-sparking zinc alloy. The 30 deg. slope of the vane end reduce drag and aids the casing in reaching TD. This gentle flow from the body to the height of the vane will eliminate scraping, gouging or digging into the formation and consequently reduce balling between the vanes. They also posses high impact and shock resistance combined with tensile and yield strength as well as resists corrosion.

CASTED STEEL SPIRALIZER- L

CASTED STEEL SPIRALIZER- R

CASTED ALUMUNIUM SPIRALIZER-L

CASTED ALUMUNIUM SPIRALIZER-R

CASTED ZINC SPIRALIZER- R

CASTED ZINC SPIRALIZER- L

CASTED STEEL CENTRALIZER

CASTED ALUMUNIUM CENTRALIZER

CASTED ZINC CENTRALIZER

CASTED CENTRALIZER [STEEL/ALLUMINUM/ZINC]

MODEL: WC-CST-S, WC-CSTS-A & WC-CST-Z
PRODUCT No.: WC-40103, WC-40101 & WC-40105

WELLCARE straight blade solid centralizers provide the right features for getting a good primary cementing job with maximum casing/ wellbore standoff. These are constructed of one piece high strength corrosion resistant cast aluminum, steel or non- sparking zinc alloy as per the customer's requirement. They provide ultimate drag and torque reduction with maximum fluid bypass with low friction factor, withstand high wellbore temperatures while providing maximum horizontal standoff. Our centralizers are wellhead friendly and have high impact with shock resistance, optimum tensile and yield strength.

Conductor Pipe Centralizer

CONDUCTOR PIPE CENTRALIZER

MODEL: WC-CRPC

PRODUCT No.: WC-40601

Conductor Pipe Centralizer are being used in Oil Well Rig in big well bore. These centralizers are very heavy duty centralizer. These are available with us for different hole size varying from 20" to 30" for respective casing sizes.

WELLCARE Conductor pipe centralizers provide the right features for getting a good primary cementing job with maximum casing/ wellbore standoff. WELLCARE Conductor pipe centralizers are constructed of two piece high strength corrosion resistant.

WELLCARE Conductor Pipe centralizers provide ultimate drag and torque reduction with maximum fluid bypass with low friction factor WELLCARE Conductor pipe centralizers with stand high wellbore temperatures while providing maxi. horizontal standoff.

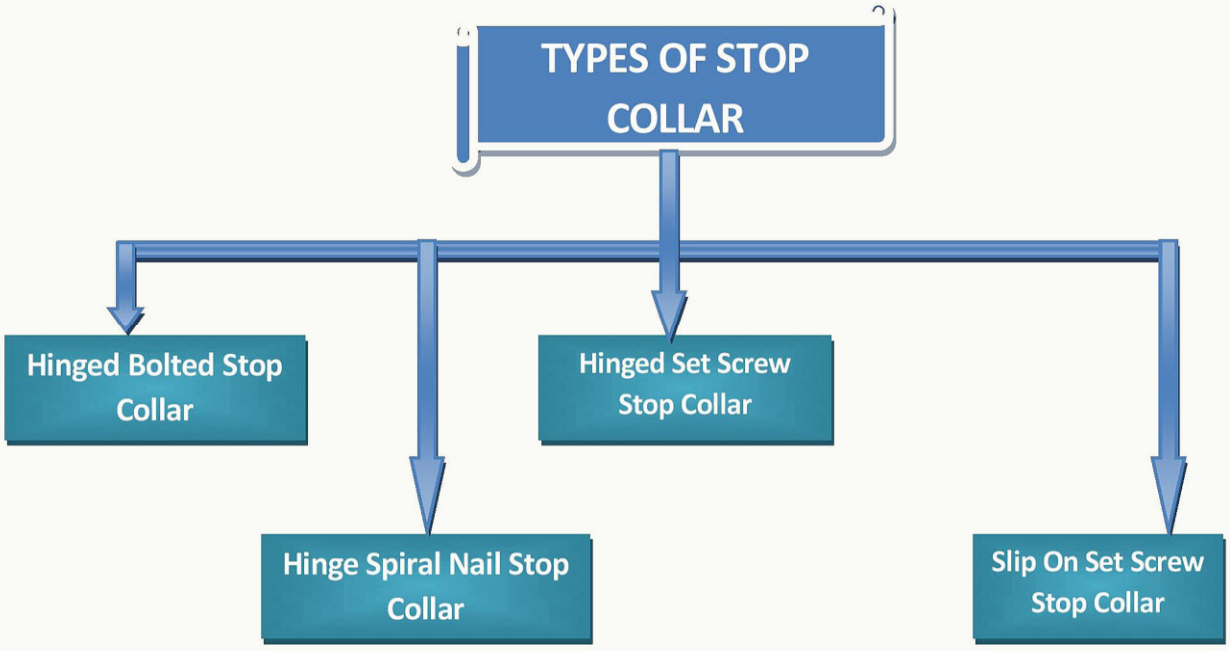
WELLCARE centralizers are wellhead friendly and have high impact with shock resistance, along with optimum tensile and yield strength.

Specification Guide: [WC-CST-S, WC-CSTS-A & WC-CST-Z]

Casing Size in	Hole Size in	Nos. Of Bows	OD in
2-7/8	4-1/8	4	3-49/64
	6,6-1/8	4	5-41/64
3-1/2	6-1/8	4	5-41/64
4	6-1/8	4	5-41/64
4-1/2	6	4	5-3/4
	6-1/4	4	6
	6-1/2	4	6-1/4
	7-7/8	4	7-5/8
5	6-1/2	4	6-1/4
	6-3/4	4	6-1/2
	7-7/8	4	7-5/8
	8-1/2	4	8-1/4
5-1/2	6-3/4	4	6-1/2
	7-7/8	4	7-5/8
	8-1/2	4	8-1/4
	8-3/4	4	8-1/2
6-5/8	8-1/2	5	8-1/4
7	8-1/2	5	8-1/4
	8-3/4	5	8-1/2
	9-7/8	5	9-5/8
7-5/8	9-7/8	5	9-5/8
8-5/8	10-5/8	6	10-3/8
	11-5/8	6	11-3/8
	12-1/4	6	12
9-5/8	11-5/8	6	11-3/8
	12-1/4	6	12
	13-3/4	6	13-1/2
9-7/8	11-5/8	6	11-3/8
	12-1/4	6	12
	13-3/4	6	13-1/2
10-3/4	12-1/4	6	12
	13-3/4	6	13-1/2
	14-3/4	6	14-1/2
11-3/4	13-3/4	7	13-1/2
	14-3/4	7	14-1/2
	15-1/2	7	15-1/4
13-3/8	16	8	15-3/4
	17-1/2	8	17-1/4
13-5/8	16	8	15-3/4
	17-1/2	8	17-1/4
14	16	8	15-3/4
	17-1/2	8	17-1/4
16	20	10	19-3/4
	22	10	21-3/4
18-5/8	22	10	21-3/4
	24	10	23-3/4
20	24	10	23-3/4
	26	10	25-3/4

Note: Any other standard sizes can be manufactured as per customer demand.

STOP COLLAR



PERFORMANCE OF STOP COLLAR:

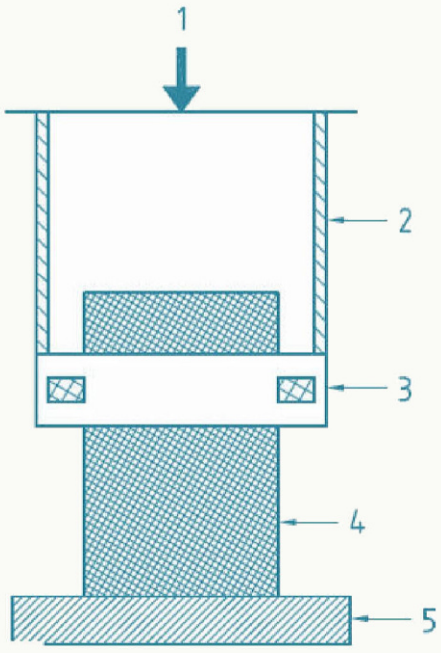
Stop collars are being tested in accordance with API RP 10D-2 / ISO 10427-2 to evaluate their performance characteristics reliable to suite field applications.

The test casing is within the tolerances as indicated in API 5CT for non-upset pipe.

Burrs or Similar defects being removed from the stop collars prior to testing.

The outer sleeve should provide a load surface to distribute the load to the stop device (as shown in Fig.-2).

Holding force being recorded at the starting point of slippage of stop collar and till the end of the test for displacement of stop collar along the casing up-to 4 inch.



Key

1 applied force
2 outer sleeve
3 stop collar
4 test casing
5 rigid surface

Figure 2 — Typical test assembly

HINGED BOLTED STOP COLLAR

MODEL: WC-SCHB

PRODUCT No.: WC-40901

An economical collar suitable for subcritical annular tolerances. Available in the size range 4 ½ " to 20", it has a cross bolt design which makes it an efficient and user friendly device.

HINGED SPIRAL NAIL STOP COLLAR

MODEL: WC-SCHN

PRODUCT No.: WC-40902

Available in the size range 4 ½ " to 20", this device can be set in both upset and non-upset casing to provide maximum clearance during rotation. It has a groove in the middle into which a spiral nail can be driven for improved grip on the casing. The broader band firmly grips the collar into position around the casing.

HINGED STOP COLLAR WITH SET SCREW

MODEL: WC-SCSS-1

PRODUCT No.: WC-40903

Available in the size range 4 ½ " to 20", this device has a high cost-utility ratio. This hinged collar with a row of set screws positions easily and firmly around the casing.

SLIP-ON STOP COLLAR WITH SET SCREW

MODEL: WC-SCSS

PRODUCT No.: WC-40904

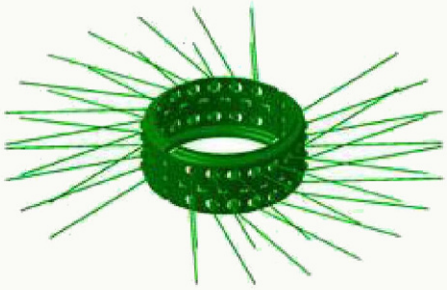
This slip-on stop collar with set screw device is recommended for small hole operations. Available in size range 2-7/8" to 20" and is gripped on casing by a row of set screws. This is a heavy duty device.

WIRE BRISTLE SCRATCHER

MODEL: WC-SCWS

PRODUCT No.: WC-41001

Consists of a hinged collar radiating into bristles. Each bristle is made of hardened & tempered wire with two scratching elements. Available in the size range 4 ½ " to 20" these scratchers improve the cement bond between the casing and porous formations while reinforcing the cement column.



WELLBORE WIPER

MODEL: WC-SCWW

PRODUCT No.: WC-41101

Consisting of loop wire cables of tempered steel laced into a collar, these wipers clean the well bore efficiently by permitting removed filter cake to pass, thereby providing excellent reinforcement to the cement column especially under close spacing. Available in size range 4 ½ " to 20".

CEMENT BASKETS

Cement baskets are run on casing or liners above porous or weak formations that require protection from the hydrostatic pressure enerated by the cement column. They can also be used to help support a cement column near the well surface while the cement sets. In stage-cementing operations, one basket is run on the joint just below the stage tool and another is run on the string above the tool. Some operators pump their first stage of cement above the lower basket and allow the cement to set while they circulate mud for the next stage. The bridge that is formed elps support the upper cement column.Wellcare has two types cement basket.

HINGED BASKET

HINGED WELDED CEMENT BASKET

MODEL: WC-HWB
PRODUCT No.: WC-41201

Available in the size range 4 ½ " to 20", this device consists of flexible steel spring bows welded to Hinged collars. Bows are hardened and tempered for maximum strength and uniformity. It is run on casing or liners above weak or porous formations to provide protection from hydrostatic pressure generated by the cement column. Its overlapping metal fins provide flexibility and fluid passage while maintaining optimum support characteristics.

SLIP-ON BASKET

SLIP-ON WELDED CEMENT BASKET

MODEL: WC-SWB
PRODUCT No.: WC-41202

Available in the size range 4 ½ " to 20", this device consists of slip-on style made of high strength, flexible steel bows mounted on steel slip-on end collars with metal petals spot welded to one end of the collar. Bows are hardened and tempered for maximum strength and uniformity.

Performance

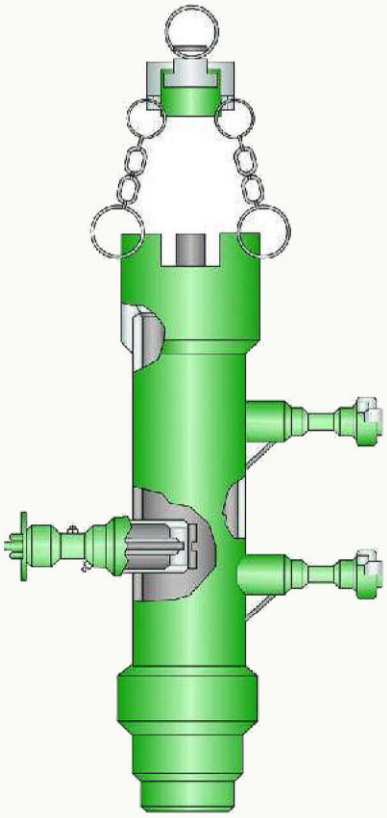
- Aids in premature cement hydration to help reduce hydrostatic fluid column above a loss zone or weak formation
- Works similar in cementing applications like a coffee filter does in catching particles to form a bridge in the annulus to prevent cement from falling back

Applications

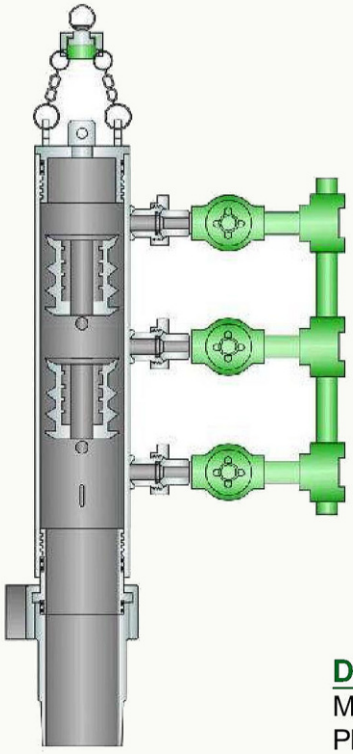
- Used in most types of well designs
- May be used in cased hole and openhole applications
- The metal petals are convex shape for added strength and durability and afford great adaptability to expansion and contraction.

CEMENTING HEAD

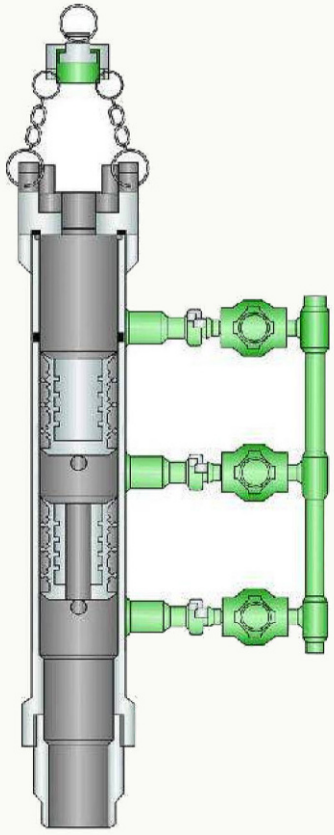
The Plug Dropping Cement Head is designed to drop Wellcare's Stage Collar cementing plugs or conventional top and bottom cementing plugs. Cement Heads are available in either single or Double cavity configurations.
Cement Head is manufactured utilizing API grade steels with connections for API 8 Round, buttress and premium threads. Cementing Heads are available in a wide range of working Pressures from 3,000 psi / 20 Mpa to 10,000 psi / 68 Mpa. All cement heads are hydrostatically tested prior to shipment. Design of Cement Head incorporates such features as quick release retainer bar, double gland seals for positive sealing of indicating wires, fully detachable cementing manifold and an integral pressure relief system to allow for pressure equalization. Optional features include plug cavity sweep arm for confirming plug release, rotating release retainer bars and quick change casing connectors. The cement head manifold is supplied with either ball valves or plug valves rated to the same working pressure as the cement heads. Cement Heads are available in sizes 2 3/8" / 60mm through 20" / 508mm.



SINGLE CAVITY CEMENTING HEAD
MODEL: WC-CTHD-1
PRODUCT No.: WC-41301



DOUBLE CAVITY CEMENTING HEAD
MODEL: WC-CTHD-2
PRODUCT No. WC-41302



DOUBLE CAVITY CEMENTING HEAD
MODEL: WC-CTHD-3
PRODUCT No.: WC-41303