UDAN MAS PAMOR
Trust & Prosperity

Service Catalog

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Well Intervention Thru-Tubing Service

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Motor Head Assembly

Description

The Motorhead assembly is a compact, versatile, robust upper BHA that offers the following components:

- Twin Flapper Check Valve
- Heavy Duty Hydraulic Disconnect
- Dual Circulation

Valve feature/ benefit

- The MHA's compact design gives an overall length saving of approximately 30% over the use of conventional individual components.
- The high torque capability of the MHA provides the ideal Motorhead for today's high demand coiled tubing drilling applications.
- The choice of tubing connector is not dictated by the MHA, therefore giving the operator the flexibility to choose. Most Coiled Tubing connectors can be used with the MHA.
- With a considerable reduction in the number of component parts, seals and thread connections, the MHA is uncomplicated to assemble/ disassemble and inexpensive to redress.

Motor Head Assemblies…

Specification

O.D.	1-11/16"	2-1/8 "	2-3/8"	2-7/8"
Minimum I.D.	0.406"	0.406"	0.687"	**0.750"**
Manufactured by	PCE/NOV	PCE/NOV	PCE/NOV	**PCE/NOV**
Connection	1.00"AMMT Box x Pln	1-1/2"AMMT Box x Pln	1-1/2"AMMT Box x Pln	**2-3/8" AM PAC DS1 Box x Pln**
Ball Circulation	Ball size 7/16"	Ball size 7/16"	Ball size 3/4"	**Ball size 13/16"**
Shear pin Brass	1133 psi	967 psi	838 psi	**949 psi**
Shear pin steel	1728 psi	1360 psi	982 psi	**1183 psi**
Fishneck tensile	25,425 lbs	70,000 lbs	134,793 lbs	**165463 lbs**
Shear pin Brass	2666 psi	2496 psi	2525 psi	**2099 psi**
Shear pin steel	4126 psi	3588 psi	3022 psi	**2845 psi**
Ball Disconnect	Ball size 5/8"	Ball size 5/8"	Ball size 13/16"	**Ball size 15/16"**
Shear pin Brass	1457 psi	1299 psi	1299 psi	**1088 psi**
Shear pin steel	1662 psi	1672 psi	1672 psi	**1362 psi**
Length	24 1/2"	24 1/2"	25 1/2"	**28"**
Weight	4.5 kg	8.0 kg	8.5 kg	**17.0 kg**
Internal Fishing neck	2"Nom GS profile	2"Nom GS profile	2.5" Nom GS profile	**3.00"Nom GS profile**
Working Tensile	30,000 lbs	70,000 lbs	85,000 lbs	**120,000 lbs**
Working Pressure	5000 psi	5000 psi	5000 psi	**5000 psi**
Tensile Pressure	**6500 psi**	**6500 psi**	**6500 psi**	**6500 psi**

Heavy-Duty Hydraulic Disconnect

Description

The Ball Operated Release Tool consists of the main parts shown on the picture . The tool has a release function activated by a ball circulated through the tool. The ball will force the shear pin piston forward and shear the shear pins. After the shear pin piston has been forced forwarded by the ball, the slips has the ability to expand and the tool will release, upon applying pulling force to the slips mandrel (tool string). After release operation it is possible to pump through the tool through ports in the slips mandrel.

Application:

The Heavy Duty Ball Operated Release Tool can be used in conjunction with jars, vibration tools and impact tools.

The tool is rotation locked and can be used in drilling operation.

Features

- Heavy duty ball operated disconnect provides a safe and reliable means of disconnecting from the tool string should it become 'stuck' down hole, or the job application require to leave parts of the tool string down hole, for instance TCP guns.
- Full torque through capabilities, heavy duty rotation lock designed to withstand vibration and high torque for long milling operations.
- Enhanced bending support, bending of the tool will not affect the shear pin value (as it normally will with a collet type tool).
- Large bore provides less pressure drop.

Heavy-Duty Hydraulic Disconnect …

- Full flow after disconnect (ball carried out of the well with the tool).
- Shear pins on disconnect are protected from the circulating fluid and the well bore fluid.
- Shear pins and piston are designed to withstand severe vibration and jarring.
- Easy maintenance, few parts and no special seals (only standard 0-rings).
- High tensile and yield value.
- Inside and outside fishing neck on disconnect.
- Shorter overall length and standardized thread connections.

Specification

Max OD	1.11/16"	2.1/8"	2.3/8"	2.7/8"
Min ID	0.468"	0.468"	0.782"	**0.875"**
Length	17.250"	18.750"	18.875"	**19.625"**
Tensile Strength	48.0001bs	72.0001bs	90.0001bs	**120.000lb s**
Fishneck	2" GS	2" GS	2-1/2" GS	**3" GS**
Working pressure	5000 psi	5000 psi	5000 psi	**5000 psi**
weight	8.61b s	13.91bs	16.101bs	**28.401bs**
Drop Ball Release	5/8"	5/8"	13/16"	**1"**
Internal Ball clearance	**7/16"**	**7/16"**	**3/4"**	**13/16"**

Flow Release GS Running / Pulling Tool

Description

The GS Pulling Tool is a flow operated fishing tool, specially designed to catch internal fishing profiles in tools lost down hole. The Pulling Tool is flow operated, released by the pressure drop over the nozzle. Various pressure drops can be obtained, dependent on nozzle size used. The internal pressure build up activates a piston, which moves down, retracts grapple fingers and compresses a spring and releases the tool.

Grapples can easily be changed out to catch different sized profiles.

Application

The Pulling Tool can be used in heavy duty fishing operations in conjunction with impact tools or in jarring operations.

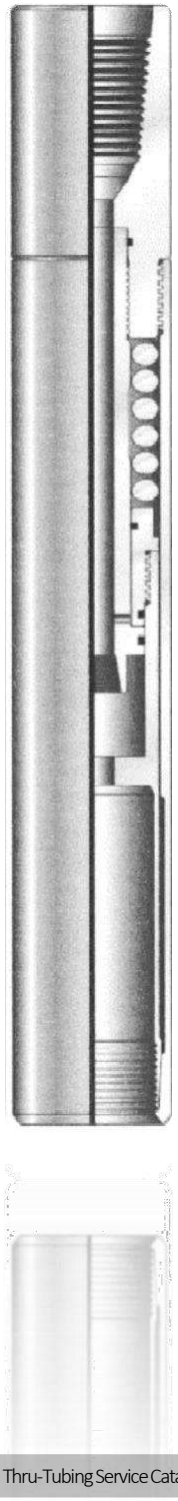
Features

- Heavy duty properties.
- Grapple catch size can easily be changed out.
- The possibility to drop a ball to increase force on activating release piston.

Specifications

Size Ref.	3" GS	4" GS
Tool OD	**2.720"**	**3.63"**
Min ID	0.390"	**0.390"**
Tensile strength	150,000 Lbs	**160,000 Lbs**
Overall length	1.49 ft	**1.59 ft**
Weight	21.55 lbs	**21.55 lbs**
Activated pressure	**1350 psi**	**1550 psi**

Flow Release Bulldog Overshot



Description

The Flow Release Bulldog Overshot is a variable catch external overshot used to retrieve a lost cylindrical fish from the well bore.

The Flow Activated Releasable Overshot operates in the same way as a standard non-releasable overshot. The tool is run in hole until it latches on the fish and butts out. Pulling up will cause the slips to set into the fish.

Should the fish be irretrievable, the tool can be released from the fish by flow activation and returned to surface.

Application

The Flow Activated Releasable Overshot can be used to fish lost or broken tubing, coil and also coiled tubing tools that have backed off down hole.

The Flow Activated Releasable Overshot can be supplied to overshoot and seal onto a specific fish in order to form a pressure tight seal. This is of importance if there is a flow activated tool beneath the fish that requires operation before the fish can be retrieved.

Features:

- Internal hammer action assists release
- Flow or drop ball activated
- Hardened clamp, double tempered slips
- Robust construction
- Variable slips sizes for each tool

Flow Release Bulldog Spear

Applications:

The spear is a variable catch internal spear used to retrieve a lost cylindrical fish from the wellbore.

A complete range of slip is available for each size tool. To operate simply run into the fish and set down weight, pick up, and retrieve the fish.

To release from fish simply set down weight, circulate in conjunction with a sequencing tool above the spear.The spear will then release due to flow created differentially.

Benefits

- Flow or drop ball activated to release
- Hardened and double tampered slips
- Robust construction
- Variable slip for each tool

Specification

Size Ref.	2.1/2"	3"	3.1/2"
Max OD	2.25"	2.620"	**3.110"**
Min ID	0.390"	0.390"	**0.390"**
Tensile strength	59.0001bs	80.0001bs	**80.000 I bs**
Length	21.62"	24.30"	**24.30"**
Catch range	2" to 2-1/8"	2-1/4" to 2-3/8"	**2-5/8" to 2-3/4"**
weight	19.81lbs	21.55 lbs	**38.501bs**
Activated pressure	1200 psi	1350 psi	**1200 psi**
Connection	**1-1/2"AMMT**	**1-1/2"AMMT**	**2-3/8" PAC**

Sequencing Valve

Description

The Sequencing Valve is designed to actuate downhole coiled tubing tools at a predetermined pressure and to operate as a controlled bleed valve when bleeding down internal coil pressure.

Application

The Sequencing Valve is a 'normally open' valve which allows circulation through the tool to the annulus, whilst running into the well. Once a pre-determined differential pressure is exceeded, the flow path to the annulus is closed and diverted into the internal bore of the toolstring, thereby enabling hydraulic activation of any tools in the lower and upper end of the tool string.

When pulling a toolstring out of the well, a Sequencing Valve can be used to safely bleed off internal coil pressure. When the coil pressure is decreased to a pre-determined pressure, the Sequencing Valve opens and allows bleed through its bypass ports. Therefore during bleed down the internal / external pressures are balanced, thus eliminating the possibility of prematurely releasing flow activated manipulation tools in the lubricator.

The closing differential pressure of the Sequencing Valve can be field adjusted to between 500 to 2000 Psi.

Features / Benefits

- 'Normally Open' allowing circulation to the annulus whilst running into well bore
- Flow activated, no drop ball required
- Simple field adjustment of closing differential pressure
- Quick to dump internal coil pressure at the tool
- Eliminates the possibility of dropping tools in the lubricator
- Suitable for fluid & gas applications.

Bull-nose Jetting Nozzles

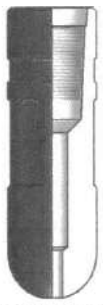
Description

The Bull Nose Jetting Nozzles are available in single or multi port designs.The multi port nozzle is designed to give full radial coverage over the completion tubular during well intervention operations, the porting can be manufactured in any combination of up, down and side jetting with port sizes to match the optimum performance for each size of nozzle.

The single ported thru bore nozzle, is primarily designed for the placement of slurry during a shut off operation.

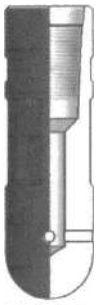
The ports can also be tapped with NPT threads to accommodate jetting nozzles. These nozzles can be supplied with a variety of hole sizes or blank enabling the operator to adjust the flow area and number of open ports.

These nozzles can be supplied without any ports if requested.



DISPLACEMENT

UP JET



SIDE JET

DOWN JET

Features and benefits

- Various port configurations for different operations.
- Full radial coverage.
- Single port for placement operations.
- Robust Design.
- Suitable for all sizes of coiled tubing.
- Designed to suit operational requirements.
- Various sizes, thread configurations and materials available on request

Dual Flapper Check Valve

Description

The Dual Flapper Check Valve is a standard coiled tubing string component. It provides a means of preventing the back flow of well fluids into the coiled tubing in the event of failure or damage to the coiled tubing string or surface equipment.

The design of the Dual Flapper Check Valve incorporates a dual sealing system in each flapper assembly for increased safety. A teflon seal provides the primary low pressure seal, while at higher pressure the flapper seals on a metal to metal arrangement.

Maximum flow area through the Flapper Cartridges reduces unnecessary back pressure on the surface pumps.

The flow path through the Flapper Cartridges does not restrict the passage of balls or darts if required during operations such as cementing.

Features

- Dual sealing in each flapper cartridge i.e. low pressure teflon seat / seal and high pressure full metal to metal seat / seal
- Full bore fluid passage for balls, darts and plugs
- Removable flapper cartridges

Specifications

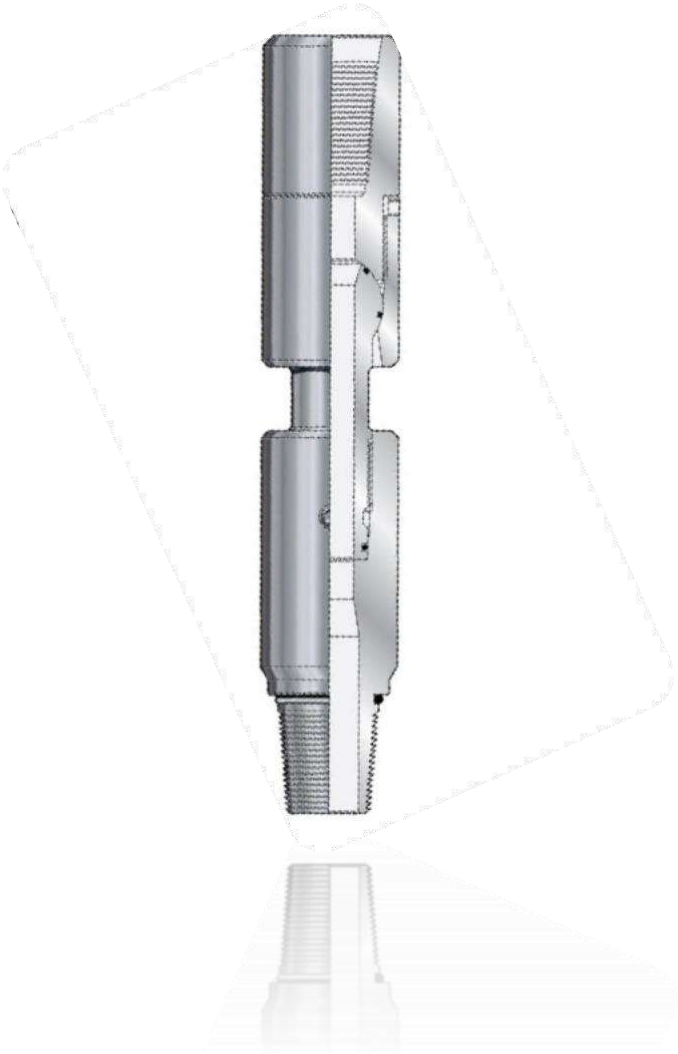
Tool OD	1-11/16"	2-1/8"	2-7/8"
End Connections	1" AMMT	1-1/2" AMMT	**2-3/8" PAC**
Tensile Strength (lbs)	45,000	77,000	**145,000**
ID (in)	0.75	0.813	**1.03**
Length (ft)	1.09	0.98	**1.15**
Working Pressure (psi)	**10,000**	**10,000**	**10,000**

Knuckle Joint

Description

The Knuckle Joint, when incorporated between the jars and the manipulation tool, will provide additional flexibility in the toolstring. This additional flexibility is often necessary when the bore of the hole the tool is running through is restricted and / or highly deviated.

The Knuckle Joint allows full 360° rotation of the toolstring and provides full 15° angular deviation and internal pressure sealing throughout the full rotation of the tool. The ball and socket of the knuckle provide the rotation and angular deviation of the tool. Seals in the ball provide the sealing capability.



Application

Where rotation under load is required see the Coiled Tubing Swivel Joint. The full flow through bore also allows the use of flow activated tools below the coiled tubing knuckle joint. Multiple coiled tubing knuckle joints can be incorporated in particularly long toolstrings.

Features

- Full flow through bore.
- Internal pressure seal.
- 15° Angular deviation.

Specifications

Tool OD	1–11/16"	2-1/8”	2-7/8”
End Connection	1" AMMT	1-1/2"	**2-3/8" PAC**
Tensile Strength (lbs)	30,000	77,300	**105,000**
ID (in)	0.56	0.875	**1**
Length (ft)	1.54	1.58	**1.6**
Working Pressure	**10,000**	**10,000**	**10,000**

Downhole Motor

Description

The Bico, Toro and, Welltonic Downhole Motors are high performance mud motors ideal for both directional and straight hole applications. Evenwall design, flexible multibody construction and power rib technology combine to deliver increased torque, horsepower and efficiency in hot-hole and oil based mud applications.

Applications:

- Heavy-duty milling
- Coil-tubing drilling
- Tubing cutting
- Under reamer
- Plug removal
- High-temperature environments
- Nitrogen (N2) environments

Features:

- Adjustable bent housings
- Drive shaft couplings
- Reamers
- Straight housings
- Top subs
- Mud lubricated bearing packs
- Mono-sealed bearing packs

Downhole Motor …

Specification

Outside Diameter	1.11/16"	1.11/16"	2-1/8"	2-1/8"	2-7/8"	2-7/8"
Power section	XTR SS100	169-56.45	XTR 55150	55150	288-78.4	**55150**
Top Connection	1"AMMT	1"AMMT	1.1/2"AMMT	1.1/2"AMMT	2-3/8"PAC	**2-3/8"PAC**
Bottom connection	1"AMMT	1"AMMT	1.1/2"AMMT	1-1/2"AMMT	2-3/8"PAC	**2-3/8"PAC**
Length (ft)	7.8	7.9	11.12	11.12	12.1	**12.84**
Stage	2.3	4.5	6	6	4	**3.5**
Lobe	5/6	5/6	5/6	5/6	7/8	**5/6**
Flow rate (gpm)	20-40	25-45	20-50	20-50	60-120	**60-120**
WOB (lbs)	2800	3000	4500	4500	7000	**6500**
Speed (rpm)	216-433	70-275	260-680	260-680	100-350	**200-400**
Pressure (psi)	560	675	1500	1500	800	**875**
Torque (lbs)	168	225	315	315	1000	**650**
Output (hp)	13	9	33	33	50	**49**
Max pull (lbs)	26.18	40	23.8	23.8	120	**42.7**
Max temperature	**400F**	**400F**	**400F**	**400F**	**400F**	**400F**

Fishing Jar

Description

The NOV Downhole Bowen Type Z Oil Jar is the result of years of continuous improvement based on actual field use. It is a straight-pull operated Jar. This Jar is simple to assemble and easy to use.

Each blow can be controlled positively by the operator to deliver a very light blow or a blow of very heavy impact. Full circulation may be maintained throughout the tool for effective flushing.

Full torque may be utilized in either direction and is at all times by means of heavy duty spines which are continuously in engagement.

Appliction

The Bowen Type Z Oil Jar is used for fishing, testing, coring, reaming, light drilling, side tracking, and washover operations.

Features

Only straight pull is required to operate the Bowen Type Z Oil Jar, and successive blows can be struck as often as the operator can slack off and raise the running string.

The Bowen Oil Jar should be tested in the Bowen Jar Tester prior to operation.

Specifications

OD size	1-13/16"	2-1/4"	2-29/32"	3-1/8"
ID size	5/16"	3/8"	1"	1"
Testing load Pull	10,000 lbs	12,000 lbs	19,000 lbs	23,000 lbs
Max load jarring in	18,000 lbs	21,000 lbs	35,400 lbs	32,400 lbs
Low pull	4,000 lbs	4.000 lbs	6.000 lbs	7.000 lbs
Lift after jarring	59.400 lbs	118.500 lbs	194.800 lbs	229.200 lbs
Max Torque	640 ft-I b	2200 ft-I b	5200 ft-I b	7600 ft-lb
Weight collar above jar	1,360-1,800 lbs	1,560-2,100 lbs	2,200-3,000 lbs	2,400-3,300 lbs
Connection	1"AMMT	1-1/4" Reg	2-3/8" PAC	2-3/8" PAC

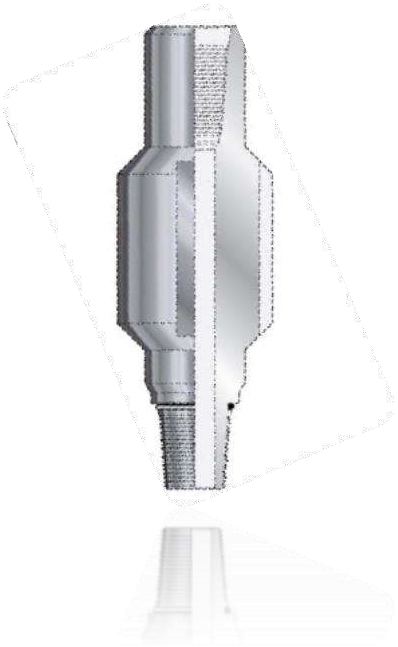
Non-Rotating Fluted Centralizer

Description

The Fluted Centralizer is designed to be included as part of the coiled tubing work string to assist in providing centralization to allow easier location of tools during fishing or to provide general stability in the tubing.

The Fluted Centralizer has a full flow through bore allowing passage of darts or drop balls and is available in any specific length.

The Fluted Centralizers are available in all common sizes.



Features/Benefits

- Full flow through bore
- Solid one piece construction

Coiled Tubing Connector

Description

Coiled tubing connector allow attachment of coil tubing to the CT tool/ workstring via the provision of threaded connection.

The Connector is attach to the coil tubing by grub screw that engage in preformed dimples in the tubing wall.

The dimples are formed by using the dimple tool that place the indents in identical positions to the screws on the connector.

Features

- High Tensile
- Internal pressure seal
- Easy to make up
- High torque

Specifications

Coil tubing 0.D	1-1/4"	1-1/2"	1-3/4"
Max OD	1.687"	2.125"	**2.25"**
Min ID	0.75"	1.00"	**1.00"**
Connection	1"AM MT	1-1/2"AMMT	**1-1/2"AM MT**
Length	5,281"	4,687"	**4,937"**
Tensile strength	68,000 lbs	88,000 lbs	**88,000 lbs**
Weight	2.34 lbs	3.91 lbs	**4.45 lbs**
Internal ball clearance	11/16"	15/16"	**15/16"**
Test pressure	**5,000 psi**	**5,000 psi**	**5,000 psi**

Roll-on Connector

Description

The Roll-On Connector with one-piece design provides a robust, cost effective means of attaching a BHA to the coil.

The one-piece design incorporates two O-ring grooves providing added security in high-pressure applications, while three crimping grooves give improved tensile strength.

The connectors can be supplied with standard through-tubing tool joints or cut to suit customer requirements. The connector is reusable and furnished with standard O-rings making it extremely easy to redress in the field.

Specifications

Coil Tubing OD	1-1/2”
Wall Thickness	TBA
OD (in)	TBA
End Connection	1" AMMT
ID (in)	0.5
Tensile Strength (lbs)	38,390
Length (ft)	0.67
Working Pressure	10,000

Dual Acting Jar

Description

The Dual Acting Jar provides both upward and downward impact. Upward impact is achieved by upward strain sufficient to overcome the selected up release setting. Downward impact is achieved by applying downward compression sufficient to overcome the selected down release setting.

Application

The Jar is impact device and can be used in a number of applications including thru-tubing, snubbing, small diameter rotary drilling and fishing.

Features

The operation of this Jar is very easy and has double function both up and down and also can perform jarring.

Specifications

OD size	2-1/8"
ID size	3/4"
Connection	1-1/2"AMMT
Overall Length	68"
Total stroke	10"
Weight	49 lbs
Max overpull	18,000 lbs
Max overpush	18,000 lbs
Max lift after jarring	95,0001bs
Max Torque	700 ft-lb
Pull Testing	16,0001bs
Push Testing	10,0001bs

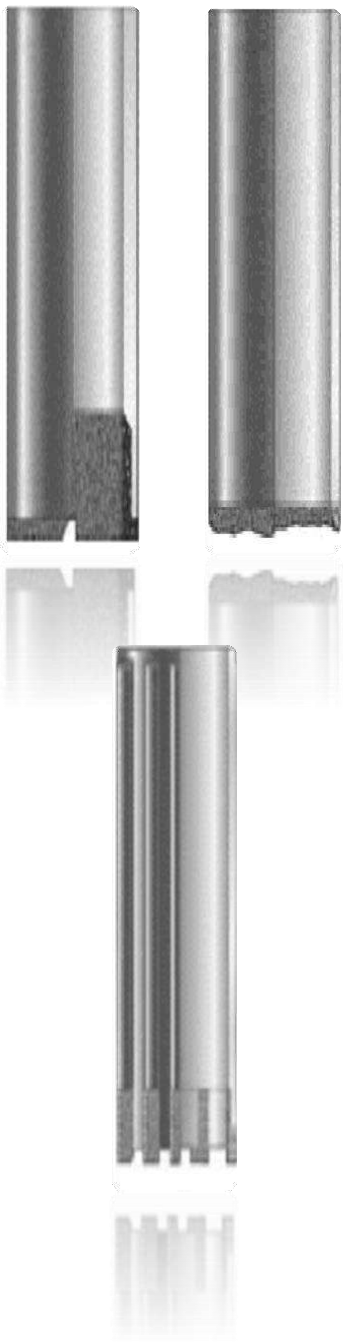
Washover Shoe

Description

MTI supplies Washover Shoes for all Thru Tubing applications. Various types of crushed carbide, carbide insert dressed wash shoes are available on request.

In general washover shoes are designed and manufactured to suit specific applications such as flat, scalloped or castellated bottom Washover Shoes. They are fabricated to suit any specific applications.

A variety of cutting structure, diameter and connection configurations are available.



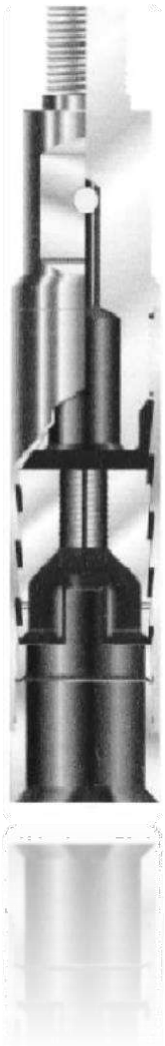
Application

The Washover Shoes are used on a variety of operations such as scale and cement milling, plug removal, fish dressing or any other general cleanout or debris removal operation.

Features

- Variety of Washover Shoes size and type are available.
- Proven technology.
- Robust design.

Series 10 Sucker Rod Overshot



Description

Series 10 Bowen Logan Releasing Sucker Rod Overshot are the best available tools for engaging and retrieving sucker rods, couplings, and similar items from inside tubing strings. Series 10 Overshot are available in sizes to engage up to 2-5/16" OD inside of 2-7/8" tubing and up to 1-5/8" OD inside 2-3/8" tubing.

Application

Bowen Logan Sucker Rod Overshot fitted with tubing thread Top Subs and Oversize Guides are ideally suited for engaging the fishing neck of wire line rope sockets and retrieving wire line tools such as gun perforators lost inside of casing.

When a Basket Grapple is used in the Series 10 assembly, a Basket Grapple Control and a Plain Guide are required.

Features

Construction:

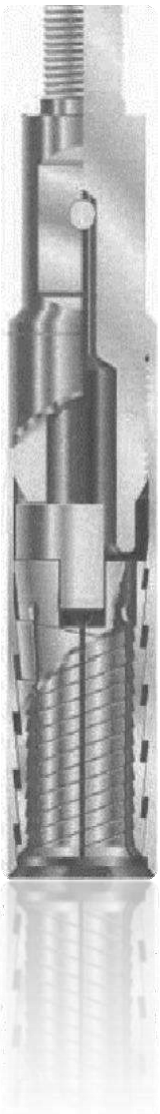
- Top Sub
- Bowl
- Spiral or Basket Grapple
- Control Guide

Series 10 Sucker Rod Overshot …

Specifications

O.D.	2-1/8"	2-1/4"	2-5/16'
Grapple No.	27768	16073	**11483**
Manufactured by	Logan	Logan	**Logan**
Connection	7/8" SR PIN	3/4" SR PIN	**3/4" SR PIN**
Overshot Type	SH	SH	**SFS**
Length	16.5"	16.7"	**16.7"**
Max Catch basket grapple	1-5/8"	1-3/4"	**1-5/8"**
Max Catch spiral grapple	1-13/16"	1-15/16"	**1-13/16"**
Load Capacity basket	40,100 lbs	40,100 lbs	**85,100 lbs**
Load Capacity spiral grapple	**55,700 lbs**	**55,700 lbs**	**118,100 lbs**

Series 20 Short Catch Sucker Rod Overshot



Description

Series 20 Bowen Logan Short Catch Sucker Rod Overshot is designed for conditions when sucker rods, couplings, and other portions of a fish are too short for retrieval with a standard overshot.

The Series 20 Short Catch Sucker Rod Overshot consists of a Top Sub, Bowl, Basket Grapple Control, and a Basket Grapple. The Grapple Control is located at the top end of the tool between the Top Sub and the Basket Grapple. The position of the Grapple Control above the Basket Grapple rather than below it allows the Basket Grapple to occupy the lowest position in the Bowl. This permits the exposed part of the fish to enter the Basket Grapple where it can be firmly and securely grasped. Operation of the Series 20 Short Catch Sucker Rod Overshot is the same as the Series 10 Sucker Rod Overshot.

Application

The Series 20 Bowen Logan Short Catch Sucker Rod Overshot is applied to catch and release.

When a Basket Grapple is used in the Series 10 assembly, a Basket Grapple Control and a Plain Guide are required.

Features

Construction:

- Top Sub
- Bowl
- Spiral or Basket Grapple
- Control Guide

Series 20 Short Catch Sucker Rod Overshot …

Specifications

O.D.	2-1/4"	2-5/16"	2-25/32"
Grapple No.	47464	17440	**18308**
Manufactured by	Logan	logan	**Logan**
Connection	7/8" SR Pin	3/4" SR PIN	**3/4" SR PIN**
Overshot Type	SH	SH	**SH**
Length	16,700"	16,700"	**16,700"**
Max Catch basket grapple	1-3/4"	1-13/16"	**2-1/8"**
Load Capacity basket	**41,000 lbs**	**50,400 lbs**	**102,300 lbs**

Series Overshot 70

Description

The Bowen Logan Overshot Series 70 is designed for conditions when the fish is too short to be engaged with a standard overshot.

The Grapple Control is positioned above the Basket Grapple rather than below it to allow the Basket Grapple to occupy the lowest position in the Bowl. This enables the overshot to firmly engage and retrieve a very short fish.

Application

Operation of the Bowen Logan Series 70 Short Catch Releasing Overshot is identical to the Series 150.

The Bowen Logan Series 70 Releasing and Circulating Overshot is used to stop and catch a coupling with a ruptured piece of pipe engaged in its upper end. The upper set of wickers will catch the ruptured pipe and act as a stop against the coupling, while the lower set of wickers will catch the coupling.

Features

- Durable construction
- Proven design
- Left hand helix with a tapered exterior
- Interior is wickered for engagement with the fish

Series Overshot 70 …

Specifications

O.D.	3-5/8"	3-3/4"
Grapple No.	17618	**13538**
Manufactured by	PCE/NOV	**PCE/NOV**
Connection	2-3/8 REG BOX	**2-3/8 REG BOX**
Overshot Type	SH	**SH**
Length	24"	**24"**
Max Catch basket grapple	2-1/2"	**2-5/8"**
Load Capacity basket grapple	**263,600 lbs**	**239,800 lbs**

Series Overshot 150

Description

The Bowen Logan Series 150 Releasing and Circulating Overshots are the industry standard for external catch fishing tools. With a proven track record and the highest quality construction and design, the Series 150 Overshot is the efficient and cost effective tool for fishing companies all over the world.

Application

The Bowen Logan Series 150 Releasing and Circulating Overshot is used to stop and catch a coupling with a ruptured piece of pipe engaged in its upper end. The upper set of wickers will catch the ruptured pipe and act as a stop against the coupling, while the lower set of wickers will catch the coupling.

Features

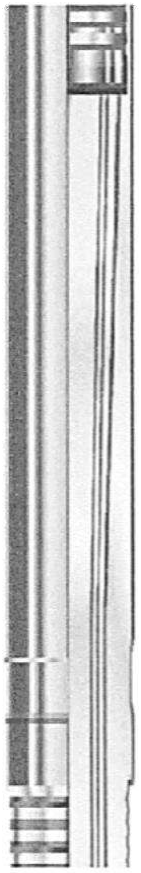
- Durable construction
- Proven design
- Left hand helix with a tapered exterior
- Interior is wickered for engagement with the fish

Series 150 Overshot …

Specifications

O.D.	2-5/8"	3-1/2"	3-5/8"	3-3/4"
Grapple No.	B-10204	B-782	9272	**37590**
Manufactured by	Logan	Logan	Logan	**Logan**
Connection	1-1/2"AMMT BOX	2-3/8 REG BOX	2-3/8 AM PAC DS BOX	**2-3/8 REG BOX**
Overshot Type	SH	FS	XFS	**SH**
Length	25"	26"	26"	**27.2"**
Max Catch basket grapple	1-3/4"	1-7/8"	2-19/32"	**2-11/16"**
Max Catch spiral grapple	2-1/8"	2-3/8"	2-7/8"	**3-1/19"**
Load Capacity basket grapple	86,400 lbs	26.5000 lbs	157,400 lbs	**217,700 lbs**
Load Capacity spiral grapple	**101,600 lbs**	**309,000 lbs**	**193,500 lbs**	**221,200 lbs**

Overshot Extension



Description

The Overshot Extension is an insertion sub assembled between the top sub and the bowl. The sub is available in length from 2 ft to 5 ft. Special lengths are available upon request.

Application

The Overshot Extension Sub is used when the upper portion of fish is damaged or not in any way to be engaged. This accesory will permit the overshot to be lowered far enough over the fish to ensure secure engagement and pack off.

Features

- Easy to assemble or disassemble in field
- Standard or customized length available
- Durable material

Specifications

Overshot Size	2-5/8"
OD	2-5/8"
ID	2.130"
Length	2ft
Connection	Std
Tensile	101,600 lbs

Bi-Directional Impact Hammer (Roto-Hammer)

Description

The NOV Bi-Directional Impact Hammer is a tool that transmits multiple down and upward impact forces at high frequency when fluid is pumped through it, thus eliminating the need to cycle the coil.

The tool operates through a combination of layoff weight or up-pull and controlled flow activation through the tool-string, converting flow and pressure into mechanical energy.

Applications

The NOV Bi-Directional Impact Hammer comprises of a single piece, non flexible impact shaft, for simplicity and maximum efficiency in transmitting impacts. Internally, a fluted dart ensures that fluid can flow through the tool with the minimum of interruption.

When the Bi-Directional Impact Hammer is set down, the impact shaft becomes seated onto the fluted dart. The dart is extended upwards against a spring under piston pressure. At a critical point, the dart comes into contact with a tappet valve.

The fluid flow path through the tool is interrupted as the tappet valve becomes seated, a rapid pressure drop results in a downward impact between dart and seat. Continuous flow with set down weight will recommence the cycle.

Bi-Directional Impact Hammer (Roto-Hammer) …

Features

- Under balanced and over balanced clean outs
- Shifting stubborn sliding sleeves
- Breaking ceramic and glass discs
- Swaging collapsed tubing and screens
- Broaching operations
- Driving debris downhole
- Scale clean out including: cement, resin coated sand, plastic, barium, calcium and iron

Specification

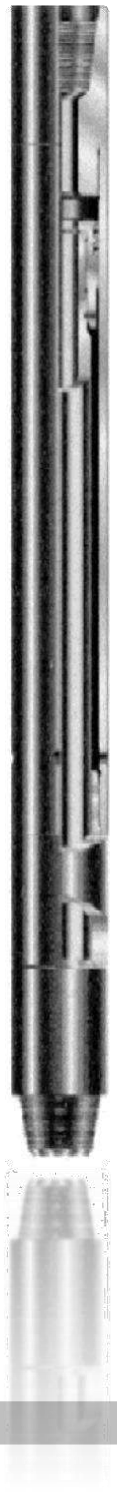
Size OD	1-11/16"
ID	n/a
flow rate	0.50 bpm
Push	800 lbs
Pull	750 lbs
press drop	800-1200 psi
Impact force	10,000 lbs
Tensile strength	51,000 lbs

Lubricated Fishing Bumper Sub

Description

The Logan Lubricated Fishing Bumper Sub is a dependable accessory that is suitable for all fishing operations, especially harsh downhole applications and deep workover operations. The tool enables the operator to release the fishing tool in the event it becomes impossible to pull the fish. It can provide the necessary impact in either direction and deliver the required torque.

The Lubricated Fishing Bumper Sub is constructed from specially high-strength, heat-treated alloy steel to withstand severe stress caused by tension, jarring, and torque.



Applications:

The Logan Lubricated Fishing Bumper Subs are suited for all fishing operations. They will bump down, jar up, or help disengage a fish after retrieval. The tool permits a vertical stroke, either upward or downward, whether it is rotating or not.

Features:

- The Fishing Bumper Sub is simple yet rugged
- It is composed of only five primary parts and a double seal assembly.
- The hexagon-shaped mandrel slides in a similar shaped mandrel body to provide continuous torque capability.
- The standard 20-inch stroke of these tools is optimum for most purposes.
- Full circulation may be maintained through the bores of the tools at all times.

Lubricated Fishing Bumper Sub …

Specifications

O.D.	1-13/16"	2-1/4 "	2-29/32"	3-1/8"
Minimum I.D.	9/16"	3/4"	1.00"	**1-1/4"**
Manufactured	PCE/NOV	PCE/NOV	PCE/NOV	**PCE/NOV**
Connection	1" AMMT BxP	1-1/2" AMMT BxP	2-3/8" PAC DS1 BxP	**2-3/8" Reg BxP**
Total Stroke	9"	10"	12"	**12"**
Length	69"	68"	84"	**84"**
Weight	33 lbs	49 lbs	96 lbs	**126 lbs**
Max Over pull	10,000 lbs	18,000 lbs	32,000 lbs	**40,000 lbs**
Max Over push	10,000 lbs	18,000 lbs	32,000 lbs	**40,000 lbs**
Torsion Yield	**330 ft-lb**	**700 ft-lb**	**2,700 ft-lb**	**3,000 ft-lb**

Wire Grab Spear

Description

The Wire Grab Spear is efficient for removal of wire line, Electric line, or braided line that has been left in the wellbore. The Wire Grab Spear is normally classed as a “last resort” tool and is commonly used after attempts to grab the ball of wire using a Wireline Grab have failed. The barbs are on the outside of the prong, so the spear is run into the centre of the wire, trying to grab it that way.

Application

The Wire Grab Spear is run in the hole until it makes contact with the wire ball. The wire will become entrapped on the barbs and retrieval of the wire is now possible. If all the wire is not retrieved, repeat the process until the wire is retrieved. The Wire Finder/Centre Spear has a ported top sub to allow for fluid displacement.

Features

- Barbed Centre Spear to hook wire ball.
- Strong and durable material.
- Simple usage, run – grap – pull.

Specifications

OD	3-3/4"	3-3/4"	3-3/4"
Length	5-1/2 Ft	8-1/2 Ft	**8-1/2 Ft**
Connection	**2-3/8" PAC Box**	**2-3/8" PAC Box**	**1-1/2" AMMT Box**

Orienter Tool (Indexing Tool)

Description

The NOV Strong Arm Hi-Torqe Orienter Tool is designed for coiled tubing applications where a high torque downhole rotation of the lower string is required.

Application

The Orienter/indexing tool is used included lateral and side tracked well accessing, also in CT fishing operations typically when used in conjunction with a Hook Wall overshot for difficult fish which have fallen over after dropping through the tubing tailpipe into the larger diameter liner below.

Features

- Stepless clockwise rotation
- High torque capability
- Simple orienting mechanism
- Smooth orienting action

Internal Cutter

Description

Internal cutters are used to cut tubing, casing, and drill pipe and may also be run on sucker rod and macaroni strings. These mechanically operated cutters permit alternate sizes of pipe to be cut when dressing an assembly. All internal cutters feature a device that permits the operator to set the cutter to any depth. Release the tool and reset it to another depth without coming out of the hole.

Operation

After the cutter has been loweredto desired cutting depth, anchor the cutter by slowly rotating while continuing to lower. This will set the slips and allow the mandrel to travel down under the knife blocks. The knife blocks will force the knives up and outward to engage the pipe so the cut can be made. Aplly the minimum weight while slow rotation (8-18 rpm) of work string is continued. Cutting is best accomplished by slacking off in increments while making the cut. Lack of reverse torque that the cut has been made.

Specifications

Pipe size to cut	2-7/8"	4-1/2"
Can be dressed for	-	4-1/2", 4-3/4", 5", 5-1/2"
Minimum cutter OD	2-1/4"	3-3/8"
Standard Assembly	Drag Spring	Wiper block
Assembly Logan P/N	409-003	409-007
Bowen P/N	8505	8844

Washover Pipe Extension

Description

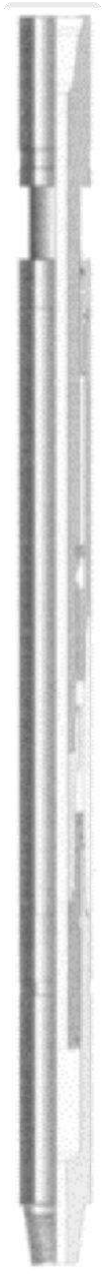
The washover pipe extension is to provide washdown capibilites to accommodate excessively long protruding part above the milled target that a single burn shoe could not cover.

Various diameter sizes and connection types are available on request.

Specifications

Tubing Size	Tubing ID	Washpipe OD	Connection	Tensile (Lbs)
2-3/8"	1.995"	1.66"	2-3/8" FL4S	**58**
2-7/8"	2.441"	1.90"	2-7/8" FL4S	**83**
3-1/2"	**2.992"**	**2.375"**	**3-1/2" OTFJ**	**102**

Jar Intensifier



Description

The CT Dual Acting Jar Intensifier provides both upward and downward jar intensification. In addition, the intensifier works to protect the pipe from shock load. Particularly valuable at shallow depths, the intensifier provides stroke that is not available in the pipe.

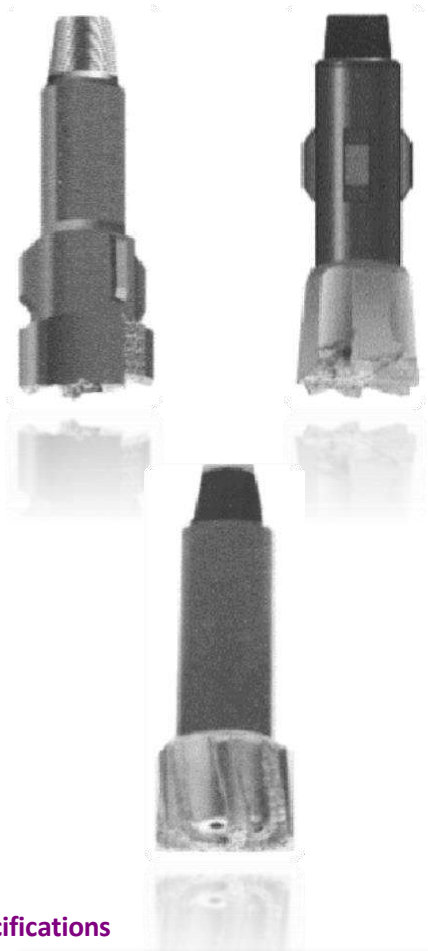
Applications:

- The intensifier works to protect the pipe from shock load.
- The intensifier provides stroke that is not available in the pipe.
- Jar to upward and downward the pipe strings in the well hole.

Features:

- Not affected by temperature
- Not affected by pressure
- Up and down acceleration
- Sealed for circulation
- Torque transmitting
- Not dependent on seals for performance

Junk Mill



Description

The mills are dressed with either crushed tungsten carbide for loose fish or junk, or inserts, for stationary fish or junk. Junk mills are available with optional-length fishing necks, stabilizers and combination stabilizers-fishing necks. Extra long mill heads reduce risk of casing damage. Large circulation ports and watercourses provide better cooling and more efficient cuttings removal. These mills are available in the full range of standard sizes and can be special ordered to any length and OD required.

Application

Milling almost anything in the well bore, including, but not limited to: bit cones, bits, cement, packers, squeeze tools, perforating guns, drill pipe, tool joints, reamers, and reamer blades.

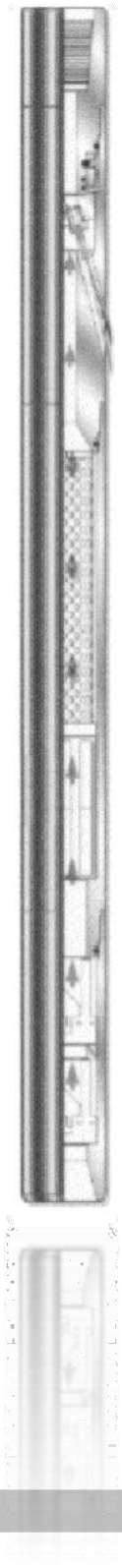
Features

Mill can be dressed with smooth OD for cased-hole wellbores and rough OD for openhole wellbores for greater versatility. Milling solutions cover the full range of casing and tubing sizes and weights.

Specifications

Dressed OD	Connection	Fish Neck OD	Torsion Yield	Tensile Yield	ID
1-3/1" to 2-3/8"	1" AMMT	1-9/16"	560 ft-lb	51.300 lbs	**3/4"**
2-1/4" to 3-1/2	1-1/2"AMMT	2-1/8"	1,360 ft-lb	98,300 lbs	**1"**
3-1/2" to 4-1/2"	2-3/8" PAC	2-7/8"	3,200 ft-lb	158,950 lbs	**1-3/8"**
3-1/2" to 4-1/2"	2-3/8" REG	3-1/8"	3,850 ft-lb	163,950 lbs	**1-1/2"**
4-1/2" to 5-1/2"	**2-7/8" PAC**	**3-1/8"**	**4,850 ft-lb**	**178,650 lbs**	**1-1/2"**

Venturi Junk Basket



Description

The Venturi Junk Basket is a tool which is used to retrieve junk and debris out of the well bore. When fluid is pumped through the string of the coiled tubing and out through the nozzles in the venturi chamber, a vacuum is created in the venturi chamber. Fluid is sucked from the bottom of the tool exit back through the venturi tubes. Most of this fluid mixes with the pressurized fluid to be re-circulated around the bottom of the tool.

The tool is essentially a high powered vacuum cleaner that may be used with fluid, nitrogen fluids or gases. The nozzles in the tool are simply changed out for the available pump rate, fluid or gas. A debris filter screen is placed before the venturi chamber to prevent debris from blocking the venturi tubes.

A hollow magnetic section with a finger type trap catches junk and debris, which is then carried from the well inside the tool.

Barrel extensions are available to increase the volume of junk which may be carried. The tool is not dependant on hole size to work, so for example you could use a 31/8" o.d. tool to retrieve debris from 7" casing

Applications

The tool is used to remove debris from the wellbore.

Features

- Single component design allows easy and inexpensive upgrade of existing tool.
- Nozzle can be supplied with any choke Orifice Size from 1/8" to 5/16" for wide range of tubing
- Sizes and injection rates.
- Nozzles can be removed or installed in minutes without any disassembly of the tool.

Venturi Junk Basket …

Features

- The volume of the debris chamber can be enlarged by adding extensions between the Cage
- Housing and the Screen Housing.
- The Nozzles are replaceable to achieve any possible ratio of flow rate and PSI combination.
- The bottom of the tool can also be dressed with carbide for milling or washing over a fish, or have a tool joint, allowing the tool to be run with a bridge plug pulling tool.
- Important feature of the Venturi is that it is not dependant on the hole Size to work, the rate of the Venturi action is much higher than the Pump Rate, no
- matter the hole size and nitrogen can be used without any damages to the tools
- Can be run with or without a mud motor

Specifications

OD	2-1/16"
ID	n/a
Connection	1.5" AMMT
Length	34.250"
Weight	23.5 Lbs
Tensile strength	68.000 Lbs
Ventury nozzle	1
Injection nozzle	0.062", 0.078", 0.094"
	0.109", 0.125", 0.140"
	0.156", 0.171", 0.187"

Weight Bar

Description

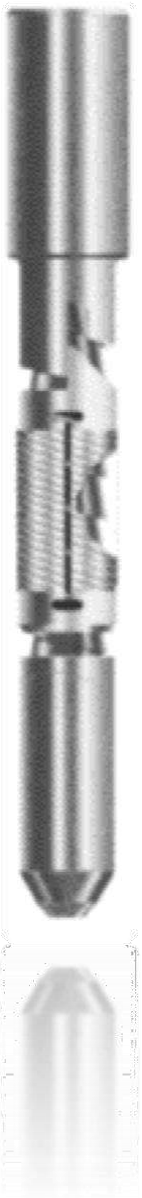
The Weight Bar provides a means of extending the toolstring, whilst maintaining the maximum through bore. The tubular section between the top & bottom sub can be interchanged to vary the length of the straight bar.

This approach offers an ideal way of spacing out tools within the toolstring, without compromising the flow requirements of flow activated or jetting tools.

Features

- Full flow through bore
- Solid construction

Releasing Spear



Description

Bowen Itco-Type Releasing Spears provide a dependable, inexpensive, and simple means of engaging a fish internally. These Spears assure positive engagement, easy release from the fish when desired and easy re-engagement after the Spear has been released.

Application

To Engage the Fish: When the Spear has reached the point of desired engagement with the fish, rotate sufficiently to move the Mandrel one full turn to the left. This turns the Mandrel down through the Grapple, placing the Grapple into the engaging position. A straight pull will then wedge the Grapple into positive engagement with the fish.

To Release: Bump down to break the freeze, then rotate two or three turns to the right. This moves the Mandrel up through the Grapple, forcing the Grapple against the Release Ring and putting the Spear in released position. A straight upward pull will then generally free the Spear; however, it is recommended that the Spear be rotated slowly to the right when coming out. The matching cams of the Release Ring and Nut constitute a safety device which resists freezing or jamming.

Features:

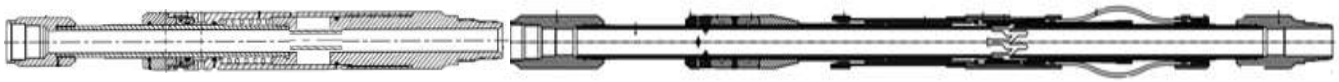
The Bowen Itco-Type Releasing Spear consists of a Mandrel, Grapple, Release Ring, and Nut. The Mandrel may be obtained in either a Flush Type or a Shoulder Type. Mandrel top connections are furnished to order. The Nut can be obtained as a plain bull nose guide or with a pin connection for the attachment of other tools below the Spear.

Releasing Spear …

Specifications

Mandrel OD	15/16"	1-1/8"	1-3/8"	1-7/8"	2-5/16"
Mandrel ID	No Bore	No Bore	No Bore	3/8"	**3/8"**
Manufacturer	Logan	Logan	Logan	Logan	**Logan**
Connection	5/8" & 3/4" SR Pin	3/4" SR Pin	3/4" SR Pin & 2-3/8" Reg Box	3/4" SR Pin & 2-3/8" Reg Box	**3/4" SR Pin & 2-3/8" Reg Box**
Grapple No.	19352	11197	9917	1348	**1230**
Tool Joint OD	15/16" & 1-5/8"	1-1/8" & 1-13/16"	1-3/8" & 2-1/2"	1-7/8" & 2-3/8"	**2-5/16" to 3-3/4"**
Body Yield Strength	29,400 Lbs	43,600 Lbs	62,000 Lbs	132,000 Lbs	**270,000 Lbs**
Nom. Catch size	**0'.937" to 1.103"**	**1.170" to 2.061”**	**1.470" to 1.972"**	**1.828" to 3.304"**	**2.328" to 3.485"**

Compression Tension Set Packer



Set Down Unloader

Compression Set Packer

Tension Set Packer

Run the packer to desired setting depth with Coiled Tubing, Recommended install set down unloader above the Packer. The Packer Run with unset position, when reach on target depth, pick up approximately 1 feet, set back down to desire depth, pick up second time and the packer will set. Apply enough tension to keep tools in set.

Compression Set Packer

Run the packer add pick up unloader tools above as recommended. With the packer in unset position. Run the Packer to desire target depth with coiled tubing. Pick up approximately 1 foot, set back to desired depth and then pick up 1 foot again. Set back down second time and tools packer will set, apply enough weight to keep set the packer.

Specification

Tubing		Packer				
OD inch	WEIGHT (lb-ft)	Tool OD	Tools ID	Thread	Length	Tensile lb
2-7/8"	6.4 - 7.9	2,150"	1,120"	1,316 CS Hyd	66.77"	58.500
3-1/2"	9.2 - 12.7	2,565"	1,370"	1,9 CS Hyd	80.20"	62.000
4-1/2"	9.5 - 15.1	3,625"	1,930"	2-3/8 CS Hyd	86.35"	107.200

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