

Completion Tools

Independent R&D
Production and Manufacturing

PRODUCTS

Petrostar Profile

PETROLSTAR TOOLS AND SERVICES INC. is a leading tools provider.

We mainly provide tools to the industry with a complete range of traditional and custom downhole completion tools, drilling tools etc.

We offer a wide range of products and services designed to maximize well production including high-pressure packer systems, subsurface safety systems, subsurface flow controls and service tools.

PETROLSTAR TOOLS AND SERVICES INC. is committed to providing the highest quality product through our highly skilled and well-trained employees using state-of-the-art manufacturing processes.

Over the years with innovative design we have earned good reputation in the Middle East, South America, Africa, Russia, Europe and in Central and Southeast Asia markets by providing value-added completion solution.

We are Qualified by ISO 9001:2015 and API Q1, 6A, 14A, 14L, 11D1, 19G1, 19AC quality system.



Contents

PACKERS.....	2
PPS PERMANENT SEAL BORE PACKERS	3
HHS HYDRAULIC SETTING TOOL	5
PPH HYDRAULIC SET PERMANENT PACKER.....	6
PRS RETRIEVABLE SEAL BORE PACKERS.....	7
STH-1 HYDRAULIC SETTING TOOL	8
PRS PACKER RETRIEVING TOOL	9
PRH1 HYDRAULIC-SET RETRIEVABLE PACKER	10
PRH2 HYDRAULIC-SET RETRIEVABLE PACKER	11
PRH3 HYDRAULIC-SET RETRIEVABLE PACKER	12
PRH4 HYDRAULIC-SET RETRIEVABLE PACKERS	13
PACKER ACCESSORIES	15
LOCATOR SEAL ASSEMBLY	16
ANCHOR SEAL ASSEMBLY	17
SUR-LATCH SHEAR RELEASE SEAL UNIT ASSEMBLY	18
GAS VENT VALVE	19
CABLE PACK-OFF	20
Y-TOOL	21
CONTROL LINE AND CABLE PROTECTORS	22
CATCHER SUBS.....	23
SEAL BORE EXTENSION & MILL OUT EXTENXION	24
TRAVEL JOINTS	25
ON-OFF TOOL	26
DOWN HOLE FLOW CONTROL.....	28
SIDE DOOR SLEEVE SDS	29
CHEMICAL INJECTION SYSTEM	31
LANDING NIPPLE AND LOCK MANDREL	32
BACK-PRESSURE VALVE SYSTEM	34
GAUGE SOFT HANGER.....	35
FLOW COUPLING	36
SAFETY VALVE.....	38
TUBING -RETRIEVABLE SAFETY VALVES	39
SAFETY VALVE LANDING NIPPLES.....	41
WIRELINE-RETRIEVABLE SAFETY VALVES	42

MULTI-STAGE FRAC SYSTEM	45
PRS UPPER SEAL BORE RETRIEVABLE PACKER	46
LATCH SEAL ASSEMBLY	47
FPP-1 DUAL ELEMENT OPEN HOLE ANCHOR / ISOLATION PACKER.....	48
HFS HYDRO-ACTIVATED FRAC SLEEVE	50
PFS BALL-ACTIVATED FRAC SLEEVE	51
PFS-1ADVANCED BALL-ACTIVATED FRAC SLEEVE.....	52
BALL AND SEAT	53
OPEN HOLE REAMER	54
OPEN HOLE CENTRALIZER.....	55
HYDRAULIC TUBING ANCHOR	56
BALL SEAT CIRCULATION VALVE	57
FLOAT SHOE	58
KING FRAC SYSTEM	59
DISSOLVABLE GRAG PLUG (GENERATION 1 ST)	60
DISSOLVABLE FRAG PLUG (GENERATION 2 ND)	62
SELF-RELEASE CEMENTING STAGE TOOL.....	64
SANDCONTROL.....	65

PACKERS

PPS Permanent Seal Bore Packers

Petrostar PPS Wireline-Set Permanent Packer is designed to set in the well casing to divert casing-to-tubing flow. It is either hydraulically set with the hydraulic setting tool with tubing string pressure or the E-line setting tool. The PPS packer is mechanically moved and locked in the set position by the internal slip. An external set of opposing slips holds the packer against downward and upward forces. The removal of packer is by drill or milled out. The packer is designed with a left hand seal bore compatible with Sur Latch seal assemblies and the bottom sub thread is compatible with a mill-out extension or with a seal bore extension. The Packer is designed to be milled if removal from the wellbore required. Firstly remove the Sur-latch seal nipple from packer by tubing string, right-hand rotation with tension on the tubing to disengage the Sur-Latch from the packer head.

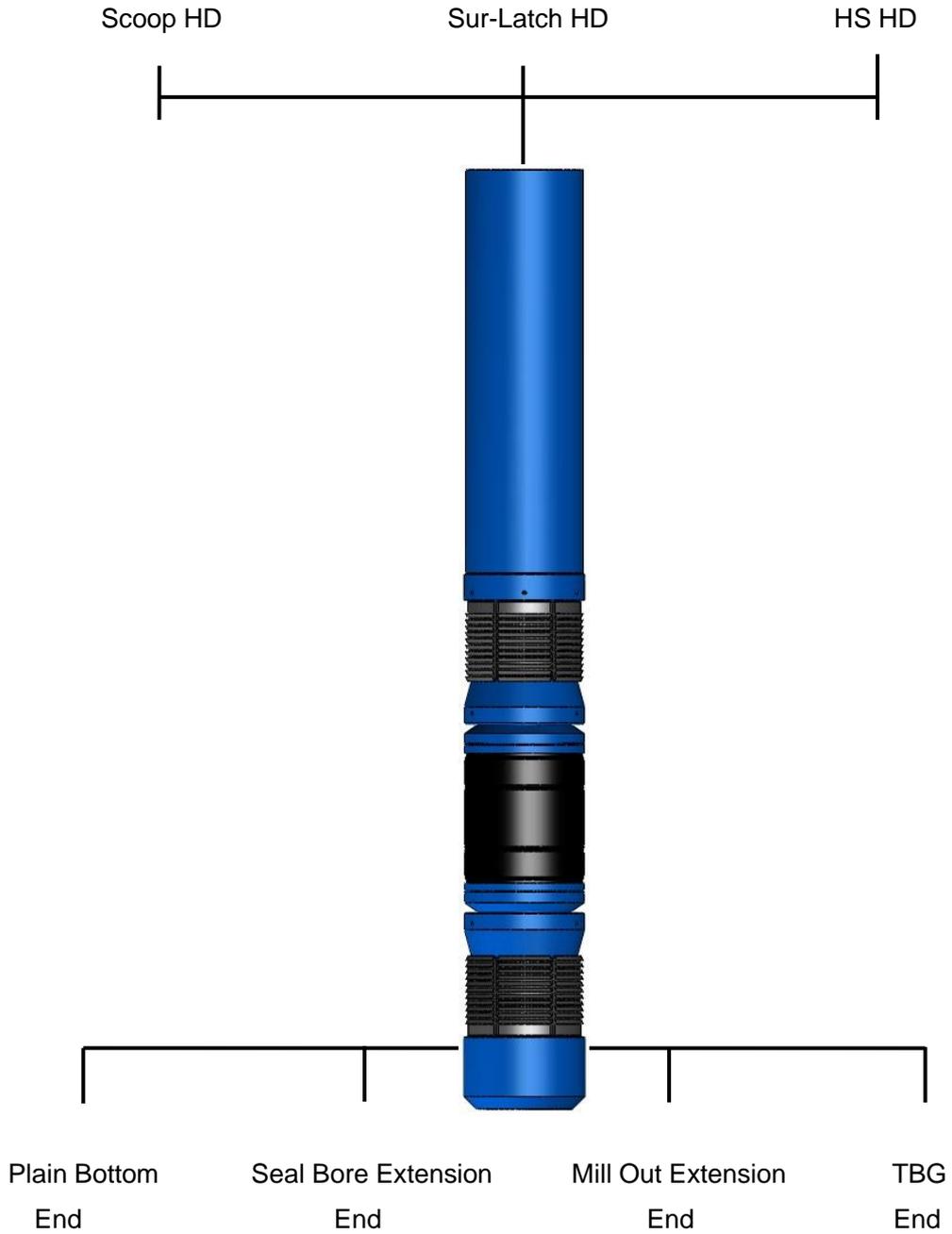
Features and Benefit

- Field proved reliable
- Simple to operation
- Economical
- Designed for most severe completion environments
- For high pressure and high temperature completions
- Provides an upper connector for attachment to seal unit locators
- Full seal bore ID through the packer
- Designed for high tensile loads
- Wireline and Hydraulic setting tools set
- Protected from pre-setting when run in hole
- Tubing rotation available when run in hole
- Milled if removal
- Standard 10ksi rate

Applications

- Sand control
- Horizontal completion assemblies
- Hanger packer in frac and stimulation jobs
- Production and injection sealbore packer





HHS Hydraulic Setting Tool

The HHS Hydraulic Setting Tool is used to hydraulically set PPS permanent packers. To attach the hydraulic setting tool to the packer, the guide tube on the packer is replaced with a modified hydraulic tube guide that is listed in the packer's Engineering Design Specifications. With the setting sleeve on the packer replaced with the hydraulic tube guide, the setting tool is attached to the packer by lugs and shear pins. The setting tool is made up on the bottom of the workstring and run into the well with the packer. After the packer is set, the setting tool is released from the packer by a straight upward pull.



PPH Hydraulic Set Permanent Packer

Petrostar PPH Packer is designed for use in applications where one trip to completion and frac is required. The packer is a hydraulic set single trip permanent millable packer with smaller OD feature is used for restrict ID casing or smaller size frac string. The packer can with Top Tubing Thread or Latch Thread. Bottom sub threaded for mill-out extension or the customer's liner. The packer design around a proven base of sealing integrity, slip anchoring system and utilizes an integral one-piece mandrel with only three pressure sealing threads within the assembly. The packer is designed with premium seal for severe down hole environments such as sour and HPHT. The Packer is designed to be milled if removal from the wellbore required. Firstly remove the Sur-latch seal nipple from packer by tubing string, right-hand rotation with tension on the tubing to disengage the Sur-Latch from the packer head.

Features and Benefit

- Field proved reliable
- Simple to operation
- Designed for most severe completion environments
- For high pressure and high temperature completions
- Large ID
- Designed for high tensile loads
- Metal to metal premium thread connection, or seal anchor assembly
- Single piece mandrel and seal bore
- Minimized potential leak paths
- Up to 15ksi rate

Applications

- Single trip production and injection wells
- High deviated and horizontal completion wells
- High pressure and high temperature wells
- Extreme completion environments such as sour gas
- Frac and stimulation
- Act as a tubing hanger



PRS Retrievable Seal Bore Packers

Petrostar PRS Packer is a retrievable, single-bore packer that has the completion features of a large-bore packer. The packer delivers high performance with simplicity of design and desirable economics. It is a 10,000 PSI plus rated packer and can be equipped to withstand severe corrosion and high temperatures.

The packers are designed to be used in Frac or gravel pack service, or suspend tools, or provide a pressure isolation point in the casing, which can be set by using hydraulic setting tool, and be pulled by running and latching the retrieving tool then applying a straight upward pull if needed.

Features and Benefit

- Field proved reliable
- Simple to operation
- Economical
- Designed for most severe completion environments
- For high pressure and high temperature completions
- Provides an upper connector for attachment to seal unit locators
- Full seal bore ID through the packer
- Designed for high tensile loads
- Wireline and Hydraulic setting tools set
- Protected from pre-setting when run in hole
- Tubing rotation available when run in hole
- Retrievable
- Able to be milled if retrieval attempts fail
- Standard 10ksi rate

Applications

- Sand control
- Horizontal completion assemblies
- Hanger packer in frac and stimulation jobs
- Production and Injection sealbore packer
- Retrieve required



STH-1 Hydraulic Setting Tool

Petrostar STH-1 hydraulic setting tool is used to set PRS or PPS packer. The STH-1 tool is attached to the top sub of the packer by pins or by the left hand thread by rotational. The set of lugs latches into the setting sleeve of the packer.

When without a lower plugging device in the tailpipe the large internal by-pass allows fluid to enter the work string eliminating the need to fill the work string while running in the hole. If there is tailpipe assembly such as the Multi-Stage Frac system with some type of float shoe or other type of plugging device is in place then it may be necessary to fill while running in the hole.

Once the packer has reached the desired depth, the tripping ball is dropped to land in ball seat circulation valve. Field adjustable differential pressure is applied activating a hydraulic chamber stroking the setting Tool against the packer which engages the slips and energizes the elements. There is a secondary ball seat within the setting tool if required.

Once the packer is set, annual pressure test can be performed. The STH-1 setting tool is released with a combination of right hand rotation while holding tension, or continue pressure the running string to hydraulic to release.

Features and Benefits

- Left hand thread connection allows heavy tail pipe weight
- Right hand rotate release and hydraulic release are available
- Anti-preset design
- Two stage ball seat permits reset the packer



PRS Packer Retrieving Tool

The Petrostar retrieving tools are a latch type retrieving tool used to retrieve PRS packers. To retrieve the packer, the retrieving tool is run on a work string, stung into the packer bore, and latched into the packer. Once latched, downward set down engage the packer's release sleeve and upward moves to release. Additional upward movement of the work string sheared releases the sleeve and moves the packer mandrel upward, which permits the packer slips to retract and pick up the packer to be retrieved.

For emergency release, continue straight pull will shear the shear screws in the spring housing and allow shear ring to move by spring to push the spring housing downward and collapse the dogs inward, this allow the retrieving tool free to rotate out and pull back from the hole.

Features and Benefits

- No rotation is required for pulling operation
- Straight-through ID allows washing down to the packer
- Easy to release: 1/4 turn on lug-type tools, and six to eight turns on an acme tool
- Rugged lug-type design engages the release sleeve



PRH1 Hydraulic-Set Retrievable Packer

PRH1 Hydraulic-Set Retrievable Packer is a single-string, hydraulic-set retrievable packer designed for Single or multi-packer production completions. The packer is made up to the tubing string and run into the well. At the desired setting depth, pressure is applied down the tubing string against a plugging device below the packer. When the full setting pressure is applied, the packer slips and elements should be fully engaged and held in the set position by internal spring loaded slips. The Packer design allows for no mandrel movement during the setting sequence.

The Packers can be run either in single packer or multiple packer completions. When used in multiple packer completions, the setting pressure can be adjusted to allow the packers to be set and tested individually.

To release the Packer, straight pull on the tubing is all that is required. Straight pull on the tubing shears a set of release pins which allows the packer mandrel to move upward moving the supports from beneath the slips. Further upward movement relaxes the elements and enables the packer to be retrieved.

Features & Benefits

- Field proved reliable
- High performance at low cost
- Small OD
- Hydraulically-set for safe, dependable operation in multiple packer applications
- Triple-seal multidurometer elements
- Shear screws allow operator to vary the setting pressure and release force
- No mandrel movement when setting
- Requires only a straight pull to release
- Multiple packers can be run and set in one trip
- Standard 7.5ksi rate

Applications

- Single or multi-packer production completions
- Production and injection wells.
- The lower packer in dual completions
- Act as a bridge plug with an on off tool.
- Multi-zone completions



PRH2 Hydraulic-Set Retrievable Packer

The PRH2 Hydraulic-Set Retrievable packer is a retrievable single-string packer which is designed to be set by plugging the tubing below the packer and applying internal pressure. The packer is retrieved by simply raising the tubing string to shear the release shear pins.

The packer does not require mandrel movement to establish a full set which makes it suitable for multi-packer installations. The packer is capable of hanging heavy tailpipe loads in the casing and is available with selective-set mechanisms.

The packer is suitable for production and injection installations. In addition, service applications such as stimulation and tubing-conveyed perforating operations may also be carried out using this packer taking special precautions to prevent premature shear of the release pins.

Features and Benefit

- Field proved reliable
- Designed for deep or deviated wells
- Production and Injection application
- Designed for high tensile loads
- Internal locking mechanism
- Protected from pre-setting when RIH
- hydraulic-actuated hold down slips above and
- Standard slips below the elements to bite into the casing
- Lower setting pressure
- Prevents both upward and downward movement
- Straight pull to release
- Field adjustable the setting pressure and shear release
- Standard 7.5ksi rate

Applications

- Single or multi-packer production completions
- Production and injection wells
- Frac and stimulation jobs



PRH3 Hydraulic-Set Retrievable Packer

The PRH3 packer is a hydraulic-set retrievable single-string packer which is design for high pressure, large ID or TCP applications. The packer allows multiple bores or control line feed –through.

Except straight-shear release features, the PRH3 packer can be set up cut to release which is use to high pressure or heavy tailpipe. The cage slip, which distributes the packer to casing loads more.

Features and Benefits

- Field proved reliable
- Production and Injection application
- Large ID
- Single piece mandrel
- No mandrel movement for multi zone stacked packer application
- Single trip capability
- Multiple bores or control line feed–through
- Straight pull to release or cut to release
- Used in high pressure, large ID or TCP well condition
- Field adjustable the setting pressure and shear release
- Upper tubing connection or Latch head

Applications

- Single or multi-packer production completions
- Production and injection wells
- TCP
- Production and injection wells



PRH4 Hydraulic-Set Retrievable Packers

PRH4 ESP packer is designed to be run with Electric Submersible Pumps. The packer is a hydraulic-set, straight pull shear release, upper single-string, double-bore retrievable packer.

The packer with several additional optional ports allows venting of annular pressure, fluid injection through the packer, and/or instrument wire port bypass. The vent valve is designed to be threaded to the top of the packer. The valve is hydraulically operated and allows for gas bypass around the packer. The packer comes with a plug for when the vent valve is not used.

Features

- Hydro-test capability of feed through connection.
- A pack-off power cable feed-through system is provided with thread connections
- Additional bores for venting of annular pressure, chemical-injection lines, control lines, and well-monitoring devices through the packer
- Slip design offers exceptional hang weight capability
- Case carburized bi-directional slips anchor the packer against well pressure from above or below

Benefits

- Field redress is quick, easy, and cost effective
- Efficiently reduce the overall costs of submersible pump completions
- Performance is long-term and dependable
- No relative movement between tubing and cable
- Low pressure set
- Requires only straight pull to release
- Field adjusted the setting pressure and shear value
- Allows adjustment of pull-to-release in the field

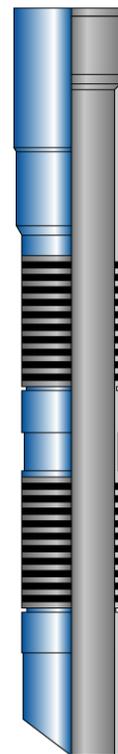




PACKER ACCESSORIES

Locator Seal Assembly

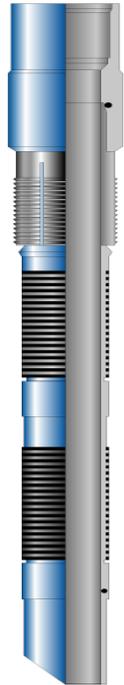
The Locator Seal Assembly is used when it is not desirable to anchor the seals into the packer. The Locator Seal Assembly allows movement of the seals in response to pressure and temperature changes on the tubing string. Force changes tending to elongate the tubing string are transferred through the locator into the packer and casing. Seals are dynamic and must be designed to accommodate sliding or reciprocation, in addition to temperature and wellbore fluids. The Locator Seal Assembly is retrieved by straight pick-up.



Anchor Seal Assembly

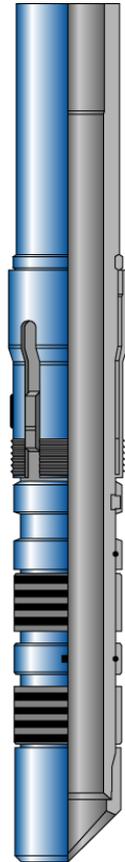
Anchor Seal Assemblies lock, or anchor, into the packer top and seal in the bore of the packer or seal bore extension below the packer. The anchor seal assembly transfers tubing forces through the anchor into the packer; the seals are static and are only subjected to pressure differentials.

The anchor seal assembly consists of the seal mandrel, seal units as required, a re-entry guide bottom and a latch mechanism and locator. In some cases, a spacer tube is used to properly position the seals within the seal bore. The anchor seal assembly is released by right-hand rotation.



Sur-Latch Shear Release Seal Unit Assembly

The Sur-Latch Shear Release Seal Unit Assembly is used with Petrostar Seal Bore Packers. The seal unit provides a tubing-to-packer seal, a positive locking condition, for tubing left hand rotational release or straight pull shear release. The seal unit assembly is made up to the lower most part of the tubing string at the surface if a wireline-set packer is used. If a hydraulic packer is used, the seal unit assembly may be installed into the packer at the surface and RIH. The seal unit packing contacts the mating hone bore in the packer to form a seal. The floating latch moves up enough to allow its collet-type ends to flex inward. This allows the mating left-hand threads engaged in the packer. To release, a straight pull above the predetermined force will shear the shear pins, allow the latch to move downward and collapsed inward, disengaged from the packer head. Alternatively, by right hand rotational method with a tensile force 1,000 to 1,500 lb force.

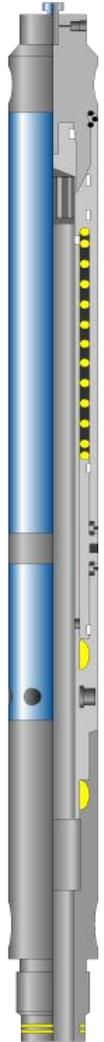


Gas Vent Valve

The Gas Vent Valve is designed to be threaded onto PRH4 ESP packer and vent the gas to maintain optimum fluid levels for the ESP. It is a control line actuated valve from surface. The valve is opened by applying hydraulic control pressure, and closes when the pressure is released.

Features and Benefits

- Controlled by hydraulic control-line pressure
- Sealing reliable and long service life
- Large flow area
- Two sizes: 1" and 1 1/2", c/w 1/4" NPT connection
- 5000psi working pressure rating



Cable Pack-Off

The Cable Pack-Off provides an effective seal for an electrical submersible pump (ESP) cable when used with a multistring packer. To achieve a seal, the metal shield on the cable is removed from a short section, and the cable is installed through the secondary side of the ESP packer. The tool isolates pressure below from pressure above the packer by sealing on the rubber jacket of the cable.

Features and Benefits

- Compression energized elastomeric seals
- Without splicing or using expensive penetrators when running cable through the packer
- Seals on cable OD, designs available for round and flat cables
- Simple tighten of a nut to compress the elastomers
- Standard 3000psi working pressure rating



Y-Tool

The Y-Tool is designed to be run with ESP below ESP packer. As the produced fluid leaves the ESP it flows through a pump sub and then joins the main production string through the Y-Tool profile that has been carefully designed to minimize flow erosion. The Y-Tool offsets the ESP in the well to provide a straight line conduit for wireline or coiled tubing tools to bypass the ESP. The Y-Tool has an upper connection for the production tubing and two lower connections, one for the ESP and the other for the bypass. A blanking plug is located in the bypass side in a special nipple to prevent recirculation of the pumped fluid. The blanking plug is removed prior to and after intervention. For logging operations, the blanking plug is replaced by a logging plug which allows real time or memory logging to be conducted whilst the pump is operating.



Features and Benefits

- Large flow area
- Minimize flow erosion
- Simple design
- Standard 2 3/8", 2 7/8" and 3 1/2" sizes

Control line and Cable Protectors

The Control Line and Cable Protectors fix the cable on tubing, and it protects the cable. The tubing supports the control line and cable and ensures they not be destroyed while running the string. Consequently, the control line and cable could be used again and the cost is reduced. Negative effects would occur if the cable were not protected while running the string. Such as attrition, changing pump and well repair work. Especially the big diameter cables are more easily damaged at the coupling.

Features and Benefits

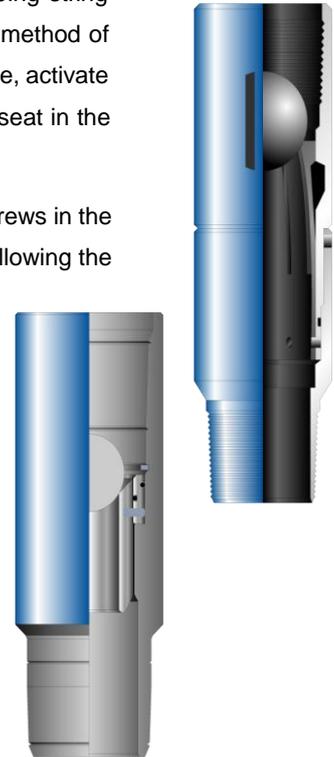
- Different size for tubing
- Anticorrosion material capable
- Special tools for right installation
- Record the torque and position
- Guard against falling objects



Catcher Subs

The Model Hydro Trip Pressure Sub is a pressure actuated device installed in tubing string below a hydrostatically actuated tool such as a Hydraulic set packer. It provides a method of applying pressure to activate and set the packer and then through continued pressure, activate the Hydro Trip Sub. Packer is set by circulating a ball through packer down to ball seat in the Hydro Trip Sub.

After packer is set, a continued increase in pressure is applied to shear the shear screws in the shear ring, allowing the ball seat collet to move down into the collet relief area and allowing the ball to pass down the Hydro Trip Sub through the tubing, leaving a "full open" Sub with no restrictions to production. The Collet Catcher Sub is used when any restrictions are installed below, ball and solid bar are available.



Seal Bore Extension & Mill Out Extension

The Seal Bore Extension are generally used in installations where floating seals are required due to excessive tubing contraction. The Seal Bore Extensions have the same sealing bore ID as the corresponding packer to allow a continuous seal bore for the lower most seals of a long seal assembly. The Seal Bore Extensions are available in a variety of lengths.

The Mill Out Extension are designed for use with seal bore packers in installations where a larger inside diameter is required to accommodate the latching mechanism of packer retrieval tools. The mill out extension has a slightly larger ID than the corresponding packer to allow the packer retrieval tool to latch. Mill out extension are available in a variety of lengths and materials.



Travel Joints

Travel Joints are made up in the tubing string and run into the well with packers and other down hole flow control equipments, and provide alternate methods of compensating for tubing contraction and elongation in producing, injection, and disposal wells. The travel joint are pinned in the closed, mid, or extended position before running. They also are keyed to prevent future rotation. The joints without keys are used when tubing torque below the joint is not required.

These travel joints can be pinned at any point in the stroke. The release value can be varied by the number of shear screws and can be sheared by tension or compression.

Features and Benefits

- Compensating tubing moving in various conditions
- Adjusted shear value
- Can be locked in open, mid-stroke, or closed positions
- ID of the tool is compatible with tubing ID
- Rotation is available by keyed type

Technical Data

Size		OD		ID		Stroke	
In.	mm	In.	mm	In.	mm	ft	m
2 7/8	73.03	4.28	108.71	2.42	61.47	10	3.05
						20	6.10
3 1/2	88.90	4.78	121.41	2.90	73.66	10	3.05
						20	6.10
4 1/2	114.30	5.80	147.32	3.88	98.55	10	3.05
						20	6.10

*Other sizes available depending on tubing size selected and request.



On-off Tool

Petrostar's on-off tool enables the tubing string above packer be disconnected for lower zone isolation, tubing retrieval, and temporary zone abandonment. The tool's stringer or seal receptacle contains an internal "SX or "SR" lock profile for landing the wire line blanking plug for zone isolation below the packer.

The tool consist of two major components: the Overshot mounted below tubing string and the stinger/receptacle mounted on the top of packer. The Overshot is disengaged by the Left or Right hand J-slot release. The mill bottom allows cuts through debris for easy engagement the stinger. Moulded seals are installed in the overshot, enable easy redress on surface for the re-run.

Features and Benefits

- Enables the packer used as bridge plug for lower zone isolation, or removal of upper string for redress, temporary abandonment or shut down lower zones, or kill the well.
- Bonded seals enable reliable multiple disconnections without costly retrieval replacement.
- The rugged, dependable design enables easy "right or Left Hand" rotational retrieval without disturbing the packer.
- Automatic ¼ turn set down and tension for jay engage or jar out.



DOWN HOLE FLOW CONTROL

Side Door Sleeve SDS

Side Door Sleeve SDS is used together tubing which when open, allows flow between the well tubing and the annular area. This can be opened or closed by standard slickline methods to gain communication between the tubing/casing annulus. It is designed with a landing nipple profile in the top sub, packing bores in both the top and bottom sub, and a non-elastomer seal package and with full tubing flow through the nipple and the sleeve.

This circulation & production sleeve is installed as an integral part of the main tubing string and any number of pieces can be run in a single tubing string. It can be run in either the open or closed position. The closing sleeve may be placed in three positions: open, equalizing, or closed. This operation is done with a positioning tool attached to a standard slickline tool string.

Features and Benefits

- Nipple profile available
- Non-elastomer seals
- Polished pack off area
- Circulation/production area equals the tubing area
- Several pieces of equipment can be run in a single tubing string
- All the pieces can be shifted on a single trip of the slickline, and individual sleeves can also be opened or closed selectively as desired
- Inner sleeve can be shifted repeatedly, opens up or down
- Packing does not move when the sleeve is shifted
- The sleeve can be kept in full open, equalizing or full closed position by three-position collet lock
- Equalizing ports in the inner sleeve allow equalizing at high differential pressure

Application

- Circulating completion or kill fluids
- Single selective production and injection completions
- Tubing pressure test by running a plug inside
- Washing above packer



Technical Data

Tubing Size		Tubing Weight		Tubing ID		Seal Bore	
In.	mm	lb/ft	kg/m	in.	mm	in.	mm
2 3/8	60.3	4.6	6.85	1.995	50.67	1.875	47.63
		4.7	6.99	1.995	50.67		
2 7/8	73.0	6.4	9.52	2.441	62.00	2.312	58.72
		6.5	9.67	2.441	62.00		
3 1/2	88.9	9.2	13.69	2.992	76.00	2.812	71.42
		10.3	15.33	2.992	76.00	2.750	69.85
4	101.6	10.9	16.22	3.476	88.29	3.312	84.12
		11	16.37	3.476	88.29		
4 1/2	114.3	12.6	18.75	3.958	100.53	3.812	96.82
		12.75	18.97	3.958	100.53		
		15.2	22.62	3.826	97.18		
5 1/2	137.5	17	25.30	4.818	122.38	4.562	115.87
		20	29.76	4.694	119.23		

* Other seal bore size available depending on tubing size selected.

Chemical Injection System

The Chemical Injection System is designed to inject and control the amount of chemicals or the tubing to control corrosion in wells, treat paraffin, salt and/or hydrate formation. This can optimize flow assurance, reduce expensive intervention costs, and ultimately optimize production. The system includes Chemical Injection Mandrel (CIM) and Chemical Injection Valve (CIV). The chemicals or fluids are injected through a control line from surface. The check valve in CIV provides absolute protection for the check valves during installation in the well and provides a barrier between the production tubing and the annulus.

Features and Benefits

- Optimize flow assurance and production performance
- Reduce costly intervention
- CIM are eccentric non-welded mandrels, can absorb shock without damage
- CIV with check valve and rupture disc feature
- Land Nipple profile is available



Landing Nipple and Lock Mandrel

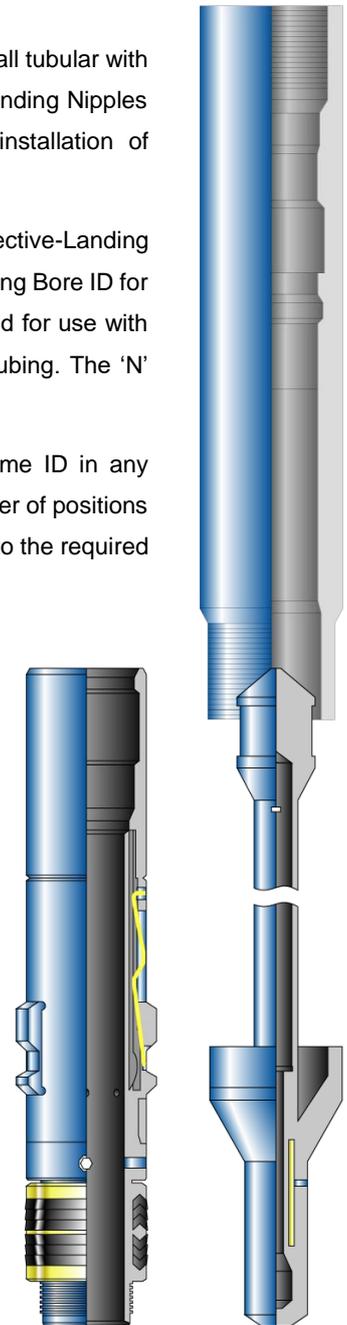
Landing nipples are downhole components, fabricated as a short section of heavy wall tubular with a machined internal surface that provides a seal area and a locking profile. The Landing Nipples are included in most completions at pre-determined intervals to enable the installation of flow-control devices, such as Plugs and Chokes.

Three basic types of Landing Nipples are commonly used: No-Go Nipples, Selective-Landing Nipples and Ported Safety Valve Nipples. The Landing Nipples have the same Packing Bore ID for a particular tubing size and weight. 'LNX' and 'LNXN' Landing Nipples are designed for use with standard weight tubing. 'LNR' and 'LNRN' Landing Nipples are for heavy weight tubing. The 'N' designation is for No-Go Nipples.

The completion can have as many LNX and LNR selective nipples with the same ID in any sequence as desired on the tubing string. This versatility result in an unlimited number of positions for setting and locking subsurface flow controls. The flow control, which is attached to the required lock mandrel, is run in the well via the selective running tool on the slickline.

Features and Benefits

- Large bore for minimum restriction
- Universal nipple with one internal profile
- Lock mandrel locks design to holds pressure from above and below
- Extra-large ID for high flow rate
- Simple operation
- Versatility helps reduce completion and production maintenance costs
- Multiple options when running, setting, or retrieving subsurface flow controls
- Field proven
- Versatility helps reduce completion and production maintenance costs



Applications

- Gauge hangers for bottom hole pressure/temperature surveys
- Almost unlimited locations for setting and locking subsurface flow controls
- Lock Mandrel with plugs holds pressure from above and below
- Setting packers
- Killing the well
- Removing the wellhead

Technical Data

Tubing								For Standard Tubing Weights					
Size		Weight		ID		Drift		LNX profile		LNXN profile			
in.	mm	Lb/ft	Kg/m	in.	mm	in.	mm	Packing bore		Packing bore		NO-Go ID	
								in.	mm	in.	mm	in.	mm
2 3/8	60.3	4.6	6.85	1.995	50.67	1.901	48.29	1.875	47.63	1.875	47.63	1.79	45.4
		4.7	6.99									1	9
2 7/8	73.0	6.4	9.52	2.441	62.00	2.347	59.61	2.312	58.72	2.312	58.72	2.20	56.0
		6.5	9.67									5	1
3 1/2	88.9	9.3	13.84	2.992	76.00	2.867	72.82	2.812	71.42	2.812	71.42	2.66	67.7
		10.2	15.18									2.992	74.22
4 1/2	114.3	12.75	18.97	3.958	100.5 3	3.833	97.36	3.812	96.82	3.812	96.82	3.72 5	94.6 2
5 1/2	139.7	17	25.30	4.892	124.2 6	4.767	121.0 8	4.562	115.8 7	4.562	115.8 7	4.45 5	113.1 6

* Other profile and packing bore size available depending on tubing size selected and request.

Back-Pressure Valve System

The Petrostar Back-Pressure Valve System is designed primarily for use in Xmas Tree Wellhead Tubing Hangers. This PRS back-pressure valve can be used in conjunction with PRS Nipple Profile. This PRS Back-Pressure Valve has several special features. It has two external packing stacks, one internal packing stack, two internal MTM seals, three shear pin hold-down features, a knockout plug feature, and O-rings in the packing stacks. This PRS back-pressure valve is a high-pressure top no-go lock system. The top no-go provides a position locating means to simplify running procedures and eliminate mis-runs. The PRS back-pressure valve is designed such that pressure from above and below is held by key/nipple engagement. This assembly is designed for H2S service, has Teflon/PEEK packing, Chemraz O-rings, and meets the requirements of NACE MR-01-75.

Features and Benefits

- Application for tubing hangers and Xmas Tree
- Top No-Go locator feature
- Simply running and retrieving
- Reduce cost and time of service
- Using slickline to install
- Metal to Metal seal feature
- Can used in other landing nipples
- High pressure seal stack, standard for 10,000psi



Gauge Soft Hanger

The Gauge Hanger is designed to locate a bottom hole pressure and temperature gauge in NO-GO Landing Nipple with the appropriate profile to survey the well data. The gauge hanger is installed/retrieved using standard slickline methods.

Features and Benefits

- Soft mechanical release
- Can be set in one of many landing nipples
- Allows data surveys using conventional slickline methods
- Does not require jarring to set

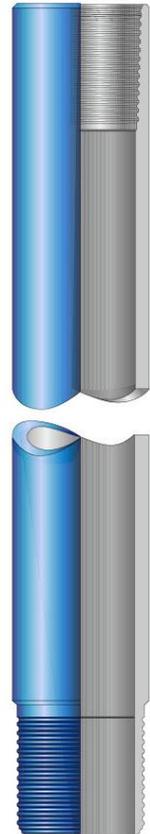


Flow Coupling

Flow couplings are thick-walled tubular components normally utilized in completions and located adjacent to changes in the tubing ID. They are an important part of life-of-the-well completion planning and used where erosional turbulence caused by changes in the tubing ID. Petrostar recommends flow couplings to be installed above and below landing nipples, safety valve landing nipples or any other restrictions that may cause turbulent flow. Flow couplings are generally connection OD and are available in 3, 4, 6 and 8 ft lengths.

Features and Benefits

- Wall thickness greater than tubing and normal connection OD
- Available in various lengths
- Available in various materials
- Helps extend the life of the well completion
- Installed above and below landing nipples, safety valve landing nipples or any other restriction that may cause turbulent flow



SAFETY VALVE

Tubing -Retrievable Safety Valves

Petrostar Type Tubing Retrievable Safety Valves are self-equalizing, flapper type safety valve designed to shut in a well at a point below the surface. The safety valve is a surface controlled, subsurface safety valve and is normally closed. The valve is held open by hydraulic control pressure and remains open until the control-line pressure is exhausted. The hydraulic control pressure is transmitted from a remote location through a control line to operate the valve. The valves are value engineered to provide long-lasting, safe, and reliable operation.

Rod Piston Safety Valves are designed and built for performance and reliability. The rugged hydraulic actuator of the safety valve provides durability and isolates the internal workings from well fluids through its unique construction. The metal-to-metal sealing integrity in the body joints and closure mechanism places it in a premium valve category while featuring an economical price. The simple, compact design enhances the valve's overall reliability and provides for trouble-free operation. Rod piston safety valves are available with working pressure rating to 10000psi.

Single Rod Piston Safety Valves are used a single rod piston with reliable spring-energized, no-elastomer dynamic seals; a static, full-closed, metal to metal seal. The valves are designed for general production with enhanced reliability and long life. The valves provide reduced OD, premium piston system, deep set design and many other optional features. Single Rod piston safety valves are available with working pressure rating to 10000psi and always be used in the wells with extreme down hole conditions.

Features and Benefits

- Simple, compact design
- Single Rod Piston type with Non-elastomer dynamic piston seals
- Rod Piston type with unique hydraulic actuation(single-piece piston/flow tube)
- Metal-to-metal seal in closed position
- Positive debris barrier at both ends of flow tube
- Flapper sealing verified to sand service (no resilient seal required)
- Minimized potential leak paths
- Optimum reliability
- Superior well containment and safety
- Low friction, smooth operation
- Critical component isolated from well environment
- Enhanced debris isolation and tolerance

Applications

- General production completion
- Hostile well environments in compatible with elastomer



Technical Data

Tubing Size		Max. OD		Internal Packing Bore		Pressure Rating	
in.	mm	in.	mm	in.	mm	psi	MPa
2 3/8	60.3	3.70	93.38	1.875	47.63	5,000	34.5
		3.97	100.84			10,000	69.0
2 7/8	73.0	4.65	118.11	2.125-2.312	53.98-58.72	5,000	34.5
		4.74	120.24			10,000	69.0
		4.91	124.71			10,000	69.0
3 1/2	88.9	5.20	132.08	2.562-2.812	65.07-71.42	5,000	34.5
		5.37	136.40			10,000	69.0
		5.62	142.75			10,000	69.0
4 1/2	114.3	6.73	170.94	3.750-3.812	95.25-96.82	5,000	34.5
		6.97	177.04			7,500	51.7
5 1/2	139.7	7.65-9.50**	194.31-241.3	4.313-4.75		5000-10000	34.5-68.9
7	177.8	8.375-10.50**	212.7-266.7	5.75-6.00		5000-10000	34.5-68.9

* Other profile and seal bore size available depending on tubing size selected and request.

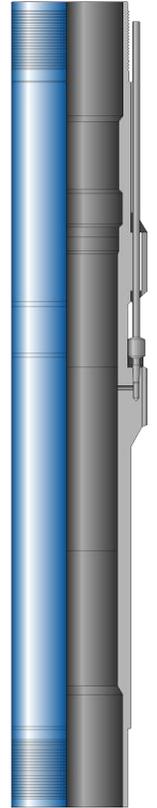
** Depend on material and pressure rating.

Safety Valve Landing Nipples

Petrostar Safety Valve Landing Nipples are used to accommodate wireline retrievable sub surface safety valves. These nipples have a locking recess and a hydraulic communication port located between the two polished bores. This nipple features an integral control line connection port which operates Sub Surface Safety Valve. The nipple is a one-piece construction, manufactured from bar stock and contains the highly successful, field-proven lock profile.

Features and Benefit

- Large ID
- Offered in various combinations of lock profiles
- The lock profile enables completion optimization without restriction to standard seal bore sizes
- Manufactured from bar stock with an eccentric machine slug containing the control-line connection
- The nipple is constructed without welding, providing homogeneous material properties
- The 10,000-psi (68.9-MPa) working pressure with standard materials 9Cr or 13Cr, other materials available on request ensure application versatility



Applications

- Production and injection wells

Technical Data

Tubing Size		Tubing Weight		OD		Packing Bore	
In.	mm	lb/ft	kg/m	in.	mm	in.	mm
2 3/8	60.3	4.6	6.85	3.40	86.36	1.875	47.63
		4.7	6.99	3.40	86.36		
2 7/8	73.0	6.4	9.52	4.22	107.19	2.312	58.72
		6.5	9.67	4.22	107.19		
3 1/2	88.9	9.2	13.69	4.53	115.06	2.812	71.42
		10.3	15.33	4.53	115.06	2.750	69.85
4	101.6	10.9	16.22	5.28	134.11	3.312	84.12
		11	16.37	5.28	134.11		
4 1/2	114.3	12.6	18.75	5.56	141.22	3.812	96.82
		12.75	18.97	5.56	141.22		
		15.2	22.62	5.56	141.22		

* Other profile and packing bore size available depending on tubing size selected and request.

Wireline-Retrievable Safety Valves

Petrostar Wireline-Retrievable Safety Valves offer premium features similar to a tubing retrievable safety valve and are landed in safety valve landing nipples that are equipped with a control line connected to the surface control system. This configuration enables the safety valve to be easily retrieved for repair or maintenance. When assembled to a wireline lock, the assembly can be installed in a safety valve nipple. Hydraulic control line connects the safety valve nipple to the surface emergency shut-down system. Loss of control line pressure will close the valve and shut-in the well. These wireline valves are premium valves due to the use of non-elastomeric seal material, metal-to-metal housing threads, high tensile strength metallurgy, and unique HP/HT packing and piston seal stacks when required by the application. These design features are imperative when considering applications for big bore, high temperature, high pressure, extremely corrosive, and hostile.

Features and Benefit

- Equalizing feature
- Large bore design
- Non-elastomeric dynamic seal assembly
- The lock profile enables completion optimization without restriction to standard sealbore sizes
- Easy field operation
- 10,000-psi working pressure

Applications

- Production and injection wells



Technical Data

Tubing Size		Tubing Weight		Valve ID		Nipple Seal Bore	
In.	mm	lb/ft	kg/m	in.	mm	in.	mm
2 3/8	60.3	4.6	6.85	0.75	19.05	1.875	47.63
		4.7	6.99	0.75	19.05		
2 7/8	73.0	6.4	9.52	1.13	28.58	2.312	58.72
		6.5	9.67	1.13	28.58		
3 1/2	88.9	9.2	13.69	1.52	38.61	2.812	71.42
		10.3	15.33	1.52	38.61	2.750	69.85
4	101.6	10.9	16.22	1.75	44.45	3.312	84.12
		11	16.37	1.75	44.45		
4 1/2	114.3	12.6	18.75	2.12	53.85	3.812	96.82
		12.75	18.97	2.12	53.85		
		15.2	22.62	1.89	48.00	3.688	93.68
5 1/2	139.7	17	25.30	2.56	65.02	4.562	115.87
		23	34.23	2.25	57.15	4.437	112.70
7	177.8	35	52.09	3.38	85.85	5.875	149.22

* Other profile and seal bore size available depending on tubing size selected and request.



MULTI-STAGE FRAC SYSTEM

PRS Upper Seal Bore Retrievable Packer

PRS Upper Seal Bore Packer is a single string mechanical set production packer; it is designed for high pressure applications from above and below. The packer can be set by using a Hydraulic Setting Tool or in some cases an electric line tool with a setting adapter kit. To retrieve, the retrieving tool is stab in, pushed downward to latch on the packer, follow by straight pull to shear release the shear sleeve upward, this release the packer locking mechanism collapse the slips and continue upward pull will the packer out.

Features and Benefits

- Can be set to provide an anchor point in the well casing
- Polished upper bore function as a seal bore for a seal assembly
- Provides an upper connector for attachment to seal unit locators
- Diverts flow from the casing below the packer to the tubing above
- Provides a pressure isolation point in the casing
- Holds pressure from above and below once seals or a plug is installed
- Lower threaded connector to suspend tools or sand control screens
- Used with a range of other tools to achieve well completion objectives.
- Able to be milled if retrieval attempts fail.
- Full seal bore ID through the packer.
- Scoop Guide to guide tools and seals through the packer bore.
- Able to be logged on depth before setting.



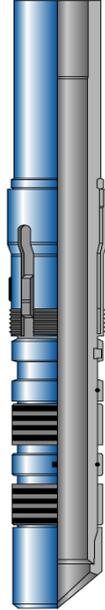
Technical Data

Casing Size		Casing Weight		Max O.D.		Min I.D.		STD Connection	
in	mm	Lb/ft	Kg/m	in	mm	in	mm	in	mm
7	177.8	23-29	34.23-43.16	6.00	152.4	38.4	98.55	4 1/2 LTC	114.3

*Check with Petrostar with other size.

Latch Seal Assembly

The Petrostar Sure Latch Seal Assembly is designed to be used with either the SLH, PRS or PPS Packer. The seal assembly incorporates heavy duty quadruple bonded seals and is run on the tubing after the packer has been set. The latch mechanism engages automatically with set down weight and disengages with right hand rotation while pulling tension.



Features and Benefits

- Prevents both upward and downward movement when latched
- Heavy duty bonded seals
- Available with premium elastomers
- Large bore ID
- Available in a wide range of materials and connections
- Standard 10ksi rate

Technical Data

Casing Size		Packer Bore		Max O.D.		Min I.D.		STD Connection	
in	mm	in	mm	in	mm	in	mm	in	mm
7	177.8	3.88	98.55	4.545	115.44	2.97	75.44	3 1/2 EUE	88.9
7	177.8	4.75	120.65	5.880	149.35	3.88	98.55	4 1/2 LTC	114.3
9 5/8	244.5	6.00	152.4	8.220	208.79	4.25	107.95	5 1/2 LTC	139.7

*Check with Petrostar with other size

FPP-1 Dual Element Open Hole Anchor / Isolation Packer

The Petrostar FPP-1 open hole packer is designed to be run in either cased or open hole applications in vertical or horizontal wells for multi-stage frac application. The Anchor Packer incorporates a one piece bi-directional slip system in order to help prevent movement during higher pressure operations whereby the Isolation Packer is a non-anchoring packer. The Anchor can be ran as a single zone application packer or ran in conjunction with several packers in a multiple zone completion. Typically, on multiple zone horizontal open hole applications the Anchor packer would be used as the toe packer and/or the liner hanger packer. Durable construction and reliability makes the Packer and the excellent alternatives to using inflatable packers.

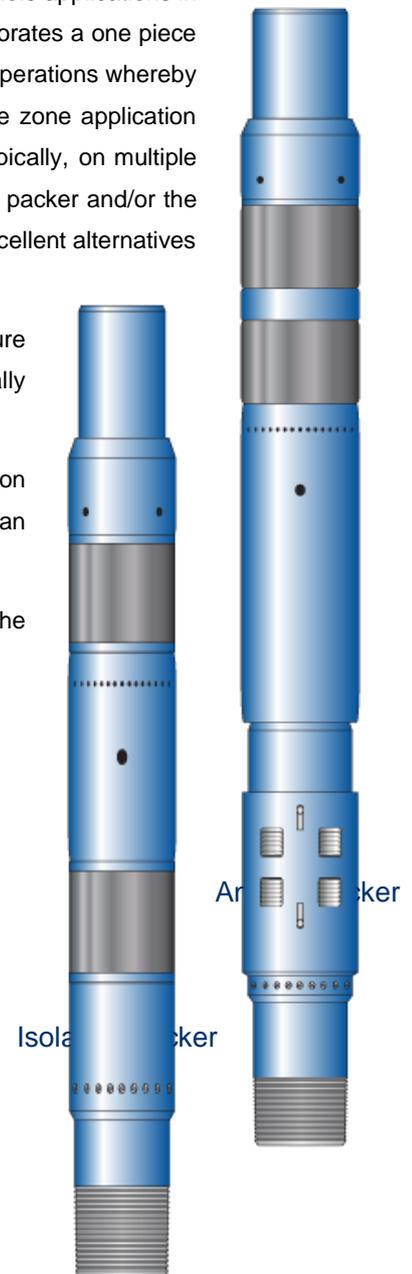
The Hydro-Activated Frac Sleeve is activated by field adjustable differential pressure from inside the sleeve across the actuation ports by a plugging device below, usually being the ball seat circulating sub.

The Hydro-Activated Frac Sleeve can be cemented in the hole and will reliably function as they have an isolated internal shifting mechanism. Once open, the sleeves have an internal locking mechanism to ensure the open position is securely maintained.

The Sleeve can be designed to has external fins across the frac ports to minimize the cement thickness between the sleeve and the formation.

Features and Benefits

- Dual Element to Seal reliable
- Outer components locked to prevent pre-set
- Anchor packer incorporates a bi-directional slip system
- Field adjustable setting pressure
- Field adjustable shear release
- Designed for cased hole or open hole
- Available with carbide slips
- Available in a wide range of materials and connections
- Available with premium elastomers
- Vertical/horizontal applications
- Standard 10ksi rate
- Field proved reliable



Technical Data

Max O.D.		Min I.D.		STD Connection	
in	mm	in	mm	in	mm
4.282	108.76	2.38	60.30	2 7/8 EUE	73.0
5.690	144.53	3.00	76.20	3 1/2 EUE	88.9
5.690	144.53	3.85	97.79	4 1/2 LTC	114.3
6.822	173.28	4.85	123.19	5 1/2 LTC	139.7

*Check with Petrostar with other size.

HFS Hydro-Activated Frac Sleeve

The Petrostar HFS Hydro-Activated Frac Sleeve is designed for use when selectively stimulating multiple zones in either open or cased hole applications. The Hydro-Activated Frac Sleeve can be used in either horizontal or vertical wells and is usually the first valve run in the well accompanied by multiple Frac Sleeve. The Hydro-Activated Frac Sleeve is hydraulically opened and an internal locking mechanism ensures the open position is securely maintained.

The Hydro-Activated Frac Sleeve is activated by field adjustable differential pressure from inside the sleeve across the actuation ports by a plugging device below, usually being the ball seat circulating sub.

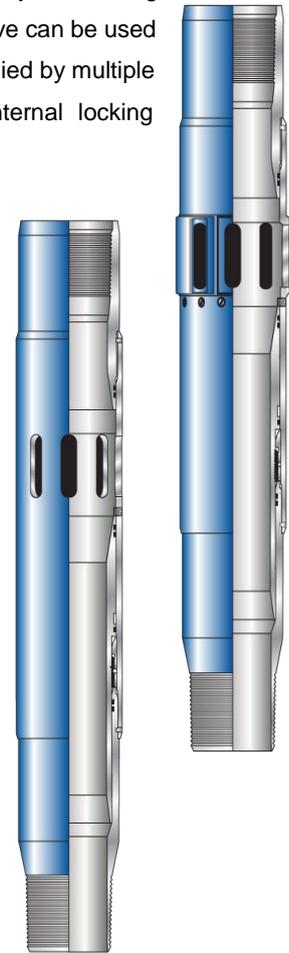
The Hydro-Activated Frac Sleeve can be cemented in the hole and will reliably function as they have an isolated internal shifting mechanism. Once open, the sleeves have an internal locking mechanism to ensure the open position is securely maintained.

The Sleeve can be designed to have external fins across the frac ports to minimize the cement thickness between the sleeve and the formation.

Features and Benefits

- Internal locking mechanism
- Field adjustable opening pressure
- Suitable for high pressure applications
- Designed for both horizontal and vertical applications
- Designed for multiple zone applications
- Full bore ID
- Available in a wide range of materials and connections

Standard 10ksi rate



Technical Data

Max O.D.		Min I.D.		STD Connection	
in	mm	in	mm	in	mm
4.282	108.76	2.38	60.30	2 7/8 EUE	73.0
5.690	144.53	3.00	76.20	3 1/2 EUE	88.9
5.690	144.53	3.85	97.79	4 1/2 LTC	114.3
6.822	173.28	4.85	123.19	5 1/2 LTC	139.7

*Check with Petrostar with other size.

PFS Ball-Activated Frac Sleeve

The Petrostar PFS Ball-Activated Frac Sleeve is designed for selectively stimulating multiple zones in either open or cased hole applications. The Ball-Activated can be used in either vertical or horizontal wells usually in conjunction with the Hydro-Activated Frac Sleeve and FPP Packers. The Ball-Activated Frac Sleeve is activated by circulating a ball into a drillable seat inside the tool. Applied differential pressure from above the ball seat shifts the internal piston downward opening up the frac ports. The Ball-Activated sleeve has an internal locking mechanism keeping the piston locked securely in place after it has been shifted. The standard Ball-Activated piston is made out of an easily drillable material.



Features and Benefits

- Field adjustable opening pressure
- Internal locking mechanism
- Suitable for high pressure applications
- Designed for horizontal and vertical applications
- Designed for multiple zone applications
- Easily drillable ball seat
- Available in a wide range of materials and connections

Technical Data

Max O.D.		Min I.D.		STD Connection	
in	mm	in	mm	in	mm
4.282	108.76	2.50	63.50	2 7/8 EUE	73.0
5.690	144.53	3.00	76.20	3 1/2 EUE	88.9
5.690	144.53	3.87	98.30	4 1/2 LTC	114.3
6.822	173.28	5.00	127.00	5 1/2 LTC	139.7

*Check with Petrostar with other size.

PFS-1 Advanced Ball-Activated Frac Sleeve

The Petrostar PFS-1 Advanced Ball-Activated Frac Sleeve has all the proven features of the conventional Ball-Activated Frac Sleeve with the additional benefit of selective zone isolation. The Advanced Frac Sleeve is ran as part of the conventional Multi-Stage Frac system and after the sleeve is opened utilizing ball drop technology, the piston can then be drilled out and the sleeve can be closed/opened using the activation tool on coil.

Features and Benefits

- Can be closed/opened with coil ran activation tool
- Field adjustable setting pressure
- Designed for multiple zone applications
- Internal locking mechanism

Technical Data

Max O.D.		Min I.D.		STD Connection	
in	mm	in	mm	in	mm
5.69	144.53	3	76.2	3 1/2EUE	88.9
5.69	144.53	3.76	95.5	4 1/2 LTC	114.3
6.822	173.28	4	101.6	5 1/2 LTC	139.7

*Check with Petrostar with other size.



Ball and Seat

In order to activate each sleeve, a properly sized ball is pumped along with a fracturing fluid inside the well. Each ball is smaller than the opening of all of the previous sleeves, but larger than the sleeve it is intended to open. Seating of the ball exerts pressure at the end of the sliding sleeve assembly, causing it to slide and open the frac ports. Once the port is opened, the fluid is diverted into the open hole space outside of the completion assembly, causing the formation to fracture.

At the completion of each fracturing stage, the next larger ball is injected into the well, which open the next sleeve, and so on, until all of the sleeves are opened and multiple fractures are created in the well. The main advantage of this completion technique is the speed of operation which also reduces costs.

Typically, ball sizes are staged in .250" or .125" increments. It is important to understand that this process is not without risk of failure and should only be undertaken after considerable research and consideration. Frac plugs are designed to seal from above the plug only. Each plug uses a plastic fracturing ball that seals on top of the mandrel. The fracturing ball is free to float off the mandrel with pressure or flow from below the plug. This allows immediate flow back of all zones following treatment.

Technical Data

Ball Seat ID	Ball Size
in	in
0.905	1.000
1.030	1.125
1.155	1.250
1.280	1.375
1.405	1.500
1.530	1.625
1.655	1.750
1.780	1.875
1.905	2.000
2.030	2.125
2.155	2.250
2.280	2.375
2.405	2.500
2.530	2.625
2.655	2.750
2.780	2.875
2.905	3.000
3.030	3.125
3.155	3.250
3.280	3.375
3.405	3.500
3.530	3.625
3.655	3.750
3.800	4.000
4.050	4.250
4.300	4.500

*Check with Petrostar with other size.

Open Hole Reamer

The Petrostar Open Hole Reamer is generally ran in order to dress out the open hole before installing STAR Multi-Stage Frac systems.

The Reamer is a rigid heavy duty one-piece tool with 2 sets of 12 opposing tungsten carbide capped spiraled blades with an OD close to hole tolerances in order to best prepare the well bore ID properly before running Multi-Stage Frac systems.



Features and Benefits

- Heavy duty one piece design
- 2 sets of 12 tungsten carbide blades
- Close O.D. to open hole tolerance

Technical Data

Max O.D.		Min I.D.		STD Connection	
in	mm	in	mm	in	mm
4.650	118.11	1.50	38.1	2 7/8 IF	73.03
5.950	151.13	2.00	50.8	3 1/2 IF	88.90
6.000	152.40	2.00	50.8	3 1/2 IF	88.90
7.700	195.58	2.00	50.8	3 1/2 IF	88.90
8.500	215.90	3.00	76.2	4 IF	101.60

*Check with Petrostar with other size.

Open Hole Centralizer

The Petrostar Open Hole Centralizer is mainly used with STAR Open Hole Packers, generally as part of the STAR Multi-Stage Frac System. The Centralizer helps to protect the packers from damage during equipment installation in the open hole section of the well bore as well as helping to centralize the packers during the setting procedure. The Centralizer freely swivels to allow for rotation when running in the hole if required and has spiraled grooves to ensure good circulation.



Features and Benefits

- Helps prevent running damage
- Centralizes when setting
- Available in composite or steel
- Swivels to allow for tool string rotation

Technical Data

Open Hole Size		Max O.D.		STD Connection	
in	mm	in	mm	in	mm
6	118.11	5.8	147.32	3 1/2 EUE	88.9
6 1/8	155.58	5.812	147.62	3 1/2 EUE	88.9
6 1/8	155.58	5.812	147.62	4 1/2 LTC	114.3
6 1/4	195.58	5.93	150.62	3 1/2 EUE	88.9
6 1/4	151.13	5.93	150.62	4 1/2 LTC	114.3
7 7/8	200.03	7.5	190.5	5 1/2 LTC	139.7
8 1/2	215.9	8.16	207.26	6 5/8 LTC	168.3

*Check with Petrostar with other size.

Hydraulic Tubing Anchor

The Petrostar Tubing Anchor is a reliable, retrievable double grip anchor catcher which prevents tubing string from excessive movement in tension, compression, or rotation during pumping operation increasing pump efficiency and decreasing rod and tubing wear.

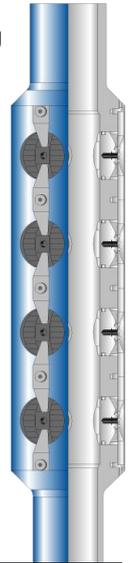
Features and Benefits

- Efficient and reliable anchor system
- Available for H₂S and CO₂ compatibility
- Easy to redress

Technical Data

Casing Size		Casing Weight		Max OD		Min ID		Connection	
in	mm	lb/ft	Kg/m	in	mm	in	mm	in	mm
5 1/2	139.7	13-17	19.3-25.3	4.63	117.60	2.44	61.98	2 7/8 EUE	73.0
5 1/2	139.7	20-26	29.8-38.7	4.52	114.80	2.44	61.98	2 7/8 EUE	73.0
7	177.8	17-20	25.3-29.76	6.26	159.00	2.98	75.69	3 1/2 EUE	88.9
7	177.8	23-38	34.23-56.55	5.82	147.83	2.98	75.69	3 1/2 EUE	88.9

*Check with Petrostar with other size.



Ball Seat Circulation Valve

The Petrostar Ball Seat Circulating Valve is designed to be a reliable closeable circulation port generally ran at the bottom of a tool string in either cased or open hole for vertical or horizontal well completions. Once the tool string is in place and the required circulation operation is complete a ball is circulated onto the seat, an adjustable pre-determined pressure is applied and an internal sleeve shifts downwards which closes the internal circulating ports. Once the sleeve has been shifted a positive locking mechanism ensures it is securely maintained in place.



Features and Benefits

- Internal secure locking mechanism
- Adjustable closing pressure
- Designed for both horizontal and vertical applications
- Designed for both cased and open hole applications
- Available in a wide range of materials and connections

Technical Data

Max O.D.		STD Connection	
in	mm	in	mm
2.28	57.91	2 7/8 EUE	73
5.42	137.67	3 1/2 EUE	88.9
5.42	137.67	4 1/2 LTC	114.3
6.51	165.35	5 1/2 LTC	139.7

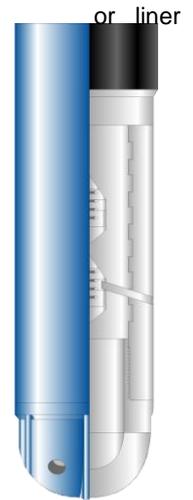
*Check with Petrostar with other size.

Float Shoe

The Float Shoe attaches to the lowest end of the casing string and is used to guide the casing into the wellbore. The check-valve assembly within the float shoe prevents the flow of fluids into the liner during the running process or following the circulation operation. Customers can request any casing grade and premium thread by special order.

Features and Benefits

- Single or dual poppet valves
- All internal parts PDC drillable
- 50,000 psi through 125,000 psi yield strengths are standard
- API RP 10F category IIIC compliant
- Cement nose standard, bladed bottom available.



King Frac System

The King Frac System delivers unprecedented flexibility for multistage completions. There is no practical limit to the number or spacing of stages. It also isolates and stimulates multiple stages in a single trip on coiled tubing and is typically used in Cased hole. This Hydraulic Jet Frac System works in both horizontal and vertical wellbores. Tool string depth is correlated to desired perforation depth by using a mechanical casing coupling locator. Starting with the lowest stage, the Packer is set to isolate the zone from wellbore below the packer. Then the abrasive slurry is pumped down the coiled tubing string to the Hydraulic Jet Unit. The high-velocity jets cut through the casing and cement and into the formation. After perforating, a leading-edge fluid such as acid can be circulated or injected down the coiled tubing/casing annulus. Then the frac is also pumped down the annulus. If screenout occurs, excess sand can be quickly reverse circulated out. Finally, a pull on the coiled tubing unsets the packer, which is then moved up to the next perforation point, where the sequence is repeated.

Features and Benefits

- Simple design and most efficient
- Unlimited stages and spacing
- Precise frac location
- Water and chemical reservation
- Unrestricted, production-ready wellbore after frac.
- When annular fracturing, the coiled tubing serves as a deadleg for monitoring actual pressure at the frac point to assist in adjusting pad size, sand concentration and ramp, fluid viscosity and pump pressure in real time
- When screenout occurs, excess sand can be quickly reverse-circulated out without tripping out of the hole
- Equalizing valve allows movement without flowing the well
- Hydraulic disconnect unit enables emergency release
- Less hydraulic horsepower needed
- 5 minutes between Fracs. The simple operation of the Multistage Unlimited system cuts the time between fracs to as little as 5 minutes.
- Less equipment, less exhaust, smaller footprint. Environmentally friendly fracturing.



Dissolvable Frac Plug(Generation 1st)

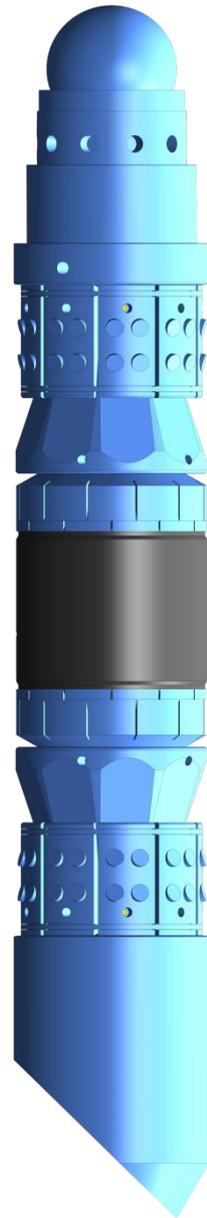
The dissolvable frac plug is a new generation solutions for the unconventional completions. This high-performance frac plug provides zonal isolation for pumpdown applications during wellbore stimulation. The large bore ID allows operators to produce through the plug while it remains in the wellbore and begins the dissolution process immediately following fracturing. Both of the body and the element can be dissolved, full wellbore ID is achieved after complete dissolution, eliminating the need for drilling out, thus help saving time and cost.

Features and Benefits

- Made from material that dissolve over time based on temperature and salinity
- Large ID to facilitate immediate flowback and well clean up
- Eliminate the risk and cost associated with conventional plug removal
- High pressure rating metal plug for demanding frac stimulations

Applications

- Wellbore stimulation



Technical Data

Casing Size		Weight	Max OD	Min ID	Length	Pressure	Temperature
in.	mm	Lb/ft	mm	mm	mm	Mpa	°C
5 1/2	139.7	17-20	113	35	600	70	70-120
		20-23	110	35	600	70	70-120
		26.8-29.7	103	35	567	70	70-120
			99	30	567	70	70-120
			95	30	550	70	70-120
5	127	21.4	93.35	30	511	70	70-120
4 1/2	114.3	11.6-13.5	93.35	30	511	70	70-120
		13.5-15.1	91.44	30	565	70	70-120
3 1/2	88.9	9.2-10.2	67.56	24.13	437	70	70-120

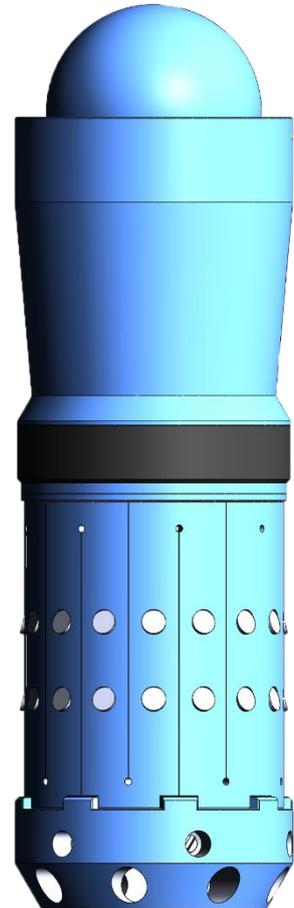
Dissolvable Frac Plug(Generation 2nd)

This dissolvable frac plug is a big bore plug that has a shorter length for stimulation operations. It dissolves in low temperature, low salinity, or even fresh water wellbore environments.

This high-performance frac plug provides zonal isolation for pumpdown applications during wellbore stimulation. The big bore ID allows operators to produce through the plug while it remains in the wellbore and begins the dissolution process immediately following fracturing. Both of the body and the sealing rubber can be dissolved, full wellbore ID is achieved after complete dissolution, eliminating the need for drilling out, thus help saving time and cost.

Features and Benefits

- Full 10,000 psi bottom-hole differential pressure between stages;
- Large ID to facilitate immediate flowback and well clean up;
- Eliminate the risk and cost associated with conventional plug removal;
- Simplistic three piece design and compact construction;
- Integrated anti-preset design;
- Low dissolvable rubber content.



Technical Data

Casing Size		Weight	Max OD	Min ID	Length	Pressure	Temperature
in.	mm	Lb/ft	mm	mm	mm	Mpa	°C
5 1/2	139.7	17	115	63	330	70	40-120
		20	112	63	330	70	40-120
		23	110	63	330	70	40-120
		26.8	105	63	330	70	40-120
4 1/2	114.3	11.6	95.3	46	311	70	40-120
		13.5	93	46	311	70	40-120
		15.1	91	46	311	70	40-120
3 1/2	88.9	9.2-10.2	69.85	24	306	70	40-120

Self-Release Cementing Stage Tool

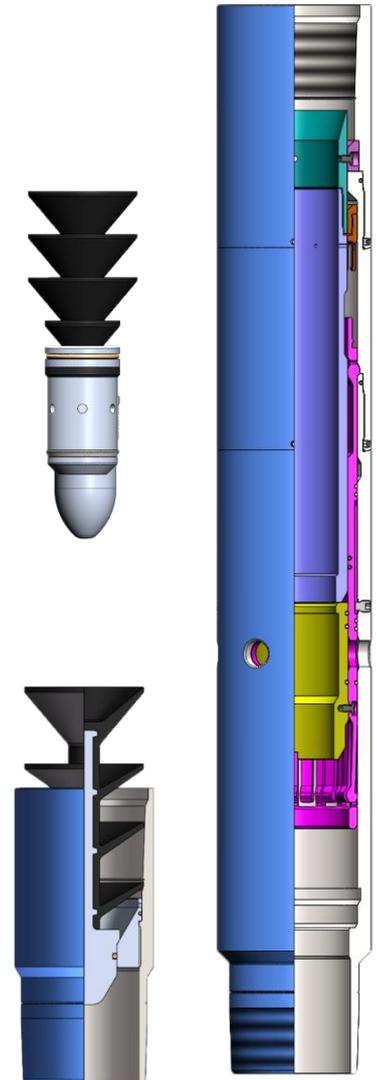
The Self-Release Cementing Stage Tool is used in stage cementing applications. With featured self-released mechanical design, the innards of the tool can be released and free falling to bottom of the well, thus full bore is achieved and drill out operation is eliminated. This technology saves both time and money, and reduces intervention risk.

Features and Benefits

- Free-falling of the opening and closing seat after cementing eliminates drill-out operation
- Rugged design with high dependability
- Opening and closing pressure indication
- Special shear screw design ensures the sheared screws remaining in the relative components
- Special mechanism prevents premature closing
- Free-falling opening cone & pump-down opening cone & ball are available for opening the stage tool
- Can used with annular casing packer

Applications

- Full bore after stage cementing without drilling out



Technical Data

Casing Size		Max. OD		Min. ID (Opening and Closing Seat Released)		Standard Connection
in.	mm	in.	mm	in.	mm	
5 1/2	139.7	6.589	167.36	4.545	115.44	5 ½ BTC, LTC
				4.653	118.19	
7	177.8	7.677	195	5.512	140	7 BTC, LTC

Sand Control

Applied Conditions of Screens

Category	Applicable conditions	Not applicable conditions
Slotted Liner	<ol style="list-style-type: none"> 1. Single or similar lithologic character reservoir, or multi reservoir un-selective producer, the length is not greater than 30m; 2. Conventional casing completion and open hole completion; 3. Medium or coarse sands; 4. For lower production onshore oil and gas wells, water wells; 	<ol style="list-style-type: none"> 1. Thermal wells, severe sand wells, heavy oil wells and corrosive wells; 2. Fine sand, fine powder sand layer and high shale content reservoir.
Precise punched slotted screen (PPS)	<ol style="list-style-type: none"> 1. Single or similar lithologic character reservoir, or multi reservoir un-selective producer, no length limit for Reservoir length; 2. Conventional casing completion and open hole completion; 3. Medium or coarse sands; 4. For higher production wells, water wells; 5. Applicable to thermal wells, heavy oil wells and corrosive wells; 	<ol style="list-style-type: none"> 1. Fine sand, fine powder sand layer and high shale content reservoir.
Wire-Wrapped Screen	<ol style="list-style-type: none"> 1. The thickness of Single product layer and prolific layer is greater than 3m ; 2. Applicable to $D_{10}/D_{95} < 10$, $D_{40}/D_{90} < 3$ and the oil and gas reservoir below 44 μm with the sand content $< 2\%$ when used alone; 3. When used in combination with gravel packing, applicable to $D_{50} < 75 \mu\text{m}$ or $D_{10}/D_{95} > 10$ or $D_{40}/D_{90} > 5$ or the oil and gas reservoir below 44 μm with the sand content $> 5\%$; 4. For higher production low-pressure oil and gas wells, water wells; 5 Applicable to water wells, thermal wells, heavy oil wells and corrosive wells; 	
Premium Screen	<ol style="list-style-type: none"> 1. Applicable to $D_{10}/D_{95} \leq 10$, $D_{40}/D_{90} \leq 5$ and the oil and gas reservoir below 44 μm with the sand content is $\leq 5\%$ 2. Conventional casing completion and open hole completion, especially applicable to open hole completion, can also be used for gravel packing and frac sand operation; 3. For higher production oil and gas wells and water well, the mining techniques are mainly use of Electrical Submersible Pumps (ESP); 4. High temperature and high pressure wells and corrosive oil and gas wells; 5. Well Completion and Workover Operations; 	
Prepacked Screen	<ol style="list-style-type: none"> 1. Applicable to $D_{50} \geq 80 \mu\text{m}$, $D_{10}/D_{95} \leq 10$, $D_{40}/D_{90} \leq 5$ and the oil and gas reservoir below 44 μm with the sand content is $\leq 5\%$; 2. Commonly used alone, can also be used in in combination with gravel; 3. High investment and high production wells, water wells; 4. High temperature and high pressure wells and corrosive oil and gas wells, especially applicable to heavy oil thermal recovery wells; 5. Well Completion and Workover Operations; 	

Technical Specifications for Slotted Liner

Size mm	Base pipe OD		Weight of pipe ppf	Slot width mm	Slot length mm	Screen OD mm
	mm	in				
60	60.3	2-3/8	4.6	0.15-2.0	30~100	60.3
73	73.0	2-7/8	6.4	0.15-2.0	30~100	73
89	88.9	3-1/2	9.2	0.15-2.0	30~100	88.9
102	101.6	4	9.5	0.15-2.0	30~100	101.6
114	114.3	4-1/2	13.5	0.15-2.0	30~100	114.3
127	127.0	5	15	0.15-2.0	30~100	127
140	139.7	5-1/2	20	0.15-2.0	30~100	139.7
168	168.3	6-5/8	24	0.15-2.0	30~100	168.3
178	177.8	7	26	0.15-2.0	30~100	177.8
194	193.7	7-5/8	29.7	0.15-2.0	30~100	193.7





PETROLSTAR TOOLS AND SERVICES INC.

To find out more about our completion tools,
contact us or visit www.petrostartools.com.