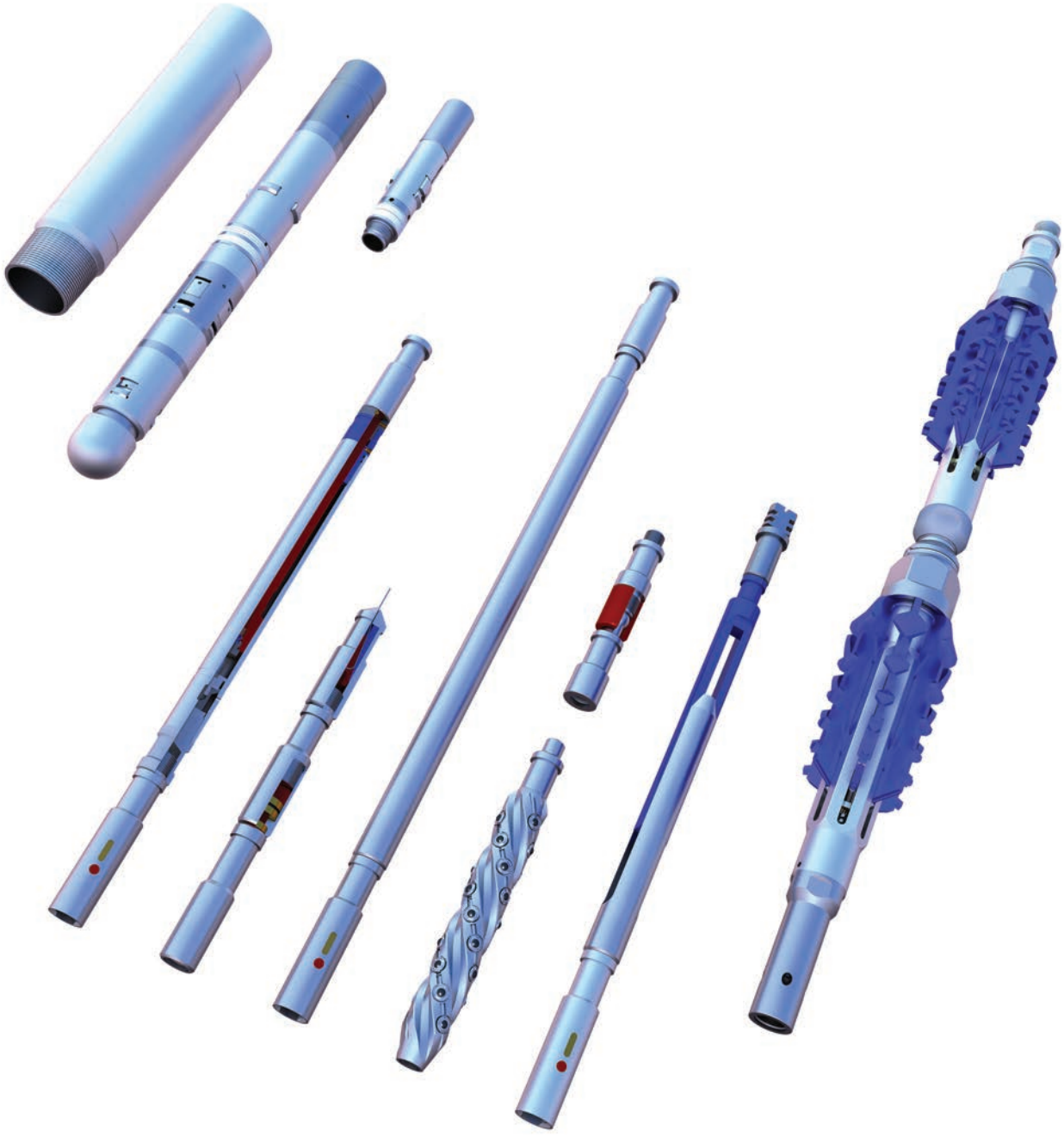
Elmar™ Tools

Wireline & Flow Control Products



Elmar | NOV Completion & Production Solutions

ASEP™ · Elmar™ · DynaWinch™ · Artex™

Creating the complete wireline solution

Our vision is to be globally recognised as the supplier of wireline equipment products, aftermarket support and training against which all others are measured.

The Elmar product range covers wireline trucks and winches, masts, wireline pressure control equipment, slickline tools, flow control equipment, hydraulic control units and tubular products. High quality Elmar™, DynaWinch™, Artex™ and ASEP™ products are manufactured in our five major plants. We can provide a wireline service company with the full package it needs to perform an intervention – from the winch unit to the pressure control to the tools. We have field-proven, reliable equipment to suit any intervention need.

Aftermarket

Our aftermarket team is available 24 hours a day, enabling an immediate global response to client needs.

Since its inception in late 2010, our aftermarket department has played an extremely important role in the growth of our business and has differentiated us from other suppliers of well service equipment. Worldwide, the aftermarket team has a workforce of over 100 people , which is increasing steadily as our business grows. We have aftermarket dedicated management and support teams based in the USA, Canada, UK, Singapore, Australia, UAE, Saudi Arabia, CIS and Norway. These support centres help maximise the efficiency of our customers' operations anytime, and anywhere, in the world.

We utilize a unique aftermarket software system, enabling support cases and customer queries to be monitored globally. This ensures cases are handled professionally and prevents recurrences. In addition, we have a dedicated professional engineering team to support our clients. This is a significant differentiator in the marketplace and demonstrates our level of commitment to provide high quality services as well as products.

For aftermarket support visit www.nov.com/elmar and click Aftermarket Request, or call us at one of the regional numbers indicated.

Aftermarket Products & Services

- Worldwide service
- Support, service, commissioning and spare parts
- WPCE service, maintenance and recertification
- Wireline unit/truck and mast maintenance, refurbishment and recertification
- Rental of WPCE, wireline units, masts and ancillary equipment
- Spooling, wire supply and maintenance service
- Training

Main Contents

Standard Toolstring Tools

Slickline Service Tools for H_2S/CO_2 Service

Slickline tools are typically deployed to carry out some form of down hole manipulation and the tools are not left down hole permanently. Our standard practise for these slickline tools would be to trim the tools for H_2S/CO_2 service. This means supplying them with Inconel X 750 springs, but the tool material is likely to be 4140 in the 30-36 RockwellC 110,000 minimum yield condition. This hardness ensures the tools are tough and durable for the job they have to perform. A good maintenance procedure of these tools is recommended (they need to be flushed at surface prior to breaking them out).

However, although this is standard practice by manufacturers, this hardness does not conform to NACE. For a low alloy steel this would dictate 4140 in the 18-22 RockwellC 80,000 minimum yield conditions. The use of the lower heat treated material will ultimately mean the tools are not as durable as the higher heat treat standard service material which in some situations may lead to a shorter service life.

To summarize, our H_2S/CO_2 trim downhole service tools are usually fine for low concentrations of H_2S or CO_2 and will give dependable service provided they are thoroughly cleaned after use in H_2S inhibitor. In the event of higher concentrations of H_2S/CO_2 or longer than standard exposure times, the service tools can be supplied in the lower heat treated
18-22 NACE compliant condition.

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Tools - Connection Strengths

Tools in this catalogue are shown with sucker rod connections. However, they can be made with any of the connections shown below.

Sucker Rod Connection

Connection	Standard Service		H_2S Service	
	Yield (lbs)	UTS (lbs)	Yield (lbs)	UTS (lbs)
5/8-10UN	20,500	24,390	14,900	18,620
15/16UN	55,190	65,670	40,140	50,170
1 1/16UN	73,800	87,820	53,670	67,080
1 9/16UN	175,140	208,410	127,380	159,220

Breech Lock Connection

Connection	Standard Service		H_2S Service	
	Yield (lbs)	UTS (lbs)	Yield (lbs)	UTS (lbs)
1 1/2"	64,600	76,220	46,980	58,725
1 7/8"	103,530	122,160	75,290	94,110
2 1/2"	170,210	200,840	123,790	154,738

HDC Connection

Connection	Standard Service		H_2S Service	
	Yield (lbs)	UTS (lbs)	Yield (lbs)	UTS (lbs)
1 1/2"	65,960	78,492	47,970	59,960
1 7/8"	103,910	123,653	75,570	94,460
2 1/2"	184,310	219,329	134,040	167,550

QLS Connection

Connection	Standard Service		H_2S Service	
	Yield (lbs)	UTS (lbs)	Yield (lbs)	UTS (lbs)
1 1/2"	59,870	71,240	43,540	54,420
1 7/8"	96,490	114,820	70,170	87,712
2 1/2"	151,000	179,690	109,820	137,270

Note: The above values are based on the minimum material yield stress of 110,000 psi (standard service) and 80,000 psi (H_2S service). All the above values are calculated design load without considering SOF.

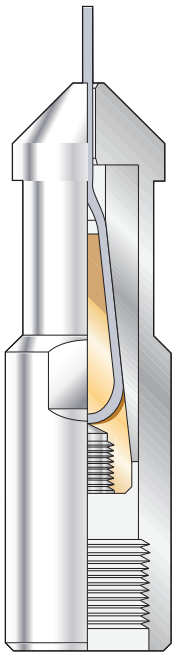
Pear Drop (& Sleeve) Type Rope Socket

Pear drop and sleeve type rope sockets are used to securely attach wireline to the tool string. It utilises a brass wedge (pear drop) to keep the wireline attached within the rope socket instead of a spring, thimble and spool as used for the more conventional rope sockets.

The pear drop (and sleeve) type rope socket is available in various sizes and consists of a body, brass wedge (pear drop) and a set screw.

Pear Drop (& Sleeve) Type Rope Sockets

Part Number	O.D.	Fishneck O.D.	Bottom Connection	Line Size
B067-016	1.250"	1.187"	15/16UN	0.092" - 0.125"
B067-022	1.500"	1.375"	15/16UN	0.092" - 0.125"
B067-059	1.750"	1.375"	15/16UN	0.092" - 0.125"
B067-054	1.875"	1.750"	1 1/16UN	0.092" - 0.125"
B067-055	2.125"	1.750"	1 1/16UN	0.092" - 0.125"
B067-056	2.500"	2.313"	1 1/16UN	0.092" - 0.125"
TBA	2.500"	2.313"	1 9/16UN	0.092" - 0.125"



Pear Drop (& Sleeve)
Type Rope Socket

Slip-Type Rope Socket

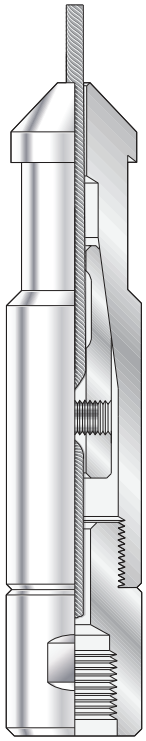
Slip-type rope sockets are designed for use with small braided lines up to 5/16" diameter. Slip type rope sockets are available in various O.D. sizes and consist of a body sub, carriage, slips, a set screw and features simplicity in construction and assembly.

The slips are designed to cause the line to break under severe loading at a specific percentage of the full line tensile strength. Standard 50% and 80% slips are available, please specify when ordering. If during operation the running tools become stuck, the operator is assured that the wire will break at the rope socket, rather than up-hole, allowing retrieval of the wireline. Slip-type rope sockets to accommodate alternative wire sizes are available on request.

Slip Type Rope Sockets

Part Number	O.D.	Fishneck O.D.	Bottom Connection	Wire Diameter
B068-031	1.250"	1.187"	15/16UN	3/16" & 7/32"
B068-010	1.500"	1.375"	15/16UN	3/16" & 7/32"
B068-060	1.875"	1.750"	1 1/16UN	0.313"
B068-004	1.875"	1.750"	1 1/16UN	3/16" & 7/32"
B068-011	2.125"	1.750"	1 1/16UN	3/16" & 7/32"
B068-056	2.500"	2.313"	1 9/16UN	0.313"
B068-001	2.500"	2.313"	1 9/16UN	3/16" & 7/32"

Note: Slips available in various Sizes, 40%, 50%, 80% and 90%.



Slip-Type Rope Socket

Disc & Spring Type Rope Socket

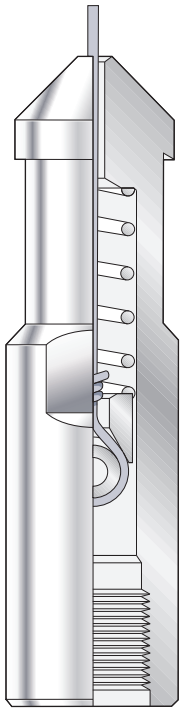
Disc and spring type rope sockets are used to securely attach 0.092" - 0.108" wireline to the toolstring. Available in various sizes, the rope socket consists of a body, spring, disc and spring support.

The body has three functions, a housing for the spring, disc and support, an integral fishing neck to allow the tool string to be pulled if lost, and a flat top preventing cutter bars from peening the wireline entry hole closed.

The wireline is fastened to the grooved disc around its circumference. This groove is sufficiently deep to prevent damage to the wireline when the disc comes to bear against the spring support.

Disc & Spring Type Rope Sockets

Part Number	O.D.	Fishneck O.D.	Bottom Connection	Line Size
B066-003	1.250"	1.187"	15/16UN	0.092" - 0.108"
B066-001	1.500"	1.375"	15/16UN	0.092" - 0.108"
B066-004	1.875"	1.750"	1 1/16UN	0.092" - 0.108"
L-9811068732	2.125"	1.750"	1 1/16UN	0.092" - 0.108"
B066-006	2.500"	2.313"	1 9/16UN	0.092" - 0.108"



Disc & Spring Type Rope Socket

Clamp Type Rope Socket

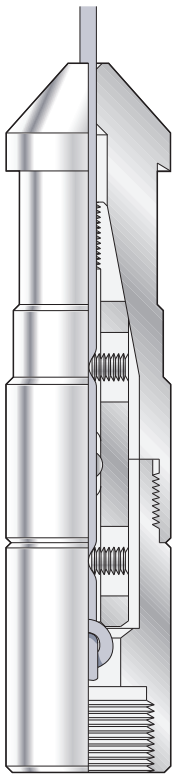
The clamp type rope socket is used to provide a secure way of attaching stranded wireline to a wireline toolstring.

The clamp type rope socket consists of a body section, a threaded bottom sub and the cable head. The body section has a flat top so that a cutter bar will not peen the wireline closed and a fishing neck to allow the toolstring to be retrieved if lost.

The wireline is threaded through the cable head and clamped securely into recesses using three set screws. When pulled upwards the wedge shaped cable head clamps the wireline in its jaws circumference. This groove is sufficiently deep to prevent damage to the wireline when the disc comes to bear against the spring support.

Clamp Type Rope Sockets

Part Number	O.D.	Fishneck O.D.	Bottom Connection	Wire Diameter
B068-033	1.250"	1.187"	15/16UN	7/32"
B068-034	1.500"	1.375"	15/16UN	7/32"
B068-057	1.750"	1.750"	1 1/16UN	7/32"
B068-035	1.875"	1.750"	1 1/16UN	7/32"
B068-036	2.125"	1.750"	1 1/16UN	7/32"
L-9811046749	2.125"	1.750"	1 1/16UN	0.313"



Clamp Type Rope Socket

Standard Toolstring Tools

Stem/Sinker Bars

Stem/sinker bars are used with wireline tools to provide additional weight to a string wireline tools. They are especially useful when used in conjunction with wireline hydraulic jars. By adding weight to the string, the speed of the closing operation is increased, and the jarring blow is intensified.

Stem/sinker bars are available in a range of sizes and lengths to suit any wireline operation. Top and bottom connections are designed to mate to other wireline equipment.

Lead Filled Stem

Lead filled stem sometimes called sinker bar provide the mass required in wireline operations although they should not be used in operations where heavy jarring is anticipated.

Lead filled stem are used instead of conventional stems when additional weight per foot for a given diameter is required.

Lead filled stem are available in various lengths and diameters.

Stem/Sinker Bars

Part Number	O.D.	Fishneck O.D.	Connections	Weight	Length
00-01687	1.250"	1.187"	15/16UN	8lbs	2ft
00-01649	1.250"	1.187"	15/16UN	12lbs	3ft
00-01686	1.250"	1.187"	15/16UN	20.5lbs	5ft
00-01324	1.500"	1.375"	15/16UN	12lbs	2ft
00-01325	1.500"	1.375"	15/16UN	18lbs	3ft
00-01326	1.500"	1.375"	15/16UN	30lbs	5ft
00-01327	1.875"	1.750"	1 1/16UN	19lbs	2ft
00-01328	1.875"	1.750"	1 1/16UN	28.5lbs	3ft
00-01329	1.875"	1.750"	1 1/16UN	47.5lbs	5ft
00-01690	2.125"	1.750"	1 1/16UN	24lbs	2ft
00-01689	2.125"	1.750"	1 1/16UN	36lbs	3ft
00-01688	2.125"	1.750"	1 1/16UN	69lbs	5ft
00-01330	2.500"	2.313"	1 9/16UN	34lbs	2ft
00-01331	2.500"	2.313"	1 9/16UN	50lbs	3ft
00-01332	2.500"	2.313"	1 9/16UN	83lbs	5ft

Lead Filled Stems

Part Number	O.D.	Fishneck O.D.	Connections	Weight	Length
B074-011	1.250"	1.187"	15/16UN	9lbs	2ft
B074-012	1.250"	1.187"	15/16UN	13.5lbs	3ft
B074-013	1.250"	1.187"	15/16UN	23lbs	5ft
B074-005	1.500"	1.375"	15/16UN	13.5lbs	2ft
B074-006	1.500"	1.375"	15/16UN	18lbs	3ft
B074-007	1.500"	1.375"	15/16UN	33lbs	5ft
B074-008	1.875"	1.750"	1 1/16UN	22lbs	2ft
B074-002	1.875"	1.750"	1 1/16UN	33lbs	3ft
B074-014	1.875"	1.750"	1 1/16UN	55lbs	5ft
B074-015	2.125"	1.750"	1 1/16UN	28lbs	2ft
B074-016	2.125"	1.750"	1 1/16UN	42lbs	3ft
B074-017	2.125"	1.750"	1 1/16UN	70lbs	5ft
L-9811068495	2.500"	2.313"	1 9/16UN	40lbs	2ft
B074-019	2.500"	2.313"	1 9/16UN	60lbs	3ft
B074-020	2.500"	2.313"	1 9/16UN	92lbs	5ft

Stem Sinker Bar

Lead Filled Stem

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Standard Toolstring Tools

Tungsten Filled Stem

Tungsten filled stem, sometimes called sinker bars, provide the mass required in wireline operations although they should not be used in operations where heavy jarring is anticipated.

Tungsten filled stems consist of a top sub with fishing neck and pin connection, a tube which carries the tungsten inserts and a bottom sub with box connection.

Tungsten filled stems are used instead of conventional stems when additional weight per foot for a given diameter is required. Tungsten filled stems are available in various lengths and diameters. Special sizes are available on request.

Roller Stem

Roller stem is a tool used in the wireline workstring to minimise the effect of friction caused by the toolstring sliding on the tubing wall during wireline work in deviated wellbores.

Roller stems consist of standard sinker bars with slots to accommodate simple rollers held in position with captive dowel pins.

Roller stems are available in various diameters and lengths. Roller diameters are to suit tubing sizes. Please specify required roller size when ordering.

Steel or nylon roller with various wheel diameters available.

Tungsten Filled Stems

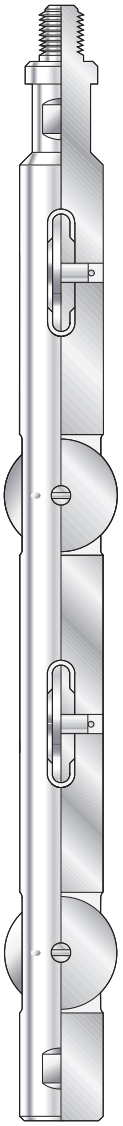
Part Number	O.D.	Fishneck O.D.	Connections	Weight	Length
B126-022	1.250"	1.187"	15/16UN	10lbs	2ft
B126-023	1.250"	1.187"	15/16UN	15.5lbs	3ft
B126-024	1.250"	1.187"	15/16UN	26.5lbs	5ft
B126-011	1.500"	1.375"	15/16UN	16lbs	2ft
B126-003	1.500"	1.375"	15/16UN	22lbs	3ft
B126-004	1.500"	1.375"	15/16UN	38lbs	5ft
B126-009	1.875"	1.750"	1 1/16UN	25lbs	2ft
B126-001	1.875"	1.750"	1 1/16UN	37lbs	3ft
B126-002	1.875"	1.750"	1 1/16UN	62lbs	5ft
B126-016	2.125"	1.750"	1 1/16UN	34lbs	2ft
B126-017	2.125"	1.750"	1 1/16UN	50lbs	3ft
B126-018	2.125"	1.750"	1 1/16UN	83lbs	5ft
B126-019	2.500"	2.313"	1 9/16UN	48lbs	2ft
B126-020	2.500"	2.313"	1 9/16UN	69lbs	3ft
B126-021	2.500"	2.313"	1 9/16UN	115lbs	5ft

Roller Stems

Part Number	O.D.	Fishneck O.D.	Connections	Weight	Length
B095-058	1.250"	1.187"	15/16UN	9lbs	2ft
B095-093	1.250"	1.187"	15/16UN	13.5lbs	3ft
B095-017	1.250"	1.187"	15/16UN	23lbs	5ft
B095-024	1.500"	1.375"	15/16UN	13.5lbs	2ft
B095-066	1.500"	1.375"	15/16UN	18lbs	3ft
B095-022	1.500"	1.375"	15/16UN	33lbs	5ft
B095-002	1.875"	1.750"	1 1/16UN	22lbs	2ft
B095-075	1.875"	1.750"	1 1/16UN	33lbs	3ft
B095-064	1.875"	1.750"	1 1/16UN	55lbs	5ft
L-9811046751	2.125"	1.750"	1 1/16UN	28lbs	2ft
L-9811046752	2.125"	1.750"	1 1/16UN	42lbs	3ft
L-9811046753	2.125"	1.750"	1 1/16UN	70lbs	5ft
B095-003	2.500"	2.313"	1 9/16UN	40lbs	2ft
B095-010	2.500"	2.313"	1 9/16UN	60lbs	3ft
B095-096	2.500"	2.313"	1 9/16UN	92lbs	5ft

Note: Steel or nylon rollers and various wheel diameters available.

Tungsten Filled Stem



Roller Stem

Elmar Wireline 'Double-Safe' Release Joint

Our Wireline 'Double Safe' Release Joint (WDSRJ) enables the controlled disengagement of the wireline from a toolstring which has become stuck downhole, eliminating the need to revert to the traditional fishing.

The WDSRJ comprises of an upper section, which contains an hydraulic reservoir/ transfer system; and a lower section, which houses a shear-pinned release assembly. The lower release assembly consists of a bottom sub with an internal 'GS' fishing neck looking up. This is secured to the tool via lug segments, which are locked out by a shear sleeve pinned to the body of the tool.

The shear pin is protected from shearing prematurely by the hydraulic reservoir, which acts as a damper to any shock loads. When tool release is required, a simple time delay/sit down action effects hydraulic transfer.

After a short time lapse, the release joint is jarred down. This effectively shears the release pin and drives down the shear sleeve, un-backing the lug segments and releasing the bottom sub from the remainder of the tool. The released bottom sub/lower part of the toolstring may then be fished using a 'GS' type pulling tool, in the usual manner.

Elmar Hydraulic Wireline Jar

Hydraulic wireline jars employ a patented hydraulic system similar to that used in the well known Bowen™ hydraulic jar. This system permits the operator to closely control the force of the blow over a wide range from a light blow to one of maximum impact. These jars may be run on any measuring line or stranded wireline which does not require electrical continuity below the jar. They are particularly valuable in fishing, swabbing and permanent well completion operations.

Our hydraulic wireline jar consists essentially of a sliding mandrel within a hydraulic chamber. In the closed position, an integral piston on the lower end of the mandrel rests in the middle body cylinder. When strain is taken on the line, the top sub and mandrel are pulled upward, while the piston is impeded in its upward movement by hydraulic fluid. This fluid is restricted in its flow from above the piston by the narrow passage between the piston and the cylinder wall. Fluid flow is retarded, thereby delaying completion of the jarring stroke until sufficient strain has been taken on the line to strike a blow of required impact value. When the piston passes from the cylinder into the enlarged internal portion, fluid resistance ceases.

The top sub and the mandrel then travel upward with great acceleration until the top of the piston strikes the middle body insert, transmitting the jarring force. The jar is closed after the stroke by slacking off on the line, a check valve in the piston allows free passage of fluid, permitting the jar to close freely.

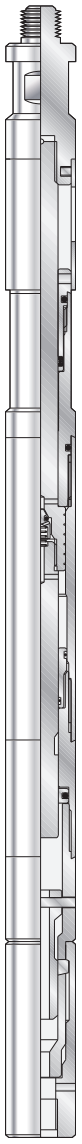
The 1 1/4" and 1 1/2" O.D. jars have a two piece middle body insert and bushing combination, designed to simplify replacement of the high pressure seal assembly.

Elmar Wireline 'Double-Safe' Release Joints

Part Number	O.D.	Upper Fishing Neck O.D.	Lower Fishing Neck I.D.	Retrieval Tools	Upper & Lower Thread Connection
B125-014	1.500"	1.375"	1.08"	1 1/2"	15/16UN
B125-015	1.875"	1.750"	1.38"	2"	1 1/16UN
B125-016	2.125"	1.750"	1.38"	2"	1 1/16UN

Hydraulic Wireline Jars

Part Number	O.D.	Fishneck O.D.	Connections
B058-079	1.250"	1.187"	15/16UN
B058-001	1.500"	1.375"	15/16UN
B058-005	1.750"	1.750"	1 1/16UN
B058-002	1.875"	1.750"	1 1/16UN
B058-004	2.125"	1.750"	1 1/16UN
B058-003	2.500"	2.313"	1 9/16UN



Elmar 'Double Safe' Release Joint

Hydraulic Wireline Jar

Link/Spang Jars

Wireline link jars, sometimes called spang jars or mechanical jars are of the cable tool type and utilize the weight of the stems connected immediately above to deliver effective jarring impacts, by manipulating the wireline upwards or downwards at the surface.

Manufactured from AISI 4140 110 ksi material.

The effectiveness of these impacts are largely dependant on the weight of the stem used, the length of the stroke of the jars, the size and straightness of the tubing, the viscosity of the fluid in the tube, and the well pressure acting upon the cross sectional area of wireline.

Jars are composed of two pieces linked together rather like long chain links which are free to be extended or collapsed (stroke). Jars are available in sizes 1 1/4", 1 1/2", 1 7/8", and 2 1/2" O.D. and “strokes" of 20" and 30". All wireline jars are supplied with standard wireline threads (pin and box) and fishing necks.

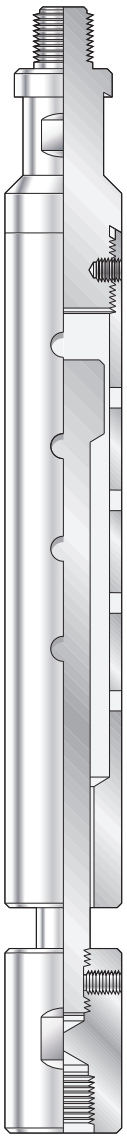
Tubular Jars

The tubular jar is designed to enable the operator to deliver effective jarring forces in conjunction with wireline running tools and other devices. By manipulating the wireline at the surface, these jarring forces can be delivered in both upward and downward directions. The effectiveness of the impact forces is largely dependant upon the weight of the stems used above the jars and the length of the stroke of the jars. However, the size and the straightness of the tubing, size and depth of the tools, density and viscosity of the fluid in the tubing, well pressure and wire size, are factors that contribute positively or negatively to the impact forces obtained.

This type of jar is particularly useful in permanent well completions, to pull both up and down as a way to aid in pulling, fishing, or gas lift operations. The jar is tubular in construction with the tube section perforated for fluid bypass to facilitate plunger movement. This jar is also especially effective in large tubing and casing as there is less tendency for malfunction due to the buckling action of the tube as might occur with a link type jar. Recommended placement of tubular jars in the wireline toolstring is directly below the wireline stem.

Link/Spang Jars				
Part Number	**O.D.**	**Fishneck O.D.**	**Connections**	**Stroke**
B157-024	1.250"	1.187"	15/16UN	20"
B157-025	1.250"	1.187"	15/16UN	30"
B157-023	1.500"	1.375"	15/16UN	20"
B157-008	1.500"	1.375"	15/16UN	30"
B157-004	1.875"	1.750"	1 1/16UN	20"
B157-010	1.875"	1.750"	1 1/16UN	30"
B157-026	2.125"	1.750"	1 1/16UN	20"
B157-018	2.125"	1.750"	1 1/16UN	30"
L-9811047255S020	2.500"	2.313"	1 9/16UN	20"
L-9811047255S030	2.500"	2.313"	1 9/16UN	30"
Bowen Tubular Jars				
Part Number	**O.D.**	**Fishneck O.D.**	**Connections**	**Stroke**
B056-055	1.000"	0.875"	5/8UN	18"
B056-010	1.250"	1.187"	15/16UN	24"
B056-049	1.500"	1.375"	15/16UN	20"
B056-008	1.500"	1.375"	15/16UN	24"
B056-050	1.500"	1.375"	15/16UN	30"
B056-002	1.875"	1.750"	1 1/16UN	20"
B056-006	1.875"	1.750"	1 1/16UN	24"
B056-003	1.875"	1.750"	1 1/16UN	30"
B056-054	2.125"	1.750"	1 1/16UN	20"
B056-013	2.125"	1.750"	1 1/16UN	24"
B056-014	2.125"	1.750"	1 1/16UN	30"
L-98110501105S024	2.500"	2.313"	1 9/16UN	24"
L-98110501105S030	2.500"	2.313"	1 9/16UN	30"

Link/Spang Jar



Tubular Jar

Standard Toolstring Tools

Elmar Low Friction Jar

Our low friction jar is ideally suited for use in deviated wells and is normally run in conjunction with roller stems which are installed immediately above.

Sliding bearings and a PTFE coated mandrel ensure a low friction action, thereby allowing full impact force from the roller stem above. The tube body is also slotted to minimise friction and fluid resistance.

Elmar Low Friction Jar				
Part Number	**O.D.**	**Fishneck O.D.**	**Connections Box & Pin**	**Stroke**
B056-063	1.500"	1.375"	15/16UN	20"
B056-064	1.875"	1.750"	1 1/16UN	20"
B056-065	2.125"	1.750"	1 1/16UN	20"
B056-066	2.500"	2.313"	1 9/16UN	20"

Elmar Mechanical Spring Jar

Our mechanical spring jar is a tool used in the wireline work string to give upward jarring impact during heavy duty fishing operations.

The mechanical spring jar operates on the well proven “shifting key" latch principle which ensures trouble free operation with the minimum of maintenance.

This jar is supplied with a calibrated box spanner to give an indication of load settings and also a release tool for manually unloading the jar.

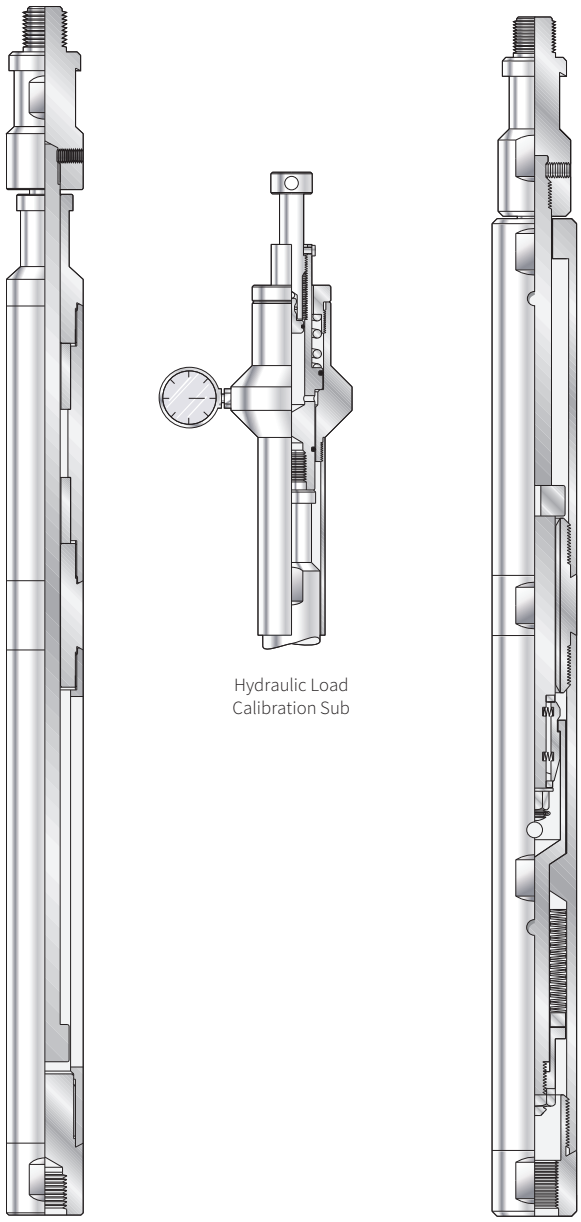
Our mechanical spring jar is available in sizes of 1 1/2", 1 7/8", 2 1/8" and 2 1/2" O.D. For standard service and can be dressed for H_2S.

Elmar Mechanical Spring Jars			
Part Number	**O.D.**	**Fishneck O.D.**	**Connections Box & Pin**
B057-055	1.500"	1.375"	15/16UN
B057-022	1.875"	1.750"	1 1/16UN
B057-068	2.125"	1.750"	1 1/16UN
B057-006	2.500"	2.313"	1 9/16UN

Hydraulic Load Calibration Sub

An hydraulic load calibration sub is available as an optional extra to allow the mechanical spring jar to be surface load set and tested prior to running in the well.

Hydraulic Load Calibration Sub		
Part Number	**O.D.**	**Connections**
B057-198-150	1.500"	15/16UN
B057-198-175	1.750"	1 1/16UN
B057-198-187	1.875"	1 1/16UN
B057-198-250	2.500"	1 9/16UN



Low Friction Jar

Hydraulic Load Calibration Sub

Mechanical Spring Jar

Elmar 'Heavy Duty' Mechanical Spring Jar

We have recognised that with the increasing use of heavier wire, operators require jars that are compatable with the higher pulling loads now achievable.

With this in mind we have made significant improvements to our existing our mechanical spring jar design to meet and exceed the operational challenges of working within this new criteria.

By strengthening the latch keys with a second load bearing shoulder and adding a stronger spring stack, the jar's performance has exceeded all expectations. Testing has proved that the our HD mechanical spring jar is now truly a jar fit for any heavy duty operation. As well as improving the performance, we have also added a feature to simplify the operational field adjustment of the jar. By simply winding an integral knurled adjuster sub, situated at the lower end of the tool, the release tension may be increased or decreased. Therefore, prior to deployment, our HD mechanical spring jar may be adjusted in situ as part of the tool string.

Internally, an adjuster aligns with a slotted window in the body which is calibrated with three radial grooves marked 'low', 'medium' and 'high', these grooves serve to indicate the load setting of the jar to the operator. All improvements have been made without losing the jar's field proven, simple working mechanism and re-dress. It is therefore possible to retro-fit existing standard jars with the new design enhancements.

Features

- Capable of consistent heavy duty operation
- Field proven latch mechanism
- Simple redress
- Can be easily adjusted on or off the toolstring
- Slick re-cocking action
- Dressed for H_2S
- Can be configured for standard or heavy duty pull loads
- Available with the field proven 'HD' Elmar Breech Lock GR quick connect system

Elmar 'Heavy Duty' Mechanical Spring Jars					
Size		1 1/2"	1 7/8"	2 1/8"	2 1/2"
Fishneck Diameter		1.375"	1.750"	1.750"	2.313"
Jar Stroke		12"	12"	12"	12"
Breech Lock 'GR' Connections					
Assembly Part Number		B057-182GR	B057-176GR	B057-178GR	B057-180GR
Upper Connection (B.L. Male)		1 1/2"	1 7/8"	1 7/8"	2 1/2"
Lower Connection (B.L. GR)		1 1/2"	1 7/8"	1 7/8"	2 1/2"
Maximum Working Tensile (lbs)		45,000	63,000	72,000	134,000
Make Up Length (Closed)		46.3"	47"	46"	55"
Weight (lbs)		18	25	34	57
Sucker Rod Thread Connections					
Assembly Part Number		B057-181	B057-168	B057-177	B057-179
Upper Connection (Pin Thread)		15/16"	1 1/16"	1 1/16"	1 9/16"
Lower Connection (Box Thread)		15/16"	1 1/16"	1 1/16"	1 9/16"
Maximum Working Tensile (lbs)		40,000	57,000	72,000	114,000
Make Up Length (Closed)		43"	43.6"	42.7"	51"
Weight (lbs)		16	20	29	50
Jar Release Load Settings (lbs)					
Heavy Duty (Dressed for H_2S Service) Disc Spring Setup	**High**	1000	3100	3100	4000
	Medium	700	1450	2090	2500
	Low	400	800	1000	1200
Standard Duty (Dressed for H_2S Service) Coil Spring Setup	**High**	450	1350	1350	1500
	Medium	375	950	950	1100
	Low	225	650	650	700

'Heavy Duty' Mechanical Spring Jar

Elmar Mechanical Combination Toolstring

The mechanical combination toolstring is normally used where toolstring length/height is a limitation.

A typical application would be running and pulling plugs from the tubing hanger in conventional or subsea wellheads where it is always desirable to close the upper swab valve in the event that the wireline is pulled from the rope socket or the toolstring gets stuck.

The mechanical combination toolstring incorporates a mechanical spring jar, accelerator, weight bar and optional integral rope socket in a compact design. This offers considerable weight/length and handling advantages. Mechanical combination toolstrings are available in 2 1/2" through to 6" diameter.

Elmar Mechanical Combination Toolstrings

Part Number	O.D.	Fishneck O.D.	Connections Box & Pin	Weight	Length
B057-091	2.5"	1.750"	1 1/16UN	36kg	69"
B057-113	3.0"	2.313"	1 9/16UN	43kg	68"
B057-126	3.5"	2.313"	1 9/16UN	45kg	64"
B057-114	4.0"	2.125"	1 9/16UN	50kg	69"
B057-134	4.5"	2.313" RS	1 1/16UN	50kg	60"
B057-138	6.0"	3.125" RS	1 9/16UN	107kg	42"

Elmar Downstroke Combination Toolstring

Our downstroke combination toolstring is normally used where toolstring length/height is a limitation.

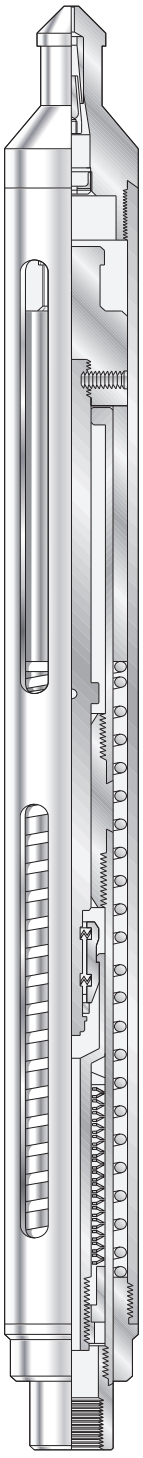
A typical application would be running and pulling plugs from the tubing hanger in conventional or subsea wellheads where it is always desirable to close the upper swab valve in the event the wireline is pulled from the rope socket or the toolstring gets stuck.

The downstroke combination toolstring incorporates a heavy wall tubular jar, acting as a weight bar and optional integral rope socket in a compact design that minimises tool length while maximising tool weight.

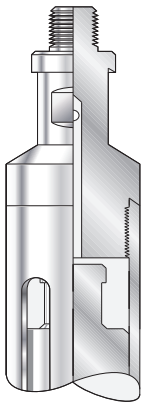
Downstroke combination toolstrings are available in 2 1/2", 3", 4 1/2" and 6" sizes.

Elmar Downstroke Combination Toolstrings

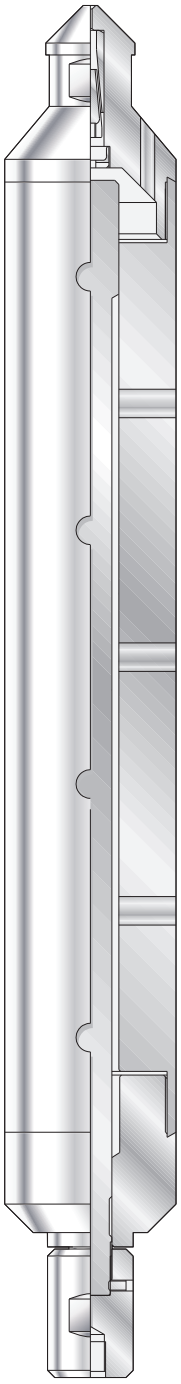
Part Number	O.D.	Rope Socket Line Size	Fishneck O.D.	Connections
B057-149	3.0"	0.108" - 0.125"	2.313"	1 1/16UN
B057-159	4.0"	0.108" - 0.125"	2.313"	1 1/16UN
B057-131	4.5"	0.108" - 0.125"	2.313"	1 1/16UN
B057-124	5.8"	0.108"	2.313"	1 1/16UN
B057-122	6.0"	0.108"	3.125"	1 9/16UN
B057-183	6.0"	0.125"	3.125"	1 9/16UN



Mechanical Combination Toolstring



Optional Threaded Top Connection



Downstroke Combination Toolstring

Standard Toolstring Tools

Wireline Knuckle Jar

Wireline knuckle jars are similar in design to the Knuckle Joint, however, the knuckle jar design incorporates a length extension of the socket that allows the ball to move vertically for light jarring.

The wireline knuckle jar has a built in double fish neck as standard.

Wireline Knuckle Joint

The knuckle joint is a wireline accessory used to provide flexibility within the wireline tool string.

Constructed with a ball and socket the knuckle joint is recommended for use within the make up of the tool string.

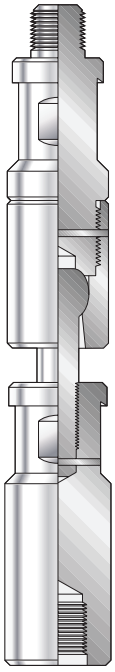
It is also recommended that a knuckle joint be placed just below the rope socket when using .108" wire or stranded line. The knuckle joint has a built in double fish neck as standard. If a knuckle joint is not built into a kickover tool, one must be used just above the kickover tool. The knuckle joint is often used to compliment knuckle-less kickover tools .

Heavy Duty Swivel Joint

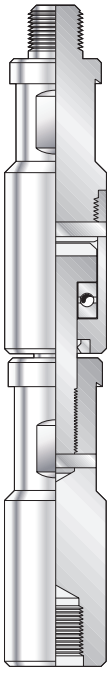
The heavy duty swivel joint is a wireline tool used to minimise the effect of line twist on any subsurface device being run.

The heavy duty swivel joint has been designed to take impact loads and can be used below the jars in a toolstring. The heavy duty swivel joint has a double fishneck feature and standard pin and box connections.

Wireline Knuckle Jar



Wireline Knuckle Joint



Heavy Duty Swivel Joint

Wireline Knuckle Jars

Part Number	O.D.	Fishneck O.D.	Connections Box & Pin
B065-002	1.250"	1.187"	15/16UN
B065-010	1.500"	1.375"	15/16UN
B065-001	1.875"	1.750"	1 1/16UN
L-9811055931	2.125"	1.750"	1 1/16UN
B065-006	2.500"	2.313"	1 9/16UN

Wireline Knuckle Joints

Part Number	O.D.	Fishneck O.D.	Connections Box & Pin
B064-056	1.000"	0.875"	5/8UN
B064-071	1.250"	1.187"	15/16UN
B064-062	1.500"	1.375"	15/16UN
B064-002	1.875"	1.750"	1 1/16UN
B064-009	2.125"	1.750"	1 1/16UN
B064-004	2.500"	2.313"	1 1/16UN
B064-003	2.500"	2.313"	1 9/16UN

Heavy Duty Swivel Joints

Part Number	O.D.	Fishneck O.D.	Connections Box & Pin
B091-006	1.500"	1.375"	15/16UN
B091-030	1.250"	1.187"	15/16UN
L-9811060747	1.750"	1.375"	1 1/16UN
B091-004	1.875"	1.750"	1 1/16UN
B091-037	2.125"	1.750"	1 1/16UN
B091-007	2.500"	2.313"	1 9/16UN

Wireline Shock Absorber

Wireline shock absorbers are used to dampen the shock transmitted to delicate downhole instruments being run into the wellbore during wireline operations.

The wireline shock absorber basically consists of a fishneck, main body, upper spring, mandrel, lower spring and bottom sub. The lower spring is usually the heavier of the two springs in that it is constantly compressed by the weight of the instruments normally suspended immediately below the shock absorber. The mandrel floats between the upper and lower springs and absorbs shock, therefore protecting the delicate downhole instruments. The wireline shock absorber is available in various sizes and is available in standard or H_2S service.

Wireline Shock Absorbers

Part Number	O.D.	Fishneck O.D.	Top Connection	Bottom Connection
B059-015	1.250"	1.187"	15/16UN	3/4 Amerada
B059-001	1.500"	1.375"	15/16UN	3/4 Amerada
B059-007	1.750"	1.375"	15/16UN	3/4 Amerada
B059-002	1.875"	1.750"	1 1/16UN	3/4 Amerada
B059-008	2.000"	1.750"	1 1/16UN	3/4 Amerada
L-9811068496	2.500"	2.313"	1 9/16UN	3/4 Amerada

Wireline Accelerator

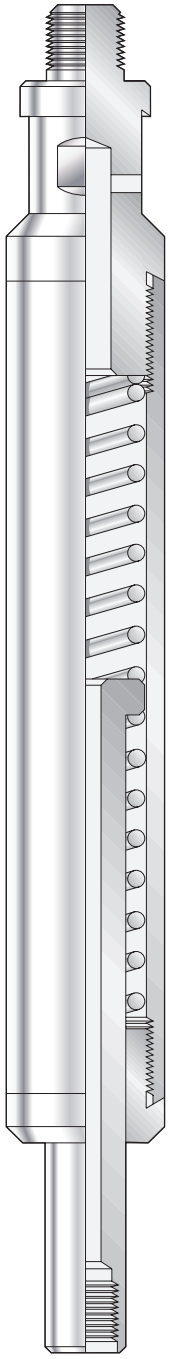
The wireline accelerator is a wireline stretch simulator device used in conjunction with hydraulic or spring jars when jarring at shallow depths in the well bore. The wireline intensifier is available in sizes from 1 1/4" to 3" O.D., in standard or H_2S trim.

Upward tension on the wireline compresses the spring within the intensifier assembly and the stored energy is transferred to the hydraulic or spring jars located further down the tool string.

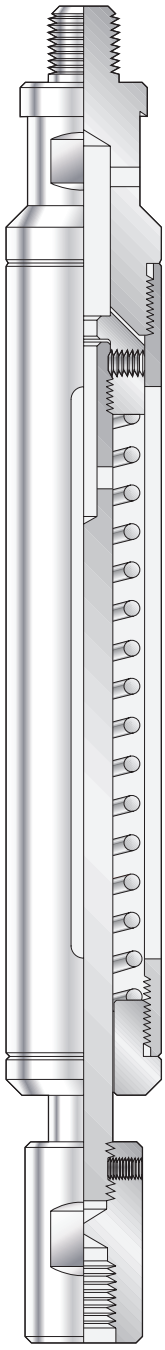
A combination of surface wireline tension and the energy stored within the spring of the accelerator will eventually cause the hydraulic or spring jar to fire, thus releasing totally the energy stored within the spring. The tension of the wireline can then be relaxed and the operation repeated until the subsurface tool is jarred free.

Wireline Accelerators

Part Number	O.D.	Fishneck O.D.	Connections Box & Pin
B060-060	1.250"	1.187"	15/16UN
B060-033	1.500"	1.375"	15/16UN
B060-027	1.750"	1.375"	15/16UN
B060-031	1.875"	1.750"	1 1/16UN
B060-028	2.125"	1.750"	1 1/16UN
B060-003	2.500"	2.313"	1 9/16UN
B060-001	3.000"	2.313"	1 9/16UN



Wireline Shock Absorber



Wireline Accelerator

Ball Orienting Impression Tool for Lead Impression Block

The Ball Orienting Impression Tool (BOIT) is an accessory tool used in conjunction with the Lead Impression Block (LIB) during fishing operations.

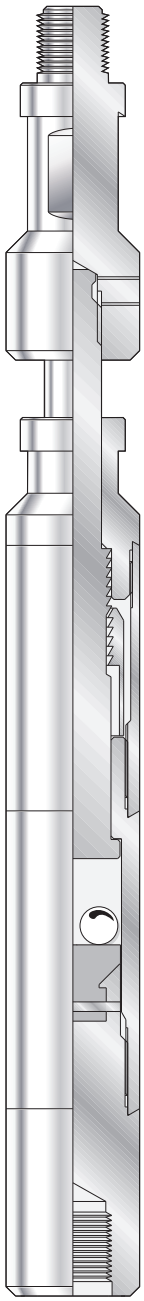
The LIB is used to take impressions of foreign objects in the tubing string. The lead impression taken will define the shape and a guide to the position of the obstruction.

The BOIT, when used with the LIB, provides a more accurate survey of the fish. A secondary lead imprint of a (free moving) ball within the BOIT is used relative to the main imprint on the LIB. The ball impression provides a datum relative to the fish as being the low side.

By calculating the angle between the two imprints a more accurate picture of the position of the fish can be formed.

Ball Orienting Impression Tool for L.I.B.'s

Part Number	O.D.	Fishneck O.D.	Top Connection
B080-032	1.500"	1.375"	15/16UN
B080-033	1.875"	1.750"	1 1/16UN
L-9811045528	2.500"	2.313"	1 1/16UN



Ball Orienting Impression Tool for LIB's

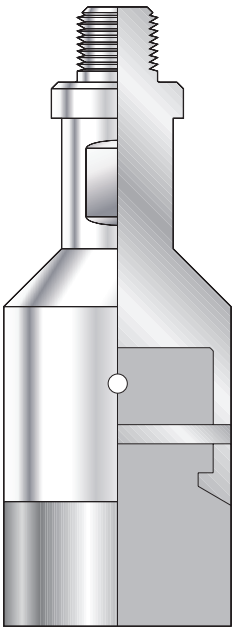
Lead Impression Block

The lead impression block is a wireline service tool used to take impressions of foreign objects in the tubing string. It is normally used during fishing operations, the impressions taken will help to define the shape and relative position of the obstruction so the proper fishing tool may be selected.

Lead impression blocks consists of a lead filled hollow steel housing, exposed at one end to enable impressions to be made in the soft lead face.

Lead Impression Blocks

Size Range	Fishneck O.D.	Top Connection
1.25" - 1.50"	1.187"	15/16UN
1.50" - 2.00"	1.375"	15/16UN
2.00" - 2.50"	1.375"	15/16UN
2.50" - 3.00"	1.750"	1 1/16UN
3.00" - 4.00"	1.750"	1 1/16UN
4.00" - 5.00"	2.313"	1 1/16UN
5.00" - 6.00"	3.125"	1 9/16UN



Lead Impression Block

Our grip release breech lock wireline tool string connection has been established for many years as one of the best multi shouldered quick release connections available on the market. This well proven connection has now been re-engineered to provide the operator with an even greater degree of reliability and simplicity of operation.

Our grip release connector combines all the principle features of the original lever type breech lock but now offers two additional benefits. A simple grip pad release is now incorporated in the design to replace the out dated lever release system. There is no longer any need for special tools or secondary levers to operate this lock.

The positive and automatic locking system prevents the plunger moving with inertia loads during jarring operations. This now provides the wireline operator with an unrivaled level of connection security during all operations.

All of the features of our original breech lock have been incorporated into the grip release. The three shouldered load bearing faces ensure strength characteristics are maximized and the ability for the connection to be incorporated into all wireline tools without the need for secondary threaded connections.

The newly engineered features in the our grip release are incorporated in the female section of the connector. This will accept all our breech lock connectors in that size and are fully interchangeable with the new grip release system.

Operation

The grip release breech lock connection consists of an upper assembly, containing the female connection, and a lower male connector sub. The upper (female) connector houses the release assembly, which comprises of a plunger, 2 springs, 2 release pawls, 2 locking inserts and 2 followers.

To lock the grip release breech lock connection. Insert the male into the female part on the next component in the toolstring.

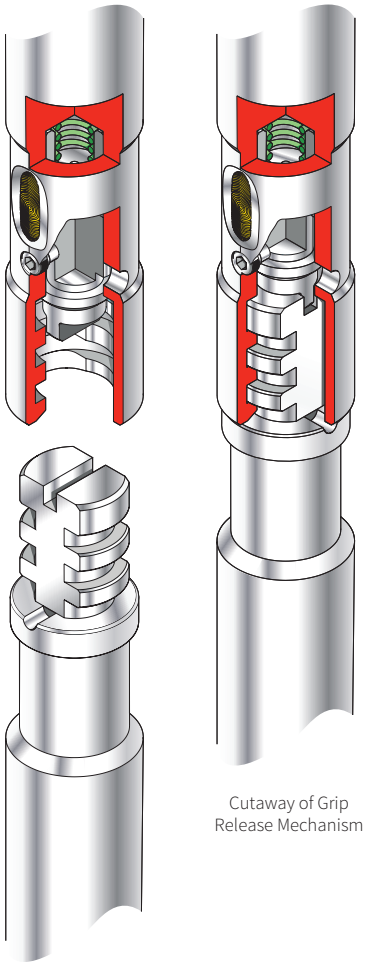
This pushes the plunger back against the spring. Rotate one quarter of a turn allowing the sprung loaded locking inserts to click into the pawl recess in the female connector, thus locking the connection.

As this action occurs, the sound of the locking inserts striking the pawls should be positively heard and felt through the pawls, which will now be sprung loaded. This is a positive field make up indication that confirms to the operator that the joint is locked out.

To unlock the grip release breech lock connection. Simply press the two grip pads fully in and rotate the male part of the connector one-quarter turn. This will release the sprung loaded plunger, which will positively unlatch the joint.

Features

- Simple finger grip quarter turn release action
- Jar safe, positively locked out plunger makes this connection ideally suited to heavy duty jarring operations
- Stronger than the corresponding toolstring screwed connection
- Safe and simple make-up characteristics help to eradicate the possible risk of operator injury, which can occur during conventional wrench make-up and break out
- Positive field indication that the joint is locked out
- Three load bearing surfaces in each direction spreading the impact loads more evenly than the single or double shoulder quick locks, making it suitable for heavy and prolonged Wireline operations



Cutaway of Grip Release Mechanism

Slickline HDC Connection

Our slickline HDC connection has been designed to be compatible with the HDQRJ connection. This well proven connection has now been engineered to provide the operator with an even greater degree of reliability and simplicity of operation.

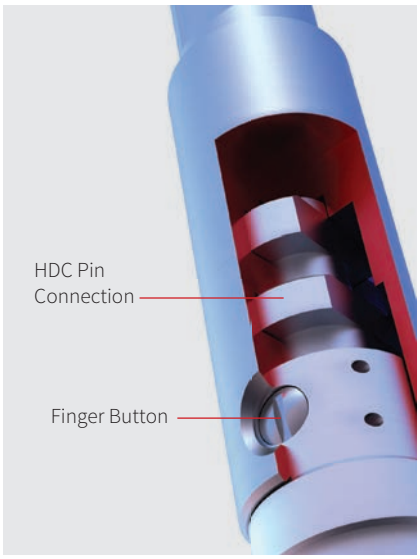
The slickline HDC connection has a simple button release feature incorporated into the design. There is no longer any need for special tools or secondary levers to operate this connection.

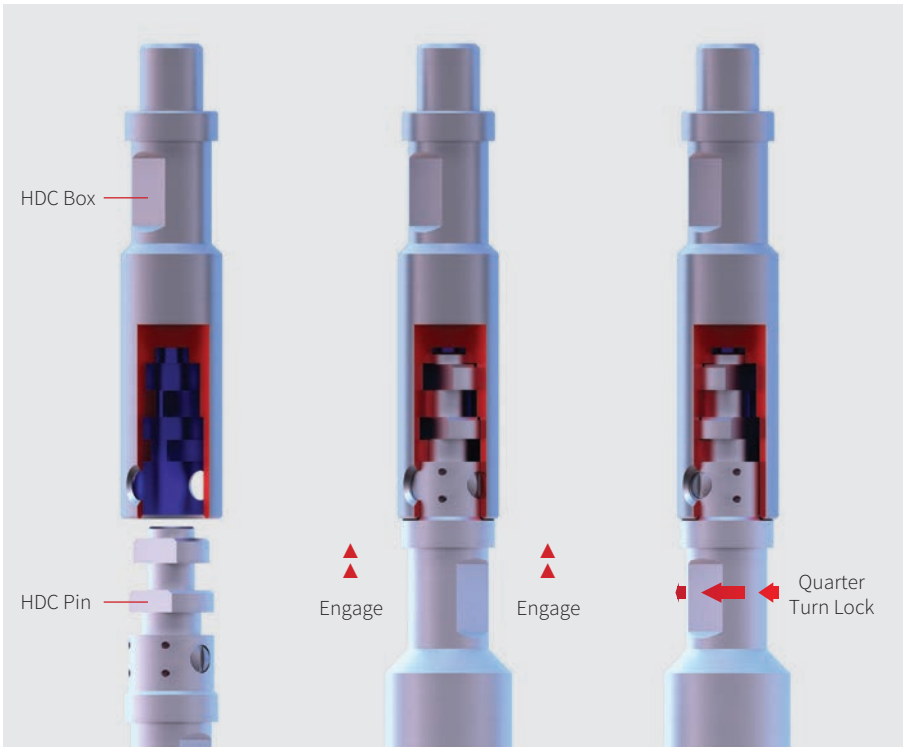
The positive and automatic locking system provides the wireline operator with an unrivaled level of connection security during all operations.

The slickline HDC connection can be incorporated into all wireline tools without the need for secondary threaded connections.

Features

- Simple finger button and quarter turn release action
- Stronger than the corresponding toolstring threaded connection
- Safe and simple make-up characteristics help to eradicate the possible risk of operator injury, which can occur during conventional wrench make-up and break out
- Positive field indication that the joint is locked out
- Suitable for heavy and prolonged wireline operations





Slickline QLS Connection

In 1987 Petroline (now Weatherford) introduce the QLS™ quick lock system to replace traditional sucker rod connections.

This connection allows for rapid make-up and break out of toolstrings and eliminates the need for use of pipe wrenches.

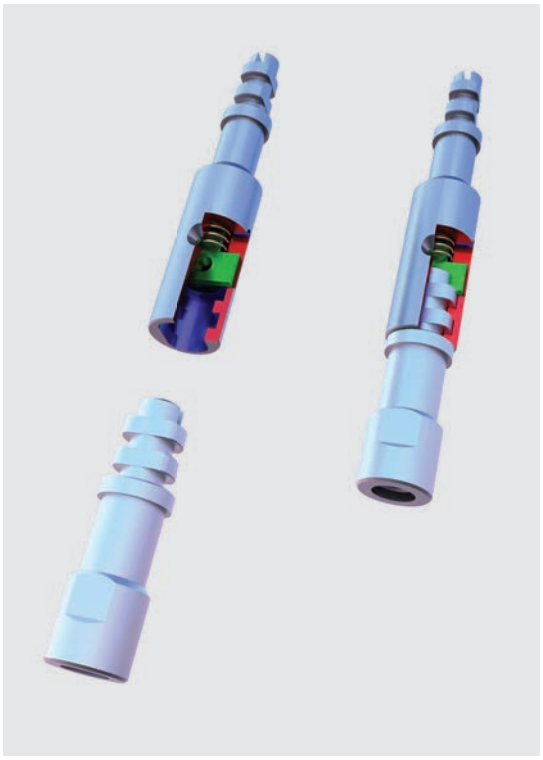
We are able to offer all tool string components with Licensed Petroline QLS connections. These connections are made under a license from Weatherford and are manufactured to the same high standard that is synonymous with Petroline equipment.

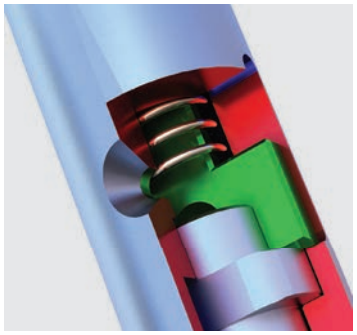
Features

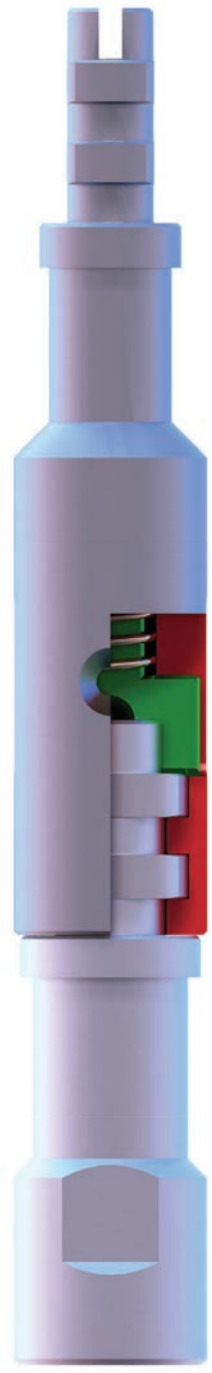
- Positive locking mechanism
- Simple disconnection without need for pipe wrenches
- Range of sizes available

Benefits

- Save operating time during make-up and break out
- No potential of pressure locking
- Reduces the risk of personnel injury



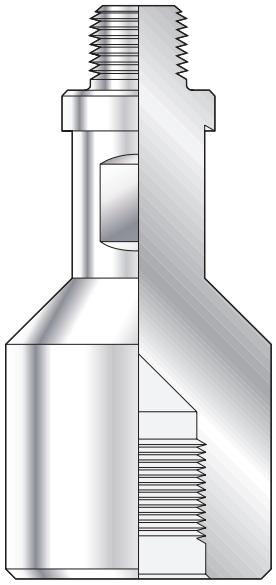




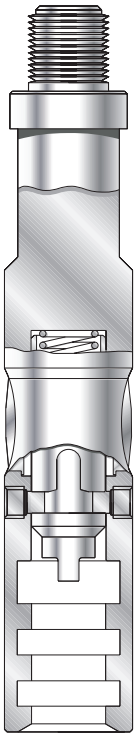
Slickline QLS Connection

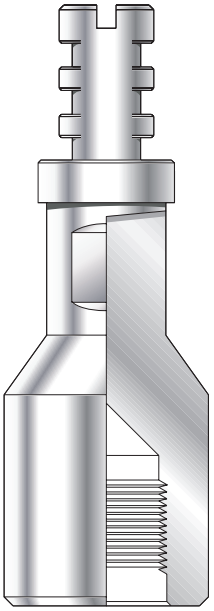
Wireline Cross Over

The wireline cross over is a wireline toolstring adapter designed to connect two tool string items with incompatible threads. Below is a selection of standard options, other sizes are available on request.



Wireline Crossover





Male & Female 'Grip Release' Breech Lock Wireline Toolstring Crossovers

Wireline Pin To Box Cross Overs

Part Number	Pin Connection	Box Connection	Fishneck O.D.
00-00320	15/16UN	1 1/16UN	1.375"
00-00321	15/16UN	3/4 Amerada	1.375"
00-00329	1 1/16UN	15/16UN	1.750"
00-02280	1 1/16UN	1 9/16UN	1.750"
00-02279	1 9/16UN	1 1/16UN	2.313"
00-02278	1 9/16UN	15/16UN	2.313"
00-02282	15/16UN	1 9/16UN	2.313"
00-02281	3/4 Amerada	1 1/16UN	1.375"
00-02283	1 1/16UN	3/4 Amerada	1.750"
00-00735	3/4 Amerada	15/16UN	1.375"
00-01707	1 1/16UN	Drain Rod	1.750"

Wireline Pin To Pin Connectors

Part Number	Pin Connection	Pin Connection	Fishneck O.D.
00-01704	15/16UN	15/16UN	1.375"
00-01705	1 1/16UN	1 1/16UN	1.750"
L- 9821070976	1 9/16UN	1 9/16UN	2.313"

Wireline Box To Box Connectors

Part Number	Pin Connection	Pin Connection	Fishneck O.D.
00-01701	15/16UN	15/16UN	1.375"
00-01702	1 1/16UN	1 1/16UN	1.750"
00-01703	1 9/16UN	1 9/16UN	2.313"

Elmar Wireline 'Grip Release' Breech Lock Female Wireline Toolstring Cross Overs

Part Number	Size	Service	Fishneck O.D.	Top Connection	Lower Connection
B063-065GR	1 1/2"	Standard	1.375"	1 1/2" BL Female	15/16-10 Pin
B063-066GR	1 7/8"	Standard	1.750"	1.875" BL Female	1 1/16-10 Pin
B063-069GR	2 1/2"	Standard	2.313"	2.500" BL Female	1 9/16-10 Pin

Elmar Wireline 'Grip Release' Breech Lock Male Wireline Toolstring Cross Overs

Part Number	Size	Service	Fishneck O.D.	Top Connection	Lower Connection
00-08802	1 1/2"	Standard	1.375"	1 1/2" BL Male	15/16-10 Box
00-08604	1 7/8"	Standard	1.750"	1.875" Male	1 1/16-10 Box
00-09648	2 1/2"	Standard	2.313"	2.500" BL Male	1 9/16-10 Box

Anti Blow-Up Tool

Anti blow-up tools are particularly useful as part of a toolstring when downhole instruments are to be deployed into a multi zone completion well.

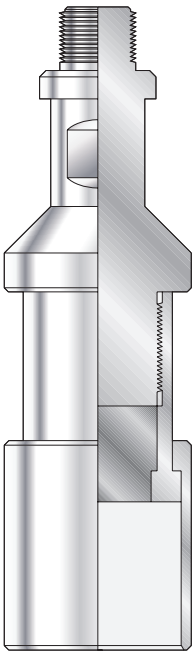
The anti blow-up tool will help to prevent a toolstring being blown up the production string if the differential flow rates between zones should try to push the toolstring upwards.

The anti blow-up tool has been designed so that if the lower part of the toolstring starts to lift, two arms are thrown outward to lock into the tubing wall, stopping any further upward movement. The lock is released by upward tension on the string which lifts the upper body of the tool and closes the arms, releasing the toolstring.

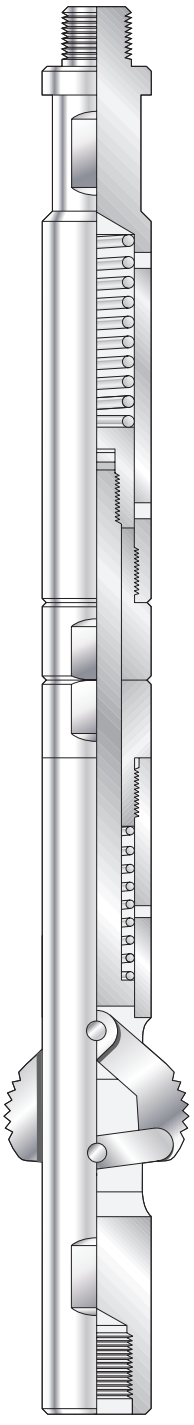
Anti blow-up tools are available to suit a range of tubing sizes.

Anti Blow-Up Tools

Part Number	O.D.	O.D. Dogs Expanded	Fishneck O.D.	Connections
B100-001	2.375"	2.010"	1.375"	15/16UN
B100-002	2.875"	2.441"	1.375"	15/16UN
B100-003	3 1/2"	2.992"	1.375"	15/16UN
B100-005	4 1/2"	3.958"	1.750"	1 1/16UN
L-17469631-001	5 1/2"	5.020"	1.750"	1 9/16UN



Skirted Magnet



Anti-Blow-Up Tool

Skirted Magnet

The skirted magnet is a wireline service tool used to magnetically attract and retrieve ferrous debris lost in the well bore.

Skirted magnets consists of a top sub, body, skirt and magnet. The top sub has standard wireline thread and fishing neck. The skirt is made from non ferrous material, its main purpose being to stop the ferrous debris picked up in the well from being dislodged during retrieval of magnet from the well.

Skirted magnets are available in sizes from 1 ½" O.D. through 6" O.D.. Non skirted magnets are also available on request.

Skirted Magnets

O.D.	Fishneck O.D.	*Max Pull Force (kg)	Top Connection
1.250"	1.187"	4	15/16UN
1.500"	1.187"	4	15/16UN
1.750"	1.375"	4	15/16UN
2.000"	1.375"	15	15/16UN
2.250"	1.375"	33	15/16UN
2.500"	1.375"	60	15/16UN
3.000"	1.750"	60	1 1/16UN
4.000"	1.750"	130	1 1/16UN
5.000"	2.313"	130	1 1/16UN
6.000"	3.125"	130	1 9/16UN

Note: *Requires full face magnet face contact

Non-Skirted / Bar Magnets

Part Number	O.D.	Fishneck O.D.	Top Connection
L- 17879672-002	1.800"	1.375"	15/16UN
L- 17879513-002	2.000"	1.187"	15/16UN
L- 17879672-003	2.200"	1.375"	15/16UN
L- 17879514-002	2.500"	1.375"	15/16UN
L- 17879514-003	2.700"	1.375"	15/16UN
L- 17879515-002	3.000"	1.75"	1 1/16UN
L- 17879678-002	3.400"	1.375"	15/16UN
L- 17879516-002	3.500"	1.75"	1 1/16UN
L- 17879680-002	4.500"	2.313"	1 9/16UN
L- 17879685-002	5.500"	2.313"	1 9/16UN

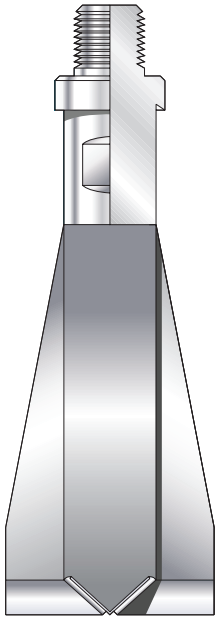
Star Bit Chisel

The star bit chisel is a wireline service tool designed to help break up sand and other debris that has bridged within the tubing.

Star bit chisels are designed to enable the operator to jar down heavily to clear any obstruction, and can be run in conjunction with our wireline broaches and tubing gauge cutters to ensure any obstructions are totally cleared.

The star bit chisel is available in a range of sizes to suit all standard tubing dimensions.

Star Bit Chisels		
Size Range	**Fishneck O.D.**	**Top Connection**
1.50" - 2.00"	1.375"	15/16UN
2.00" - 2.50"	1.375"	15/16UN
2.50" - 3.00"	1.750"	1 1/16UN
3.00" - 4.00"	1.750"	1 1/16UN
4.00" - 5.00"	2.313"	1 1/16UN
5.00" - 6.00"	3.125"	1 9/16UN



Star Bit Chisel

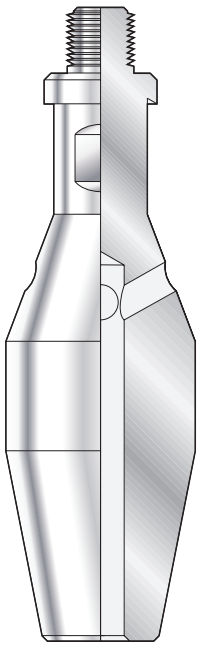
Tubing Swage

Tubing swages are used to swage out mashed or lightly collapsed tubing areas and other obstructions in the tubing string to ensure free passage of the subsurface devices. It is sometimes used to open 'orange peel' type bull plugs on the lower end of the tubing.

Tubing swages have a top threaded connection, fishneck and is tapered at both ends. Since the waist of the tool is approximately equal to the drift diameter of the tubing, fluid bypass is provided by a central bore and lateral ports.

When ordering this product please specify part number and the actual O.D. of tool required.

Tubing Swages		
Size Range	**Fishneck O.D.**	**Top Connection**
1.25" - 1.50"	1.187"	15/16UN
1.50" - 2.00"	1.375"	15/16UN
2.00" - 2.50"	1.375"	15/16UN
2.50" - 3.00"	1.750"	1 1/16UN
3.00" - 4.00"	2.313"	1 1/16UN
4.00" - 5.00"	2.313"	1 1/16UN
5.00" - 6.00"	3.125"	1 9/16UN



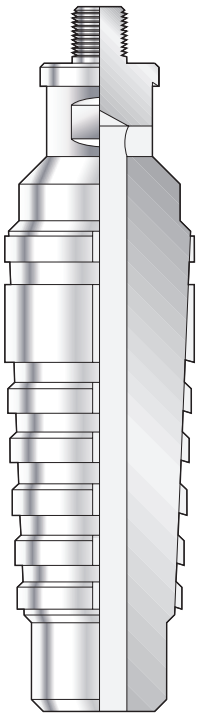
Tubing Swage

Straight Cut Broach

The straight cut broach is a hardened tempered cutting tool used to broach out restrictions of what ever nature in the wellbore.

Each broach is capable of broaching out approximately 0.1" depending on the material type to be removed. The broach should therefore be ordered as a set to broach from restricted I.D. to the I.D. required.

Straight Cut Broaches		
Size Range	Fishneck O.D.	Top Connection
1.5" - 2.0"	1.375"	15/16UN
2.0" - 2.5"	1.375"	15/16UN
2.5" - 3.0"	1.750"	1 1/16UN
3.0" - 4.0"	1.750"	1 1/16UN
4.0" - 5.0"	2.313"	1 1/16UN
5.0" - 6.0"	3.125"	1 9/16UN



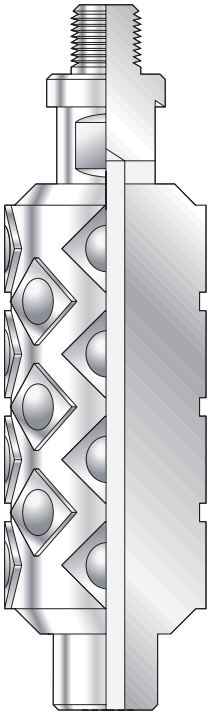
Straight Cut Broach

Diamond Cut Broach

The diamond cut broach is a heavy duty hardened and tempered cutting tool used to broach out restrictions of whatever nature in the well bore.

Each broach is capable of broaching out approximately 1/10" of an inch depending on the type of material to be removed. The broach should therefore be ordered as a set to broach from restricted I.D. to the I.D. required.

Diamond Cut Broaches		
Size Range	Fishneck O.D.	Top Connection
1.50" - 2.00"	1.375"	15/16UN
2.00" - 2.50"	1.375"	15/16UN
2.50" - 3.00"	1.750"	1 1/16UN
3.00" - 4.00"	1.750"	1 1/16UN
4.00" - 5.00"	2.313"	1 1/16UN
5.00" - 6.00"	3.125"	1 9/16UN



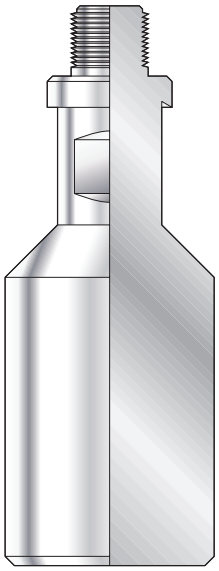
Diamond Cut Broach

Blind Box

Blind boxes are used to beat down an obstruction encountered in the tubing string. It is also widely used to cut wireline on a rope socket during fishing operations.

The blind box is approximately nine inches long with a male thread connection and fishneck facing upwards and flat bottom down. The diameter of the blind box should normally be matched to the tubing in which it is to be used.

Blind Box		
Size Range	**Fishneck O.D.**	**Top Connection**
1.00" - 1.24"	0.875"	5/8UN
1.25" - 1.50"	1.187"	15/16UN
1.50" - 2.00"	1.375"	15/16UN
2.00" - 2.50"	1.375"	15/16UN
2.50" - 3.00"	1.750"	1 1/16UN
3.00"- 4.00"	1.750"	1 1/16UN
4.00" - 5.00"	2.313"	1 1/16UN
5.00" - 6.00"	2.313"	1 9/16UN
6.01" - 7.00"	2.313"	1 9/16UN



Blind Box

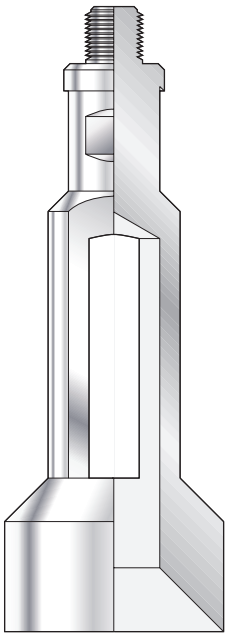
Tubing Gauge Cutter

Tubing gauge cutters are a wireline tool designed to gauge and scrape clean the I.D. of the tubing.

The cutter O.D. should be selected very close to the I.D. of the tubing in which it is run. It should be used prior to running or pulling a subsurface control. This assures the operator that the tubing is clear down to the point to which a sub surface device has to be run.

The tubing gauge cutter may also be used as a paraffin/wax cutter.

Tubing Gauge Cutters		
Outside Diameter	**Fishneck O.D.**	**Top Connection**
1.25" - 1.50"	1.187"	15/16UN
1.50" - 2.00"	1.375"	15/16UN
2.00" - 2.50"	1.375"	15/16UN
2.50" - 3.00"	1.750"	1 1/16UN
3.00"- 4.00"	1.750"	1 1/16UN
4.00" - 5.00"	2.313"	1 1/16UN
5.00" - 6.00"	3.125"	1 9/16UN



Tubing Gauge Cutter

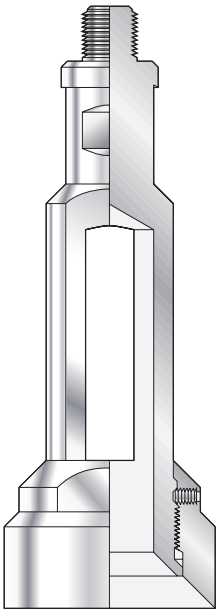
Tubing Gauge Cutter Ring Mandrel

The gauge cutter ring set is a wireline service tool designed to operate as a standard gauge cutter, but with the added facility of being able to interchange different size gauge cutters on a standard carrier.

Gauge cutter ring sets are of primary benefit where an operation requires a number of gauge cutters of similar diameter to be run. This flexibility means that there is no need to keep a large inventory of different size gauge cutters.

Tubing Gauge Cutter Ring Sets

Part Number	Size Range	Fishneck O.D.	Top Connection
B016-059	1.25" - 2.50"	1.187"	15/16UN
B016-060	1.50" - 3.00"	1.375"	15/16UN
B016-061	3.00" - 6.00"	1.750"	1 1/16UN



Gauge Cutter Ring Mandrel

Tubing Gauge Cutter/Sample Collector

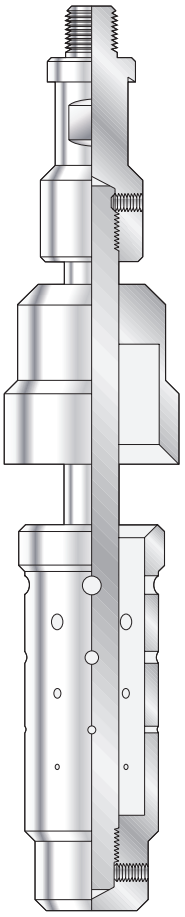
The gauge cutter/sample collector is a wireline service tool that allows the operator to collect and retain samples of scale or wax attached to the tubing wall.

A downward movement of the assembly will lift the gauge cutter ring and any debris will fall into the collection chamber below. When the gauge cutter/sample collector is picked up the gauge cutter ring will close and cover the chamber retaining the samples for analysis on surface.

Gauge cutter/sample collectors are available in all sizes for tubing and nipple profiles.

Tubing Gauge Cutter/Sample Collectors

Part Number	Tubing Size	Fishneck O.D.	Gauge Cutter O.D.	Sample Collector O.D.	Top Connection
B016-062	2 3/8"	1.375"	1.730"	1.620"	15/16UN
B016-063	2 7/8"	1.375"	2.200"	2.080"	15/16UN
B016-064	3 1/2"	1.375"	2.730"	2.530"	15/16UN



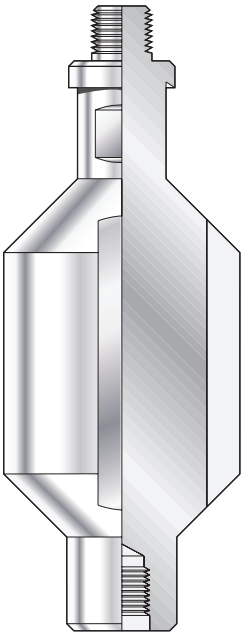
Gauge Cutter Sample Collector

Fluted Centralizer

The fluted centralizer is a wireline tool designed to ensure that the work string running or pulling tool is at its most central position, especially during operations in deviated wells.

Normally attached to the tool string just above the running/pulling, or fishing tool, the O.D. is machined to suit the I.D. of the tubing in which it is to be run. This allows the tool to be used as a tubing drift or gauge in addition to centralizing the tool string.

Fluted Centralizers		
Size Range	**Fishneck O.D.**	**Top Connection**
1.5" - 2.5"	1.375"	15/16UN
2.5" - 3.5"	1.750"	1 1/16UN
3.5" - 4.5"	2.313"	1 9/16UN
4.5" - 6.0"	2.313"	1 9/16UN



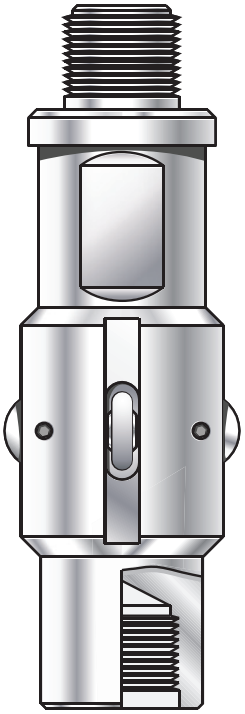
Fluted Centralizer

Wireline Roller Centralizer

The wireline roller centralizer is designed to be run in conjunction with low friction toolstrings into deviated wells, where a degree of toolstring centralization is desirable.

The multiple wheels help overcome the friction caused by the contact of the toolstring against the tubing wall.

Roller Centralizers			
Tubing O.D.	**O.D. (Across Wheels)**	**Fishneck O.D.**	**Connections**
2 3/8"	1.750"	1.375"	15/16UN
2 7//8"	2.250"	1.750"	1 1/16UN
3 1/2"	2.250"	1.750"	1 1/16UN
4 1/2"	3.400"	2.313"	1 1/16UN



Roller Centralizer

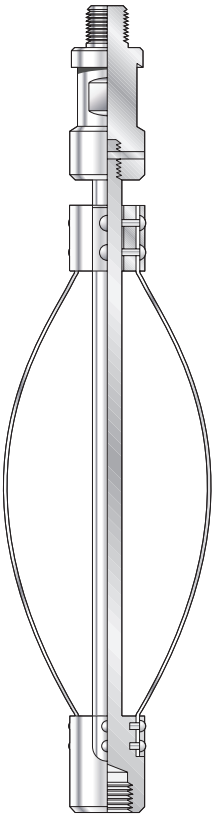
Bow Spring Centralizer

The bow spring centralizer is designed for use with slickline toolstrings or when running downhole gauges out through the tail pipe and into the casing.

The bow spring centralizer is able to pass through the restricted bores of the tail pipe and expand into the casing liner below thus enabling the tools to be held away from the casing.

The range of the standard tool enables it to pass through a 2" restriction and expand up to 4" diameter.

Roller Centralizers				
Part Number	**O.D. Range**	**O.D.**	**Fishneck O.D.**	**Top Connection**
B082-012	2.0" - 4.0"	1.500"	1.375"	15/16UN
L-9811054607	2.0" - 4.0"	1.750"	1.750"	1 1/16UN



Bow Spring Centralizer

Standard Toolstring Tools

Elmar Roller Conveyance System

Our RCS (Roller Conveyance System) is specifically designed to allow slickline toolstring access to highly deviated well bores through a combination of multi-ball roller surface contact area and fluted helix design.

The tool (which is a non-wheeled device) provides one of the highest roller contact areas available per cm of tool length.

The RCS is a device used to facilitate the movement of a slickline tool string along a highly deviated well to the target location point down the production tubing. Typically three RCS units are run on a tool string, with a swivel joint directly below the rope socket, and as a guide one below the swivel joint and one either side of the mechanical jars.

Fluted Body

The flutes in the body are designed for maximum fluid bypass and the helical twist allows multiple ball contact with the tubing wall.

The RCS is available in a range of sizes to cover all toolstrings diameters including 1 ½", 1 ⅞", 2 ⅛" and 2 ½" allowing access to all standard tubing sizes.

Connections available include threaded SR, Breech Lock, QLS & HD (HDQRJ compatible).

FeaturesHigh contact area for shorter tool length
- No axles or shafts
- Helically fluted
- Available with a range of tool connections

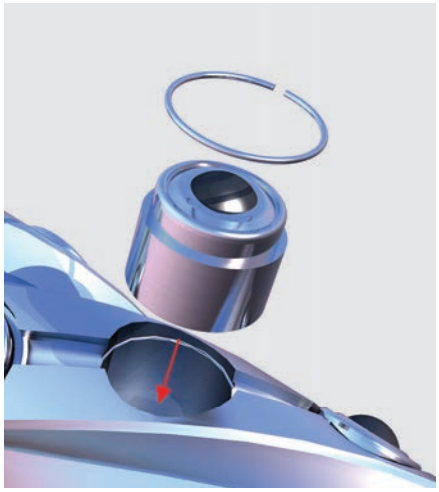
BenefitsEnsures good rolling effect in tubing
- Minimum maintenance required
- Maximum fluid bypass
- No crossovers needed for connection with existing tools

Ball Transfer Units

The ball system incorporated in the body of the tool is of a premium grade and well proven in many different industrial situations. The close tolerance and the fact that there are no shafts or axles (as found in wheeled systems) to break or seize make the system highly reliable and require minimal maintenance.

The RCS is a simple design which comprises a machined body fitted with magnetic stainless steel BTUs (Ball Transfer Units) and Inconel retaining rings. Because of the limited number of different components, assembly and BTU replacement is easy. Furthermore, the BTUs are fitted with PTFE scraper seals which means that they are self-lubricating and self-cleaning. The balls themselves are made from a non-metallic compound so adhesive wear (galling) is unlikely. The same BTUs are used for the three most common tool sizes (2.5", 3", 3.5") but alternative units are used for other tool sizes.

Ball transfer units



Part Numbers

Part Number	Nominal Roller Diameter	Effective Roller Diameter	Length	Weight	Fishneck	Connection
L-9811050063	2.000"	1.850"	17.0"	3.4kg	1.375"	15/16UN
L-9811050018	2.500"	2.440"	18.0"	6.1kg	1.750"	1 1/16UN
L-9811050064	3.000"	2.940"	19.0"	8.2kg	1.750"	1 1/16UN
L-9811050065	3.500"	3.500"	22.7"	12.8kg	1.750"	1 1/16UN
L-9811050066	4.000"	TBA	25.0"	21.2kg	1.750"	1 1/16UN

Note: Additional sizes and connections available on request.

Slip Over Bow Spring Centralizer

The slip over bow spring centralizer is designed for use with wireline toolstrings where the overall toolstring length is a consideration.

To minimise on length, the slip over centralizer comprises a short sub which is made up to the toolstring. The upper sleeve of the centralizer is then anchored to a groove in the short sub with grub screws.

The lower portion of the centralizer is sized to slip over the standard toolstring O.D.

This slip over centralizer is also available for mono-conductor toolstrings.

Slip Over Bow Spring Centralizers				
Part Number	**O.D. Range**	**Toolstring Diameter**	**Fishneck O.D.**	**Top Connection**
B082-088	2.13" - 5.50"	1.500"	1.375"	15/16UN
B082-089	2.50" - 5.90"	1.875"	1.750"	1 1/16UN
B082-090	2.75" - 6.13"	2.125"	1.750"	1 1/16UN
L-9811058778	3.13" - 6.50"	2.500"	2.313"	1 1/16UN

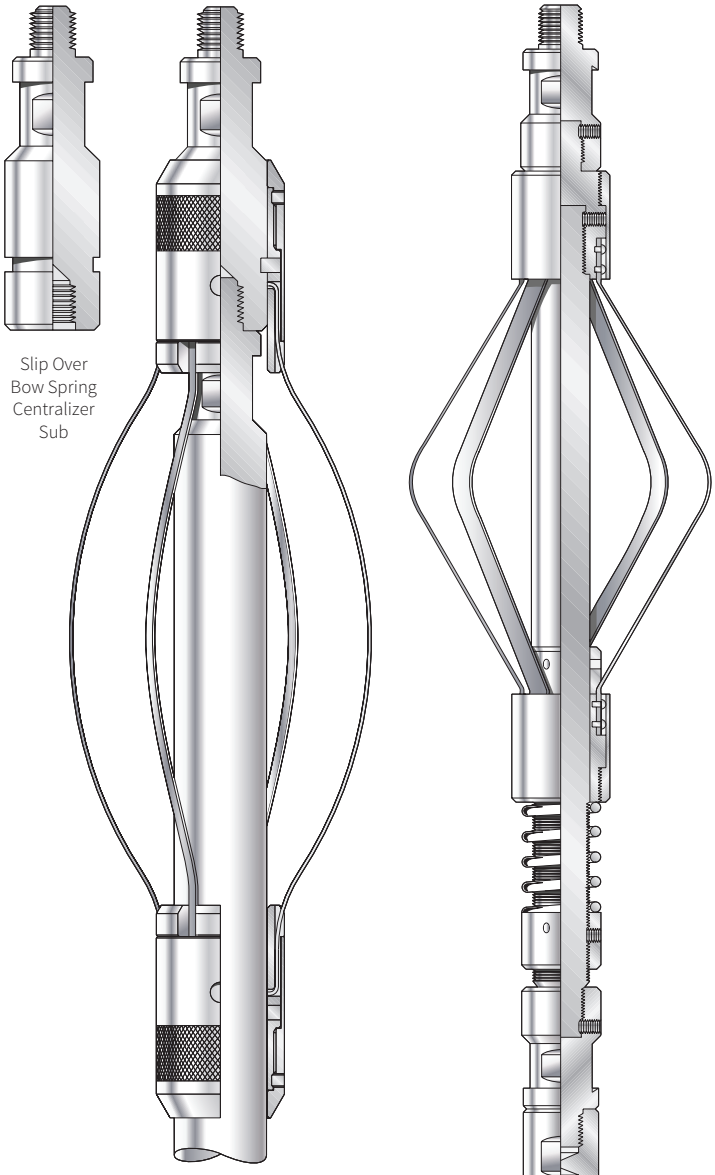
Adjustable Spring Centralizer

The adjustable spring centralizer is designed for use with slickline toolstrings or when running downhole gauges out through the tail pipe and into the casing.

Adjustable spring centralizers are able to pass through the restricted bores of the tail pipe and expand into the casing liner below thus enabling the tools to be held away from the casing.

The range of the standard tool enables it to pass through a 2 1/4" restriction and expand up to 7" diameter. Also the tension of the bow spring can be adjusted to allow for the weight of the toolstring, it has to support.

Adjustable Spring Centralizers				
Part Number	**O.D. Range**	**Fishneck O.D.**	**Top Connection**	**Bottom Connection**
B082-002	2" - 7"	1.75"	1 1/16UN	1 1/16UN



Slip Over Bow Spring Centralizer Sub

Slip Over Bow Spring Centralizer

Adjustable Spring Centralizer

Wireline Scratcher

The wireline scratcher is a wireline service tool used to loosen paraffin accumulation from the inside wall of the tubing.

Normally run while flowing the well on a choke, the wire scratcher scrapes the paraffin accumulation, and the loosened wax is then flowed out of the tubing. Several short runs down the tubing and back are recommended for the best results.

Wireline Scratchers

Part Number	Outside Diameter	Fishneck O.D.	Top Connection	Length
B061-044	1.000"	0.875"	5/8UN	18"
B061-043	1.000"	1.375"	15/16UN	18"
B061-024	1.500"	1.375"	15/16UN	18"
B061-042	1.875"	1.750"	1 1/16UN	18"
B061-031	2.500"	2.313"	1 1/16UN	18"
B061-045	2.125"	1.750"	1 1/16UN	18"

Wireline Brush

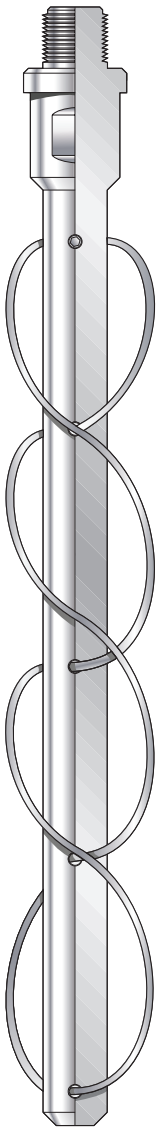
The wireline brush is used to brush out scale, waxes or packing debris from the tubing string and tubing nipples prior to running the subsurface devices.

Wireline brushes consist of a wireline sinker bar with 0.25" diameter holes drilled at varying intervals along the length of the bar. Grub screws are then used to hold the brush cable in position.

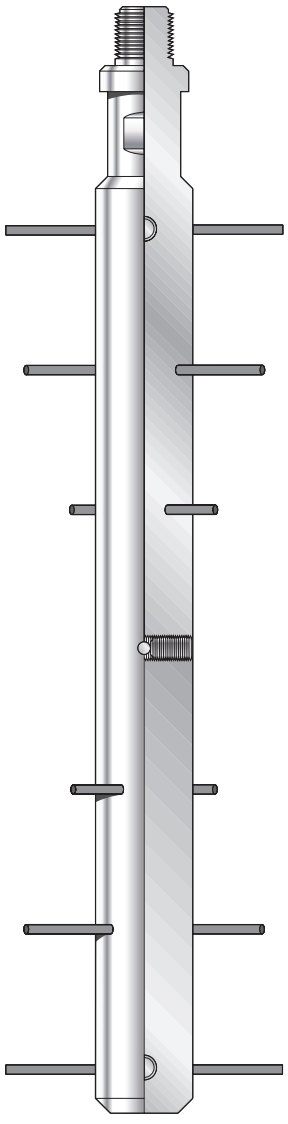
Wireline Brushes

Part Number	Outside Diameter	Fishneck O.D.	Top Connection	Length
B061-009	1.375"	1.375"	15/16UN	25"
B061-007	1.875"	1.750"	1 1/16UN	25"
B061-012	2.500"	1.750"	1 1/16UN	25"
B061-004	4.000"	2.313"	1 1/16UN	18.5"
L-9811056467	3.000"	2.313"	1 1/16UN	16.5"
L-9811063344	3.500"	2.313"	1 1/16UN	18.5"

Note: Wire not supplied. Shown for example purposes only.



Wireline Scratcher



Wireline Brush

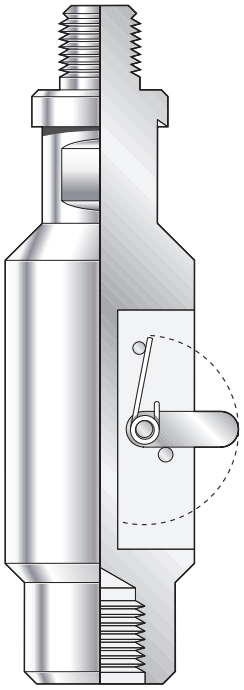
Tubing End Locator

The tubing end locator is used for depth correlation purposes.

Tubing end locators consist of a slotted body in which a spring loaded trigger is retained by a pivot pin. A shear pin limits the outward travel or rotation of the trigger so that, when the tool emerges from the lower end of the tubing, the trigger will swing to a maximum reach position approximately perpendicular to the body and will not be allowed to re-enter the tubing until the shear pin is cut.

Tubing End Locators

Part Number	Body O.D.	Tubing Sizes	Fishneck O.D.	Connections
B062-007	1.50"	2 3/8" & 2 7/8"	1.375"	15/16UN
B062-005	1.75"	2 7/8" & 3 1/2"	1.375"	15/16UN
B062-008	2.00"	2 7/8" & 3 1/2"	1.750"	1 1/16UN
B062-002	2.50"	3 1/2" & 4 1/2"	1.750"	1 1/16UN
B062-003	3.50"	5 1/2" & 7"	2.313"	1 9/16UN



Tubing End Locator

Two Arm Repeatable Tubing End Locator

The two arm repeatable tubing end locator is used for depth correlation purposes.

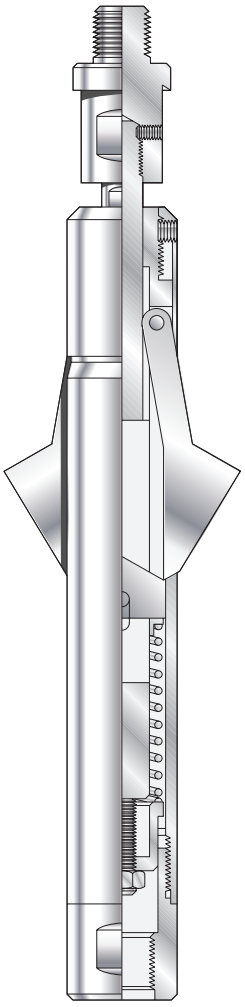
The two arm repeatable tubing end locator consists of two arms designed to expand and catch on the lower end of the tubing whenever an overpull is taken to correlate depth. Light jarring is then required to compress the main spring to allow the arms to retract into the body and permit the tool to re-enter the tubing.

The principle advantage of this tool is that it can be used to correlate depth repeatedly without the need to come out of the wellbore to redress the tool.

The two arm repeatable tubing end locator is available in sizes to suit all standard tubing I.D.s.

Two Arm Repeatable Tubing End Locators

Part Number	To Suit Tubing Sizes	Fishneck O.D.	Connections
B062-014	2 3/8" & 2 7/8"	1.375"	15/16UN
B062-018	2 7/8" & 3 1/2"	1.750"	1 1/16UN
B062-015	3 1/2" & 4 1/2"	1.750"	1 1/16UN
B062-016	4 1/2" & 5 1/2"	2.313"	1 1/16UN



Two Arm Repeatable Tubing End Locator

Sample/Drive Down Bailers

The sample/drive down bailer is a wireline service tool used to take debris from the site of obstruction in the tubing or casing.

The sample/drive down bailer consists of a top sub, bailer tube and a ball or flapper mule shoe. The ball or flapper opens when the bailer assembly is jarred into the debris and closes when the bailer is jarred out of the debris. The angled mule shoe helps to cut into the debris. Standard sample/drive down bailer tubes are 5' long.

Sample/drive down bailers are designed to take debris samples from the site of obstruction in the tubing. Standard sample/drive down bailer tubes are 2' long.

Please specify bailer shoe sizes and configuration when ordering.

Optional Bailer Shoe Configurations

A) *Ball type bailer shoe
B) *Flapper type bailer shoe
C) *Junk catcher type bailer shoe

* All bailer shoe configuration options are also available with mule shoe bottoms.

Sand Pump Bailers

The sand pump bailer is a wireline service tool used to clear debris which has settled on top of the subsurface equipment preventing recovery of the equipment by regular wireline operations.

The sand pump bailer is a pump type tool which operates on the conventional lift pump and piston principle.

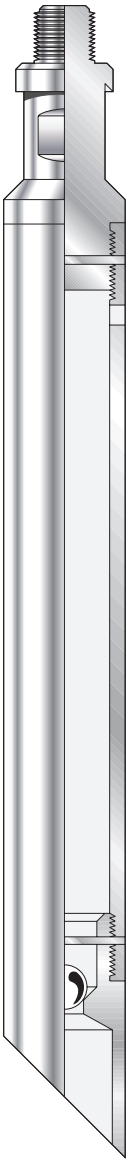
A double male adapter sub and extension bailer tube are available as optional extras in the event of large volume bailing operations.

Please specify bailer shoe sizes and configuration when ordering.

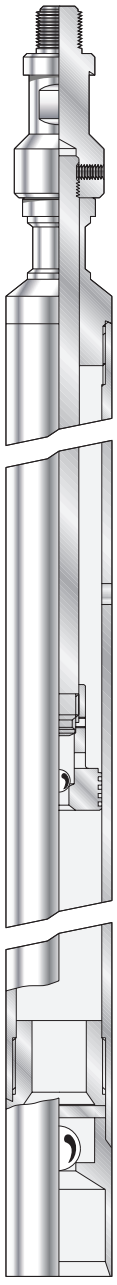
Optional Bailer Shoe Configurations

A) *Ball type bailer shoe
B) *Flapper type bailer shoe
C) *Junk catcher type bailer shoe

* All bailer shoe configuration options are also available with mule shoe bottoms.



Sample/Drive Down Bailer



Sand Pump Bailer

Sample/Drive Down Bailers

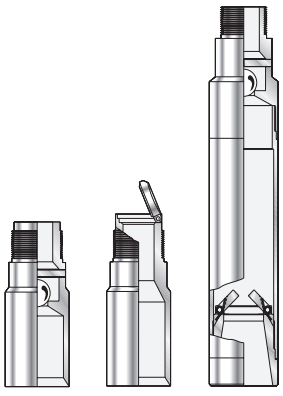
Part Number	Outside Diameter	Fishneck O.D.	Top Connection	*Sample Tube Length SB	*Standard Tube Length DD
B051-001	1.50"	1.375"	15/16UN	2ft	5ft
B051-004	1.75"	1.375"	15/16UN	2ft	5ft
B051-005	2.00"	1.750"	1 1/16UN	2ft	5ft
B051-013	2.50"	2.313"	1 1/16UN	2ft	5ft
B051-018	3.00"	2.313"	1 1/16UN	2ft	5ft
B051-023	4.00"	2.313"	1 9/16UN	2ft	5ft

Note: *Alternative tube lengths are available on request.

Sand Pump Bailers

Part Number	Outside Diameter	Fishneck O.D.	Top Connection	Tube Length
B050-002	1.500"	1.375"	15/16UN	5ft
B050-006	1.750"	1.375"	15/16UN	5ft
B050-005	1.875" (Shoe)	1.750"	1 1/16UN	5ft
B050-007	2.000" (Shoe)	1.375"	15/16UN	5ft
B050-097	2.500"	2.313"	*1 9/16UN	5ft
B050-104	3.000"	2.313"	*1 9/16UN	5ft
B050-039	3.500"	2.313"	1 1/16UN	6ft
B050-070	4.000"	2.313"	*1 9/16UN	5ft
L-9811082215D450	4.500"	2.313"	1 1/16UN	5ft

Note: *1 1/16" Connection is available on request.



(A) (B) (C)

elmar@nov.com nov.com/elmar

Cement Dump Bailer 'Trigger Release Type'

The cement dump bailer trigger release type is a multi-barrel bailer capable of dumping large volumes of cement in one run.

The cement dump bailers are specifically designed to dump cement by the use of a finger locator. This eliminates the need to jar down on any sub-surface device or disturb the drying process of any cement previously dumped. Cement dump bailers are fitted with a series of NPT ports in the bottom shoe assembly. These serve to act as combined filler and drain ports. The fact that the bailer has a bottom filler enables easier deployment and gives the advantage that it may be filled in the vertical, and does not need to be laid down horizontally for refills. A ball-check valve within the tool prevents back-flow of cement.

The bottom shoe assembly houses a locator trigger. This trigger is matched to specific O.D. tubing/casing size. For example one trigger in place may suit 7" casing. If there is a requirement to dump cement in 9 5/8" casing, the trigger must be changed out for a 9 5/8" trigger. Cement dump bailers are fitted with centraliser bow springs to improve positive location in large casing sizes.

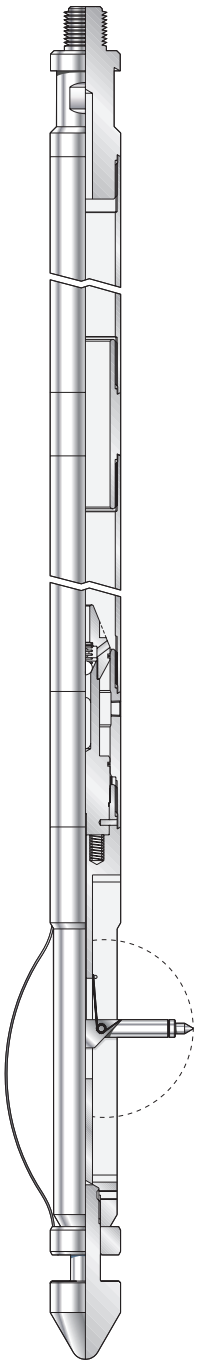
The trigger which is designed to locate flush joint or open ended tubing or casing, acts as a lever against a control dart within the filler sub of the bottom shoe. Once the desired depth is reached, upward jarring action will shear out and retract the trigger. This action will lift the control dart and open up a flow path for the cement to be dumped. Once the control dart has lifted, a lock ring prevents the tool from closing.

Dump Bailer

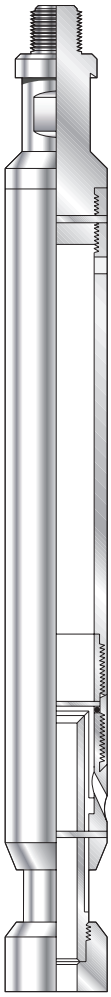
The dump bailer is designed to allow acid, mercury, ceraflow or other fluids to be dumped within the wellbore on top of any subsurface device. Dump bailer are operated by jarring down to first shear a pin after which a plunger ruptures a disc thereby allowing the fluids to escape.

Dump bailers are supplied as standard with 5ft barrel lengths. Alternative barrel lengths/extensions are also available as an option. Please specify when ordering. The outside diameter of the bailer foot required should always be matched in size with the downhole device upon which the fluid is to be dumped.

Please specify actual diameter of foot when ordering.



Cement Dump Bailer
(Trigger Release Type)



Dump Bailer

Dump Bailers 'Trigger Release Type'

Part Number	Outside Diameter	Fishneck O.D.	Top Connection	Trigger Release	Volume/ Barrel	Barrel Length
B052-019	2.50"	2.313"	1 1/16UN	To Suit	7 Litre	10ft
B052-020	3.00"	2.313"	1 1/16UN	To Suit	9 Litre	10ft
B052-021	3.50"	2.313"	1 1/16UN	To Suit	12 Litre	10ft
B052-022	4.00"	2.313"	1 9/16UN	To Suit	17 Litre	10ft
B052-023	4.50"	3.125"	1 9/16UN	To Suit	23 Litre	10ft

Note: Larger diameter sizes are available on special request, as are connector subs and barrel extensions.

Dump Bailers

Part Number	Outside Diameter	Fishneck O.D.	Top Connection	Barrel Length	Volume/ (litre/ft)
B052-004	1.50"	1.375"	15/16UN	5ft	0.23
B052-001	1.75"	1.375"	15/16UN	5ft	0.30
B052-011	2.00"	1.375"	15/16UN	5ft	0.33
B052-002	2.50"	2.313"	1 1/16UN	5ft	0.70
B052-005	3.00"	2.313"	1 1/16UN	5ft	0.90
B052-018	4.00"	2.313"	1 1/16UN	5ft	1.70

Hydrostatic Bailer

The hydrostatic bailer is a wireline service tool used to clear the debris which has settled on the top of the subsurface equipment, preventing the recovery of the equipment by regular wireline operations. The hydrostatic bailer is specifically designed for use when the debris cannot be removed from the well with a pump type bailer (sand bailer).

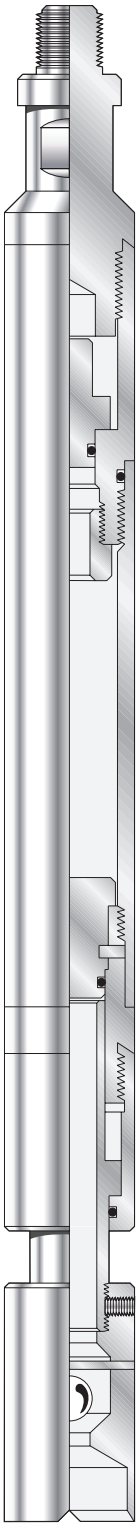
The bailer's upper portion consists of a chamber, sealed at atmosphere pressure, with a relief plug at the upper end and a shear piston at the lower end. The piston is secured to its housing with brass shear pins.

When debris has been reached, downward jarring will shear the pin securing the piston to the housing. Well pressure will cause the piston to move rapidly upwards and the suction created will draw debris into the tool.

Optional Bailer Shoe Configurations

A) *Ball type bailer shoe
B) *Flapper type bailer shoe
C) *Junk catcher type bailer shoe
D) Ball check snorkel muleshoe
E) Ball check flapper/snorkel muleshoe

* All bailer shoe configuration options are also available with mule shoe bottoms.



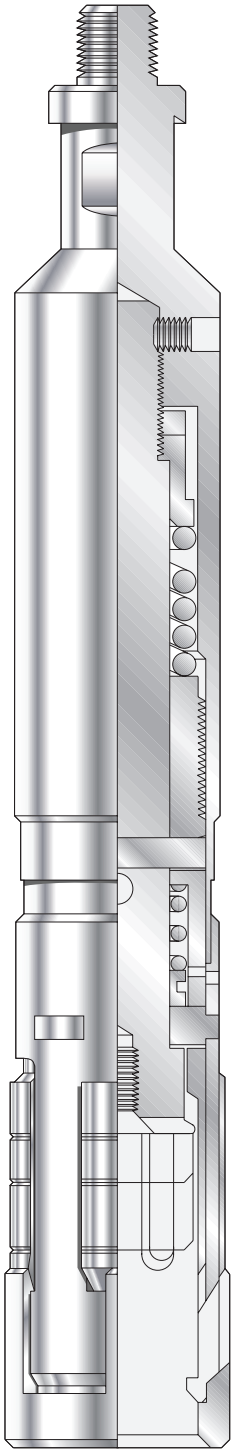
Hydrostatic Bailer

Hydrostatic Bailers

Part Number	Outside Diameter	Fishneck O.D.	Top Connection	Tube Length
B053-002	1.500"	1.375"	15/16UN	5ft
B053-001	1.750"	1.375"	15/16UN	5ft
B053-005	*1.875"	1.375"	15/16UN	5ft
B053-007	*2.000"	1.375"	15/16UN	5ft
B053-058	2.250"	1.750"	1 1/16UN	5ft
B053-003	2.500"	2.313"	1 9/16UN	5ft
L-9811075484D250	2.500"	1.750"	1 1/16UN	6ft
B053-004	3.000"	2.313"	1 9/16UN	5ft
B053-026	3.500"	2.313"	1 1/16UN	5ft

Note: * Bottom Shoe I.D.

Running, Pulling, Shifting and Positioning Tools

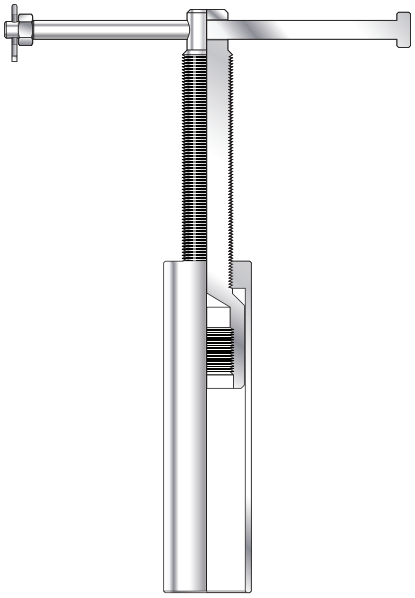


Repinning Tool

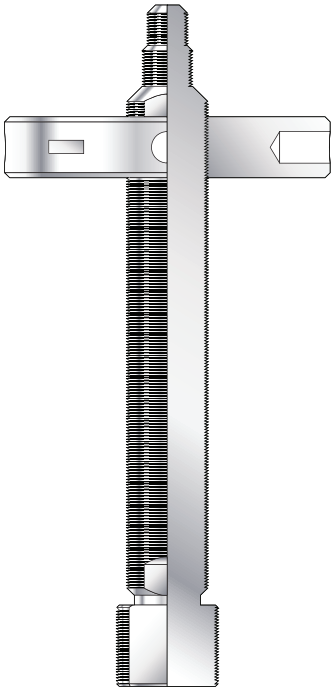
The re-pinning tool allows the core of the pulling tool to be pulled back into running position which allows for a new shear pin to be installed.

Repinning Tool for UPT/R/S and J Series Pulling Tools		
Part Number	**Size**	**Connection**
SRB118-012		15/16UN

GS Repinning Tools		
Part Number	**Size**	**Connection**
B086-026	2.0"	15/16UN
B086-027	2.5"	15/16UN
B086-023	3.0" - 4.0"	1 1/16UN
B086-025	5.0"	1 1/16UN



GS Repinning Tool



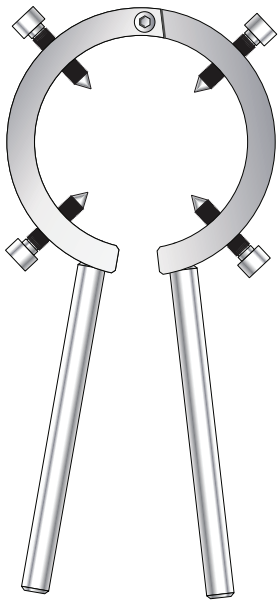
Pinning Tool (B118-012)

Releasing Tool

The releasing tool is designed for easy use to release a standard pulling tool.

Use of the tool allows the operator to remove a latched device from the pulling tool without having to strip the pulling tool or remove the shear pin.

Releasing Tools	
Part Number	**Size**
B085-040	2.0" - 3.5"
B085-041	4.0"



Releasing Tool

Heavy Duty Releasable Pulling Tool

Our heavy duty releasable pulling tool is a collet type pulling tool used to latch and retrieve wireline tools with badly damaged external fishing necks.

The heavy duty releasable pulling tool is extremely robust in construction and allows a full 360 degrees engagement with the fishing neck to be latched. The fishing socket can be released by jarring downwards provided a solid footing is available for the core to be driven against.

Heavy Duty Releasable Pulling Tools

Part Number	Nominal Size	Outside Diameter	To Catch Fishnecks	*Maximum Reach	Length	Fishneck O.D.	Top Connection
B138-029	1 1/4"	1.285"	0.875"	2.000"	14.6"	1.187"	15/16UN
B138-012	1 5/8"	1.625"	1.000"	1.850"	15.6"	1.187"	15/16UN
B138-008	1 5/8"	1.625"	1.187"	1.850"	15.6"	1.187"	15/16UN
B138-003	2.0"	1.875"	1.375"	1.840"	15.6"	1.375"	15/16UN
B138-002	2.5"	2.300"	1.750"	1.840"	15.6"	1.750"	1 1/16UN
B138-006	3.0" Slimline	2.870"	2.313"	2.125"	18.6"	2.313"	1 1/16UN
B138-014	3.0"	3.250"	2.313"	1.690"	18.6"	2.313"	1 1/16UN
B138-007	4.0"	3.800"	3.125"	2.730"	18.6"	2.313"	1 1/16UN

Note: * Core reach extensions are available on request, please specify when ordering.

Heavy Duty Universal Puling Tool

Our heavy duty pulling tool operates as the standard Universal Pulling Tool (UPT) see page 41. The HDUPT is a shear-up, shear-down, three reach pulling tool used to set and retrieve sub surface devices with an external fish neck from the well bore. The HDUPT can be adapted from a shear-up to release to a shear-down to release tool, without the need for any additional parts, it has a universal core which permits the same tool to be able to retrieve devices with fish necks of different lengths or reach (i.e. short, medium or long reach).

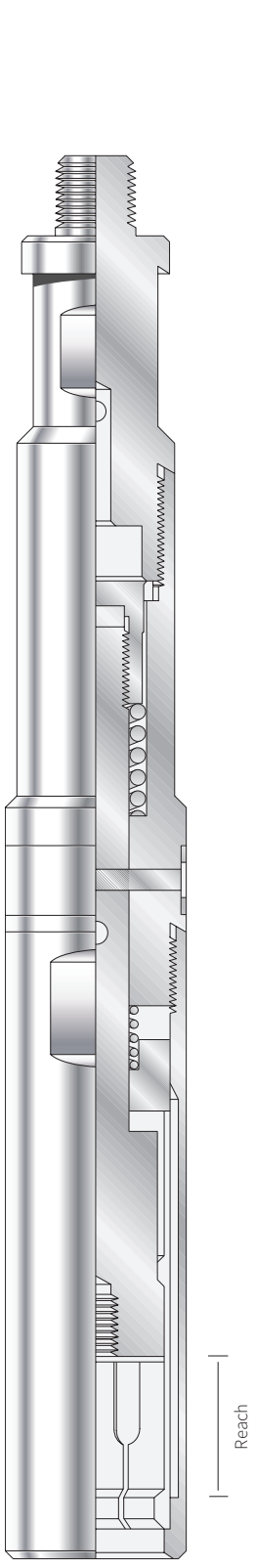
The heavy duty universal pulling tool is extremely robust in construction and allows a full 360 degrees engagement with the fishing neck to be latched.

Heavy Duty Universal Pulling Tools

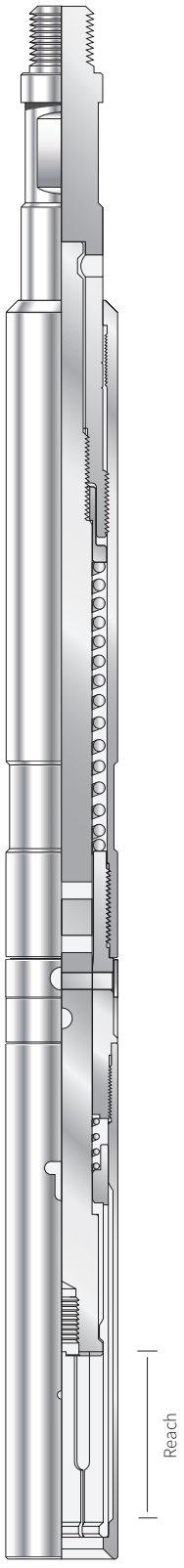
Part Number	Nominal O.D.	Outside Diameter	To Catch Fishnecks	Fishneck O.D.	Top Connection
B118-154	1.625"	1.625"	1.187"	1.187"	15/16UN
B118-139	2.0"	1.870"	1.187"	1.375"	15/16UN
B118-140	2.0"	1.870"	1.375"	1.375"	15/16UN
B118-153	2.5"	2.300"	1.750"	1.750"	1 1/16UN
B118-159	4.0"	3.750"	3.125"	2.313"	1 9/16UN
B118-142	3.0"	2.800"	2.313"	1.750"	1.875" QLS
B118-143	4.0"	3.750"	3.125"	2.313"	2.5" QLS

Reach For 3 Position Core

Nominal Size	1.625"	2.0"	2.5"	3"	4.0"
	1.25"	1.25"	1.30"	1.38"	1.60"
	2.05"	2.05"	2.10"	2.20"	2.30"
	2.60"	2.60"	2.60"	2.70"	3.00"



Heavy Duty Releasable Pulling Tool



Heavy Duty Universal Pulling Tool

Universal Pulling Tool

The Universal Pulling Tool (UPT) is a field proven alternative to conventional wireline pulling tools. The UPT provides both cost savings coupled with the latest design principles. The UPT is a shear-up, shear-down, three reach pulling tool used to set and retrieve sub surface devices with an external fish neck from the well bore.

The UPT can be adapted from a shear-up to release to a shear-down to release tool, without the need for any additional parts, it has a universal core which permits the same tool to be able to retrieve devices with fish necks of different lengths or reach (i.e. short, medium or long reach).

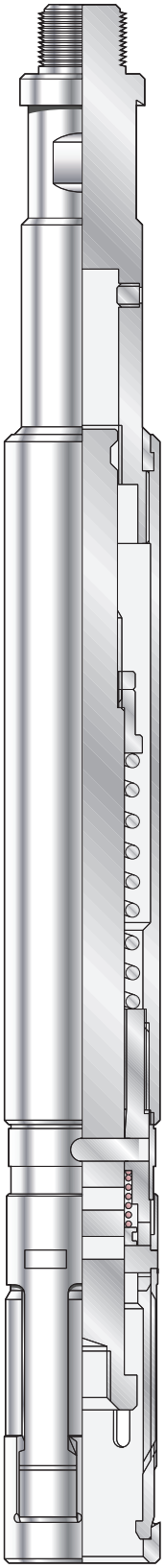
The UPT combines modern innovation with traditional principles to enable a single tool to replace 2 if not 6 conventional tools normally associated with wireline operations.

The UPT is available in 18-22 Rockwell 'C' condition for H_2S service. All UPT's are manufactured with Inconel springs as standard.

UK Patent GB 2200674A
US Patent 149318

Design Features

- Can be converted from shear-down to shear-up without the need for any additional parts or the need to purchase two different types of tools, i.e. does the same job as an Otis 'R' or 'S' series pulling tool or a Camco 'JD' or 'JU' series pulling tool
- Can be pinned in short, medium or long reach positions without the need to purchase additional cores, as would be necessary with Otis or Camco pulling tools i.e. eliminates the need for 5 Otis or 3 Camco cores
- Pawl design eliminates pawl and core damage, and prevents the possibility of the pawls swelling the apertures in the dog assembly and therefore dangerously increasing the pulling tool O.D.
- Stainless steel shear pin retainer enables shear pin replacement without the need to disassemble the pulling tool
- Dogs are manufactured from AISI 4140 or British equivalent in Rockwell hardness of 30-36 for standard service, thereby eliminating the possibility of 'shucking dog tips' as occurs with high heat treat dogs as used by other manufacturers
- Superior dog skirt engagement, thereby minimising the possibility of dog distortion resulting in an inability to release from the fishing neck engaged



Universal Pulling Tool

Universal Pulling Tools

Nominal Size	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"
Part Number	B118-005	B118-007	B118-001	B118-002	B118-010	B118-118	B118-011
Corresponding To	JDC, SM	JDS, JUS, SS, RS, SB	JDS, JUC, RB, SB, JDC, RS, SS, RJ, JUL, JUS	JDS, JUC, RJ, JDC, RB, SB JUS, RS, SS	JDS, JUC, RJ, JDC, RB, SB, JUS, RS, SS	SB, RB, RS	JDS, JUS, JDC, RB, JUS, RS, SB
Max O.D.	1.290"	1.437"	1.860"	2.250"	2.800"	3.200"	3.750"
Fish Neck on Tool	1.187"	1.187"	1.375"	1.375"	1.750"	2.313"	2.313"
Thread Connection	15/16-10UN	15/16-10UN	15/16-10UN	15/16-10UN	1 1/16-10UN	1 1/16-10UN	1 9/16-10UN
To Engage Fish Neck	0.875"	1.187"	1.375"	1.750"	2.313"	2.750"	3.125"
Weight	2kgs	2kgs	4kgs	5kgs	9kgs	12kgs	13kgs
Length (Shear-down)	16.750"	17.040"	22.450"	23.610"	23.750"	21.760"	24.000"
Length (Shear-up) Shoort Reach	N/A	N/A	19.020"	20.280"	20.550"	18.440"	20.730"
Length (Shear-up) Med Reach	15.000"	15.050"	19.820"	21.080"	21.400"	19.140"	21.380"
Length (Shear-up) Long Reach	15.250"	15.600"	20.370"	21.580"	21.850"	19.840"	22.000"

Reach For 2 Position Core			Reach For 3 Position Core				
Short	N/A Extn Av.	N/A Extn Av.	1.25"	1.30"	1.38"	1.5"	1.60"
Medium	1.68"	1.30"	2.05"	2.10"	2.20"	2.2"	2.30"
Long	1.96"	1.85"	2.60"	2.60"	2.70"	2.9"	3.00"

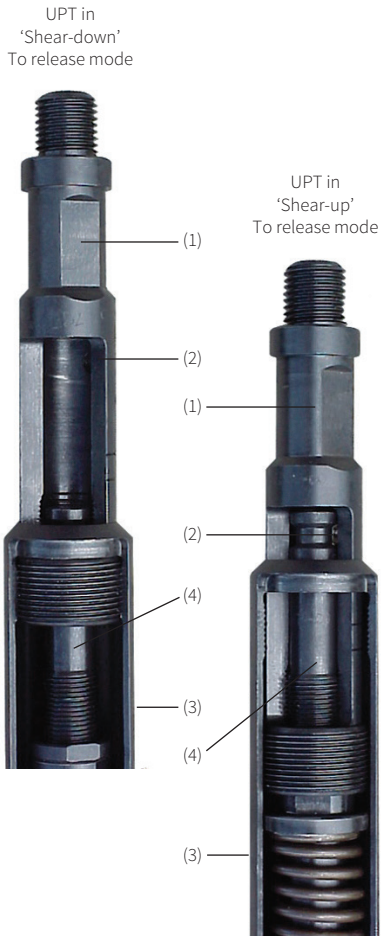
Universal Pulling Tool Configurations

Conversion from 'Shear-Down' to 'Shear-Up' Mode

After removing the shear pin from the core (4), and with the core in the uppermost position, the exterior thread at the lower end of fish neck (1) is released from the upper cylinder (3).

The inner thread at the lower end of the fish neck (1) is then re-engaged onto the mating thread at top of the core (4) and tightened.

Finally the captivated grub screw (2) is tightened onto the core. The tool is now in the shear-up configuration.

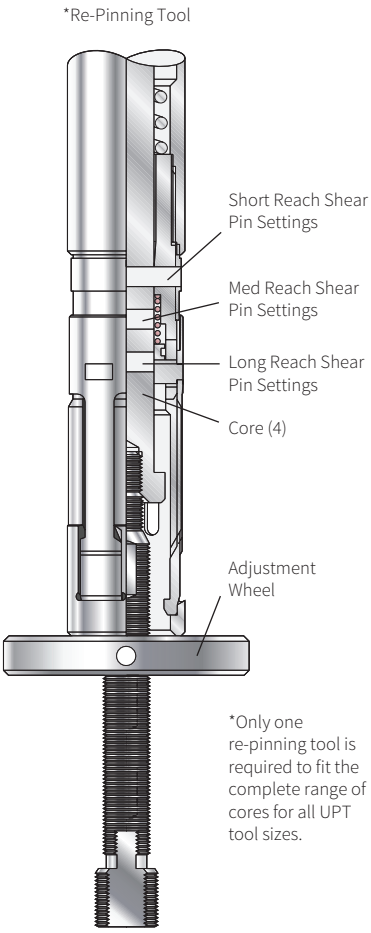


Three Core Reach Adjustment

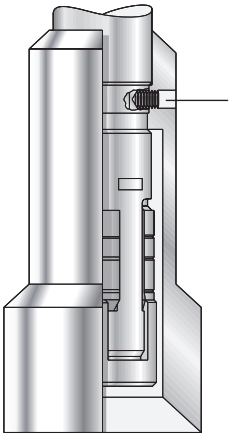
With the tool in either the shear-up or shear-down mode, the UPT can be configured to any one of three different core reach settings, with the simple use of a UPT re-pinning tool. With the re-pinning tool secured in a vice, the UPT is screwed into the thread at the base of the core (4).

When the wheel of the re-pinning tool is tightened, the core (4) is drawn downwards and compresses the spring (6). By turning the wheel slowly and watching through the shear pin hole you line up the shear pin hole with the shear pin hole in the core (4) for each of the three settings. When the desired setting is reached, the tool is pinned with a shear pin with a value to suit the application required.

Back off the adjustment wheel far enough to unscrew the UPT completely from the re-pinning tool and the tool is ready to re-run.



*Only one re-pinning tool is required to fit the complete range of cores for all UPT tool sizes.



Bellguide grub screws locate into holes in the shear pin retainer profile

UPT Integral Bell Guide

Our UPT integral bell guide can be used when it is necessary to retrieve small diameter fish neck profiles from large diameter tubing. By utilising the shear pin retainer profile the integral bell guide can give a full range of bell guide diameters for any given tool size, without the need for the skirt to be threaded.

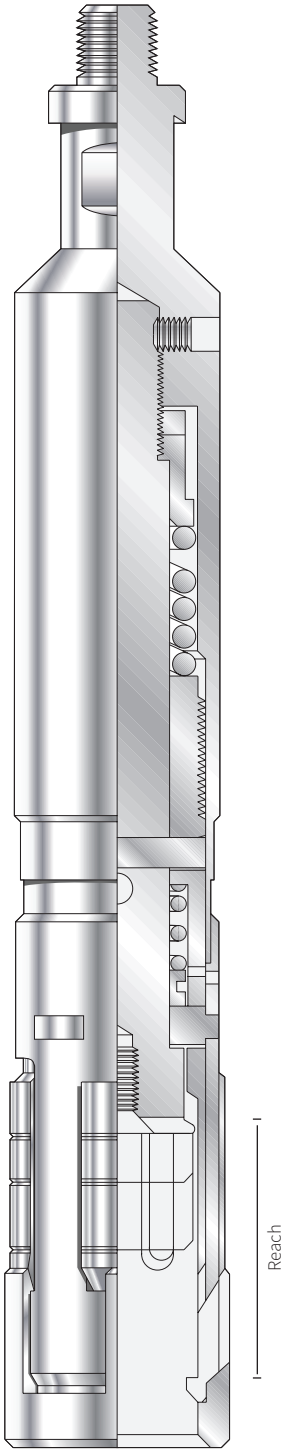
Elmar 'SU' Pulling Tool

Our SU (Shear-Up) pulling tool is a heavy duty pulling tool used to set or retrieve sub surface devices with an external fishneck from the well bore.

The SU pulling tool is used when it is necessary to release from the surface device by jarring upwards. The SU pulling tool has interchangeable cores to give the reach required. The SU pulling tool is available in 18-22 Rockwell C condition for H_2S service (including dogs). All springs in the our SU pulling tool are Inconel as standard.

Design Benefits

- Heavy duty with superior dog/skirt engagement, thereby eliminating the possibility of dog distortion resulting in an inability to release from the fishing neck engaged
- Simple and familiar operation of tool similar to that of JD and JU range of tools
- Superior pawl design eliminates pawl and core damage, and prevents the possibility of the pawls swelling the apertures in the dog assembly, therefore dangerously increasing the pulling tool O.D.
- Internal dog spring in conjunction with stainless steel shear pin retainer enables shear pin replacement without the need for removing the dog spring
- Dogs are manufactured from AISI 4140 or British equivalent in Rockwell hardness of 30-36 for standard service or 18-22 for H_2S service, thereby eliminating the possibility of 'shucking dog tips' as occurs with high heat treat dogs as used by other manufacturers



'SU' Pulling Tool

Elmar 'SU' Pulling Tools

Part Number	Nominal O.D.	Outside Diameter	Fishneck O.D.	Top Connection	Reach	Length	Weight	To Engage Fish Neck
B118-032	1 1/4"	1.290"	1.187"	15/16UN	1.68"	11.80"	2.5lbs	0.875"
B118-033	1 1/4"	1.290"	1.187"	15/16UN	1.96"	13.34"	2.5lbs	0.875"
B118-034	1 1/2"	1.437"	1.187"	15/16UN	1.30"	12.10"	3lbs	1.187"
B118-035	1 1/2"	1.437"	1.187"	15/16UN	1.85"	12.10"	3lbs	1.187"
B118-036	2"	1.860"	1.375"	15/16UN	1.25"	15.70"	6lbs	1.375"
B118-037	2"	1.860"	1.375"	15/16UN	2.05"	15.70"	6lbs	1.375"
B118-038	2"	1.860"	1.375"	15/16UN	2.60"	15.70"	6lbs	1.375"
B118-039	2 1/2"	2.250"	1.375"	15/16UN	1.30"	17.50"	9lbs	1.750"
B118-040	2 1/2"	2.250"	1.375"	15/16UN	2.10"	17.50"	9lbs	1.750"
B118-041	2 1/2"	2.250"	1.375"	15/16UN	2.60"	17.50"	9lbs	1.750"
B118-042	3"	2.800"	1.75"	1 1/16UN	1.38"	18.00"	12lbs	2.313"
B118-043	3"	2.800"	1.75"	1 1/16UN	2.20"	18.00"	12lbs	2.313"
B118-044	3"	2.800"	1.75"	1 1/16UN	2.70"	18.00"	12lbs	2.313"
B118-045	4"	3.750"	2.313"	1 9/16UN	1.60"	19.50"	25lbs	3.125"
B118-046	4"	3.750"	2.313"	1 9/16UN	2.30"	19.50"	25lbs	3.125"
B118-047	4"	3.750"	2.313"	1 9/16UN	3.00"	19.50"	25lbs	3.125"

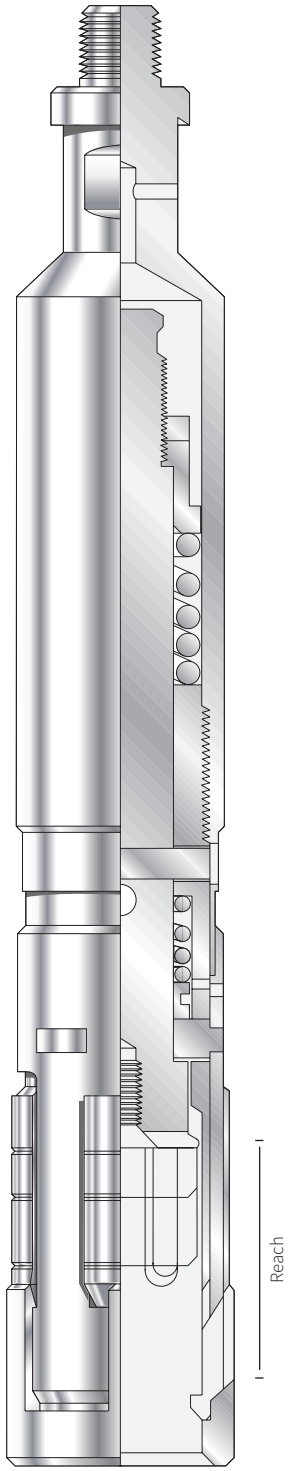
Elmar 'SD' Pulling Tool

Our SD (Shear-Down) pulling tool is a heavy duty pulling tool used to set or retrieve sub surface devices with an external fishneck from the well bore.

The SD pulling tool is used when it is necessary to release from the surface device by jarring downwards. Our SD pulling tool has interchangeable cores to give the reach required. The SD pulling tool is available 18-22 Rockwell C condition for H_2S service (including dogs). All springs in the SD pulling tool are Inconel as standard.

Design Benefits

- Heavy duty with superior dog/skirt engagement, thereby eliminating the possibility of dog distortion resulting in an inability to release from the fishing neck engaged
- Simple and familiar operation of tool similar to that of JD and JU range of tools
- Superior pawl design eliminates pawl and core damage, and prevents the possibility of the pawls swelling the apertures in the dog assembly, therefore dangerously increasing the pulling tool O.D.
- Internal dog spring in conjunction with stainless steel shear pin retainer enables shear pin replacement without the need for removing the dog spring
- Dogs are manufactured from AISI 4140 or British equivalent in Rockwell hardness of 30-36 for standard service or 18-22 for H_2S service, thereby eliminating the possibility of 'shucking dog tips' as occurs with high heat treat dogs as used by other manufacturers



'SD' Pulling Tool

Elmar 'SD' Pulling Tools

Part Number	Nominal O.D.	Outside Diameter	Fishneck O.D.	Top Connection	Reach	Length	Weight	To Engage Fish Neck
B118-016	1 1/4"	1.290"	1.187"	15/16UN	1.68"	11.8"	2.5lbs	0.875"
B118-017	1 1/4"	1.290"	1.187"	15/16UN	1.96"	11.8"	2.5lbs	0.875"
B118-018	1 1/2"	1.437"	1.187"	15/16UN	1.30"	12.1"	3lbs	1.187"
B118-019	1 1/2"	1.437"	1.187"	15/16UN	1.85"	12.1"	3lbs	1.187"
B118-020	2"	1.860"	1.375"	15/16UN	1.25"	15.7"	6lbs	1.375"
B118-021	2"	1.860"	1.375"	15/16UN	2.05"	15.7"	6lbs	1.375"
B118-022	2"	1.860"	1.375"	15/16UN	2.60"	15.7"	6lbs	1.375"
B118-023	2 1/2"	2.250"	1.375"	15/16UN	1.30"	17.5"	9lbs	1.750"
B118-024	2 1/2"	2.250"	1.375"	15/16UN	2.10"	17.5"	9lbs	1.750"
B118-025	2 1/2"	2.250"	1.375"	15/16UN	2.60"	17.5"	9lbs	1.750"
B118-026	3"	2.800"	1.750"	1 1/16UN	1.38"	18.0"	12lbs	2.313"
B118-027	3"	2.800"	1.750"	1 1/16UN	2.20"	18.0"	12lbs	2.313"
B118-028	3"	2.800"	1.750"	1 1/16UN	2.70"	18.0"	12lbs	2.313"
B118-029	4"	3.750"	2.313"	1 9/16UN	1.60"	19.5"	25lbs	3.125"
B118-030	4"	3.750"	2.313"	1 9/16UN	2.30"	19.5"	25lbs	3.125"
B118-031	4"	3.750"	2.313"	1 9/16UN	3.00"	19.5"	25lbs	3.125"

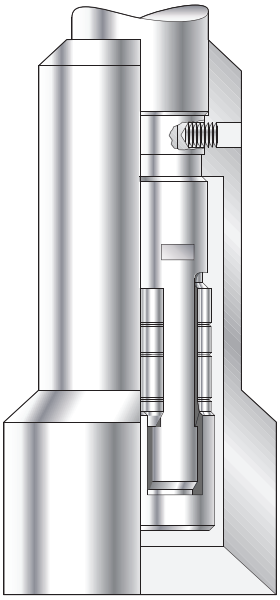
Integral Bell Guide

Our integral bell guide concept is used when it is necessary to retrieve small diameter fish neck profiles from large diameter tubing. By utilising the shear pin retainer profile on the pulling tools, the integral bell guide can give a full range of bell guide diameter for any given tool size without the need for the skirt to be threaded or any special attachment.

The integral bell guide is available for the our Universal, SU and SD pulling tools.

When ordering this product please specify O.D. of tool required.

Note: Various sizes available.

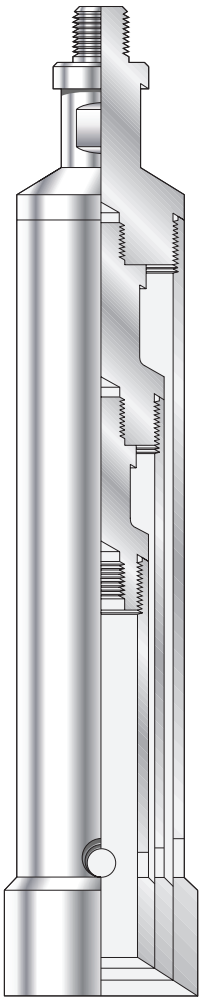


Integral Bell Guide

Bell Guide Set

A bell guide set consists of three individual bell guide tools that fit one into the other, allowing either overshots, spears or pulling tools to be screwed up inside any one of the three bell guides available. This therefore ultimately enables a 1" fishneck. Neck to be fished from within 6" I.D. casing without the need to fit either threaded or welded bell guides onto individual overshots or pulling tool skirts.

The bell guide set can also be used during wireline operation in deviated wells as a running or pulling tool centralizer.



Bell Guide Set

Bell Guide Sets

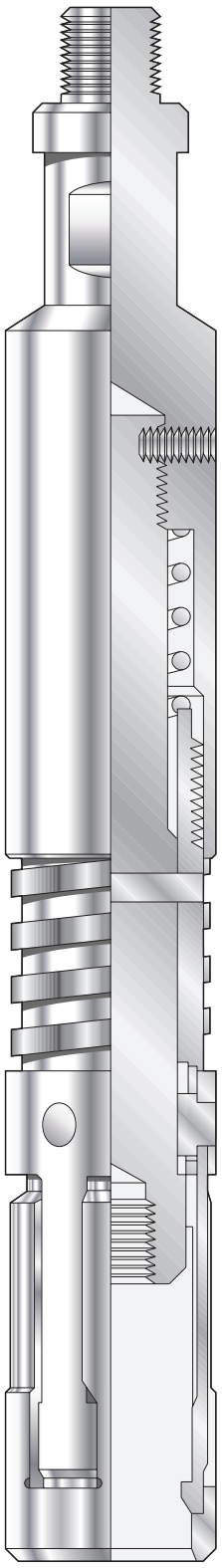
Part Number	Type	Major O.D.	Fishneck O.D.	Top Connection	Bellguide O.D.'s
B081-028	Set 1	6.0"	2.313"	1 9/16UN	3"/ 4"/ 6"
B081-027	Set 2	4.5"	2.313"	1 1/16UN	2.75"/ 3.75"/ 4.50"
B081-026	Set 3	4.5"	1.750"	1 1/16UN	2.70"/ 3.60"/ 4.50"
B081-023	Set 4	5.0"	2.313"	1 1/16UN	2.50"/ 3.75"/ 5.00"

'JU' Type Pulling Tool

The JU type pulling tool is a wireline service tool designed to remove retrievable subsurface devices, with external fishing necks, from a well. The JU type pulling tool is available with different core lengths which permits the tool to retrieve subsurface devices with different fishing neck reach.

The JU type pulling tool utilises a top sub which is made up to the core of the tool. The dogs, which are mounted on the skirt, are inserted into the vertical openings in the skirt. The dogs are spring loaded and have pawls located in the windows in the skirt. The JU type pulling tool can be released, if necessary, from the retrievable device by upward jarring.

In the tool nomenclature, the second letter designates the direction of shear release from the tool. A JU is a 'jar up' release tool. The third letter designates core length; a C being a 'long' core and an S a 'short' core.
A third core length, designated as an L, is even shorter than an S but has limited application.



'JU' Type Pulling Tool

'JUC' Type Pulling Tools

Part Number	Nominal O.D.	Outside Diameter	To Engage Size	Reach	Fishneck O.D.	Top Connection
B083-001	1 1/4"	1.291"	0.875"	1.937"	1.187"	15/16UN
B083-044	1 3/8"	1.375"	1.000"	1.875"	1.187"	15/16UN
B083-032	1 1/2"	1.422"	1.187"	1.094"	1.187"	15/16UN
B083-036	1 5/8"	1.625"	1.187"	1.094"	1.187"	15/16UN
B083-013	2"	1.859"	1.375"	1.437"	1.375"	15/16UN
B083-015	2 1/2"	2.250"	1.750"	1.313"	1.375"	15/16UN
B083-017	3"	2.796"	2.313"	1.437"	1.750"	15/16UN
B083-011	4"	3.750"	3.125"	2.313"	2.313"	1 1/16UN

'JUS' Type Pulling Tools

Part Number	Nominal O.D.	Outside Diameter	To Engage Size	Reach	Fishneck O.D.	Top Connection
B083-048	1 1/4"	1.291"	0.875"	2.690"	1.187"	15/16UN
B083-047	1 3/8"	1.375"	0.875"	2.625"	1.187"	15/16UN
B083-039	1 1/2"	1.430"	0.875"	2.687"	1.187"	15/16UN
B083-035	1 5/8"	1.625"	1.187"	1.844"	1.187"	15/16UN
B083-004	2"	1.859"	1.375"	2.125"	1.375"	15/16UN
B083-006	2 1/2"	2.250"	1.750"	2.188"	1.375"	15/16UN
B083-008	3"	2.796"	2.313"	2.125"	1.750"	15/16UN
B083-009	4"	3.750"	3.125"	3.373"	2.313"	1 1/16UN

'JUL' Type Pulling Tool

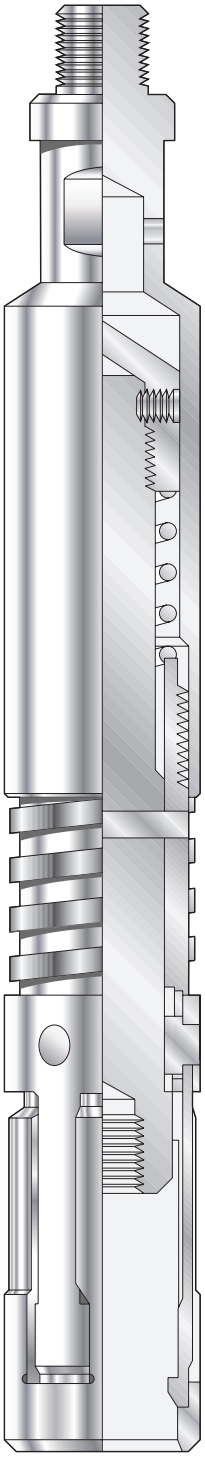
Part Number	Nominal O.D.	Outside Diameter	To Engage Size	Reach	Fishneck O.D.	Top Connection
B083-046	2"	1.860"	1.375"	2.968"	1.375"	15/16UN

'JD' Type Pulling Tool

The JD type pulling tool is a wireline service tool designed to remove retrievable subsurface devices, with external fishing necks, from a well. The JD type pulling tool is available with different core lengths which permits the tool to retrieve subsurface devices with different fishing neck reach.

The JD type pulling tool utilises a top sub which is made up to the skirt of the tool. The dogs, which are mounted on the skirt, are inserted into the vertical openings in the skirt the dogs are spring loaded and have pawls located in the windows in the skirt. The JD type pulling tool can be released, if necessary, from the retrievable device by downward jarring.

In the tool nomenclature, the second letter designates the direction of shear release from the tool. A JD is a 'jar down' release tool. The third letter designates core length; a C being a 'long' core and an S a 'short' core. A third core length, designated as an L, is even shorter than an S but has limited application.



'JD' Type Pulling Tool

'JDC' Type Pulling Tools

Part Number	Nominal O.D.	Outside Diameter	To Engage Size	Reach	Fishneck O.D.	Top Connection
B083-002	1 1/4"	1.291"	0.875"	1.937"	1.187"	15/16UN
B083-028	1 3/8"	1.375"	1.000"	1.875"	1.187"	15/16UN
B083-030	1 1/2"	1.422"	1.187"	1.093"	1.187"	15/16UN
B083-034	1 5/8"	1.625"	1.187"	1.093"	1.187"	15/16UN
B083-003	2"	1.859"	1.375"	1.437"	1.375"	15/16UN
B083-005	2 1/2"	2.250"	1.750"	1.313"	1.375"	15/16UN
B083-007	3"	2.796"	2.313"	1.437"	1.750"	15/16UN
B083-018	4"	3.750"	3.125"	2.313"	2.313"	1 1/16UN

'JDS' Type Pulling Tools

Part Number	Nominal O.D.	Outside Diameter	To Engage Size	Reach	Fishneck O.D.	Top Connection
B083-027	1 1/4"	1.291"	0.875"	2.687"	1.187"	15/16UN
B083-029	1 3/8"	1.375"	1.000"	2.625"	1.187"	15/16UN
B083-031	1 1/2"	1.422"	1.187"	1.844"	1.187"	15/16UN
B083-033	1 5/8"	1.625"	1.187"	1.844"	1.187"	15/16UN
B083-012	2"	1.859"	1.375"	2.125"	1.375"	15/16UN
B083-014	2 1/2"	2.250"	1.750"	2.188"	1.375"	15/16UN
B083-016	3"	2.796"	2.313"	2.125"	1.750"	15/16UN
B083-010	4"	3.750"	3.125"	3.373"	2.313"	1 1/16UN

'JDL' Type Pulling Tools

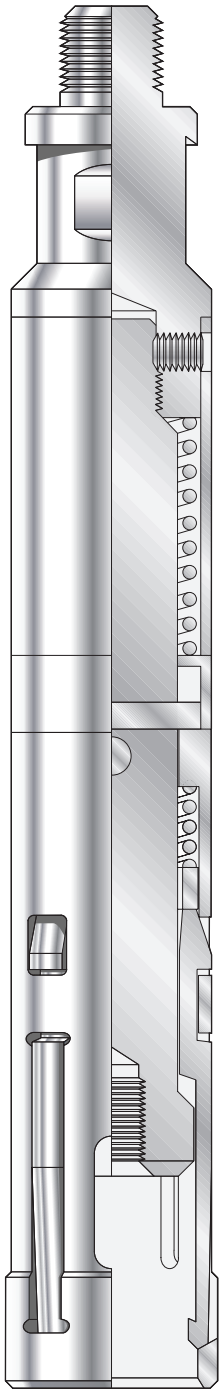
Part Number	Nominal O.D.	Outside Diameter	To Engage Size	Reach	Fishneck O.D.	Top Connection
B083-041	2"	1.859"	1.375"	2.812"	1.375"	15/16UN
TBA	3"	2.812"	2.313"	2.609"	1.75"	15/16UN

‘R’ Type Pulling Tool

The R type pulling tool is a wireline pulling tool designed to engage an external type fishing neck.

The tool is offered in a wide range of sizes, with three reaches in each size. The short reach version is designated RB type, the medium reach type RS and the long reach RJ type.

The R type pulling tool is designed to be released from the downhole device by upward jarring. It is particularly suited for retrieving devices which are unlocked by downward jarring.



‘R’ Type Pulling Tool

‘RS’ Type Pulling Tools

Part Number	Nominal Size	Outside Diameter	To Engage Size	Reach	Fishneck O.D.	Top Connection
B085-044	1 1/4"	1.250"	1.000"	2.125"	1.100"	15/16UN
B085-022	1 1/2"	1.430"	1.187"	1.797"	1.187"	15/16UN
B085-023	2"	1.770"	1.375"	1.984"	1.375"	15/16UN
B085-004	2 1/2"	2.170"	1.750"	1.984"	1.375"	15/16UN
B085-005	3"	2.740"	2.313"	2.190"	2.313"	1 1/16UN
B085-048	3 1/2"	3.110"	2.750"	2.100"	2.313"	1 1/16UN
B085-024	4"	3.670"	3.125"	2.156"	2.313"	1 1/16UN

‘RJ’ Type Pulling Tools

Part Number	Nominal Size	Outside Diameter	To Engage Size	Reach	Fishneck O.D.	Top Connection
B085-025	1 1/2"	1.430"	1.188"	2.547"	1.187"	15/16UN
B085-026	2"	1.770"	1.375"	2.547"	1.375"	15/16UN
B085-006	2 1/2"	2.170"	1.750"	2.547"	1.375"	15/16UN
B085-007	3"	2.740"	2.313"	2.609"	2.313"	1 1/16UN
B085-051	4"	3.670"	3.125"	2.000"	2.313"	1 1/16UN

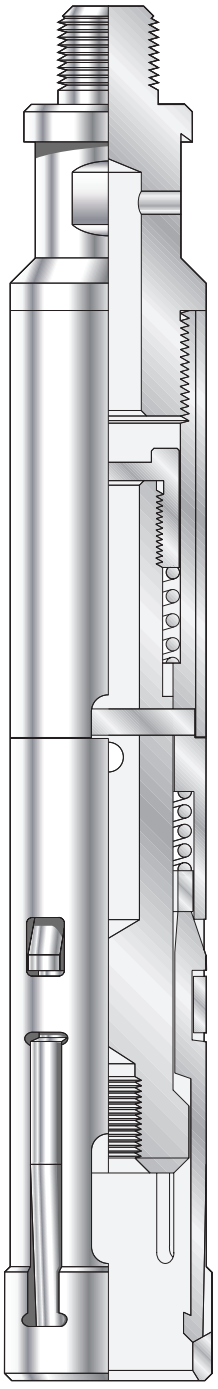
‘RB’ Type Pulling Tools

Part Number	Nominal Size	Outside Diameter	To Engage Size	Reach	Fishneck O.D.	Top Connection
B085-020	1 1/2"	1.430"	1.187"	1.265"	1.187"	15/16UN
B085-021	2"	1.770"	1.375"	1.219"	1.375"	15/16UN
B085-002	2 1/2"	2.170"	1.750"	1.203"	1.375"	15/16UN
B085-003	3"	2.740"	2.313"	1.297"	2.313"	1 1/16UN
B085-076	3 1/2"	3.110"	2.750"	1.350"	2.313"	1 1/16UN
B085-011	4"	3.670"	3.125"	1.490"	2.313"	1 1/16UN

‘S’ Type Pulling Tool

The S type pulling tool is a wireline pulling tool designed to engage an external type fishing neck.

The tool is offered in a wide range of sizes, with three reaches in each size. The short reach version is designated SB type, the medium reach SM type and a long reach SS type. The S type pulling tool is designed to release by downward jarring.



‘S’ Type Pulling Tool

‘SS’ Type Pulling Tools

Part Number	Nominal Size	Actual O.D.	To Engage Size	Reach	Fishneck O.D.	Top Connection
B085-013	1 1/2"	1.437"	1.188"	1.780"	1.187"	15/16UN
B085-014	2"	1.770"	1.375"	2.030"	1.375"	15/16UN
B085-015	2 1/2"	2.180"	1.750"	2.000"	1.375"	15/16UN
B085-016	3"	2.840"	2.313"	2.210"	2.313"	1 1/16UN
B085-065 (Slimline)	3"	2.735"	2.313"	2.210"	2.313"	1 1/16UN
B085-017	4"	3.670"	3.125"	2.185"	2.313"	1 1/16UN

‘SM’ Type Pulling Tools

Part Number	Nominal Size	Actual O.D.	To Engage Size	Reach	Fishneck O.D.	Top Connection
B085-027	1 1/4" (1.66")	1.190"	0.875"	1.680"	1.188"	15/16UN
B085-018	1 1/2"	1.430"	1.187"	1.578"	1.187"	15/16UN
B085-019	2"	1.770"	1.375"	1.640"	1.375"	15/16UN

‘SB’ Type Pulling Tools

Part Number	Nominal Size	Outside Diameter	To Engage Size	Reach	Fishneck O.D.	Top Connection
B085-031	1 1/4"	1.220"	1.000"	1.280"	1.000"	5/8UN
B085-012	1 1/2"	1.420"	1.188"	1.297"	1.187"	15/16UN
B085-001	2"	1.771"	1.375"	1.219"	1.375"	15/16UN
B085-008	2 1/2"	2.180"	1.750"	1.281"	1.375"	15/16UN
B085-028	3" Slimline	2.740"	2.312"	1.380"	2.312"	1 1/16UN
B085-009	3"	2.838"	2.312"	1.380"	2.313"	1 1/16UN
B085-055	3 1/2"	3.110"	2.750"	1.690"	2.313"	1 1/16UN
B085-010	4"	3.670"	3.125"	1.500"	2.313"	1 1/16UN

‘SJ’ Type Pulling Tools

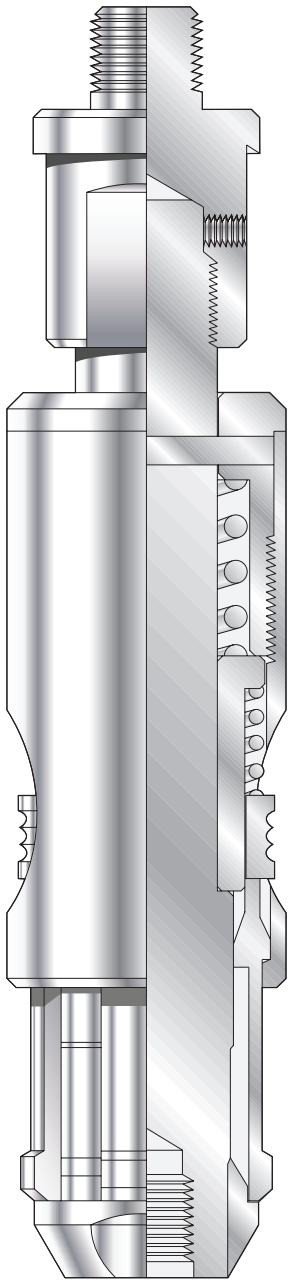
Part Number	Nominal Size	Outside Diameter	To Engage Size	Reach	Fishneck O.D.	Top Connection
9811084845	2"	1.777"	1.375"	2.540"	1.375"	15/16UN
9811084846	2 1/2"	2.180"	1.750"	2.730"	1.375"	15/16UN
9811084847	3"	2.838"	2.313"	2.780"	2.313"	1 1/16UN

‘GS’ Type Running & Pulling Tool

The GS type running and pulling tool is used to run and pull a large variety of tools utilising an internal fishneck.

The GS type running and pulling tool is a shear down to release type of tool and is easily converted to a GR type shear up tool by adding a shear-up adapter.

Where downward jarring is necessary prior to pulling a sub surface device, the shear-up adapter is recommended for routine operations. (See page 52).



‘GS’ Type Running & Pulling Tool

‘GS’ Type Running & Pulling Tools

Part Number	Nominal Size	Actual O.D.	Fishneck O.D.	Top Connection	Engaging Neck I.D.
B086-088	1 1/4"	1.170"	1.000"	5/8UN	0.88"
B086-028	1 1/2"	1.500"	1.187"	15/16UN	1.06"
L-9811078817	1.781	1.750"	1.375"	15/16UN	1.38"
B086-001	2"	1.810"	1.375"	15/16UN	1.38"
B086-002	2 1/2"	2.250"	1.750"	15/16UN	1.81"
B086-003	3"	2.720"	2.313"	1 1/16UN	2.31"
B086-004	3 1/2"	3.110"	2.313"	1 1/16UN	2.62"
B086-005	4"	3.620"	2.313"	1 1/16UN	3.12"
B086-006	5"	4.500"	3.125"	1 1/16UN	4.00"
B086-049	6"	5.560"	3.125"	1 1/16UN	4.75"
B086-008	7"	5.830"	3.125"	1 1/16UN	5.38"
B086-080	7 3/4"	5.830"	3.125"	1 1/16UN	6.25"

‘GSL’ Cores

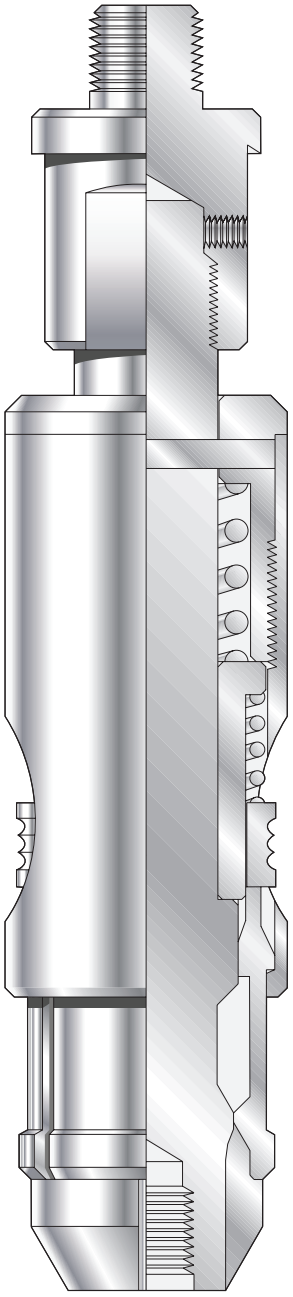
Nominal Size	Part Number
2.0"	00-04716
2.5"	00-04195
3.0"	00-04717

Heavy Duty ‘GS’ Type Running & Pulling Tool

The heavy duty type GS pulling tool is designed primarily to retrieve downhole tools where sustained heavy upward jarring may be required.

The latching mechanism, dog/core design is more robust than the standard GS pulling tool and is capable of withstanding prolonged jarring without incurring damage.

The heavy duty dogs are supported laterally, which makes them particularly suited for fishing jobs in deviated wells where the jarring loads may be uneven.



Heavy Duty ‘GS’ Type Running & Pulling Tool

Heavy Duty ‘GS’ Type Running & Pulling Tools

Part Number	Nominal Size	Outside Diameter	Fishneck O.D.	Top Connection	Engaging Neck I.D.
B086-134	2"	1.81"	1.375"	15/16UN	1.380"
B086-135	2 1/2"	2.25"	1.750"	1 1/16UN	1.810"
B086-136	3"	2.72"	2.313"	1 1/16UN	2.310"
B086-137	3 1/2"	3.11"	2.313"	1 1/16UN	2.620"
B086-138	4"	3.62"	2.313"	1 1/16UN	3.120"
B086-139	5"	4.50"	3.125"	1 1/16UN	4.000"
B086-108	6"	5.56"	3.125"	1 1/16UN	4.750"
B086-104	7"	5.83"	3.125"	1 9/16UN	5.380"
B086-105	7 3/4"	5.83"	3.125"	1 9/16UN	5.380"

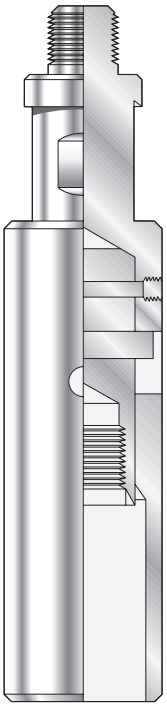
‘GU’ Type Shear Up Adapter

The GU type shear up adapter is a wireline pulling tool device used to convert a GS type pulling tool (shear down) into a type GR pulling tool (shear up).

The GU type shear up adapter, with shear pins in place is screwed onto the top of the GS pulling tool. The shear pin on the GS is then removed. The complete assembly now a GR pulling tool, will operate with a ‘shear up’ action instead of a ‘shear down’. The GU type shear up adapter is available with standard fishing necks and to suit all sizes of GS Pulling Tool.

‘GU’ Type Shear Up Adapters

Part Number	Nominal Size	Outside Diameter	Fishneck O.D.	Connections Box and Pin
B086-029	1 1/2"	1.470"	1.187"	15/16UN
B086-010	2"	1.812"	1.375"	15/16UN
B086-071	1.781"	1.750"	1.375"	15/16UN
B086-009	2 1/2"	2.250"	1.750"	15/16UN
B086-011	3", 3 1/2", 4"	2.720"	2.313"	1 1/16UN
B086-013	5"	3.600"	3.125"	1 1/16UN
B086-014	7"	5.750"	3.125"	1 1/16UN



‘GU’ Type
Shear Up Adapter

Heavy Duty Shear Up Adapter

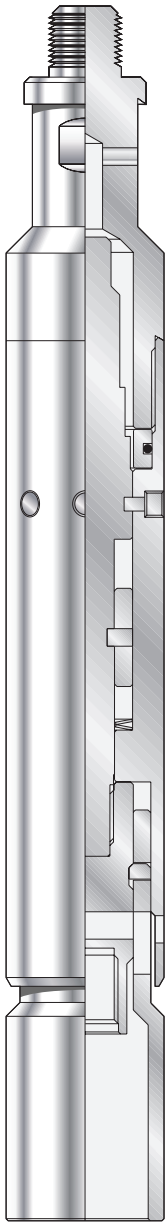
The heavy duty shear up adapter (as with the GU adapter) is a device used to convert a GS type pulling tool into a GR shear up to release type tool.

However, the heavy duty shear up adapter is designed for applications where it is desirable for the GR to endure some sustained heavy upward jars prior to releasing, which is not possible with the standard GU adapter.

The heavy duty shear up adapter is fitted with a double set of shear pins capable of sustaining heavy upward jarring before shearing in two stages. In order to achieve the release of the GS pulling tool with the shear pin removed, heavy duty jarring must be maintained in order to shear out the double set of shear pins.

Heavy Duty Shear Up Adapters

Part Number	Nominal Size	Outside Diameter	Fishneck O.D.	Top Connection
B086-098	1 1/2"	1.470"	1.187"	15/16UN
B086-099	2"	1.812"	1.375"	15/16UN
B086-100	2 1/2"	2.250"	1.750"	1 1/16UN
B086-101	3", 3 1/2", 4"	2.718"	2.313"	1 1/16UN
B086-102	5"	3.600"	3.125"	1 1/16UN
B086-031	7"	5.880"	3.125"	1 1/16UN



Heavy Duty
Shear Up Adapter

Double Jar Down Adapter

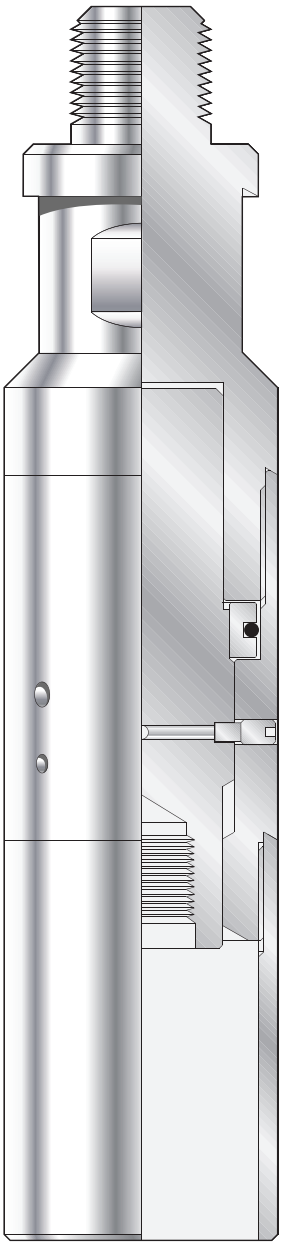
The double jar down adapter is designed to add greater flexibility to the GS pulling tool.

The double jar down adapter protects the GS pulling tool shear pin. This allows the GS pulling tool to be first jarred downwards without shearing and then upwards to shear a set of pins before ultimately jarring downwards to shear the GS pulling tool pin. The tool can then be retrieved from the well bore.

The double jar down adapter can also be run with the GS pulling tool shear pin removed, effectively adapting the GS tool into a GR (shear up) tool.

Double Jar Down Adapters

Part Number	Nominal Size	Outside Diameter	Fishneck O.D.	Top Connection
B086-129	2"	1.812"	1.375"	15/16UN
B086-130	2 1/2"	2.250"	1.750"	15/16UN
B086-115	3", 3 1/2", 4"	2.720"	2.313"	1 1/16UN
B086-131	5"	4.500"	3.125"	1 1/16UN
B086-132	5.62"	5.560"	3.125"	1 1/16UN
B086-133	7"	5.830"	3.125"	1 1/16UN



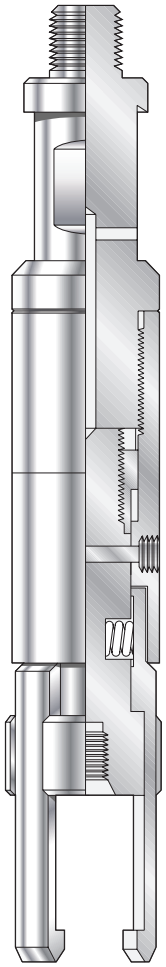
Double Jar Down Adapter

‘BB’ & ‘BE’ Type Pulling Tool

The BB and BE type pulling tool has no skirt and exposed dogs. The dogs can move down over a fishing neck more easily in wells with sand, trash, or other debris.

The BB and BE type pulling tool engages standard size wireline fishing necks. Type BB and BE pulling tools are identical except for the length of dogs which gives the BE pulling tool a longer reach than the BB pulling tool.

The BB pulling tool can be used to pull types B, C, and W slip type mandrels.



‘BB’ & ‘BE’
Type Pulling Tool

‘BB’ Type Pulling Tools

Part Number	Nominal Size	Actual O.D.	Fishneck O.D.	Top Connection	Reach	To Engage Fish Neck
B085-046	2"	1.750"	1.375"	15/16UN	1.44"	1.375"
B085-047	2 1/2"	2.125"	1.750"	15/16UN	1.44"	1.750"

‘BE’ Type Pulling Tools

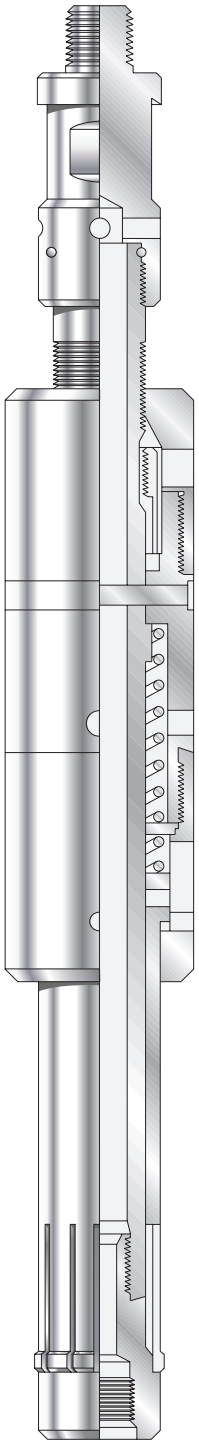
Part Number	Nominal Size	Actual O.D.	Fishneck O.D.	Top Connection	Reach	To Engage Fish Neck
B085-058	2"	1.78"	1.375"	15/16UN	2.625"	1.375"
B085-079	2 1/2"	2.25"	1.750"	15/16UN	2.750"	1.75"

‘PRS’ Type Pulling Tool

The PRS type pulling tool is a wireline service tool primarily used to retrieve DB locks and other subsurface devices with internal fishing necks from within the well bore.

The PRS type pulling tool is designed to be released from the downhole device by downward jarring in the event the device cannot be pulled.

The PRS type pulling tools are available in sizes from 2" through 6" and comes with Inconel springs as standard.



‘PRS’ Type Pulling Tool

‘PRS’ Type Pulling Tools

Part Number	Nominal Size	Outside Diameter	Fishneck O.D.	Prong Thread	Top Connection
B110-008	3 1/2"	3.125"	1.750"	3/4"-10UN	1 1/16UN
B110-001	4"	3.500"	2.313"	1"-LP	1 9/16UN
B110-010	5 1/2"	4.375"	2.313"	1 1/2"LP	1 9/16UN
B110-003	6"	5.687"	2.313"	1 1/2"LP	1 9/16UN

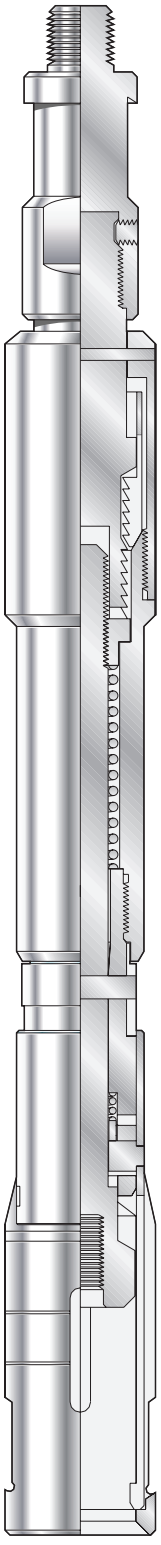
‘Elmar X’ & ‘Elmar R’ Running Tools

The Elmar X and Elmar R running tools are wireline service tools used to run and set type X, XN, R or RN lock mandrels in their corresponding downhole nipples. The Elmar X or Elmar R running tools allows locking mandrels to be run into the well bore in either the selective or nonselective modes i.e. selective when the lock mandrel has to be run through upper nipples or nonselective when the lock mandrel is to be landed in the highest nipple profile in the tubing string.

The Elmar X or Elmar R running tools are supplied with Inconel springs as standard. The Elmar X and Elmar R check set tool is a wireline service tool designed to enable the wireline operator to check that X and R type lock mandrels have been correctly set.

‘Elmar X’ Running Tools				
Part Number	**To Suit Lock Mandrel Size**	**Outside Diameter**	**Fishneck O.D.**	**Top Connection**
B117-001	1.875"	1.772"	1.375"	15/16UN
B117-002	2.313"	2.175"	1.750"	15/16UN
B117-041	2.750"	2.750"	2.313"	1 1/16UN
B117-003	2.813"	2.720"	2.313"	1 1/16UN
B117-007	2.875"	2.843"	2.313"	1 1/16UN
B117-004	3.313"	3.250"	2.313"	1 1/16UN
B117-008	3.813"	3.750"	2.313"	1 1/16UN
B117-027	4.313"	3.939"	2.313"	1 1/16UN
B117-009	4.562"	4.500"	3.125"	1 1/16UN
‘Elmar R’ Running Tools				
Part Number	**To Suit Lock Mandrel Size**	**Outside Diameter**	**Fishneck O.D.**	**Top Connection**
B117-010	1.710"	1.641"	1.187"	15/16UN
B117-011	1.781"	1.750"	1.375"	15/16UN
B117-030	2.125"	2.062"	1.375"	15/16UN
B117-031	2.188"	2.172"	1.750"	15/16UN
B117-012	2.313"	2.172"	1.750"	15/16UN
B117-013	2.562"	2.500"	1.750"	15/16UN
B117-049	2.875"	2.840"	2.313"	1 1/16UN
B117-014	3.125"	3.100"	2.313"	1 1/16UN
B117-015	3.250"	3.240"	2.313"	1 1/16UN
B117-036	3.437"	3.410"	2.313"	1 1/16UN
B117-016	3.688"	3.625"	2.313"	1 1/16UN
B117-043	4.125"	3.939"	2.313"	1 1/16UN
B117-044	4.313"	3.939"	2.313"	1 1/16UN
B117-040	4.562"	4.500"	3.125"	1 1/16UN

‘Elmar X’ & ‘Elmar R’ Type Pulling Tool



Double Jar Down Running/ Pulling Tool

Double Jar Down Running/Pulling Tool

Our double jar down running/pulling tool is designed to add greater operational flexibility to the SD pulling tool range, where downward jarring is necessary prior to pulling or releasing from a subsurface device.

The double jar down running/pulling tool mechanism allows the tool to be jarred down indefinitely without the possibility of premature tool release. Light upward jarring will then shear one pin, before ultimately jarring downwards to shear off the tool release pin; enabling tool disengagement and retrieval from the well bore in the usual manner. The double jar down running/pulling tool has been used with particular success as an alternative tool for running and pulling gas lift valves.

Double Jar Down Running/Pulling Tools						
Part Number	**Nominal Size**	**Outside Diameter**	**Fishneck O.D.**	***Reach**	**Engaging Fishneck**	**Top Connection**
B118-075	1.25"	1.290"	1.187"	2.128"	0.875"	15/16UN
B118-095	1 1/2"	1.430"	1.187"	1.850"	1.187"	15/16UN
B118-067	1 5/8"	1.625"	1.187"	1.850"	1.187"	15/16UN
B118-119	2" (Slimline)	1.770"	1.187"	1.340"	1.375"	15/16UN
B118-077	2"	1.860"	1.375"	2.050"	1.375"	15/16UN
B118-096	2 1/2"	2.190"	1.375"	2.100"	1.750"	15/16UN
B118-110	3"	2.690"	1.750"	2.200"	2.313"	1 1/16UN

Note: * Alternative cores & core extensions are available on request, please specify when ordering.

‘Elmar RXN’ Running Tool

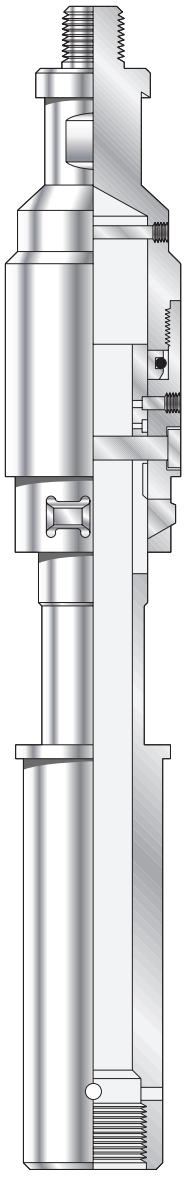
Our running tool is a wireline service tool used to run and set type R or type X locking mandrels in their respective downhole nipples.

The Elmar running tool is most commonly used to run a locking mandrel in conjunction with a safety valve to the upper most landing nipple in the tubing string.

Our running tool will allow the lock mandrel to be run in the locating position and in the selective position. When a non no-go lock is being run the keys must be in the locating position i.e. with locking keys out, and the lock must be set in the first nipple reached in the tubing string. When ano-go lock is being run the keys should be in the retracted position and the lock mandrel run until the corresponding no-go nipple has been located.

The snap ring located within the running tool gives a positive indication when the lock is fully set, as does the shearing of the upper tell tale shear pin.

‘Elmar RXN’ Running Tools				
Part Number	Nominal Size	Outside Diameter	Fishneck O.D.	Top Connection
B104-008	2.188/2.313"	2.12"	1.750"	15/16UN
B104-009	2.750"	2.62"	2.313"	1 1/16UN
B104-011	3.125"	3.09"	2.313"	1 1/16UN
B104-015	3.250"	2.62"	2.313"	1/16UN
B104-002	3.313"	3.09"	2.313"	1 1/16UN
B104-010	3.437"	3.09"	2.313"	1 1/16UN
B104-007	3.688"	3.62"	2.313"	1 1/16UN
B104-001	3.813"	3.62"	2.313"	1 1/16UN
B104-012	4.125"	3.62"	2.313"	1 1/16UN
B104-004	4.562"	4.50"	3.125"	1 1/16UN
B104-005	5.875"	5.80"	3.125"	1 1/16UN
B104-006	5.963"	5.81"	3.125"	1 1/16UN



‘Elmar RXN’ Running Tool

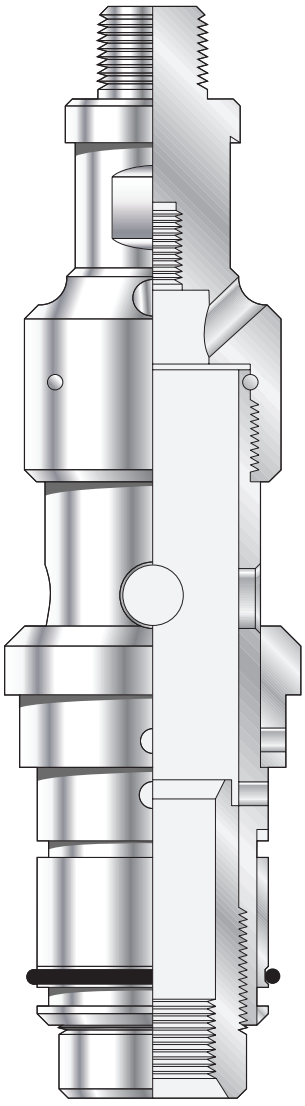
‘Z6’ Type Running Tool

The Z6 type running tool is a wireline service tool used to run and set type DB series locks into their respective nipples located within the well bore.

The Z6 type running tool incorporates a tell tale garter spring to give positive indication that the lock mandrel has been set properly.

The Z6 type running tool is available in 3 1/2" through 6" sizes and for both standard and H_2S service.

‘Z6’ Type Running Tools				
Part Number	Nominal O.D.	Outside Diameter	Fishneck O.D.	Top Connection
B110-009	3 1/2"	3.000"	2.313"	1 1/16UN
B110-002	4"	3.202"	2.313"	1 9/16UN
B110-007	5 1/2"	4.015"	2.313"	1 9/16UN
B110-004	6"	5.312"	2.313"	1 9/16UN



‘Z6’ Type Running Tool

‘C1’ Type Running Tool

The C1 type running tool is used to run and land flow control devices with external fish necks. For applications which do not require a no-go type running tool the C1 type running tool can be dressed with a thread protector which has the same O.D. as the body of the tool. Additionally by adding the required size locating ring, the tool can be converted into a no-go type running tool, providing a positive tool positioner with its no-go feature.

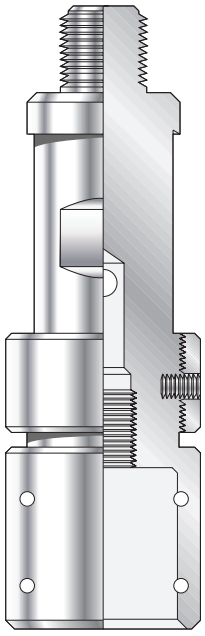
The C1 type running tool has a box down connection to accept A and N-1 type shanks.

‘C1’ Type Running Tools

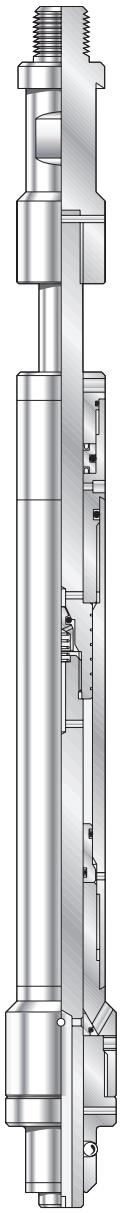
Part Number	Nominal Size	Outside Diameter	Fishneck O.D.	Prong Thread	Top Connection
B119-017	2"	1.406"	1.187"	5/8"-11UN	15/16UN
B119-003	2 3/8"	1.718"	1.375"	3/4"-16UN	15/16UN
B119-024	2 7/8"	2.189"	1.750"	1"-14UN	15/16UN
B119-018	3 1/2"	2.687"	2.313"	1"-14UN	1 1/16UN
B119-019	4 1/2"	3.562"	3.125"	1"-14UN	1 1/16UN

No-Go Rings

Tool Nominal Size	Lock Size or Standing Valve Size	Optional Extras Locator Rings
1 1/2" for 1.900" and 2 1/16" Tbg.	1.437"	1.468"
	1.500"	1.520"
	1.562"	1.593" (00-25052)
	1.625"	1.565"
2" for 2 3/8" Tbg.	1.781"	1.807"
	1.812"	1.843" (00-25018)
	1.875"	1.906" (00-29487)
	2.062"	2.093"
2 1/2" for 2 7/8" Tbg.	2.250"	2.281" (00-29491)
	2.312"	2.343" (00-29490)
	2.562"	2.593"
3" for 3 1/2" Tbg.	2.750"	2.781" (00-29489)
	2.812"	2.843" (00-29488)
4" for 4 1/2" Tbg.	3.688"	3.718"
	3.750"	3.802"
	3.812"	3.843"



‘C1’ Type Running Tool



Soft Set Running Tool

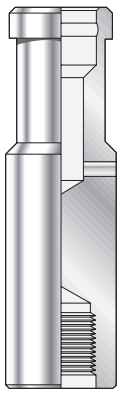
The soft set running tool can be used to run and set bottom hole instruments in to a well bore without the need to jar to release. The tool has a simple sit down action to affect hydraulic transfer and subsequent mechanical release.

Our soft set running tool is not sensitive to hanging weight which therefore eliminates the possibility of dropping instruments prematurely.

The soft set running tool has an interchangeable bottom sub which can be threaded to suit any industry standard connection. Alternatively, it can also be adapted to run instruments using standard internal and external fishing necks.

Soft Set Running Tools

Part Number	Actual O.D.	Fishneck O.D.	Top Connection	Bottom Connection
B125-009	1.875"	1.375"	15/16UN	Customer Specification
B125-010	2.250"	1.375"	15/16UN	Customer Specification
B125-011	2.750"	1.750"	1 1/16UN	Customer Specification
B125-012	3.675"	1.750"	1 1/16UN	Customer Specification



Soft Set Running Tool

‘BO’ Type Selective Shifting Tool

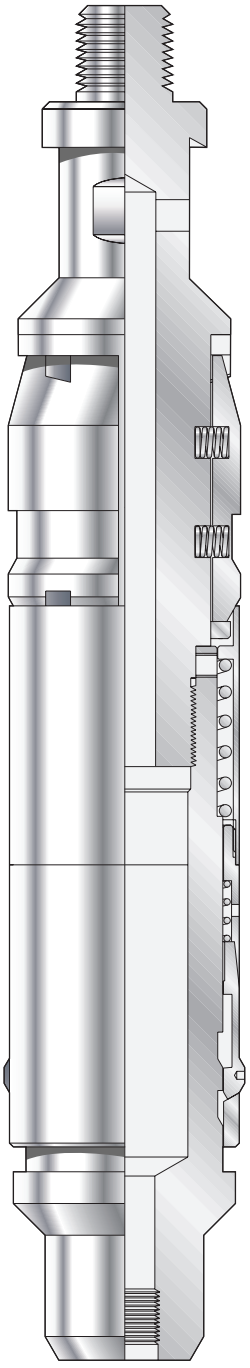
The BO type shifting tool is designed to select and downshift the closing sleeve of SSD’s.

The tool has an X running tool trip mechanism that holds the shifting keys retracted while running into the well and consequently through SSD’s that are not required to be shifted. Picking up through the appropriate sleeve, the shifting keys are released by the dogs engaging the packing bore(s) of the SSD. Downward jarring opens the SSD which is indicated by the self release profile on the keys allowing the shifting tool to pass freely.

Note; this tool is for selective downshift only and may be used in conjunction with the standard B type shifting tool.

‘BO’ Type Selective Shifting Tools

Part Number	SSD I.D.	O.D. (Keys Expanded)	O.D. (Keys Retracted)	O.D. (Dogs Expanded)	Fishneck O.D.	Connections Box & Pin
TBA	1.500"	1.690"	1.49"	1.62"	1.187"	15/16UN
B084-049	1.875"	2.160"	1.86"	1.93"	1.375"	15/16UN
B084-038	2.313"	2.600"	2.34"	2.38"	1.750"	15/16UN
L-9811087267	2.562"	2.970"	2.53"	2.68"	1.750"	15/16UN
B084-026	2.750"	3.030"	2.72"	2.84"	2.313"	1 1/16UN
B084-044	2.813"	3.160"	2.72"	2.90"	2.313"	1 1/16UN
L-9811085803	3.313"	3.610"	3.25"	3.43"	2.313"	1 1/16UN
B084-047	3.688"	4.150"	3.66"	3.75"	2.313"	1 1/16UN
B084-067	3.813"	4.090"	3.75"	3.91"	2.313"	1 1/16UN
B084-083	4.313"	4.875"	4.25"	4.42"	2.313"	1 1/16UN
B084-084	4.562"	5.000"	4.53"	4.66"	3.125"	1 1/16UN



‘BO’ Type
Selective Shifting Tool

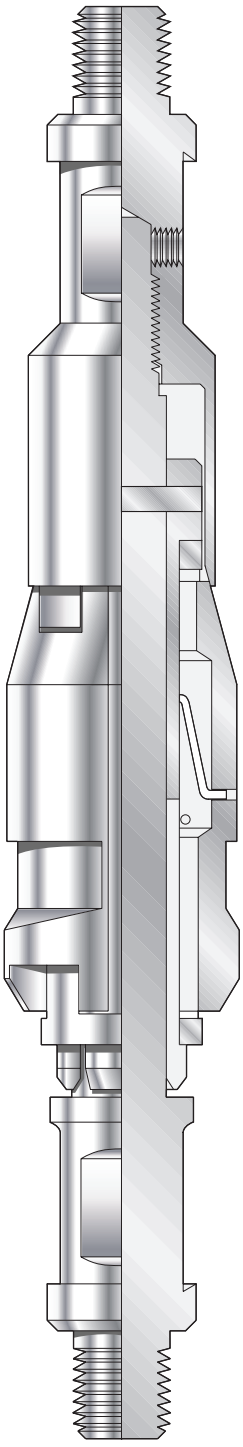
‘B’ Type Self Releasing Positioning Tool

The B type self releasing positioning tool is used to position the closing sleeve of sliding side doors to the open position or to the closed position.

The B type self releasing positioning tool will shift XA, RA, XO, XD, A, C, CB, WB, L and CM types of SSD.

Selective keys may be used which have no self release profile and rely on the shear pin as a release mechanism.

This tool will not pass a no.1 type S nipple.



‘B’ Type Self Releasing Positioning Tool

‘B’ Type Self Releasing Positioning Tools

Part Number	SSD I.D.	O.D. (Keys Expanded)	O.D. (Keys Retracted)	Fishneck O.D.	Overall Length	Connections Box & Pin
B084-002	1.375"	1.630"	1.35"	1.000"	11.12"	5/8UN
B084-003	1.500"	1.690"	1.49"	1.187"	12.44"	15/16UN
B084-001	1.625"	1.890"	1.62"	1.187"	12.75"	15/16UN
B084-004	1.710"	2.120"	1.69"	1.187"	13.00"	15/16UN
B084-005	1.781"/1.812"	2.070"	1.75"	1.375"	12.50"	15/16UN
B084-006	1.875"	2.160"	1.84"	1.375"	13.30"	15/16UN
B084-007	2.125"	2.350"	1.97"	1.375"	13.30"	15/16UN
B084-009	2.188"/2.313"	2.600"	2.15"	1.750"	13.94"	15/16UN
B084-010	2.562"	2.970"	2.53"	1.750"	13.94"	15/16UN
B084-011	2.750"	3.030"	2.73"	2.313"	13.94"	1 1/16UN
B084-012	2.813"	3.160"	2.72"	2.313"	14.19"	1 1/16UN
B084-013	3.125"	3.480"	3.06"	1.750"	16.10"	15/16UN
B084-014	3.313"	3.610"	3.25"	2.313"	14.12"	1 1/16UN
B084-015	3.437"	3.930"	3.41"	2.313"	16.10"	1 1/16UN
B084-039	3.688"	4.150"	3.66"	3.125"	13.88"	1 1/16UN
B084-017	3.813"	4.090"	3.75"	3.125"	13.88"	1 1/16UN
B084-018	4.125"	4.360"	3.86"	2.313"	17.09"	1 1/16UN
B084-019	4.313"/4.437"	4.875"	4.25"	2.313"	17.25"	1 1/16UN
B084-020	4.562"	5.000"	4.52"	3.125"	17.38"	1 1/16UN
B084-021	5.250"	5.800"	5.23"	3.125"	17.15"	1 1/16UN

Positive Key

Part Number	Nominal Size
00-08685	1.875"
00-04534	2.188"/2.313"
00-24469	2.313"
00-26797	2.562"
00-04268	2.750"
00-16366	2.813"
00-31402	3.437"
00-13540	3.688"
00-26169	4.313"/4.437"
00-29804	4.562"

Shifting Tool with Positive Key

Part Number	Nominal Size
B084-031	1.875"
B084-066	2.188"/2.313"
B084-029	2.750"
B084-127	3.437"
B084-071	3.688"
B084-187	4.313/4.437"
B084-082	4.562"

The Elmar Model D-2 Shifting Tool

The Elmar Model D-2 shifting tool is a wireline operated tool used to open and close the Model L sliding sleeve. Any number of sleeves, of the same size, in a single tubing string can be shifted in any combination or in any sequence.

Features and Benefits

- Used to open and close Model L Sliding Sleeves
- Collet used to locate the sleeve to be shifted
- Used to open and close 'L' Sleeves
- Self-release when shifting operation complete
- Shear pin safety release

When Ordering Please Specify

- Nominal size and collet size

D-2 Shifting Tool

Nominal Size	Collet Size	Top Thread	Fishneck O.D.	Maximum O.D. (A)	Bottom Thread	Adjustment Length (B)	Overall Length
1.25"	1.187"			1.213"		14.531"	
	1.250"			1.281"			
1.50"	1.443"	15/16-10 UN Pin	1.188"	1.468"	15/16-10 UN Pin	14.938"	
	1.500"			1.531"			
	1.562"			1.593"			
	1.625"			1.656"			
2.00"	1.781"	15/16-10 UN Pin	1.375"	1.807"	15/16-10 UN Pin	15.688"	38.250"
	1.812"			1.843"			
	1.875"			1.906"			
2.50"	2.250"	15/16-10 UN Pin	1.750"	2.281"	15/16-10 UN Pin	16.625"	39.375"
	2.312"			2.343"			
3.00"	2.750"	1 1/16-10 UN Pin	2.312"	2.781"	1 1/16-10 UN Pin	17.125"	39.437"
	2.812"			2.843"			
4.00"	3.688"	1 1/16-10 UN Pin	2.312"	3.743"	1 1/16-10 UN Pin	22.688"	43.000"
	3.812"			3.867"			

Model D-2 Shifting Tool

Gas Lift Running Tools and Spacers Bars

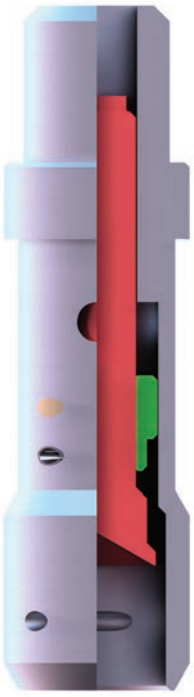
Gas Lift running tools are wireline service tools used to install 1.000" and 1.500" OD side pocket subsurface control devices in side pocket mandrels. These running tools typically attach to the side pocket device with tangential shear pins. All side pocket mandrel accessory running tools must be attached to the appropriate kickover tools to install side pocket subsurface control devices.

Note: FYI - 1¼" JDC, 1 5/8" JDS and 2" JDC Pulling Tool which are typically used for pulling the gas lift valves.

Gas Lift Running Tools and Spacers Bars
Description
JEK Running Tool (No Fish Neck) 15/16" - 10UN SR
JEK-1 Running Tool 1.187" Fish Neck 15/16" - 10UN SR
JC-3 Running Tool 1.375" Fish Neck 15/16" - 10UN SR
JC-5 Running Tool 1.375" Fish Neck 15/16" - 10UN SR
JK-1 Running Tool 1.187" Fish Neck 15/16" - 10UN SR
RK-1 Running Tool 1.187" Fish Neck 15/16" - 10UN SR
GA-2 Running Tool 1.187" Fish Neck 15/16" - 10UN SR
JK Running Tool 1.187" Fish Neck 15/16" - 10UN SR

Note: When Ordering please specify latch to be ran and spacer bar length required.

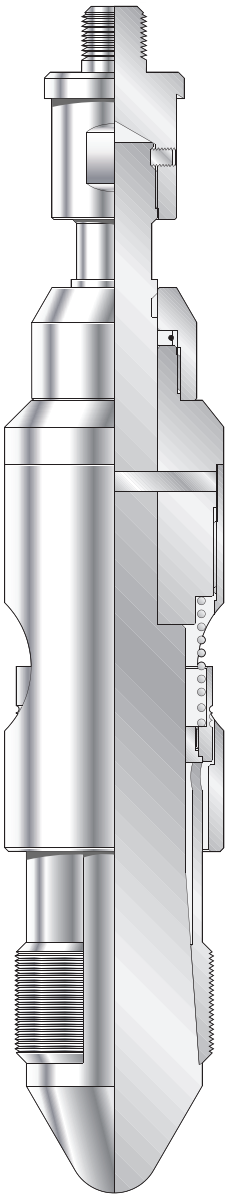
Spacer Bars	
Part Number	**Description**
V-00-21823	Spacer Bar 8.25" Effective Length c/w 15/16 Box and Pin connections (1.25" O.D.)
V-00-21822	Spacer Bar 14.25" Effective Length c/w 15/16 Box and Pin connections (1.25" O.D.)
V-00-26261	Spacer Bar 11.25" Effective Length c/w 15/16 Box and Pin connections (1.50" O.D.)
V-00-30542	Spacer Bar 7.00" Effective Length c/w 15/16 Box and Pin connections (1.50" O.D.)
V-00-30543	Spacer Bar 10.25" Effective Length c/w 15/16 Box and Pin connections (1.50" O.D.)
V-00-21823	Spacer Bar 12.00" Effective Length c/w 15/16 Box and Pin connections (1.50" O.D.)
V-00-21822	Spacer Bar 8.00" Effective Length c/w 15/16 Box and Pin connections (1.50" O.D.)
V-00-26261	Spacer Bar 11.25" Effective Length c/w 15/16 Box and Pin connections (1.50" O.D.)
V-00-30542	Spacer Bar 20 9/16" Effective Length c/w 15/16 Box and Pin connections (1.50" O.D.)
V-00-30543	Spacer Bar 9.00" Effective Length c/w 15/16 Box and Pin connections (1.50" O.D.)



GA-2 Running Tool

RK-1 Running Tool

Fishing Tools



Wireline Grab

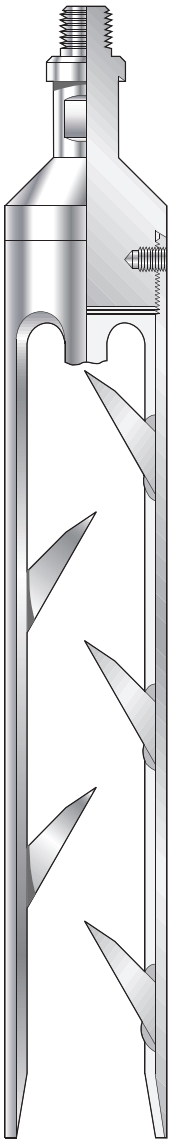
The wireline grab is a wireline service tool normally used to retrieve wire that has broken in the tubing.

The wireline grab consists of pin connection up and a housing with either two or three flexible prongs extending downwards. Pointed barbs are welded on the inside of the prongs so as to form hooks that will catch the looped end of the broken line. When a line breaks below the stuffing box, a full gauge such as a slotted skirt Wirefinder is normally used to both locate and ball up the broken end of the line before running the wireline grab.

The wireline grab is flexible enough to bend and can be gauged for the tubing it is to be run in. The prong ends of the grab should fit snugly against the walls of the tubing to help prevent line bypass.

Wireline Grabs

Part Number	Size	Fishneck O.D.	Top Connection	No. of Prongs
B039-016	1.50"	1.187"	15/16UN	2
B040-026	1.75"	1.375"	15/16UN	3
B040-014	2.25"	1.750"	1 1/16UN	3
L-9811077417D263	2.62"	1.750"	1 1/16UN	3
B040-010	3.00"	1.750"	1 1/16UN	3
B040-019	3.50"	2.313"	1 1/16UN	3
B040-011	4.00"	2.313"	1 1/16UN	3
B040-018	4.50"	2.313"	1 1/16UN	3
B040-020	5.00"	3.125"	1 9/16UN	3
B040-017	5.50"	3.125"	1 9/16UN	3
B040-021	6.00"	3.125"	1 9/16UN	3



Wireline Grab

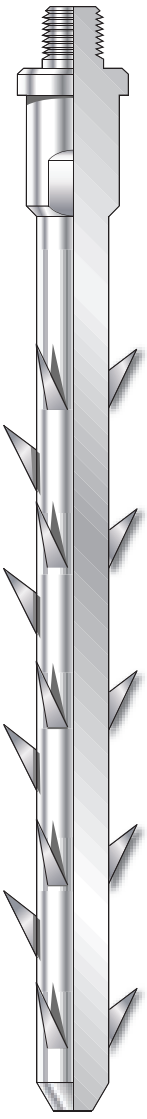
Centre Spear

The centre spear is a wireline fishing tool used to retrieve wire lost downhole. Where the wire has fouled downhole the centre spear is driven in and the barbs engage. Once the wireline is engaged it cannot be released from the spear until it reaches the surface. Therefore great care should be exercised when using this tool.

The centre spear can sometimes be driven into a ball of wire and break off small pieces at a time until the ball has been loosened enough to be able to move it up the tubing.

Centre Spears

Part Number	Size	Fishneck O.D.	Top Connection	Length
B097-001	1.500"	1.375"	15/16UN	22"
B097-002	1.875"	1.750"	1 1/16UN	22"
B097-003	2.500"	2.313"	1 9/16UN	22"



Centre Spear

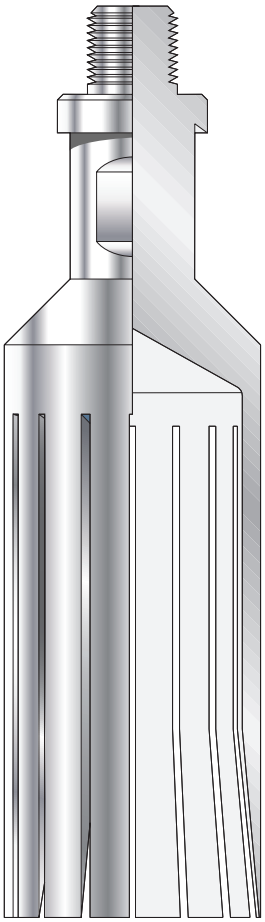
Wirefinder

A wirefinder (one piece) is a wireline tool designed to locate and ball the end of the wireline in the well bore during “wireline fishing operations". The wirefinder is a one piece tool which has a standard wireline fishing neck and threads uppermost and a slotted skirt (fingers) down. The wirefinder can be supplied from sizes from 1’ through 6" O.D..

When ordering this product please specify the part number and the actual O.D. of tool required.

Wirefinders

Part Number	Size	Fishneck O.D.	Top Connection
00-01775/D150	1.50"	1.187"	15/16UN
00-01775/D175	1.75"	1.187"	15/16UN
00-01776/D200	2.00"	1.187"	15/16UN
L-9811051773D250	2.50"	1.375"	15/16UN
00-01779D300	3.00"	1.750"	1 1/16UN
00-01779D350	3.50"	1.750"	1 1/16UN
L-9811048455D400	4.00"	1.750"	1 1/16UN
00-01780/D450	4.50"	2.313"	1 1/16UN
00-01780/D500	5.00"	2.313"	1 1/16UN
00-01781/D599	5.99"	3.125"	1 9/16UN



Wirefinder

Sleeved Expanding Wirefinder

The sleeved expanding wirefinder is designed to locate broken wireline through restricted tubing/casing. Whilst running into the well, the O.D. of the expanded wirefinder is compressed by a no-go sleeve, which encapsulates the complete assembly, preventing it from hanging up in well restrictions. The no-go sleeve is shear pinned to the expanding wirefinder top sub.

The no-go sleeve is designed to locate into a specific sized no-go nipple. Downward jarring will then shear out the pin, allowing the toolstring to move down out of the sleeve and the wirefinder fingers to expand.

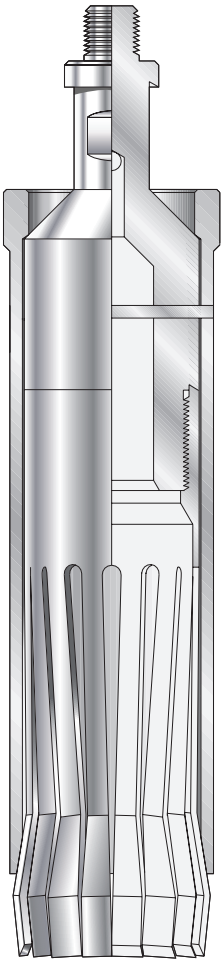
The O.D. of shoulder and the O.D. of the retainer sleeve body of the wirefinder (shown in drawing) should correspond to the shoulder diameter and the drift diameter of the no-go nipple, located at the transition between the larger and smaller tubing.

The expanding wirefinder is therefore normally manufactured to customer specification. Please specify the actual O.D. of tool required and the nipple specifications to be located in.

Sleeved Expanding Wirefinders

Part Number	NoGo O.D.	Expanded O.D.	Fishneck O.D.	Top Connection
B105-027	1.87"	2.49"	1.375"	15/16-10 UN
B105-028	2.30"	2.99"	1.375"	15/16-10 UN
B105-020	2.75"	3.50"	1.750"	1 1/16-10 UN
B105-015	3.80"	4.67"	1.750"	1 1/16-10 UN
B105-010	3.80"	5.90"	1.750"	1 1/16-10 UN
B105-006	4.31"	6.18"	2.313"	1 9/16-10 UN

Note: Other options available on request.



Sleeved Expanding Wirefinder

Go-Devil (Flat Bottomed & Cutter Bar Type)

The go-devil makes it possible to cut a conventional wireline from a stuck toolstring.

The go-devil is constructed of a solid length of bar with a slot and guide plate through which the wireline is passed. The tool is then dropped downhole in the conventional manner. If the rope socket is 'clean' a cutter bar type go-devil will cut directly on the rope socket. In operations where the wireline tools are fouled by sand, debris or wire, a flat bottomed go-devil dropped to the obstruction will give a firm cutting base for a cutter bar type go-devil or a snipper type wire cutter.

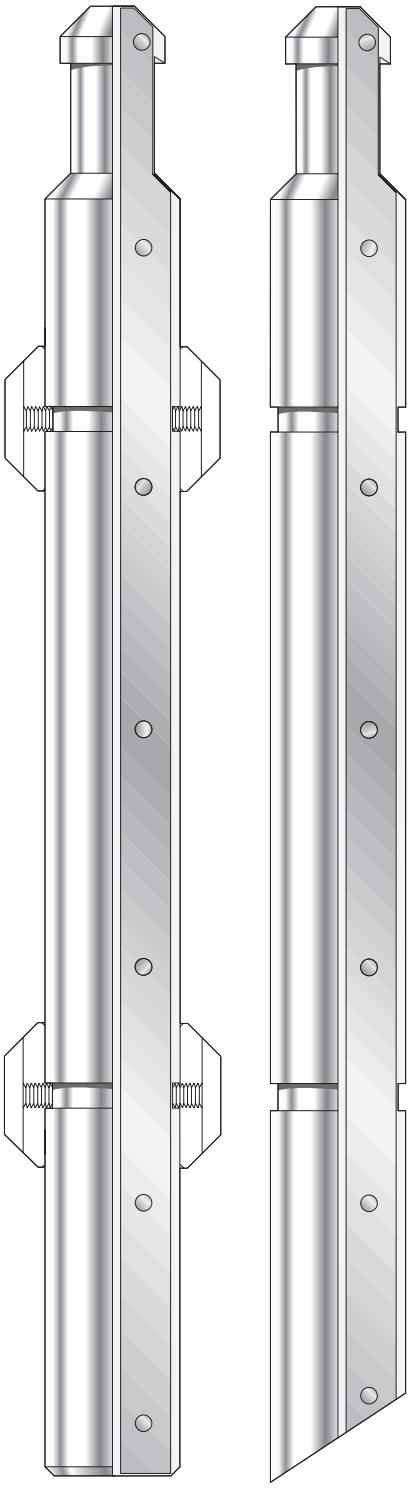
Go-devils have locating grooves for slip over centralisers (shown ghosted) for use when fishing small O.D. toolstrings in large I.D. Tubing.

Cutter Bar Type

Outside Diameter	Fishneck O.D.	Wire Size	Length
1.500"	1.375"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
1.500"	1.375"	3/16"- 7/32"	2ft/ 3ft/ 5ft
1.875"	1.750"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
1.875"	1.750"	3/16"- 7/32"	2ft/ 3ft/ 5ft
2.125"	1.750"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
2.125"	1.750"	3/16"- 7/32"	2ft/ 3ft/ 5ft
2.500"	2.313"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
2.500"	2.313"	3/16"- 7/32"	2ft/ 3ft/ 5ft

Flat Bottomed Type

Outside Diameter	Fishneck O.D.	Wire Size	Length
1.500"	1.375"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
1.500"	1.375"	3/16"- 7/32"	2ft/ 3ft/ 5ft
1.875"	1.750"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
1.875"	1.750"	3/16"- 7/32"	2ft/ 3ft/ 5ft
2.125"	1.750"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
2.125"	1.750"	3/16"- 7/32"	2ft/ 3ft/ 5ft
2.500"	2.313"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
2.500"	2.313"	3/16"- 7/32"	2ft/ 3ft/ 5ft



Flat Bottomed Type Go-Devil

Cutter Bar Type Go-Devil

Roller Go-Devil (Flat Bottomed & Cutter Bar Type)

The roller go-devil is used to minimise friction when being dropped in deviated well bores.

Roller go-devils are available with flat or cutter bar type bottoms and is used in the same manner as the conventional go-devil (see go-devil).

Roller go-devils can be made in sections to increase the total mass when being dropped in highly deviated wells. Roller size should be specified when ordering to be compatible with the tubing and associated nipples.

Roller Go Devils - Cutter Bar Type

Outside Diameter	Fishneck O.D.	Wire Size	Length
1.500"	1.375"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
1.500"	1.375"	3/16"- 7/32"	2ft/ 3ft/ 5ft
1.875"	1.750"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
1.875"	1.750"	3/16"- 7/32"	2ft/ 3ft/ 5ft
2.125"	1.750"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
2.125"	1.750"	3/16"- 7/32"	2ft/ 3ft/ 5ft
2.500"	2.313"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
2.500"	2.313"	3/16"- 7/32"	2ft/ 3ft/ 5ft

Roller Go Devils - Flat Bottomed Type

Outside Diameter	Fishneck O.D.	Wire Size	Length
1.500"	1.375"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
1.500"	1.375"	3/16"- 7/32"	2ft/ 3ft/ 5ft
1.875"	1.750"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
1.875"	1.750"	3/16"- 7/32"	2ft/ 3ft/ 5ft
2.125"	1.750"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
2.125"	1.750"	3/16"- 7/32"	2ft/ 3ft/ 5ft
2.500"	2.313"	0.092" - 0.108" - 0.125"	2ft/ 3ft/ 5ft
2.500"	2.313"	3/16"- 7/32"	2ft/ 3ft/ 5ft

Note: Please confirm roller size and type at time of enquiry.

Flat Bottomed Type Roller Go-Devil

Cutter Bar Type Roller Go-Devil

Bowen Wireline Retriever

Bowen wireline retrievers are specifically designed for recovering cut or broken single strand measuring lines.

Since cut or broken wire line 'strands' into soft coils inside the pipe, and the upper-most portions will typically be standing straight up, it is desirable to grab the line just below the break in the line.

'Baiting' Type Bulldog Spear

The baiting type bulldog spear is used to retrieve (fish) wireline tools lost in the well bore that do not have a conventional fishing neck and are therefore best fished with an internal spear.

The spear is run on a GS running/pulling tool and speared into the fish. In the event the fish cannot be pulled the GS running/pulling tool will shear its pin and release. This will leave an internal fishing neck 'looking up', to enable further fishing attempts. The fish is then said to be baited.

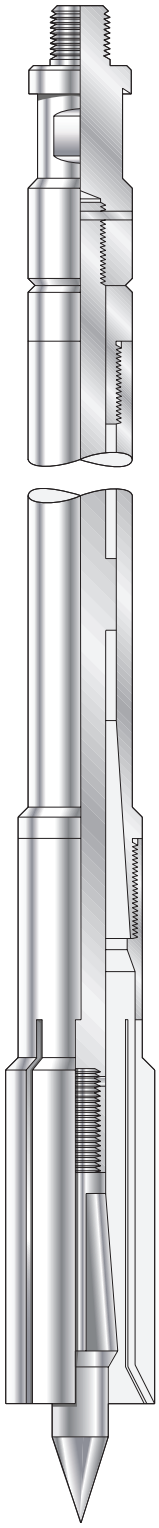
The baiting type bulldog spear has an optional engagement stop ring (shown) available on request.

Bowen Wireline Retrievers

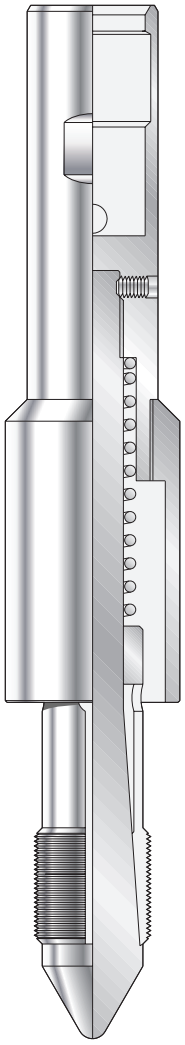
Part Number	Outside Diameter	To Run In	Can Be Adapted to Run In	Top Connection	Type	Guide Type	Weight
18995	1.50"	1 1/2" Tubing	2 1/16" to 2"	15/16UN	Slip	Slotted	13
15717	1.75"	1 1/2" Tubing	2 5/8" to 2 7/8"	15/16UN	Slip	Plain	13
18995	1 13/16"	2 3/8" Tubing	2 7/8" to 3 1/2"	15/16UN	Slip	Slotted	15

'Baiting' Type Bulldog Spears

Part Number	Nominal Size	Outside Diameter	Pulling Neck	To Catch Diameters
B087-056	2"	1.850"	1.375"	0.875" - 1.000"
B087-056	2"	1.850"	1.375"	1.000" - 1.125"
B087-056	2"	1.850"	1.375"	1.125" - 1.250"
B087-056	2"	1.850"	1.375"	1.250" - 1.375"
B087-056	2"	1.850"	1.375"	1.375" - 1.500"
B087-057	2 1/2"	2.280"	1.810"	1.125" - 1.25"
B087-057	2 1/2"	2.280"	1.810"	1.250" - 1.375"
B087-057	2 1/2"	2.280"	1.810"	1.500" - 1.675"
B087-057	2 1/2"	2.280"	1.810"	1.675" - 1.750"
B087-057	2 1/2"	2.280"	1.810"	1.750" - 1.875"
B087-057	2 1/2"	2.280"	1.810"	1.875" - 2.000"
B087-058	3"	2.720"	2.313"	1.750" - 1.875"
B087-058	3"	2.720"	2.313"	1.875" - 2.000"
B087-058	3"	2.720"	2.313"	2.000" - 2.250"
B087-058	3"	2.720"	2.313"	2.250" - 2.500"
B087-059	3 1/2"	3.625"	2.620"	2.500" - 2.750"
B087-059	3 1/2"	3.625"	2.620"	2.750" - 3.000"
B087-059	3 1/2"	3.625"	2.620"	3.000" - 3.250"
B087-059	3 1/2"	3.625"	2.620"	3.250" - 3.500"



Bowen Wireline Retriever



'Baiting' Type Bulldog Spear

Bulldog Spear

The bulldog spear is a fishing tool designed to catch tubular sections lost in the well bore. The bulldog spear is designed specifically for wireline operations and therefore has standard wireline threads and fishing necks.

All bulldog spears slips are of hardened and tempered, captured dovetail design, making them ideally suited for heavy duty fishing operations. Bulldog spears are designed with one slip to catch 1/2" through 1 1/2", two slips to catch 1 1/2" through 2 3/4" and three slips to catch 2 3/4" through 6".

The bulldog spear has an optional engagement stop ring (shown) available on request.

Bulldog Spears

Part Number	Outside Diameter	Fishneck O.D.	Top Connection	To Catch Diameters	Slips Required	Part Number (Slips)
B087-001	1.50"	1.375"	15/16UN	0.50" - 0.75"	1	00-04424
B087-002	1.50"	1.375"	15/16UN	0.75" - 1.00"	1	00-04425
B087-003	1.50"	1.375"	15/16UN	1.00" - 1.25"	1	00-04426
B087-004	1.50"	1.375"	15/16UN	1.25" - 1.50"	1	00-04427
B087-005	1.75"	1.375"	15/16UN	1.50" - 1.75"	2	00-04428
B087-006	2.25"	1.375"	15/16UN	1.75" - 2.25"	2	00-04002
B087-007	2.75"	1.750"	1 1/16UN	2.25" - 2.75"	2	00-04005
B087-008	3.25"	2.313"	1 1/16UN	2.75" - 3.25"	3	00-04008
B087-009	4.50"	3.125"	1 9/16UN	3.25" - 4.50"	3	00-04436
L-9811070182	6.00"	3.125"	1 9/16UN	4.50" - 6.00"	3	L-9821070184

Collet Type Bulldog Spears

Part Number	Outside Diameter	Fishneck O.D.	Top Connection	To Catch Diameters	Part Number (Collets)
B087-014	1.50"	1.375"	15/16UN	0.875" - 1.000"	00-04854
B087-014	1.50"	1.375"	15/16UN	1.000" - 1.125"	00-04855
B087-014	1.50"	1.375"	15/16UN	1.125" - 1.250"	00-04856
B087-014	1.50"	1.375"	15/16UN	1.250" - 1.375"	00-04857
B087-014	1.50"	1.375"	15/16UN	1.375" - 1.500"	00-04858
B087-015	2.00"	1.750"	1 1/16UN	1.125" - 1.250"	00-04862
B087-015	2.00"	1.750"	1 1/16UN	1.250" - 1.375"	00-04863
B087-015	2.00"	1.750"	1 1/16UN	1.375" - 1.500"	00-04864
B087-015	2.00"	1.750"	1 1/16UN	1.500" - 1.675"	00-04865
B087-015	2.00"	1.750"	1 1/16UN	1.675" - 1.750"	00-04866
B087-015	2.00"	1.750"	1 1/16UN	1.750" - 1.875"	00-05582
B087-015	2.00"	1.750"	1 1/16UN	1.875" - 2.000"	00-05574
B087-016	2.25"	1.750"	1 1/16UN	1.750" - 2.000"	00-05583
B087-016	2.25"	1.750"	1 1/16UN	2.000" - 2.250"	00-05576
B087-016	2.25"	1.750"	1 1/16UN	2.250" - 2.500"	00-05577
B087-016	2.25"	1.750"	1 1/16UN	2.500" - 2.750"	00-05578
B087-031	2.50"	2.313"	1 1/16UN	2.750" - 3.000"	00-05579
B087-031	2.50"	2.313"	1 1/16UN	3.000" - 3.250"	00-05580
B087-031	2.50"	2.313"	1 1/16UN	3.250" - 3.500"	00-05581
B087-031	2.50"	2.313"	1 1/16UN	3.500" - 3.750"	00-05582

Note: Please confirm collet size required.

Collet Type Bulldog Spear

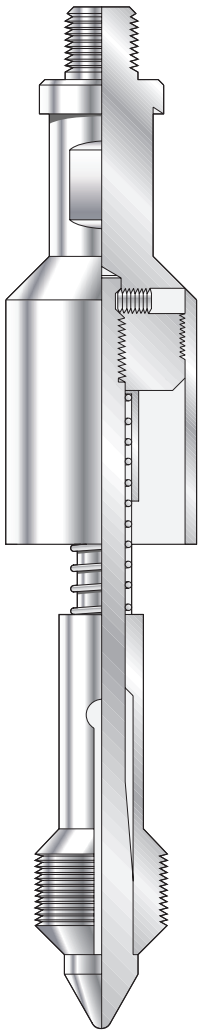
The collet type bulldog spear is used to retrieve wireline tools (fish) lost in the well bore that do not have a conventional fishing neck and are therefore best 'fished' with an internal spear.

Once latched into a fish, this type of spear cannot be released. It should therefore always be run with a rope socket and pulling tool to ensure release is possible when necessary.

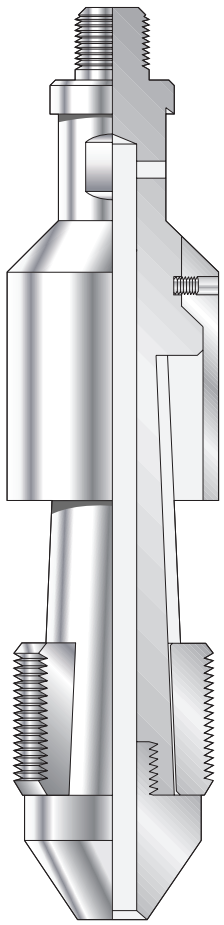
Collet type bulldog Spears are available in a range of sizes as listed below.

The collet type bulldog spear includes one collet, please specify collet size required.

The collet type bulldog spear has an optional engagement stop ring (shown) available on request.



'Collet' Type Bulldog Spear



Bulldog Spear

Wireline Heavy Duty Releasable Bulldog Spear

Our wireline heavy duty releasable bulldog spear is a variable catch internal spear used to retrieve a lost cylindrical fish from the well bore.

A complete range of slips is available for each size tool. To operate simply run into the fish and set down weight, pick up, and retrieve the fish. (This spear usually requires a positive shoulder to sit down on).

To release from the fish simply jar down to shear the pin. The spear will then automatically release.

Wireline Heavy Duty Releasable Bulldog Spears

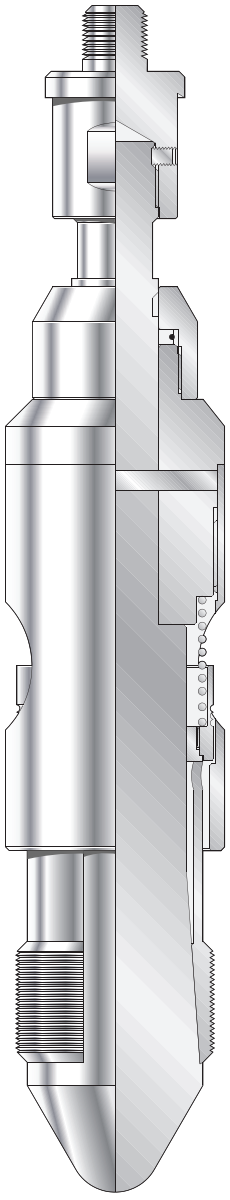
Part Number	Nominal Size	Outside Diameter	Fishneck O.D.	Top Connection	*To Catch Diameters	Part Number (Slips)
B087-051	2.0"	1.810"	1.375"	15/16UN	1 1/8" - 1 7/8"	00-21157
B087-052	2.5"	2.250"	1.750"	1 1/16UN	1 7/8" - 2 1/2"	00-29546
B087-053	3.0"	2.625"	2.313"	1 1/16UN	2 1/4" - 2 7/8"	00-30548
B087-054	3.5"	3.110"	2.313"	1 1/16UN	2 5/8" - 3 1/8"	00-30549
B087-055	4.0"	3.625"	2.313"	1 1/16UN	3 1/8" - 3 3/4"	00-30553

Note: * Larger catch sizes are available on request. Stop sleeve attachments to bottom skirt may be required if catch diameter is larger than tool O.D.

Wireline Heavy Duty Releasable Bulldog Spear (Collet Slips) Table

Spear Size	2"	2 1/2"	3"	3 1/2"	4"
Spear O.D.	1.810"	2.250"	2.625"	3.110"	3.625"
Bulldog Spear Nominal Size Range	1 1/8" - 1 7/8"	1 7/8" - 2 1/2"	2 3/8" - 2 7/8"	2 5/8" - 3 1/8"	3 1/8" - 3 3/4"
Nominal Slip Size	Catch Range (Part Number)	Catch Range (Part Number)	Catch Range (Part Number)	Catch Range (Part Number)	Catch Range (Part Number)
1 1/8"	1 1/8" to 1 1/4" (00-21155)	-	-	-	-
1 1/4"	1 1/4" to 1 3/8" (00-21156)	-	-	-	-
1 3/8"	1 3/8" to 1 1/2" (00-21157)	-	-	-	-
1 1/2"	1 1/2" to 1 5/8" (00-21158)	-	-	-	-
1 5/8"	1 5/8" to 1 3/4" (00-21159)	-	-	-	-
1 3/4"	1 3/4" to 1 7/8" (00-24282)	1 3/4" to 1.875" (00-24187)	-	-	-
1 7/8"	-	1 7/8" to 2" (00-20832)	-	-	-
2"	-	2" to 2 1/8" (00-29546)	-	-	-
2 1/8"	-	2 1/8" to 2 1/4" (00-21124)	-	-	-
2 1/4"	-	2 1/4" to 2 3/8" (00-29547)	2 1/4" to 2 3/8" (00-30548)	-	-
2 3/8"	-	2 3/8" to 2 1/2" (00-21125)	2 3/8" to 2 1/2" (00-27971)	-	-
2 1/2"	-	-	2 1/2" to 2 5/8" (00-27972)	-	-
2 5/8"	-	-	2 5/8" to 2 3/4" (00-27973)	2 5/8" to 2 3/4" (00-30549)	-
2 3/4"	-	-	2 3/4" to 2 7/8" (00-27974)	2 3/4" to 2 7/8" (00-30550)	-
2 7/8"	-	-	-	2 7/8" to 3" (00-30551)	-
3"	-	-	-	3" to 3 1/8" (00-30552)	-
3 1/8"	-	-	-	-	3 1/8" to 3 1/4" (00-30553)
3 1/4"	-	-	-	-	3 1/4" to 3 3/8" (00-30554)
3 3/8"	-	-	-	-	3 3/8" to 3 1/2" (00-30555)
3 1/2"	-	-	-	-	3 1/2" to 3 5/8" (00-30556)
3 5/8"	-	-	-	-	3 5/8" to 3 3/4" (00-30557)

Note: Sizes highlighted in grey indicate bulldog spear collet slip standard fitment.



Heavy Duty Releasable Bulldog Spear

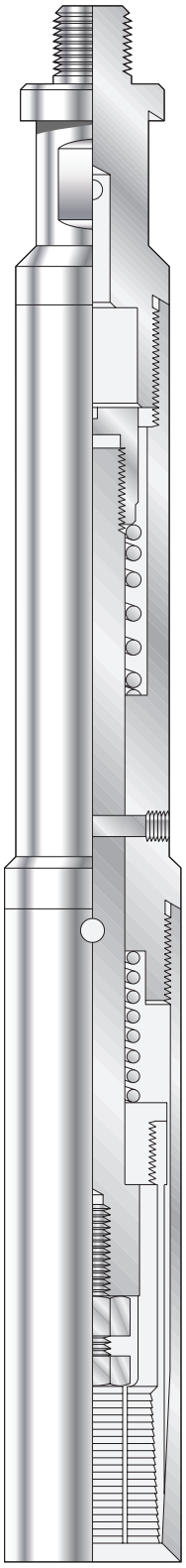
Releasable Overshot

Our releasable overshot is a slip type overshot used to retrieve a fish lost in the well bore that does not have a conventional fishing neck.

Once latched onto a fish the overshot can be released by jarring downwards provided the overshot has a solid footing upon which the core can be driven against.

Please refer to releasable overshot slips table when specifying size of slips on ordering.

Typical Releasable Overshot Slip



Releasable Overshot

Elmar Releasable Overshots

Part Number	Outside Diameter	Fishneck O.D.	Top Connection	Slips Range
B090-032	1.850"	1.375"	15/16UN	0.5" - 1.50"
B090-051	2.250"	1.375"	15/16UN	0.5" - 1.75"
B090-033	2.625"	1.750"	1 1/16UN	0.5" - 2.00"
B090-067	3.250"	2.313"	1 1/16UN	0.5" - 2.31"
B090-034	3.800"	2.313"	1 9/16UN	0.5" - 2.75"

Elmar Releasable Overshot (Slips) Table

Nominal Size	2"	2 1/2"	3"	3 1/2"	4"
Actual O.D.	1.810"	2.250"	2.625"	3.250"	3.800"
Nominal Slip Size	Catch Range (Part Number)	Catch Range (Part Number)	Catch Range (Part Number)	Catch Range (Part Number)	Catch Range (Part Number)
1/2"	7/16" to 9/16" (00-16024)	7/16" to 9/16" (00-16032)	3/8" to 9/16" (00-16038)	-	3/8" to 5/8" (00-16042)
5/8"	9/16" to 11/16" (00-16025)	9/16" to 11/16" (00-16033)	9/16" to 3/4" (00-16039)	1/2" to 11/16" (00-17491)	-
3/4"	11/16" to 13/16" (00-16026)	11/16" to 13/16" (00-16034)	-	11/16" to 7/8" (00-17492)	5/8" to 7/8" (00-16043)
7/8"	13/16" to 15/16" (00-16027)	13/16" to 15/16" (00-16047)	3/4" to 15/16" (00-16040)	-	-
1"	15/16" to 1 1/16" (00-13769)	15/16" to 1 1/16" (00-16035)	15/16" to 1 1/8" (00-16041)	7/8" to 1 1/16" (00-17493)	7/8" to 1 1/8" (00-16044)
1 1/8"	1 1/16" to 1 3/16" (00-16028)	1 1/16" to 1 3/16" (00-16036)	-	1 1/16" to 1 1/4" (00-17494)	-
1 1/4"	1 3/16" to 1 5/16" (00-16029)	1 3/16" to 1 5/16" (00-16048)	1 1/8" to 1 5/16" (00-13807)	-	1 1/8" to 1 3/8" (00-16045)
1 3/8"	1 5/16" to 1 7/16" (00-16030)	1 5/16" to 1 7/16" (00-16049)	1 5/16" to 1 1/2" (00-13806)	1 1/4" to 1 7/16" (00-17495)	-
1 1/2"	1 7/16" to 1 9/16" (00-16031)	1 7/16" to 1 9/16" (00-13764)	-	1 7/16" to 1 5/8" (00-17496)	1 3/8" to 1 5/8" (00-13198)
1 5/8"	-	1 9/16" to 1 11/16" (00-16050)	1 1/2" to 1 11/16" (00-13805)	-	-
1 3/4"	-	1 5/8" to 1 3/4" (00-16037)	1 11/16" to 1 7/8" (00-13804)	1 5/8" to 1 13/16" (00-17497)	1 5/8" to 1 7/8" (00-13195)
1 7/8"	-	-	-	1 13/16" to 2" (00-17498)	-
2"	-	-	1 7/8" to 2 1/16" (00-13799)	2" to 2 3/16" (00-16582)	1 7/8" to 2 1/8" (00-13196)
2 1/4"	-	-	-	2 1/8" to 2 5/16" (00-17499)	2 1/8" to 2 3/8" (00-13197)
2 1/2"	-	-	-	-	2 3/8" to 2 5/8" (00-13765)
2 3/4"	-	-	-	-	2 5/8" to 2 7/8" (00-16046)

Note: Sizes highlighted in grey indicate overshot slip standard fitment.

Wireline Overshots

Wireline overshots are slip type, designed specifically for wireline operations. They are used to retrieve wireline tools or parts of wireline tools (fish) that are lost in the tubing.

The wireline overshot, unlike some existing sucker rod overshots are designed specifically for wireline operations and are supplied with standard wireline threads and fishing necks.

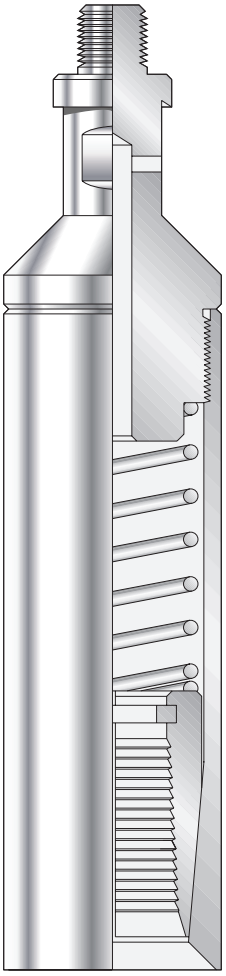
Wireline overshots are available in four different sizes and each has a complete range of hardened and double tempered slips.

Wireline overshot can be used in conjunction with a bell guide, necessary when fishing for small diameter tools in large internal diameter tubing.

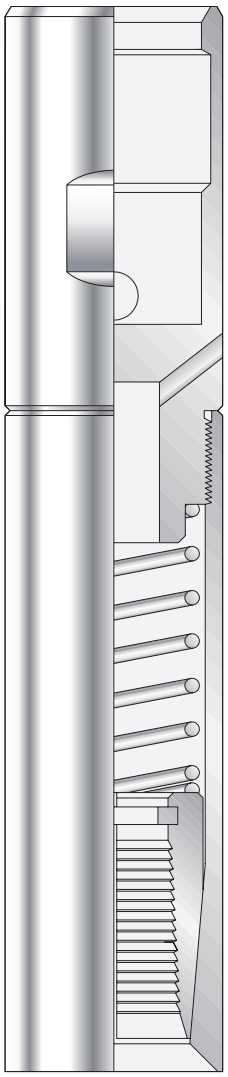
Each assembly comes complete with one set of slips, please specify which set is required when ordering.

As an option, the wireline overshot is available with a bait sub. The bait sub wireline overshot is run on a GS running/pulling tool and forced over the fish.

In the event the fish cannot be pulled the GS running/pulling tool will shear its pin and release. This will leave an internal fishing neck 'looking up', to enable further fishing attempts. The fish is then said to be baited.



Wireline Overshot



Bait Sub

Wireline Overshots

Part Number	Outside Diameter	Fishneck O.D.	Top Connection	*To Catch Diameters	Part Number (Slips)
B090-004	1.750"	1.375"	15/16UN	0.50" - 0.75"	00-01793
B090-004	1.750"	1.375"	15/16UN	0.75" - 1.00"	00-01794
B090-004	1.750"	1.375"	15/16UN	1.00" - 1.25"	00-01795
B090-010	2.250"	1.375"	15/16UN	0.50" - 0.75"	00-08004
B090-010	2.250"	1.375"	15/16UN	0.75" - 1.00"	00-08005
B090-010	2.250"	1.375"	15/16UN	1.00" - 1.25"	00-08006
B090-010	2.250"	1.375"	15/16UN	1.25" - 1.50"	00-08007
B090-010	2.250"	1.375"	15/16UN	1.50" - 1.75"	00-08008
B090-002	2.625"	1.750"	1 1/16UN	0.50" - 0.75"	00-01349
B090-002	2.625"	1.750"	1 1/16UN	0.75" - 1.00"	00-01350
B090-002	2.625"	1.750"	1 1/16UN	1.00" - 1.25"	00-01351
B090-002	2.625"	1.750"	1 1/16UN	1.25" - 1.50"	00-01352
B090-002	2.625"	1.750"	1 1/16UN	1.50" - 1.75"	00-01312
B090-002	2.625"	1.750"	1 1/16UN	1.75" - 2.00"	00-01313
B090-001	3.800"	2.313"	1 9/16UN	0.50" - 0.95"	00-02275
B090-001	3.800"	2.313"	1 9/16UN	0.95" - 1.40"	00-02274
B090-001	3.800"	2.313"	1 9/16UN	1.40" - 1.85"	00-02273
B090-001	3.800"	2.313"	1 9/16UN	1.85" - 2.30"	00-02272
B090-001	3.800"	2.313"	1 9/16UN	2.30" - 2.75"	00-02271

Note: * One set of slips comprises of 3 slips.

Note: Releasable slips are available for Bait Sub. Please ask for more details.

Alligator Grab

Our alligator grab was developed to retrieve loose debris or junk from a wellbore, at depth and in deviated wells.

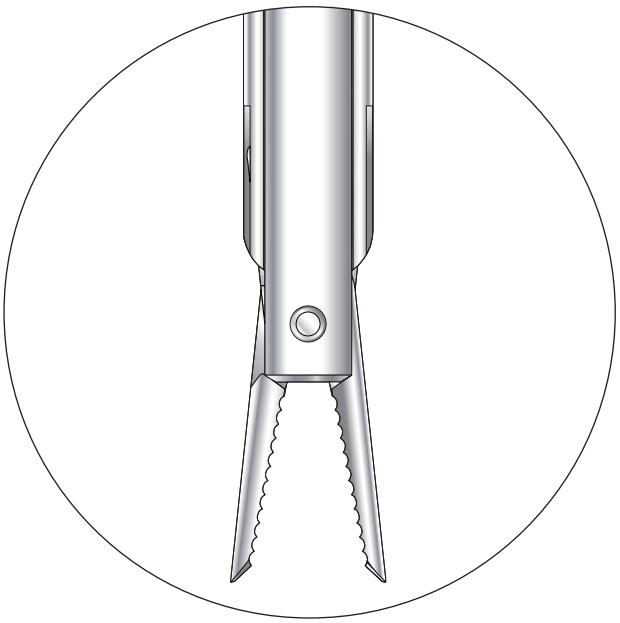
Downward jarring will shear a pin allowing the two opposing jaws to snap closes and clamp onto any object caught between them.

The jaws of the alligator grab are serrated to prevent objects from slipping free once the jaws are closed.
The grip of the jaws can be adjusted by manipulating the compression nut varying the spring tension prior to running in the hole.

Alligator Grab

Part Number	Nominal Diameter	Outside Diameter	Fishneck O.D.	Top Connection
R B115-007	1.50"	1.50"	1.187"	15/16UN
R B115-008	2.00"	1.850"	1.375"	15/10-10UN
R B115-016	2 1/2"	2.250"	1.750"	15/10-10UN
NR B115-004	1.25"	1.25"	1.187"	15/16UN
NR B115-005	1.50"	1.500"	1.187"	15/16-10UN
NR B115-001	2.00"	1.850"	1.375"	15/16UN
NR B115-002	2.50"	2.25"	1.750"	1 1/16UN
NR B115-013	3.00"	2.25"	1.750"	1 1/16UN
NR B115-017	4.00"	2.813"	1.750"	1 1/16UN
NR B115-012	4.00"	2.813"	2.313"	1 9/16-10UN
NR B115-003	4 1/2"	3.50"	2.313"	1 9/16UN

Note: NR = Non-Releasable. R = Releasable.



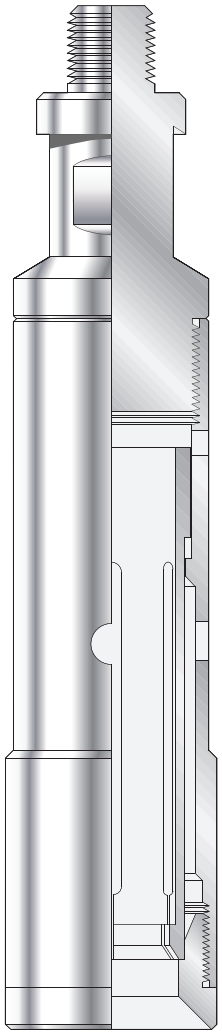
Alligator Grab

Type ‘GO’ Fishing Socket

The type GO fishing socket is designed primarily to extract prongs with fishing necks from subsurface equipment such as the PX and PS plug choke. It is also widely used as a fishing tool for latching tools with fishing necks that have become badly damaged during regular pulling operations. With an extended cylinder it can be used to overshoot and catch a fishing neck below an extra long stub looking up e.g. parted spang jars.

Type ‘GO’ Fishing Sockets

Part Number	Outside Diameter	Fishneck O.D.	Top Connection	To Catch Fishnecks
B113-001	2.00"	1.375"	15/16UN	1.000"
B113-002	2.00"	1.375"	15/16UN	1.375"
B113-003	2.50"	1.375"	15/16UN	1.750"
B113-004	3.00"	1.750"	1 1/16UN	2.313"
B113-005	3.75"	2.313"	1 9/16UN	3.125"



Type ‘GO’
Fishing Socket

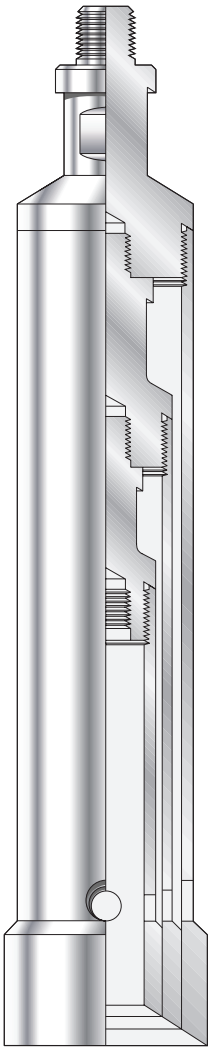
Bell Guide Set

A bell guide set consists of three individual bell guide tools that fit one into the other, allowing either overshots, spears or pulling tools to be screwed up inside any one of the three bell guides available. This therefore ultimately enables a 1" fishneck neck to be fished from within 6" I.D. casing without the need to fit either threaded or welded bell guides onto individual overshots or pulling tool skirts.

The bell guide set can also be used during wireline operation in deviated wells as a running or pulling tool centralizer.

Bell Guide Sets

Part Number	Type	Major O.D.	Fishneck O.D.	Top Connection	Bell Guide O.D.’s
B081-028	Set 1	6.0"	2.313"	1 9/16UN	3" / 4" / 6"
B081-027	Set 2	4.5"	2.313"	1 1/16UN	2.75" / 3.75"/ 4.5"
B081-026	Set 3	4.5"	1.750"	1 1/16UN	2.70"/ 3.60"/ 4.5"
B081-023	Set 4	5.0"	2.313"	1 1/16UN	2.50"/ 3.75"/ 5"



Bell Guide Set

Sidewall Cutter

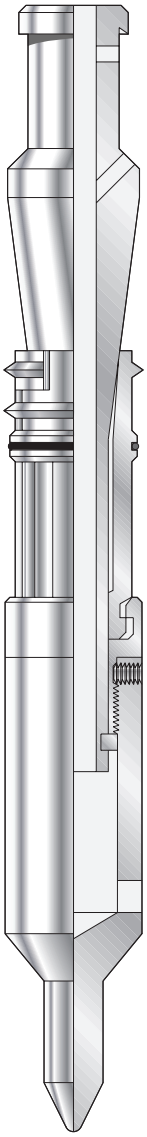
The sidewall cutter is used to cut wireline on the tubing wall when the solid footing required by other cutters is not available.

Sidewall cutters are available for tubing/casing sizes from 2 3/8" through 7".

Please specify tubing/casing size and weight when ordering.

Sidewall Cutters

Part Number	Tubing Size	Retracted O.D.	Expanded O.D.	Fishneck O.D.	Running Tool
B129-005	2 3/8"	1.78"	2.000"	1.375"	00-27675
B129-010	2 7/8"	2.25"	2.440"	1.750"	00-27675
B129-011	3 1/2"	2.72"	2.990"	2.313"	00-27676
B129-012	4 1/2"	3.56"	3.930"	2.313"	00-27709
B129-013	5 1/2"	4.25"	4.620"/ 4.750"	2.313"	00-27709



Sidewall Cutter

Wireline Snipper

The wireline snipper is used to cut 0.092", 0.108", 0.125", 0.187", 3/16", 0.219" and 7/32" wirelines at a rope socket when the downhole tools have become stuck and cannot be retrieved.

The wireline snipper comes in 1 1/4", 1 1/2", 1 7/8", 2 1/8" and 2 1/2" O.D.

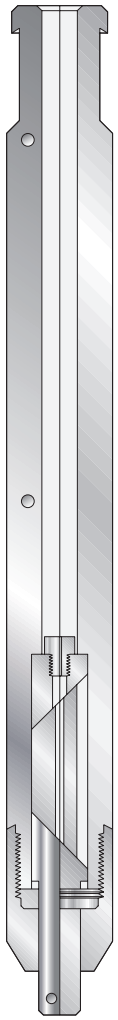
The upper end of the snipper consists of a fishing neck while the lower end of the snipper houses the cutting and crimping assembly. There is a slot along the length of the body to allow it to be placed on the wireline prior to dropping into the well.

Wireline Snippers

Part Number	Outside Diameter	Fishneck O.D.	Wire Size
B108-025	1.250"	1.187"	0.092" / 0.125"
B108-001	1.500"	1.375"	0.092" / 0.125"
B108-002	1.875"	1.750"	0.092" / 0.125"
B108-009	1.875"	1.750"	0.187" / 0.219"
B108-011	2.125"	1.750"	0.092" / 0.125"
B108-012	2.125"	1.750"	0.187" / 0.219"
B108-013	2.500"	2.313"	0.092" / 0.125"
B108-010	2.500"	2.313"	0.187" / 0.219"

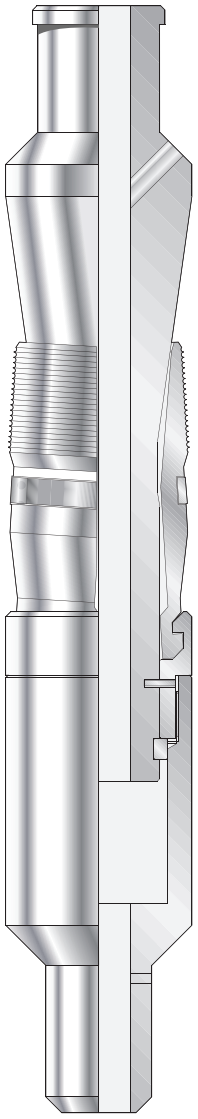
Rotary Cutter

Part Number	Outside Diameter	Fishneck O.D.	Wire Size
L-9811040046	1.500"	1.375"	0.092" / 0.125"



Wireline Cutter

Special Application Tools



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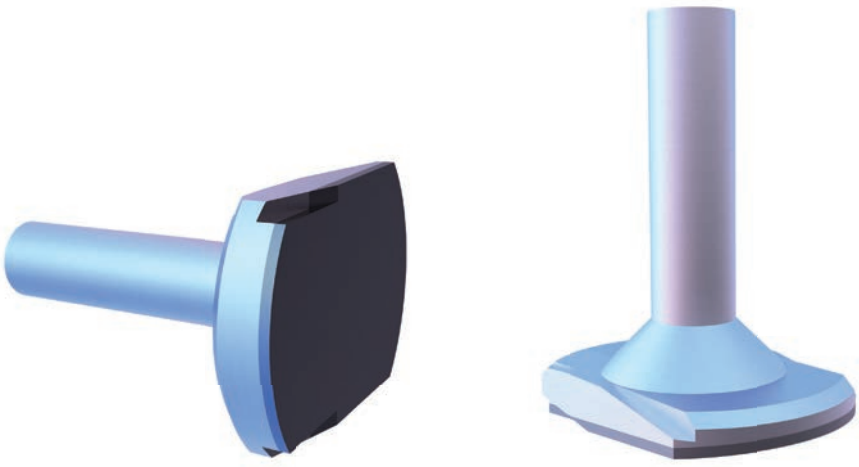
Tubing Punch

Tubing Punch Usage Guideline

The Elmar tubing punch is primarily manufactured in our Singapore facility and is subject to rigorous quality control procedures from material selection to the hardening process and final inspection. To ensure the performance of our tubing punch, we carry out continual improvement reviews. For example, as part of this the base material was changed from silver alloy to brass to improve durability and reduce the frictional coefficient against the mandrel.

The tubing punch's primary function is to perform a single hole punch through all standard completion tubing. Occasionally the Elmar tubing punch outperforms this and has been used to carry out multiple perforations but this is dependent on the many variables which affect the punch performance such as sand, temperature, tubing hardness and general well conditions etc. all of which may render the punch unusable after a single perforation.



Tubing Punch

Tubing Punch Type Perforator

The tubing punch type perforator is a mechanical device used in conjunction with standard wireline techniques to perforate a hole in the production tubing.

Perforators are available in tubing sizes 1.90" through 5 1/2".

Please specify tubing diameter and weight when ordering.

Tubing Punch Type Perforators

Part Number	Tubing Size	Body O.D.	Punch Size	Fishneck O.D.	Connections Box & Pin
B103-004	1.90"	1.470"	3/8"	1.187"	15/16UN
B103-001	2 3/8"	1.840"	3/8"	1.375"	15/16UN
B103-002	2 7/8"	2.190"	3/8"	1.375"	15/16UN
B103-003	3 1/2"	2.690"	7/16"	2.313"	1 1/16UN
L-981106429D126	4 1/2"	3.650"	1/2"	2.313"	1 1/16UN
B103-036	5.00"	4.283"	1/2"	2.313"	1 1/16UN
L-9811052735	5.50"	4.765"	1/2"	2.313"	1 1/16UN

Slimline Tubing Punch Perforator

The slimline tubing punch perforator is designed to pass through tubing which has restricted entry.

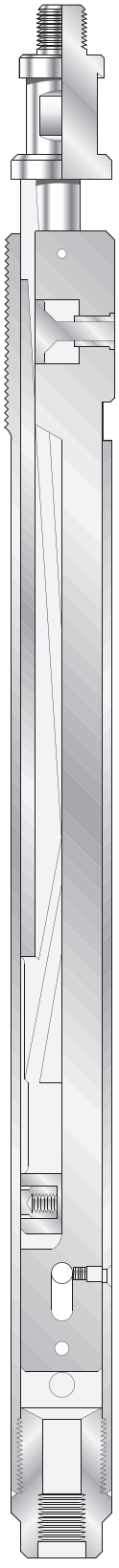
The slimline tubing punch perforator has a serrated slip built into the tool body which is retracted while running in hole. When the desired perforating site is reached, a light downward jar will release the slip.

Upward jarring will then expand the slip and punch a hole in the tubing. Once the tubing is perforated, the punch and the slip will retract within the body of the tool, enabling retrieval from the well.

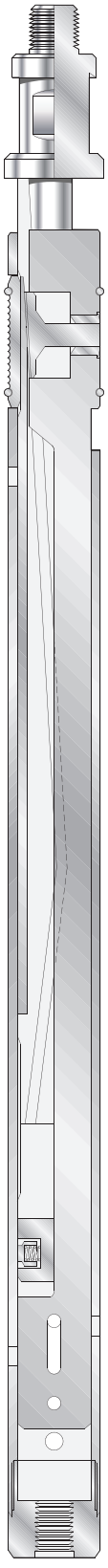
Please specify tubing diameter and weight when ordering.

Slimline Tubing Punch Perforators

Part Number	Tubing Size	Running O.D.	Fishneck O.D.	Punch Size	Connections Box & Pin
B103-005	2 3/8"	1.62"	1.187"	3/8"	15/16UN
B103-031	2 7/8"	2.00"	1.375"	3/8"	15/16UN
B103-040	3 1/2"	2.50"	2.313"	0.427"	1 1/16UN
B103-006 Slimline	3 1/2"	2.65"	2.313"	0.427"	1 1/16UN
B103-032	4 1/2"	3.43"	2.313"	1/2"	1 1/16UN



Tubing Punch Type Perforator



Slimline Tubing Punch Perforator

Tubing Stop (Slip Type)

The tubing stop (slip type) is used in flush type tubing strings where no coupling recess is available.

Slip type tubing stops are used as a wireline retrievable anchor. It can be set at any point in tubing with standard weight/I.D., and is particularly useful in providing a solid footing for wireline perforating in flush tubing.

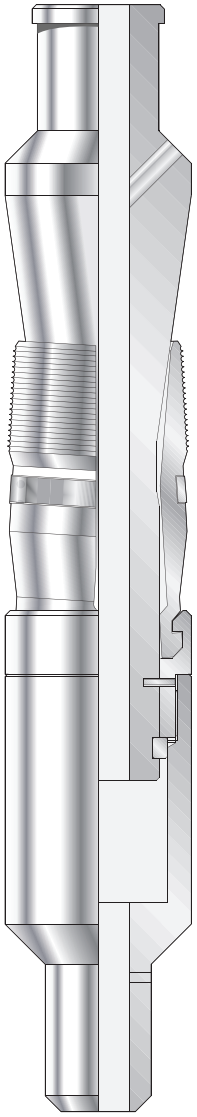
The slip type tubing stop is run with the appropriate SD type (shear down to release) pulling tool.

When the desired setting depth is reached, a rapid downward movement expands the slips and sets the stop. Downward jarring drives the serrated slips against the tubing wall and releases the running tool.

The tubing stop may also be retrieved with the correct SD pulling tool by upward jarring.

Tubing Stops (Slip Type)

Part Number	Tubing/ WT	O.D. Retracted	Minimum I.D.	Fishneck O.D.
B101-011	2 3/8" 4.6lbs/ft	1.470"	3/8"	1.187"
B101-012	2 7/8" 6.4lbs/ft	2.281"	1.05"	1.750"
B101-013	3 1/2" 9.2lbs/ft	2.718"	1.05"	2.313"
B101-014	4 1/2" 12.6lbs/ft	3.750"	1.53"	3.125"
B101-015	5 1/2" 17.0lbs/ft	4.400"	2.12"	3.125"

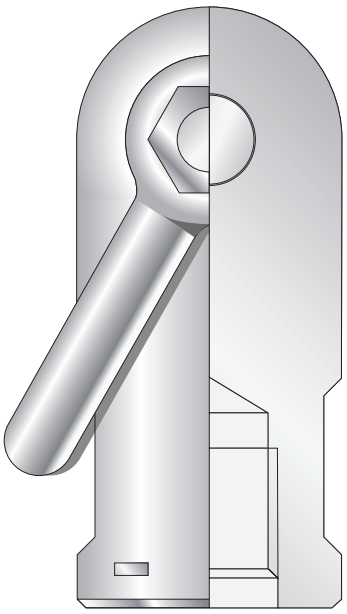


Tubing Stop
(Slip Type)

Lift Subs

Lift subs are used when wireline equipment exceeds the recommended manual handling limits. The lift subs are proof-loaded to a level that corresponds to a satisfactory safe working load. Lift subs carry identification marks for full traceability right back to the steel supplier for raw material analysis.

Lift Subs	
Part Number	**Description**
L-9811041837	Lift Sub Assembly 2 Ton SWL 15/16UN SR BOX
L-9811041838	Lift Sub Assembly 2 Ton SWL 15/16UN SR PIN
L-9811048468	Lift Sub Assembly 2 Ton SWL 1 9/16UN SR BOX
L-9811061703	Lift Sub Assembly 2 Ton SWL 1 9/16UN SR PIN
L-9811041949	Lift Sub Assembly 2 Ton SWL 1 1/16UN SR BOX
L-9811041950	Lift Sub Assembly 2 Ton SWL 1 1/16UN SR PIN

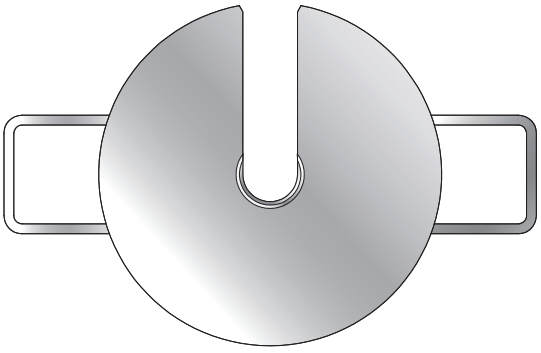


Lift Sub

Toolstring C-Plate

Elmar c-plate has been designed for the safe and efficient make-up of toolstring connections. It is typically used when working within lifting frames on semi-submersible rigs or when working at heights where it can be difficult to correctly align the toolstring connections.

Toolstring C Plate	
Part Number	**Description**
L-9811051334D050	C-Plate for 2.310" Fishneck - 5" Diameter Plate
L-9811051334D080	C-Plate for 2.310" Fishneck - 8" Diameter Plate
L-9811051334D100	C-Plate for 2.310" Fishneck - 10" Diameter Plate
L-9811051334D120	C-Plate for 2.310" Fishneck - 12" Diameter Plate
L-9811051334D140	C-Plate for 2.310" Fishneck - 14" Diameter Plate
L-9811051333D050	C-Plate for 1.750" Fishneck - 5" Diameter Plate
L-9811051333D080	C-Plate for 1.750" Fishneck - 8" Diameter Plate
L-9811051333D100	C-Plate for 1.750" Fishneck - 10" Diameter Plate
L-9811051333D120	C-Plate for 1.750" Fishneck - 12" Diameter Plate
L-9811051333D140	C-Plate for 1.750" Fishneck - 14" Diameter Plate
L-9811051332D050	C-Plate for 1.375" Fishneck - 5" Diameter Plate
L-9811051332D080	C-Plate for 1.375" Fishneck - 8" Diameter Plate
L-9811051332D100	C-Plate for 1.375" Fishneck - 10" Diameter Plate
L-9811051332D120	C-Plate for 1.375" Fishneck - 12" Diameter Plate
L-9811051332D140	C-Plate for 1.375" Fishneck - 14" Diameter Plate

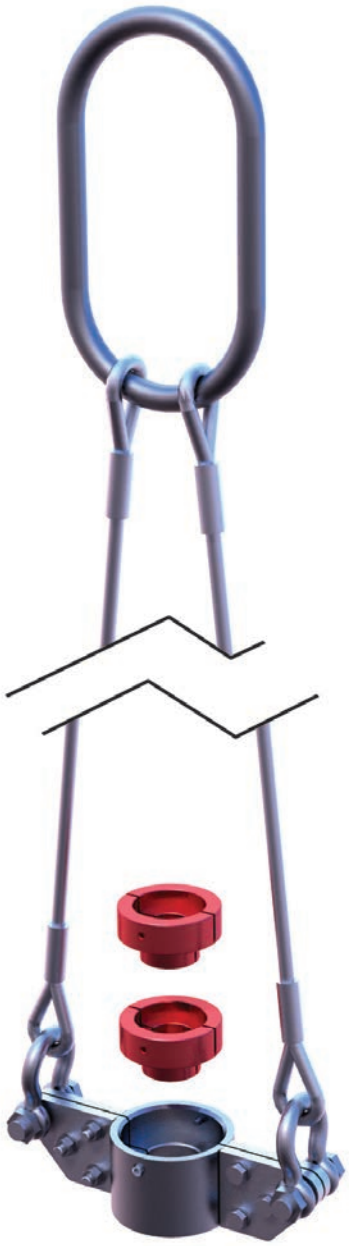


Toolstring C-Plate

Toolstring Clamp

Our toolstring clamp is designed and manufactured to locate beneath the fish neck of the toolstring. It is generally used when deploying or retrieving flow control devices or lengthy toolstrings in operations where rig-up height is limited. The toolstring can then be safely suspended, raised or lowered using the lifting attachments provided.

Toolstring Clamp					
Part Number	Fishneck Size	Maximum Width	Safe Working Load	Proof Load	Approximate Weight
L-9811047655	1 3/8" - 2.31" FN	12.20"	1,000 kg	2,000 kg	13 kg



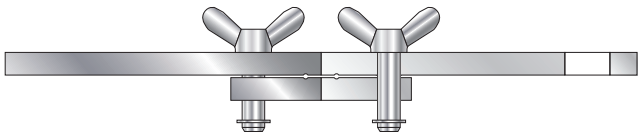
Toolstring Clamp

Bar Clamp

Primarily used to securely hold slick or braided line above the closed wireline valve during fishing operations, these clamps are designed specifically to suit the slick or braided line being used in operation.

Note: Part number WLC-1000D-XX (XX denotes wire size).
For example: For 0.108" and 0.125" wire part number WLC-1000D-BC.

Bar Clamp		
Code	Wire Size	Drill Hole Size +0.006/-0.000
A	Ø 0.092"	Ø 0.092"
B	Ø 0.108"	Ø 0.108"
C	Ø 0.125"	Ø 0.125"
D	Ø 0.160"	Ø 0.160"
E	Ø 0.187"	Ø 0.187"
F	Ø 0.218"	Ø 0.218"
G	Ø 0.250"	Ø 0.250"



Bar Clamp

i-Products

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i-Drift™

i-Drift is a fully adjustable wireline drift with fail-safe collapsible rails. It has a fluted design to allow easy flow passage. The i-Drift has a stepless adjustment and is available in all common tubing sizes.

Features

- Stepless and quick adjustment
- Each tool covers and replaces several fixed OD sizes
- Spring-loaded rails
- Wide and fluted flow passage
- Emergency shear release function
- Rails can be replaced

Benefits

- Easy usage and operation
- Simplified logistics and reduced inventory
- Easy and accurate adjustment
- Prevents debris from packing inside tool and reduces flow restriction
- Ensures safe retrieval from well

Applications

- Well ID verifications
- Adjustable centralizing
- Plug dummy run
- Collapse and scale detection

i-Drift

i-Drift	MUL mm (in.)	OD Closed mm (in.)	OD Max Open mm (in.)	F/N mm (in.)	Weight kg (lb)	Connections
Nano	480 (19.00)	38.10 (1.500)	53.34 (2.100)	30.18 (1.188)	2.4 (5.3)	15/16 in. UN10
Micro	520 (20.46)	50.80 (2.000)	73.03 (2.875)	34.93 (1.375)	5.5 (12.1)	15/16 in. UN10
Mini	690 (27.10)	73.03 (2.875)	95.25 (3.750)	44.45 (1.750)	15.0 (33.1)	1-1/16 in. UN10
Midi	820 (32.20)	88.90 (3.550)	121.92 (4.800)	58.75 (2.313)	27.0 (59.5)	1-9/16 in. UN10
Maxi	880 (34.70)	120.65 (4.700)	152.40 (6.000)	58.75 (2.313)	33.0 (72.8)	1-9/16 in. UN10

i-Broach™

i-Broach is a rigid and effective mechanical scale removal tool with adjustable cutter rails. The i-Broach assembly consists of two broach units covering 360° of the wellbore. When jarring downwards, the broach rails are forced into the scale, effectively removing deposits and scale buildup on the tubing wall.

Upon retrieval, the rails are allowed to collapse and no overpull is needed, ensuring a safe and efficient scale removal operation. The i-Broach comes in five different sizes, ranging from 53.34 to 165.10 mm (2.1 to 6.5 in.).

Features

- Fixed steps and quick adjustment
- Each tool covers and replaces several fixed OD sizes
- Wide and fluted flow passage
- Spring loaded rails
- Unique teeth cutting design
- Cutter rails can be sharpened and replaced

Benefits

- Easy usage and operation
- Simplified logistic and reduced inventory
- Prevents debris from packing inside tool
- Safe retrieval from well
- Improved broaching efficiency

Applications

- Wireline scale removal from wellbore and critical completion components
- Asphaltene and deposit removal
- Acidic/sour well conditions

i-Broach

i-Broach	MUL mm (in.)	OD Closed[1] mm (in.)	OD Max Open[1] mm (in.)	F/N mm (in.)	Weight kg (lb)	Connections
Micro	880 (34.50)	53.34 (2.100)	73.03 (2.875)	34.93 (1.375)	8 (18)	15/16 in. UN10
Mini	1,050 (41.30)	73.03 (2.875)	95.25 (3.750)	44.45 (1.750)	20 (44)	1-1/16 in. UN10
Midi	1,440 (56.62)	93.98 (3.700)	121.92 (4.800)	58.75 (2.313)	35 (77)	1-9/16 in. UN10
Maxi	1,440 (56.62)	120.65 (4.750)	152.40 (6.000)	58.75 (2.313)	39 (86)	1-9/16 in. UN10
Mega	1,440 (56.62)	134.62 (5.300)	165.10 (6.500)	58.75 (2.313)	44 (97)	1-9/16 in. UN10

Note: [1] Minor variations may occur

i-Tip™

i-Tip is a battery-driven scale removal tool run on slickline, designed to clean the inside of Surface Controlled Subsurface Safety Valve (SCSSVs). after landing, the brush is positioned in the flow tube of the SCSSV. the brush will rotate, cleaning scale and debris inside the critical area of the SCSSV. the trigger mechanism is activated by jar action, and the i-Tip brush rotates until the battery is empty. When retrieving the tool, a circuit breaker prevents any unintentional rotation that could be caused by residual battery power. the i-Tip can be used for regular preventive cleaning trips, or when required to troubleshoot SCSSVs that have lost their functionality. The i-Tip allows cleaning of the valve in the well, eliminating the need of pulling it to surface for maintenance, and minimizing production downtime.

Features

- Motor operated with re-chargeable batteries
- Qualified to suit gas applications, trapped gas bleed off
- Compact tool
- Tailor made brush design
- Acid resistant
- Modular design

Benefits

- No requirement for e-line
- Safe to operate, no trapped pressure when retrieved from well
- Compact and portable; short mobilization time
- Adaptable for various SCSSV models
- Compatible with scale dissolvers
- Flexible design to suit various profiles

Applications

- Well maintenance
- SCSSV recovery

i-Tip

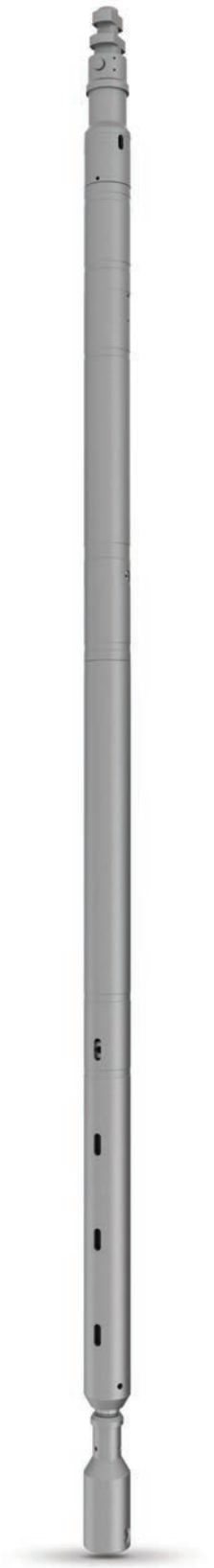
i-Tip	MUL mm (in.)	OD mm (in.)	OD Max mm (in.)	Tool Yield daN (lbf)	Brush Yield daN (lbf)	Temperature °C (°F)
550A	2,590 (102)	114.0 (4.488)	119.0 (4.685)	57,830 (130,000)	17,790 (40,000)	70 (158)
550B	2,590 (102)	114.0 (4.488)	117.1 (4.610)	57,830 (130,000)	17,790 (40,000)	70 (158)
550C	2,590 (102)	114.0 (4.488)	117.1 (4.610)	57,830 (130,000)	17,790 (40,000)	70 (158)

Note: Compatible with all 5 1/2 in. SCSSV's available

i-Jar™

i-Jar is a hydraulic, high impact slickline jar available in various configurations. The jar has a temperature compensating system, which makes it suitable for high temperature conditions. The i-Jar is pressure balanced and tension compensated, and the accelerator can easily be set up to normal or heavy duty operations by changing the springs. Due to its optimized design, the i-Jar has a low maintenance requirement.

The following configurations are available:
Shortstroke– Short overall makeup length, used where rig up heights are limited
Heavystroke– High impact, robust and reliable jar for heavy duty applications
Xtremestroke– Heavy duty jar and accelerators for fishing applications
Autostroke– Low friction self cocking jar for deviated and horizontal wells
Dualstroke– Reliable double-acting jar made for use together with well tractor or equivalent self-propelling device



Features

- Temperature compensation
- Fully pressure-balanced patented load-compensated time delay
- Hydraulic module protected against gas
- Heavy-duty properties
- New low-friction, “easy latch” system
- Large ventilation port system in accelerator and jar
- Modular design, easy to redress and maintain, long service intervals

Benefits

- Ensures functionality regardless of well conditions - easy to use
- High-impact even at low pull force
- Ensure relatching in deviated wells
- Allows debris to pass without being trapped inside
- Flexible and user-friendly, with reduced service costs

Applications

- Any wireline operation requiring high-impact quality jars

i-Jar™

i-Jar						
Shortstroke OD mm (in.)	**MUL** mm (in.)	**Min Length** mm (in.)	**Working Range** kN (lbf)	**F/N** mm (in.)	**Temperature** °C (°F)	**Connections**
47.63 (1.875)	1.575 (62.0)	1.372 (54.0)	1.3 – 17.8 (300 – 4,000)	44.45 (1.75)	200 (392)	Customer Spec.
63.50 (2.500)	1.753 (69.0)	1.524 (60.0)	1.3 – 26.7 (300 – 6,000)	58.67 (2.31)	200 (392)	Customer Spec.
Heavystroke OD mm (in.)	**MUL** mm (in.)	**Min Length** mm (in.)	**Working Range** kN (lbf)	**F/N** mm (in.)	**Temperature** °C (°F)	**Connections**
47.63 (1.875)	1.930 (76.0)	1.626 (64.0)	0.89 – 17.8 (200 – 4,000)	44.45 (1.75)	200 (392)	Customer Spec.
63.50 (2.500)	2.159 (85.0)	1.803 (71.0)	1.3 – 26.7 (300 – 6,000)	58.67 (2.31)	200 (392)	Customer Spec.
Xtremestroke OD mm (in.)	**MUL** mm (in.)	**Min Length** mm (in.)	**Working Range** kN (lbf)	**F/N** mm (in.)	**Temperature** °C (°F)	**Connections**
73.03 (2.875)	3.018 (118.8)	2.642 (104.0)	15.6 – 35.6 (3,500 – 8,000)	58.67 (2.31)	200 (392)	Customer Spec.
Autostroke OD mm (in.)	**MUL** mm (in.)	**Min Length** mm (in.)	**Working Range** kN (lbf)	**F/N** mm (in.)	**Temperature** °C (°F)	**Connections**
63.50 (2.500)	1.867 (73.5)	1.638 (64.5)	3.1 – 13.3 (700 – 3,000)	58.67 (2.31)	200 (392)	Customer Spec.
73.03 (2.875)	1.892 (74.5)	1.638 (64.5)	3.1 – 13.3 (700 – 3,000)	58.67 (2.31)	200 (392)	Customer Spec.
Dualstroke OD mm (in.)	**MUL** mm (in.)	**Min Length** mm (in.)	**Working Range** kN (lbf)	**F/N** mm (in.)	**Temperature** °C (°F)	**Connections**
73.03 (2.875)	2.794 (110.0)	2.235 (88.0)	1.6 – 8.9 (350 – 2,000)	58.67 (2.31)	150 (300)	Customer Spec.

Note: All jars are supplied with accelerators in order to maximize the performance of each specific application.

i-Jar Impact					
Tension	**1 7/8"** SS	**1 7/8"** HS	**2 1/2"** SS	**2 1/2"** HS	**2 1/2"** AS
500	4,500	8,000	7,500	15,000	7,500
1,000	9,000[1]	16,250[1]	15,000	31,000	15,000
1,500	13,500[1]	24,375[1]	22,500[1]	45,000[1]	22,500[1]
2,000	18,000[1]	32,500[1]	30,000[1]	60,000[1]	30,000[1]
2,500	22,500[2, 3]	40,625[2, 3]	37,500[1]	75,000[1]	37,500[1]
3,000	27,000[2, 3]	48,750[2, 3]	45,000[1, 3]	90,000[1, 3]	45,000[1]
3,500	31,500[2, 3]	56,875[2, 3]	52,500[2, 3]	105,000[2, 3]	52,500[2, 3]
4,000	36,000[2, 3]	65,000[2, 3]	60,000[2, 3]	120,000[2, 3]	60,000[2, 3]
4,500	-	-	67,500[2, 3]	135,000[2, 3]	-
5,000	-	-	75,000[2, 3]	150,000[2, 3]	-
5,500	-	-	-	165,000[4]	-
6,000	-	-	-	180,000[4]	-

Note: All values are in lbf.
Note: All values are estimates.
1. Accelerator spring set up #1 (soft springs).
2. Accelerator spring set up #2 (hard springs).
3. Not applicable for all configurations. Do not exceed limits in Table 5-1 and Table 5-2.
4. For emergencies only - may cause deformation in quick connectors.

i-Shift™

The i-Shift is a reliable selective hydraulic shifting tool to operate sliding sleeves (SSD). The tool is activated by flow at desired depths to open or close sleeves multiple times during the same run. The i-Shift can be supplied with various keys to allow shifting of a wide range of SSDs. It can be configured as a down, up or dual acting manipulation tool, depending on client request. Combined with the i-Stroke impact hammer, we can deliver the optimal technology for all hydraulic shifting operations.

Features

- Available in single up, down or (as tandem in) dual operation
- Robust construction and emergency release function
- Carbide insert on top of keys
- Changeable nozzles
- Wash ports under keys
- Interchangeable keys

Benefits

- Flexible setup for all needs
- Ensure safe operation and retrieval from well
- Prevents wearing of critical profile
- Adjustable activation flow rate
- Debris-resistant
- Suitable for various sleeve profiles

Applications

- Coiled tubing and drill string shifting operations

i-Shift

i-Shift	MUL mm (in.)	Body OD mm (in.)	Collapsed Tool OD mm (in.)	Latch Range (Profile ID) mm (in.)	Activation Pressure[1] kPa (psi)	Threads
240	1,011.0 (39.800)	61.0 (2.400)	61.0 (2.400)	61.0 – 85.1 (2.400 – 3.350)	3,000 (435)	1-1/2 in. AMMT
288	1,072.0 (42.200)	73.03 (2.875)	73.03 (2.875)	73.2 – 101.6 (2.880 – 4.000)	3,000 (435)	2-3/8 in. PAC
338	950.0 (37.400)	93.98 (3.700)	85.7 (3.375)	85.7 – 99.6 (3.375 – 3.920)	3,000 (435)	2-3/8 in. PAC
340	950.0 (37.400)	120.65 (4.750)	86.4 (3.400)	86.4 – 93.7 (3.400 – 3.688)	3,000 (435)	2-3/8 in. PAC

N.B. The information contained within these pages was correct at the time of publication. For operational guidelines please refer to the technical manual that can be supplied with the equipment. Elmar reserves the right to change, alter, modify or improve specifications at any time without prior notice.

No-Go Nipples

We offer a wide range of no-go nipples to suit the needs of any operation. These nipples are used in flow control operations to locate, seal and retain our flow control accessories equipped with the appropriate locks. They are equipped with no-go shoulders and integral locking grooves, as well as seal bores contoured and honed to provide an effective sealing surface without damaging the lock's V packing seals.

No-go nipples are made in two primary styles, top landing (ATN) and bottom landing (AAN). Each is designed only to match the style of lock used on the tool, ensuring it engages only with the appropriate device.

The no-go nipples are available in a wide variety of materials, and can be manufactured with custom thread styles to suit the needs of the operation. All of our nipples are pressure rated for up to 10,000psi, based on the material and threading used, and are in accordance with all API tubing and casing standards.

Typical Material Specification

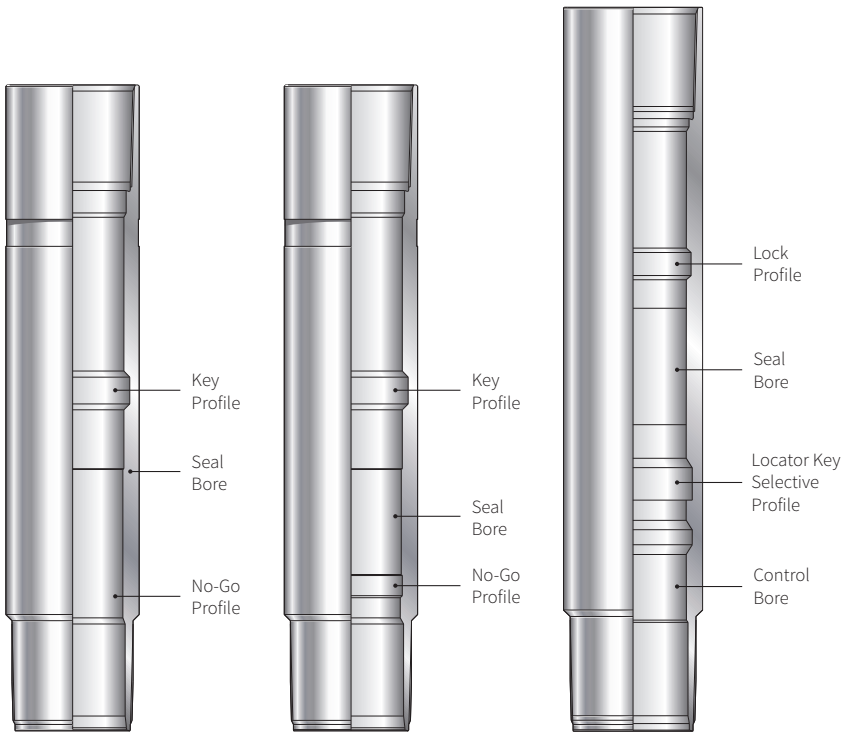
Material Specification	Rockwell Scale	Variant
AISI 4140	30 - 36Rc	00
17 - 4PH	28 - 33Rc	01
AISI 4140 (L80)	18 - 22Rc	02
13% Cr	18 - 23Rc	04
Alloy 718	30 - 40Rc	06
Super 13 Chrome	23 - 28Rc	07

Selective Nipples

Our selective nipple system provides the operator with the flexibility when setting full bore control devices. The use of these nippelse allows for an unlimited number of identical nipple positions without regard to specific sequence, or dedicated positions where specific nipple positions are used for specific devices. The latter allows for the use of devices and assemblies where the manipulation of a selective lock could be detrimental to the specific equipment.

Profile Characteristics

- Locking Profile for Lock Dogs
- Seal Bore for Plug Sealing
- Locator Key Selective Profile
- Control Bore for Trip Dogs



'ATN' Top No-Go Landing Nipple

'AAN' Bottom No-Go Landing Nipple

Selective Landing Nipple

elmar@nov.com nov.com/elmar

No-Go Lock Features

- Simple rugged construction for ease of field maintenance
- Large internal diameter and smooth flow area to combat erosion and turbulence
- Our locks and plugs are capable of being deployed on Wireline and Coiled Tubing
- Positive locking keys
- All loadings on the lock are taken through the lock keys to prevent secondary nipple damage
- The lock does not use a shear pin release mechanism, and can therefore be set with coiled tubing more than once without the need for redress or even retrieval
- No downward jarring required for setting when run on CT, making it suitable for horizontal well applications
- No-go locks are available in a large range of sizes to suit the needs of the operation.
- Full nipple washing and cleaning action when set with coiled tubing
- Can be manufactured to suit most other proprietary nipples
- Can be manufactured in a range of material specifications, working pressures and with the customer's preferred premium thread

The generic structure of our locks allows for maximum versatility while minimizing the number of different tools required by the customer. Top and bottom no-go locks have been designed to feature a high level of compatibility, allowing users to interchange them as needed with a minimum of effort. In addition, the locks can be configured to function as a number of other assemblies, such as hangers in certain applications, as well as serving as plugs, check valves, standing valves or gauge hangers.

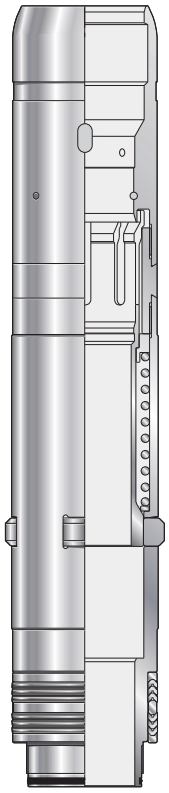
The Benefits of Running Elmar No-Go Locks on Coiled Tubing

One disadvantage of running conventional wireline plugs in high-angle wells using coiled tubing is the potential for premature activation.

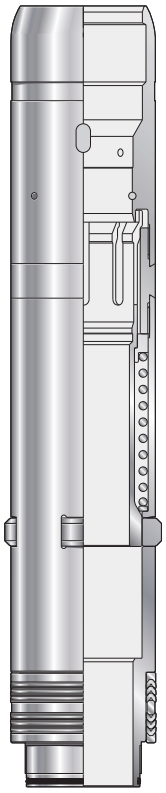
Most conventional plugs use shear pin technology to activate, meaning that once triggered, the pin is broken and the tool cannot be reset unless removed. However, when deploying conventional wireline plugs, it can be difficult to maneuver the tool through tight spots downhole. Too often, this results in the plug activating prematurely, resulting in costly misruns and increased Non-Productive Time (NPT) as the tool is pulled back to the surface and reset.

To prevent this issue, we offer a unique range of coiled tubing plugs which have several advantages when deployed on coil:

- Plugs can be set, or reset, several times, allowing operators to correct for premature activations
- The unique design ensures that the running tool will not release unless the lock dogs have positively located the landing nipple, thus offering a telltale sign of successful deployment
- The flow activated tool and plug through bore allow operators to thoroughly flush the lock profile and seal area prior to landing, thus overcoming sealing and locating problems common to wireline plugs deployed on coil



(ATL) Top No-Go Lock



(AAL) Bottom No-Go/Selective Lock

Prong Type Equalizing Assembly (PNE)

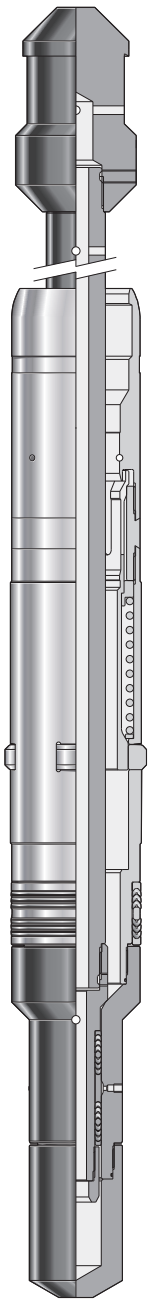
The prong type blanking plug assembly is a two-stage system designed for use in wells where sand or sediment may be encountered. It contains a removable equalizing prong that protrudes substantially above the lock mandrel, allowing for easy retrieval despite settlement which may build up above the lock/plug assembly. It also features large-diameter ports in the housing, which allow for unrestricted fluid bypass, and can maintain pressure from above or below.

To deploy, the prong type plug housing is attached to the lock and inserted into the well by conventional wireline or coiled tubing techniques. Once the plug housing is set in the nipple, a second run is made to deploy the PNE prong and land it inside the plug housing. This seals off the by-pass ports and creates the blanking plug assembly, which is now able to withstand significant pressure differentials from above and below.

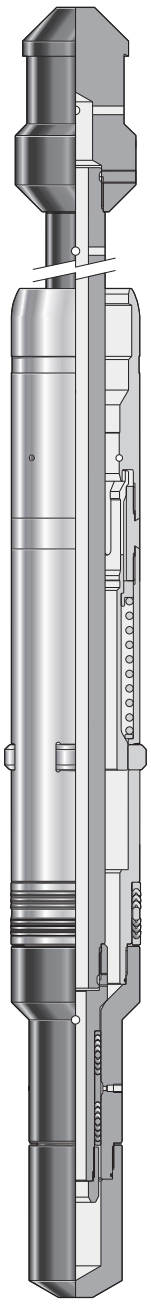
To retrieve, the PNE prong is first detached and removed. This opens the bypass ports, which equalizes any pressure differential across the plug, clears any sand or debris from the inside the assembly and making the entire operation safer and easier. Once the PNE prong is retrieved, it is just a simple run to retrieve the lock and housing from the wellbore.

The prong type equalizing assembly is designed to be used with either the top or bottom no-go locks.

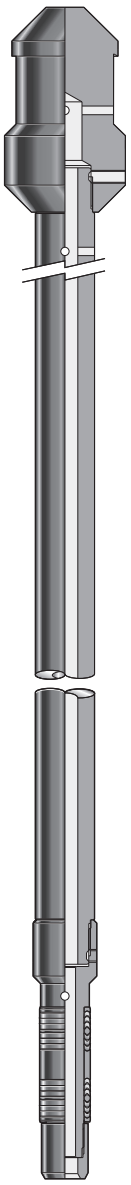
Note: The prong type blanking plug can be supplied with optional prong extensions to further increase the height of the retrieval fish neck above the lock mandrel.



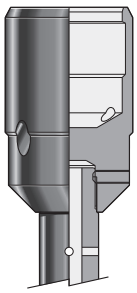
(PNE) Prong Type Equalizing Assembly and (ATL) Top No-Go Lock



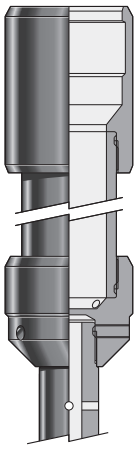
(PNE) Prong Type Equalizing Assembly and (AAL) Bottom No-Go/Selective Lock



Standard (PNE) Prong Assembly with External Fishneck



Optional (PNE) Prong Assembly with Internal Fishneck



Optional (PNE) Prong Assembly with Internal Fishneck and Junk Catcher

Melon Type Equalizing Assembly (MNE)

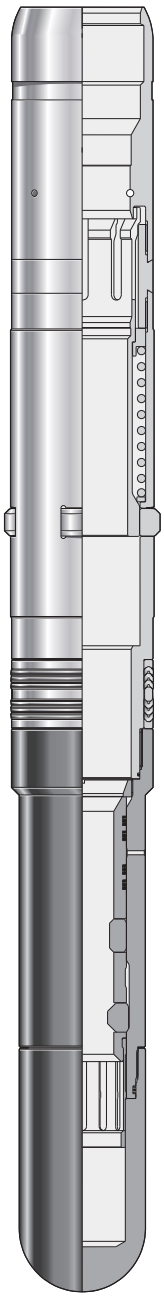
The melon type equalizing assembly is a single trip to set blanking plug designed to be deployed and retrieved by using either coiled tubing or wireline techniques. It features large-diameter ports which allow for unrestricted fluid bypass, and can maintain pressure from above or below.

To deploy, the plug & lock are attached to the running/pulling tool & prong and inserted into the hole. When the required seating nipple is located, the running/pulling tool will set and release the lock. Upward movement of the running/pulling tool and prong will check the setting of the lock and position the melon across the by-pass ports, creating a blanking plug.

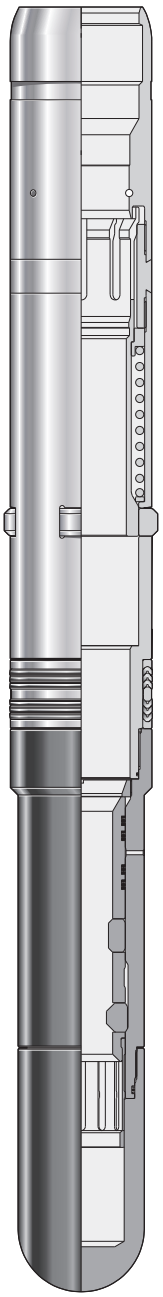
To retrieve the MNE assembly with coiled tubing, the same running/pulling tool & prong are used. When the prong first engages the blanking plug, the melon is moved downward and the by-pass ports opened to allow equalization of the device. Further downward travel of the running/pulling tool will engage the lock fish neck and release the locking dogs. The whole assembly can now be retrieved from the well.

To retrieve the MNE assembly with wireline, it is recommended that users ensure the pressure differential across the plug assembly is fully equalized prior to retrieval. The pressure is equalized by running the pulling tool with the equalizing prong, allowing for the safe and expedient retrieval of the device using the pulling tool and probe.

The melon type equalizing assembly is designed to be used with either the top or bottom no-go locks.



(MNE) Melon Type Equalizing Assembly and (ATL) Top No-Go Lock



(MNE) Melon Type Equalizing Assembly and (AAL) Bottom No-Go/Selective Lock

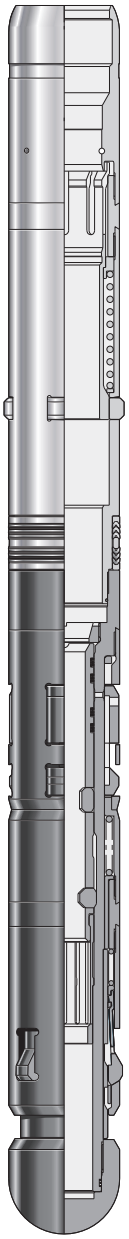
Selective Melon Type (SSE) and Selective Prong Type (PSE) Equalizing Assemblies

Conventional no-go systems suffer a number of usage limitations. Only use a limited number of units can be installed in a well without restricting flow to an unacceptable level, and this number is further reduced by the limited selection of different key profiles available.

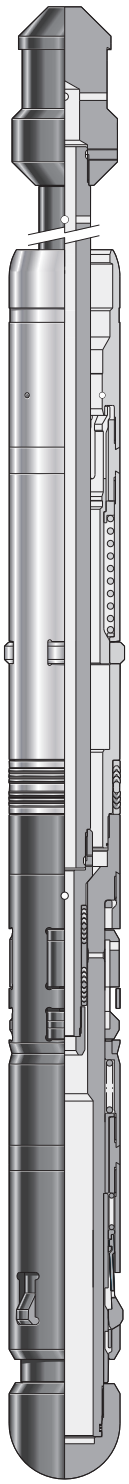
We have solved these problems through the development of a tripping key system. This enables the use of a selective lock system, which may be run and set into a number of similar nipple profiles in a single well. This has also allowed the development of a unique range of locks, plugs and nipples that do not compromise well design.

The versatility of this running method makes it ideally suited to the high deviation, horizontal and extended reach wells required today. When deployed on coiled tubing, the selective plug system is not dependent on shear pins to lock and locate. In high deviation and horizontal sections the selective plug will wash debris and clean lock profiles before setting, and may be reset and deployed in another location without redress at surface.

This intervention tooling is specifically designed to be deployed on slickline and coiled tubing. The same lock and plug can be deployed or retrieved on slickline without any modification, or can be run on slickline and retrieved on coiled tubing if required.



(SSE) Selective Melon Type Equalizing Assembly and (AAL) Bottom No-Go/Selective Lock



(PSE) Selective Prong Type Equalizing Assembly and (AAL) Bottom No-Go/Selective Lock

Standing Valve Assembly (ASV)

The standing valve assembly is a unidirectional valve designed to hold pressure from above. It is useful when full access to well pressure is required after pressure testing tubing or packer setting, as the ASV can be recovered at a later or more convenient time.

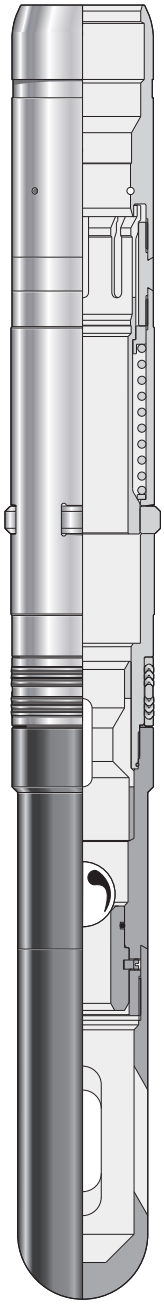
When installed in the nipple, the standing valve assembly will hold pressure with a stainless steel ball which seats in a corresponding steel housing. Flow or pressure from below the assembly will lift the ball from the seat and pass through, but pressure or flow from above is stopped fast. The ball seat is retained with calibrated shear pins which enable the operator to set a pressure value at which the seat will pump out into the sump of the assembly.

To retrieve the tool, a prong is used with the standard running/pulling tool and prong to ensure the ball seat has been sheared out and pressures equalized across the device.

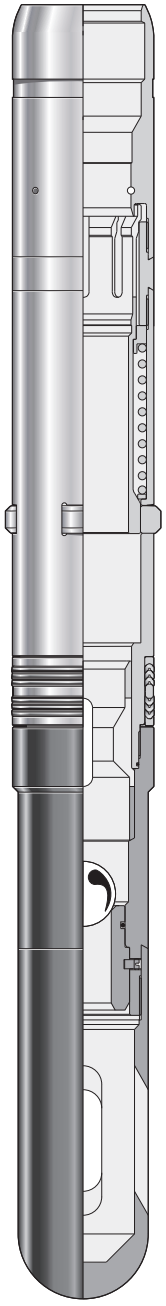
The ASV is designed to be used with either top or bottom no-go locks.

Knock Down Equalizing Sub

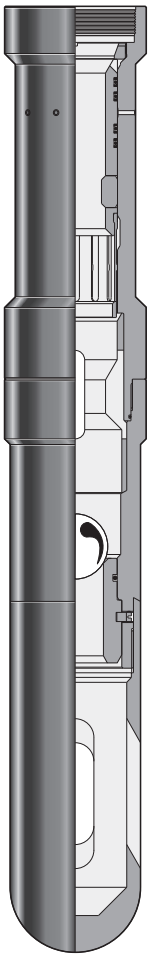
An option for the ASV is the knock down equalizing sub. This sub allows the operator to equalize the pressure across the plug by 'knocking down' the internal valve, usually performed as a wireline operation using a GS type running tool and an equalizing prong. This sub is a mechanical alternative to the standard pressure pump out system of equalizing.



(ASV) Standing Valve Assembly and (ATL) Top No-Go Lock



(ASV) Standing Valve Assembly and (AAL) Bottom No-Go/Selective Lock



(ASV) Standing Valve Assembly and Knock Down Equalizing Sub

Check Valve (ACV) and Pump Open Sub (POS) Assemblies

Our check valve is designed to be used with the top or bottom no-go lock and to hold pressure from below while allowing fluid to be circulated through the device from above.

This is accomplished using a stainless steel ball held from below by a spring, which holds it firm against a seat in a corresponding steel housing. Any pressure or flow from above the Assembly will push the ball off seat by compressing the spring, allowing fluids to pass through. However, flow or pressure from below is held back by the ball seating in the valve.

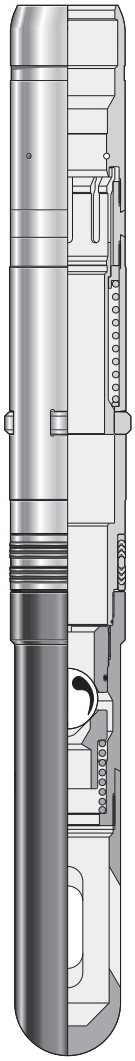
The operator can adjust the pressure required to open the valve by varing the spring rating used to hold the ball onto its seat.

When retrieved, a prong is used with the standard running/pulling tool to ensure that the ball is off seat and pressures are equalized across the device. This ensures a safe and speedy recovery of the tool.

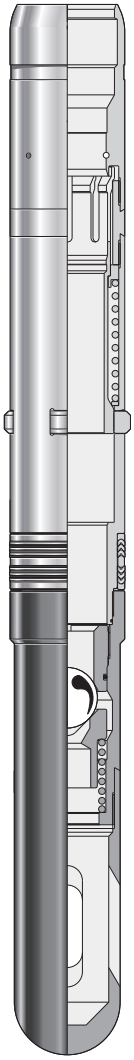
Pump Open Sub (POS)

The pump open sub assembly is a bidirectional pressure control system designed to maintain pressure using a solid plug. It is designed using shear pin technology, ensuring that it will maintain the seal until a predetermined pressure is pumped down from above, at which point the pins will shear and the plug will be removed.

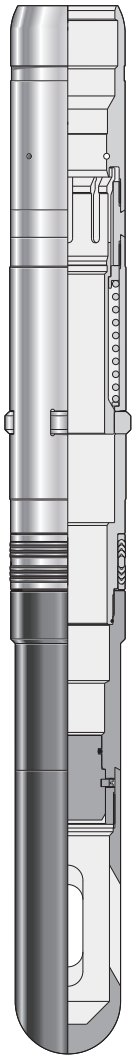
The pump open sub assembly is designed to be used with both top and bottom no-go locks. If required, our MNE melon type equalizing assembly can be installed between the lock and the pump open sub to provide an alternate means of equalizing the plug.



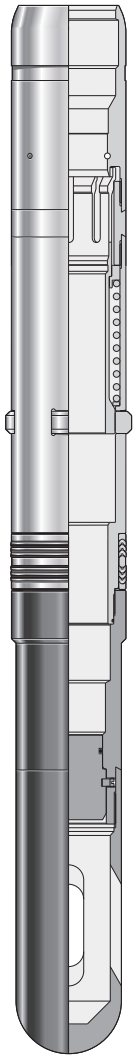
(ACV) Check Valve Assembly and (ATL) Top No-Go Lock



(ACV) Check Valve Assembly and (AAL) Bottom No-Go/Selective Lock



(POS) Pump Open Sub and (ATL) Top No-Go Lock



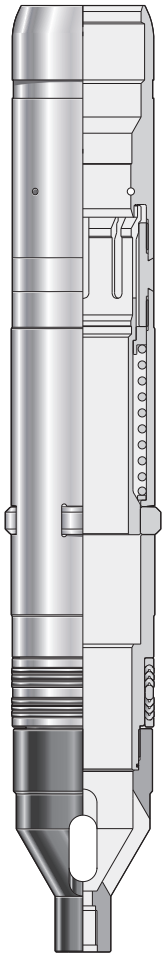
(POS) Pump Open Sub and (AAL) Bottom No-Go/Selective Lock

Gauge/Bomb Hanger Sub

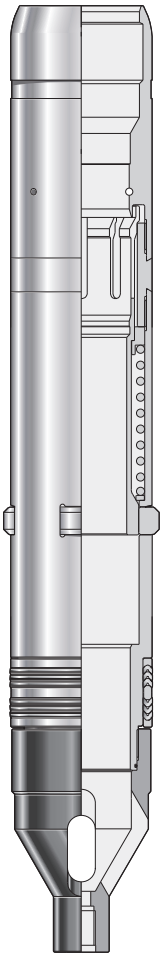
Our gauge/bomb hanger sub is designed to be used to deploy a memory type gauge. If multiple gauges are required to be run then the gauge hanger assembly should be considered. This accessory is offered for use with our no-go lock range.

When deploying sensitive gauges and bottom hole instruments, we can also supply the wireline soft set running tool, which is designed to be used to run the gauge hanger assembly. The soft set running tool is designed to run and set bottom hole instruments into a well bore without the need to jar to release. The tool has a simple sit down action to affect hydraulic transfer and subsequent mechanical release.

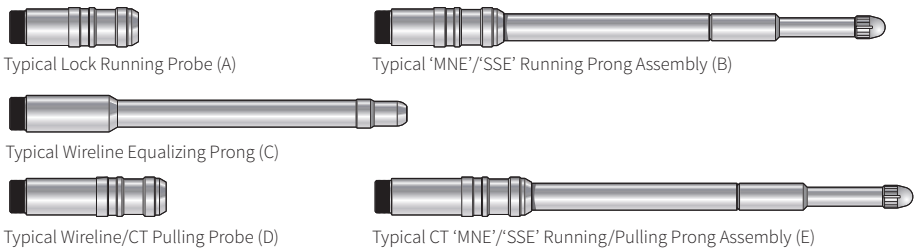
The soft set running tool is not sensitive to hanging weight, eliminating the possibility of dropping instruments prematurely.

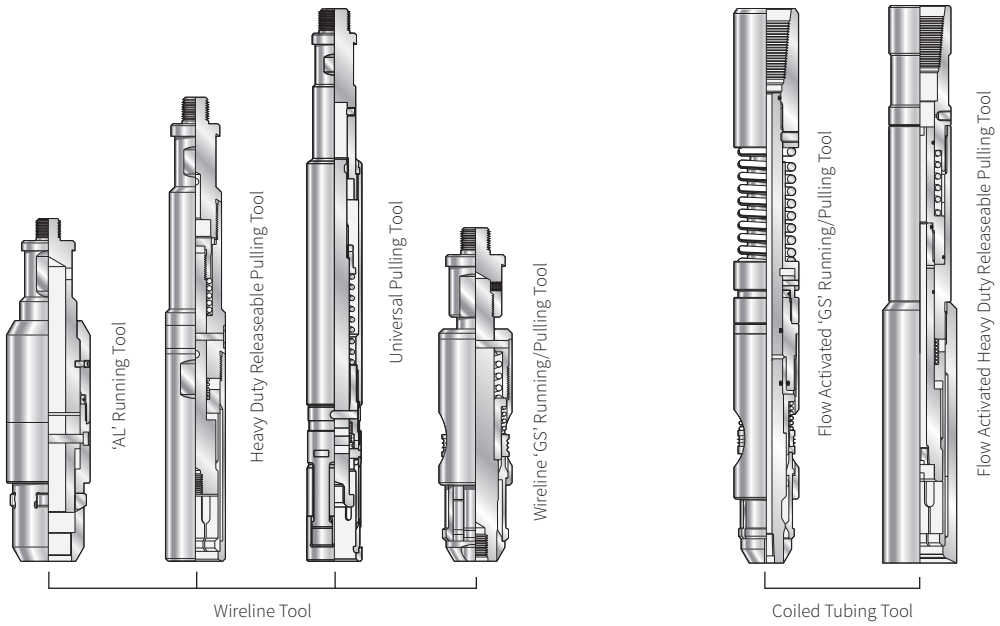


Gauge/Bomb Hanger Sub
and (ATL) Top No-Go Lock



Gauge/Bomb Hanger Sub
and (AAL) Bottom No-Go/Selective Lock





Deployment, Equalization and Retrieval Tool Options		
Operation	**Wireline Tool**	**Coiled Tubing Tool**
Running Lock & 'MNE'/'SSE'	Elmar 'AL' Running Tool + Prong Assy (B)	Elmar Flow Activated 'GS' Running/Pulling Tool + Prong Assy (E)
Equalizing 'MNE'/'SSE'	Elmar Wireline 'GS' Running/Pulling Tool + Prong (C)	N/A
Pulling Lock & 'MNE'/'SSE'	Elmar Wireline 'GS' Running/Pulling Tool + Probe (D)	Elmar Flow Activated 'GS' Running/Pulling Tool + Prong Assy (E)
Running Lock & 'PNE'/'PSE'	Elmar 'AL' Running Tool + Probe (A)	Elmar Flow Activated 'GS' Running/Pulling Tool + Probe (D)
Running 'PNE' Prong	Elmar Universal or Wireline Heavy Duty Releasable Pulling Tool	Elmar Flow Activated 'HD' Pulling Tool
Pulling & Equalizing 'PNE' Prong	Elmar Universal or Wireline Heavy Duty Releasable Pulling Tool	Elmar Flow Activated 'HD' Pulling Tool
Pulling Lock & 'PNE'/'PSE'	Elmar Wireline 'GS' Running/Pulling Tool + Probe (D)	Elmar Flow Activated 'GS' Running/Pulling Tool + Probe (D)
Running Lock & 'ASV'	Elmar 'AL' Running Tool + Probe (A)	Elmar Flow Activated 'GS' Running/Pulling Tool + Probe (D)
Equalizing 'ASV' (Knock Down Equalizing Sub)	Elmar Wireline 'GS' Running/Pulling Tool + Prong (C)	Elmar Flow Activated 'GS' Running/Pulling Tool + Prong (D)
Pulling Lock & 'ASV'	Elmar Wireline 'GS' Running/Pulling Tool + Probe (D)	Elmar Flow Activated 'GS' Running/Pulling Tool + Probe (D)
Running Lock & 'ACV'	Elmar 'AL' Running Tool + Prong (A)	Elmar Flow Activated 'GS' Running/Pulling Tool + Prong (D)
Pulling Lock & 'ACV'	Elmar Wireline 'GS' Running/Pulling Tool + Probe (D)	Elmar Flow Activated 'GS' Running/Pulling Tool + Probe (D)
Running Lock & Gauge/Bomb Hanger Sub	Elmar 'AL' Running Tool or Elmar Soft Set Running Tool + Probes (A)	Elmar Flow Activated 'GS' Running/Pulling Tool + Probe (D)
Pulling Lock & Gauge/Bomb Hanger Sub	Elmar Wireline 'GS' Running/Pulling Tool + Probe (D)	Elmar Flow Activated 'GS' Running/Pulling Tool + Probe (D)

‘V’ Series Locks and Plugs

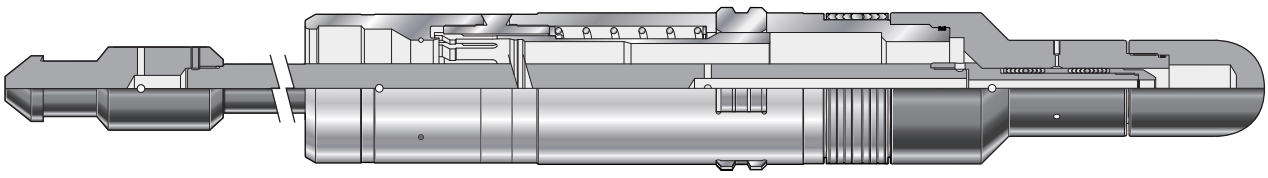
We can provide completion products tailor made to each individual completion. Both standard and non-standard sizes are available, allowing clients to develop the optimum solution for the completion, rather than being forced to plan their operations around the industry standard size product offered by other suppliers. Elmar works directly with the customer and end-user at the completion design stage to identify the optimum solution, ensuring that completion products supplied are fit for purpose, over the life of the well.

The ‘V’ Series Flow Control Locking System was designed in response to a growing demand for locks and plugs to suit high pressure and high temperature wells. The system has been designed along the lines of the regarded ‘A’ Series of locks and plugs and includes many of the same features including the locking system and the running and pulling methodology on both slickline and coiled tubing.

In order to meet or surpass customer expectations for sealing integrity Elmar is working beyond API 14L (ISO16070) ensuring our ‘V‘ Series Flow Control Locking System is also suitable for high pressure gas wells.

The Elmar Flow Control Product Line is a proven solution, having been designed and developed based on oilfield best practices and extensive experience. With the increase in the number of horizontal and multi-lateral completions, Elmar developed a lock and plug system that can be run on both Coiled Tubing and on slickline without the need for modification or disassembly to the lock or plug. This makes the lock and plug system ideal for setting in most completions.

The locks and plugs are set in Elmar Profile Nipples that are supplied with premium oilfield connections. The lock and plug system is fully complemented by running and pulling tools, equalizing assemblies and pressure control valves such as standing valves and pump out subs. The designs are robust and simple to run, set and retrieve.



N.B. The information contained within these pages was correct at the time of publication. For operational guidelines please refer to the technical manual that can be supplied with the equipment. Elmar reserves the right to change, alter, modify or improve specifications at any time without prior notice.

No-Go Nipples

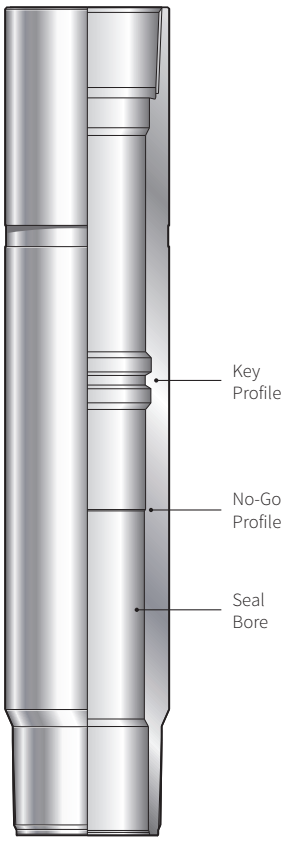
We offer a wide range of no-go nipple sizes to suit the needs of any operation. These nipples are used in flow control operations to locate, seal and retain our flow control accessories equipped with the appropriate locks. They are equipped with no-go shoulders and integral locking grooves, as well as seal bores contoured and honed to provide an effective sealing surface without damaging the lock’s V packing seals.

No-go nipples are made in two primary styles, top no-go landing (VTN) and bottom no-go landing (VAN). Each is designed only to match the style of lock used on the tool, ensuring it engages only with the appropriate device.

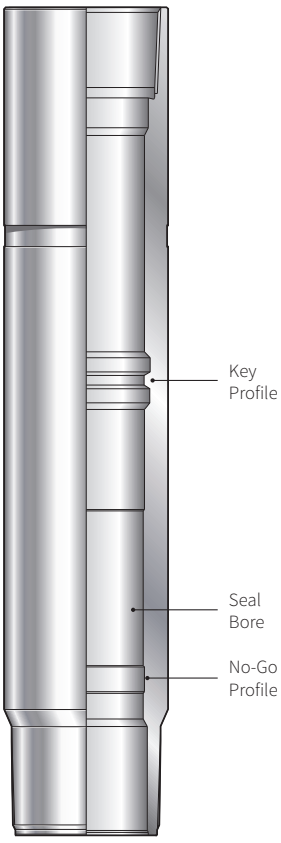
The no-go nipples are available in a wide variety of materials, and can be manufactured with custom thread styles to suit the needs of the operation.

Profile Characteristics

- Locking Profile for Lock Dogs
- Seal Bore for Plug Sealing
- No-Go Shoulder



‘VTN’ Top No-Go Landing Nipple



‘VAN’ Bottom No-Go Landing Nipple

‘V’ Series Locks and Plugs

No-Go Lock Features

- Simple rugged construction for ease of field maintenance
- Large internal diameter and smooth flow area to combat erosion and turbulence
- Our locks and plugs are capable of being deployed on wireline and coiled tubing
- Positive locking keys
- All loadings on the standard lock are taken through the lock keys to prevent secondary nipple damage
- The lock does not use a shear pin release mechanism, and can therefore be set with coiled tubing more than once without the need for redress or even retrieval
- No downward jarring required for setting when run on CT, making it suitable for horizontal well applications
- No-go locks are available in a large range of sizes to suit the needs of the operation
- Full nipple washing and cleaning action when set with coiled tubing
- Can be manufactured to suit most other proprietary nipples
- Can be manufactured in a range of material specifications and working pressures
- Seals can be tailored to suit the application

The generic structure of our V series locks allows for maximum versatility while minimizing the number of different tools required by the customer. Top and bottom no-go locks have been designed to feature a high level of compatibility, allowing users to interchange them as needed with a minimum of effort. In addition, the locks can be configured to function as a number of other assemblies, such as hangers in certain applications, as well as serving as plugs, check valves, standing valves or gauge hangers.

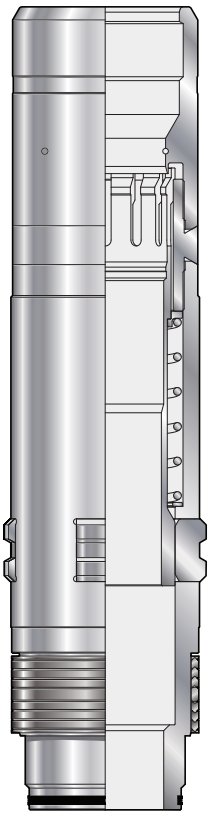
The Benefits of Running Elmar No-Go Locks on Coiled Tubing

One disadvantage of running conventional wireline plugs in high-angle wells using coiled tubing is the potential for premature activation.

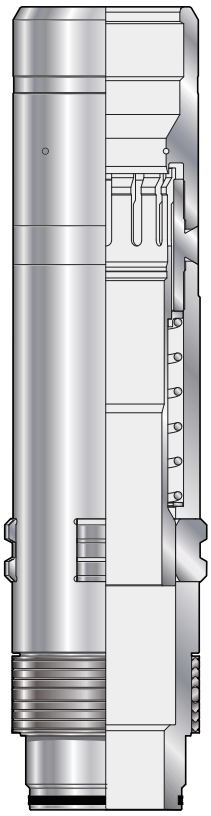
Most conventional plugs use shear pin technology to activate, meaning that once triggered, the pin is broken and the tool cannot be reset unless removed. However, when deploying conventional wireline plugs, it can be difficult to maneuver the tool through tight spots downhole. Too often, this results in the plug activating prematurely, resulting in costly misruns and increased Non-Productive Time (NPT) as the tool is pulled back to the surface and reset.

To prevent this issue, we offer a unique range of coiled tubing plugs which have several advantages when deployed on coil:

- Plugs can be set, or reset, several times, allowing operators to correct for premature activations
- The unique design ensures that the running tool will not release unless the lock dogs have positively located the landing nipple, thus offering a telltale sign of successful deployment
- The flow activated tool and plug through bore allow operators to thoroughly flush the lock profile and seal area prior to landing, thus overcoming sealing and locating problems common to wireline plugs deployed on coil



VTL Top No-Go Lock



VAL Bottom No-Go Lock

VPNE Prong Type Equalizing Assembly

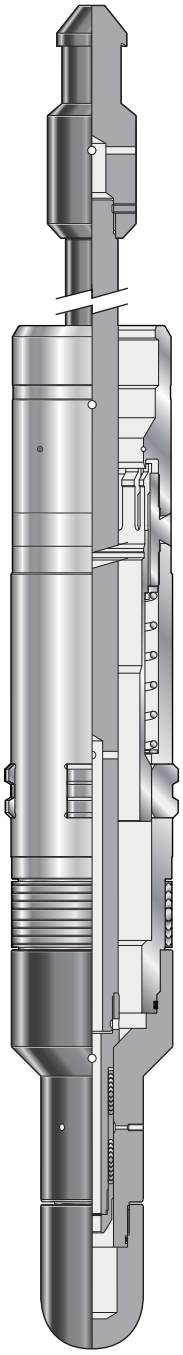
The prong type blanking plug assembly is a two-stage system designed for use in wells where sand or sediment may be encountered. It contains a removable equalizing prong that protrudes substantially above the lock mandrel, allowing for easy retrieval despite settlement which may build up above the lock/plug assembly. It also features large-diameter ports in the housing, which allow for unrestricted fluid bypass, and can maintain pressure from above or below.

To deploy, the prong type plug housing is attached to the lock and inserted into the well by conventional wireline or coiled tubing techniques. Once the plug housing is set in the nipple, a second run is made to deploy the VPNE prong and land it inside the plug housing. This seals off the by-pass ports and creates the blanking plug assembly, which is now able to withstand significant pressure differentials from above and below.

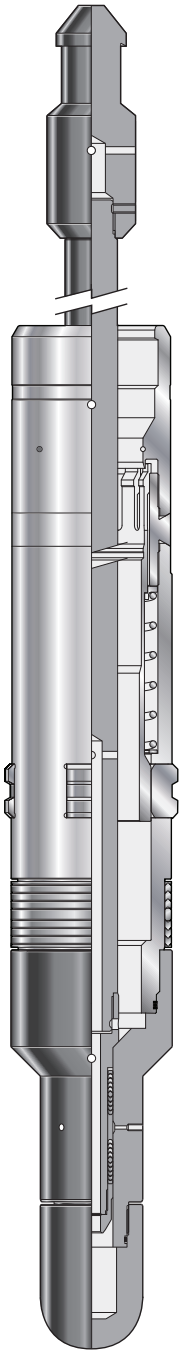
To retrieve, the VPNE prong is first detached and removed. This opens the bypass ports, which equalizes any pressure differential across the plug, clears any sand or debris from the inside the assembly and making the entire operation safer and easier. Once the VPNE prong is retrieved, it is just a simple run to retrieve the lock and housing from the wellbore.

The prong type equalizing assembly is designed to be used with either the top or bottom no-go V series locks.

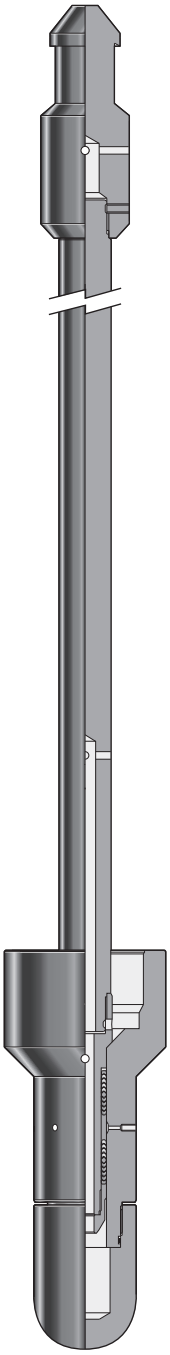
Note:- The prong type blanking plug can be supplied with optional prong extensions to further increase the height of the retrieval fish neck above the lock mandrel.



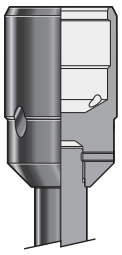
VPNE Prong Type Equalizing Assembly and VTL Top No-Go Lock



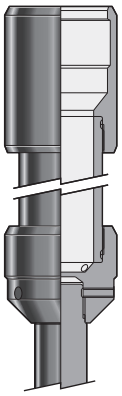
VPNE Prong Type Equalizing Assembly and VAL Bottom No-Go/Selective Lock



Standard VPNE Prong Assembly with External Fishneck



Optional VPNE Prong Assembly with Internal Fishneck



Optional VPNE Prong Assembly with Internal Fishneck and Junk Catcher

VMNE Melon Type Equalizing Assembly

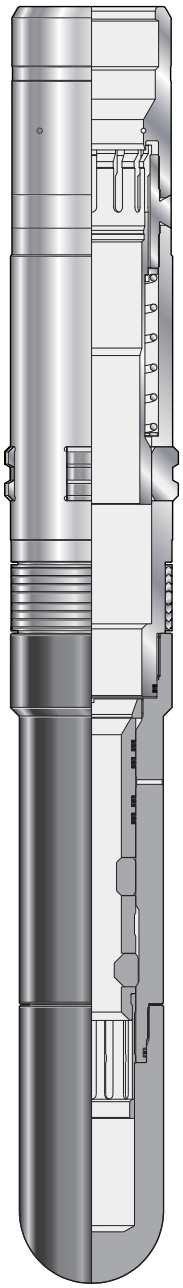
The melon type equalizing assembly is a single trip to set blanking plug designed to be deployed and retrieved by using either coiled tubing or wireline techniques. It features large-diameter ports which allow for unrestricted fluid bypass, and can maintain pressure from above or below.

To deploy, the plug and lock are attached to the running / pulling tool and prong and inserted into the hole. When the required seating nipple is located, the running/pulling tool will set and release the lock. Upward movement of the running/pulling tool and prong will check the setting of the lock and position the melon across the bypass ports, creating a blanking plug.

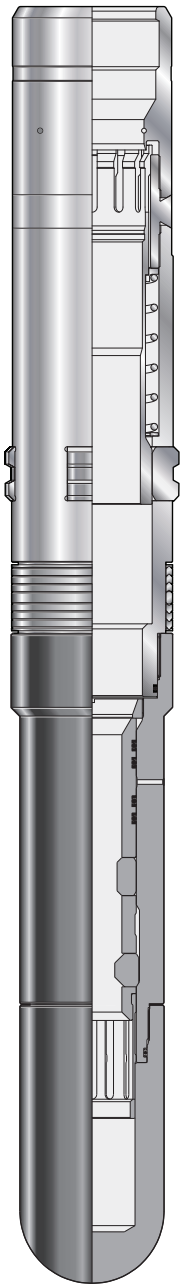
To retrieve the VMNE assembly with coiled tubing, the same running/pulling tool & prong are used. When the prong first engages the blanking plug, the melon is moved downward and the by-pass ports opened to allow equalization of the device. Further downward travel of the running/pulling tool will engage the lock fish neck and release the locking dogs. The whole assembly can now be retrieved from the well.

To retrieve the VMNE assembly with wireline, it is recommended that users ensure the pressure differential across the plug assembly is fully equalized prior to retrieval. The pressure is equalized by running the pulling tool with the equalizing prong, allowing for the safe and expedient retrieval of the device using the pulling tool and probe.

The melon type equalizing assembly is designed to be used with either the top or bottom no-go V series locks.



VMNE Melon Type Equalizing Assembly and VTL Top No-Go Lock



VMNE Melon Type Equalizing Assembly and VAL Bottom No-Go/Selective Lock

VSV Standing Valve Assembly

The standing valve assembly is a unidirectional valve designed to hold pressure from above. It is useful when full access to well pressure is required after pressure testing tubing or packer setting, as the VSV can be recovered at a later or more convenient time.

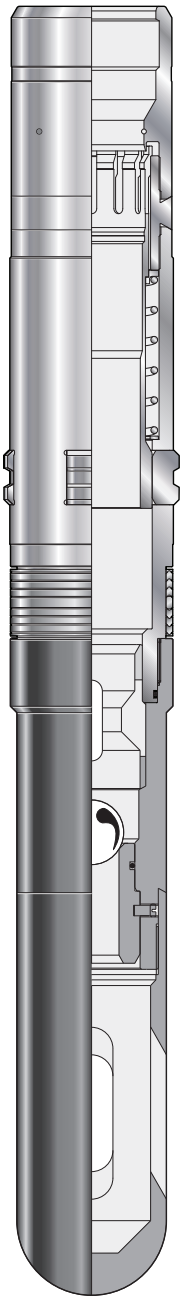
When installed in the nipple, the standing valve assembly will hold pressure with a stainless steel ball which seats in a corresponding steel housing. Flow or pressure from below the assembly will lift the ball from the seat and pass through, but pressure or flow from above is stopped fast. The ball seat is retained with calibrated shear pins which enable the operator to set a pressure value at which the seat will pump out into the sump of the assembly.

To retrieve the tool, a prong is used with the standard running/pulling tool.

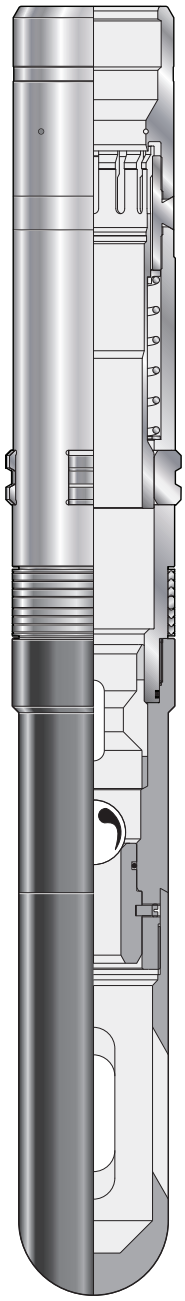
The VSV is designed to be used with either top or bottom no-go locks.

KDE Knock Down Equalizing Sub

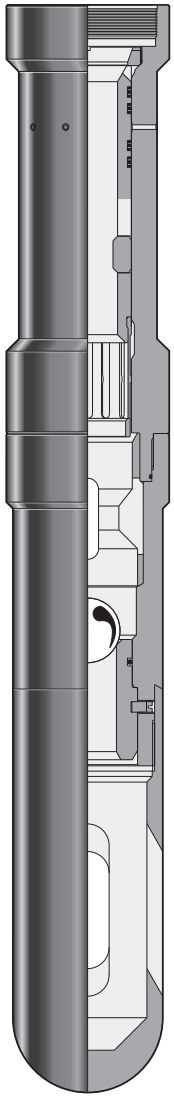
An option for the VSV is the KDE Knock Down Equalizing Sub. This sub allows the operator to equalize the pressure across the plug by ‘knocking down’ the internal valve, usually performed as a wireline operation using a GS type running tool and an equalizing prong. This sub is a mechanical alternative to the standard pressure pump out system of equalizing.



VSV Standing Valve Assembly and VTL Top No-Go Lock



VSV Standing Valve Assembly and VAL Bottom No-Go/Selective Lock



VSV Standing Valve Assembly and VKDE Knock Down Equalizing Sub

VCV Check Valve and VPOS Pump Open Sub

Our check valve is designed to be used with the top or bottom no-go lock and to hold pressure from below while allowing fluid to be circulated through the device from above.

This is accomplished using a stainless steel ball held from below by a spring, which holds it firm against a seat in a corresponding steel housing. Any pressure or flow from above the Assembly will push the ball off seat by compressing the spring, allowing fluids to pass through. However, flow or pressure from below is held back by the ball seating in the valve.

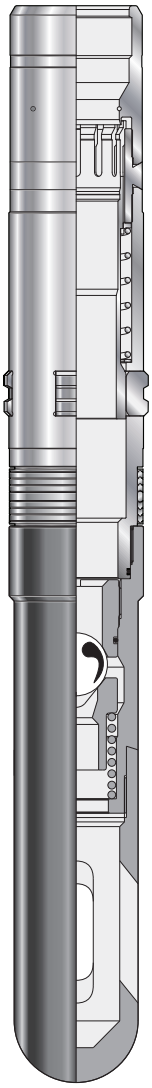
The operator can adjust the pressure required to open the valve by varing the spring rating used to hold the ball onto its seat.

When retrieved, a prong is used with the standard running/pulling tool to ensure that the ball is off seat and pressures are equalized across the device. This ensures a safe and speedy recovery of the tool.

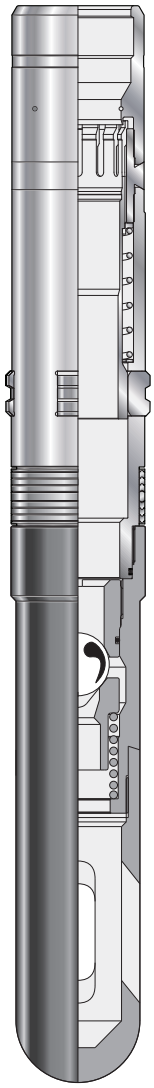
VPOS Pump Open Sub

Our pump open sub assembly is a bidirectional pressure control system designed to maintain pressure using a solid plug. It is designed using shear pin technology, ensuring that it will maintain the seal until a predetermined pressure is pumped down from above, at which point the pins will shear and the plug will be removed.

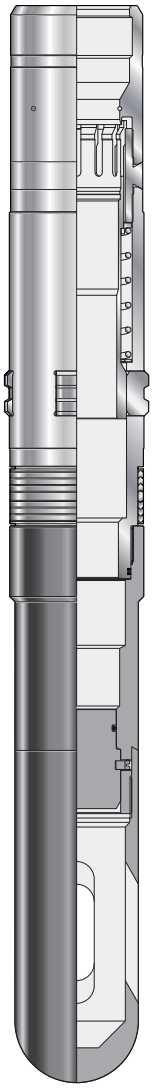
The pump open sub assembly is designed to be used with both top and bottom no-go locks. If required, our VMNE melon type equalizing assembly can be installed between the lock and the pump open sub to provide an alternate means of equalizing the plug.



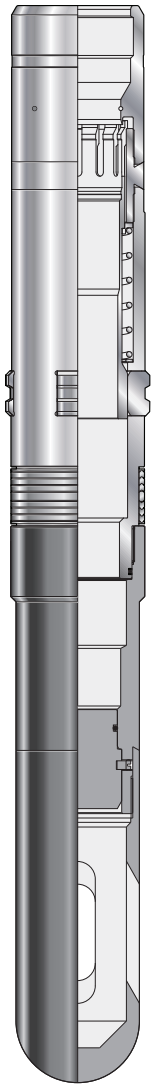
VCV Check Valve Assembly and VTL Top No-Go Lock



VCV Check Valve Assembly and VAL Bottom No-Go/Selective Lock

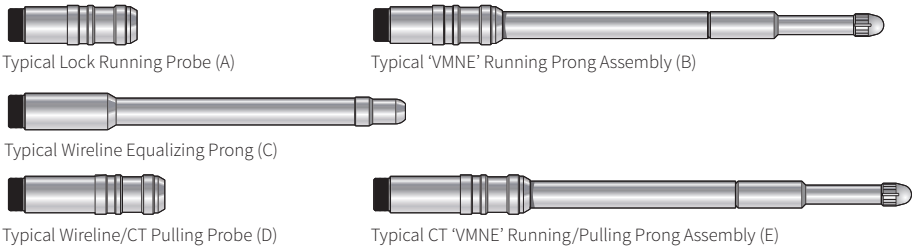


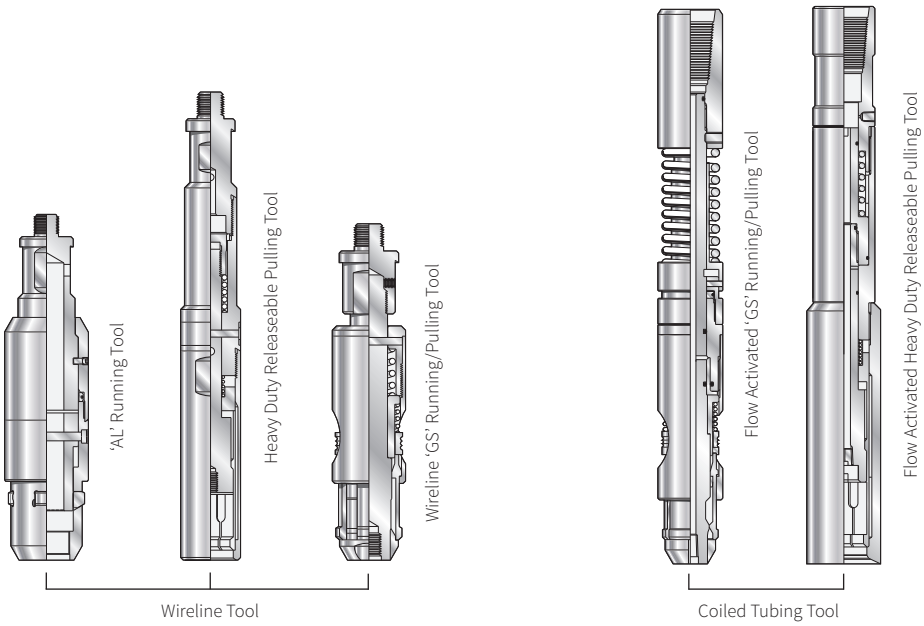
VPOS Pump Open Sub and VTL Top No-Go Lock



VPOS Pump Open Sub and VAL Bottom No-Go/Selective Lock

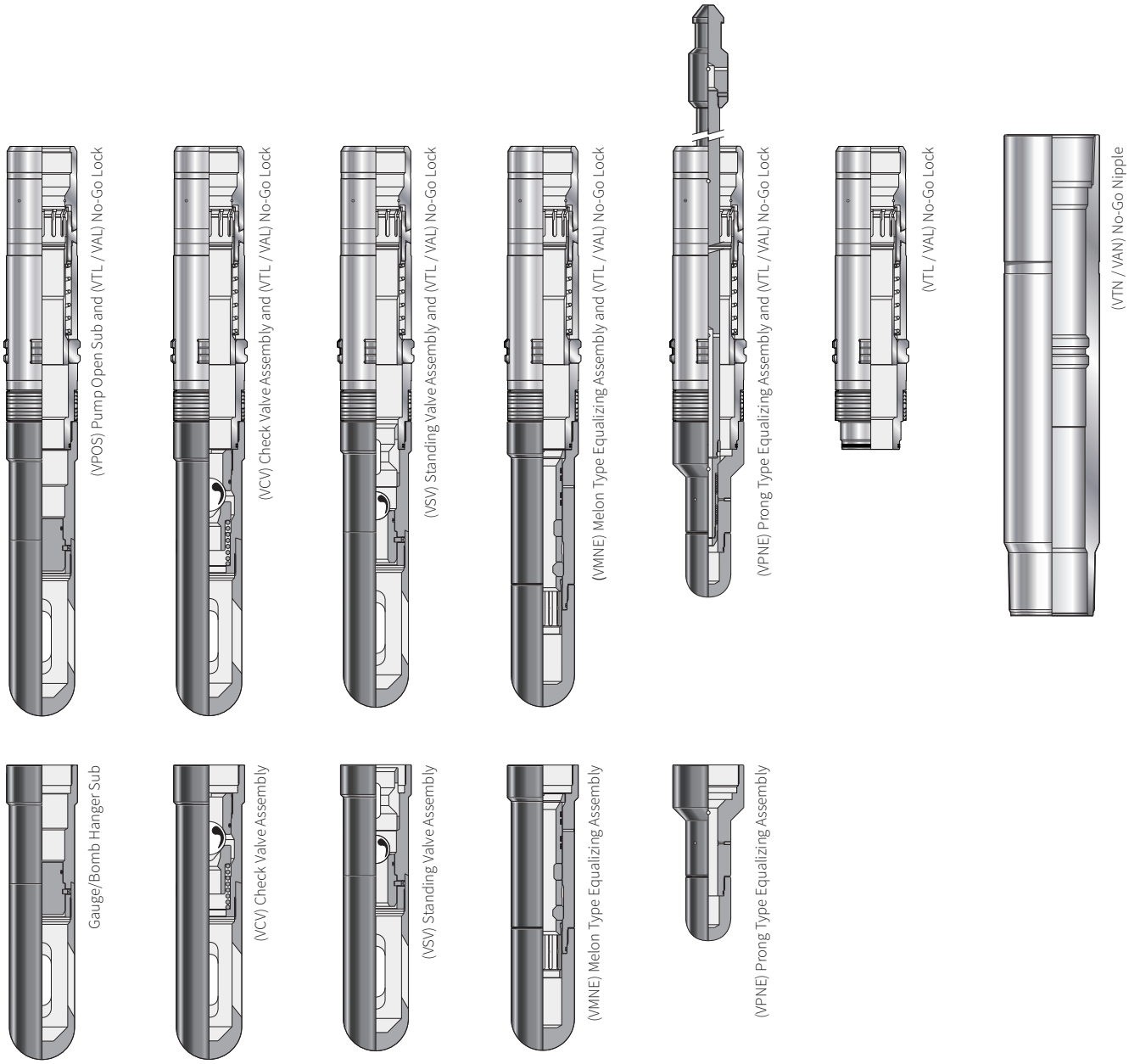
‘V’ Series Locks and Plugs





Deployment, Equalization and Retrieval Tool Options		
Operation	**Wireline Tool**	**Coiled Tubing Tool**
Running Lock and ‘VMNE’	Elmar ‘AL’ Running Tool + Prong Assy (B)	Elmar Flow Activated ‘GS’ Running/Pulling Tool + Prong Assy (E)
Equalizing ‘VMNE’	Elmar Wireline ‘GS’ Running/Pulling Tool + Prong (C)	N/A
Pulling Lock and ‘VMNE’	Elmar Wireline ‘GS’ Running/Pulling Tool + Probe (D)	Elmar Flow Activated ‘GS’ Running/Pulling Tool + Prong Assy (E)
Running Lock and ‘VPNE’	Elmar ‘AL’ Running Tool + Probe (A)	Elmar Flow Activated ‘GS’ Running/Pulling Tool + Probe (D)
Running ‘VPNE’ Prong	Elmar Wireline Heavy Duty Releasable Pulling Tool	Elmar Flow Activated ‘HD’ Pulling Tool
Pulling and Equalizing ‘VPNE’ Prong	Elmar Wireline Heavy Duty Releasable Pulling Tool	Elmar Flow Activated ‘HD’ Pulling Tool
Pulling Lock and ‘VPNE’	Elmar Wireline ‘GS’ Running/Pulling Tool + Probe (D)	Elmar Flow Activated ‘GS’ Running/Pulling Tool + Probe (D)
Running Lock and ‘VASV’	Elmar ‘AL’ Running Tool + Probe (A)	Elmar Flow Activated ‘GS’ Running/Pulling Tool + Probe (D)
Equalizing ‘VASV’ (Knock Down Equalizing Sub)	Elmar Wireline ‘GS’ Running/Pulling Tool + Prong (C)	Elmar Flow Activated ‘GS’ Running/Pulling Tool + Prong (D)
Pulling Lock and ‘VASV’	Elmar Wireline ‘GS’ Running/Pulling Tool + Probe (D)	Elmar Flow Activated ‘GS’ Running/Pulling Tool + Probe (D)
Running Lock and ‘VACV’	Elmar ‘AL’ Running Tool + Prong (A)	Elmar Flow Activated ‘GS’ Running/Pulling Tool + Prong (D)
Pulling Lock and ‘VACV’	Elmar Wireline ‘GS’ Running/Pulling Tool + Probe (D)	Elmar Flow Activated ‘GS’ Running/Pulling Tool + Probe (D)
Running Lock and Gauge/Bomb Hanger Sub	Elmar ‘AL’ Running Tool or Elmar Soft Set Running Tool + Probes (A)	Elmar Flow Activated ‘GS’ Running/Pulling Tool + Probe (D)
Pulling Lock and Gauge/Bomb Hanger Sub	Elmar Wireline ‘GS’ Running/Pulling Tool + Probe (D)	Elmar Flow Activated ‘GS’ Running/Pulling Tool + Probe (D)

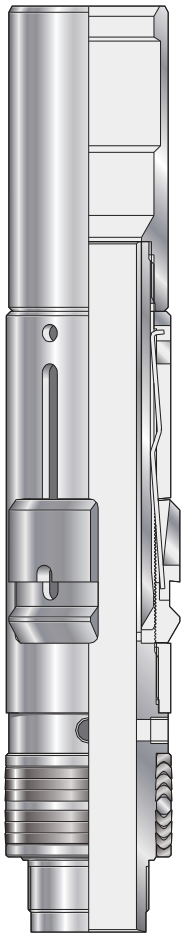
‘V’ Series Locks and Plugs



Technical Specifications

API Tubing Specifications				Lock Dimensions					Lock Pressure Rating		
				VTN Top No-Go		VAN Bottom No-Go			Material Yield Strength		
Tubing Size	Weight	I.D.	Drift	Seal Bore	Lock O.D.	Seal Bore	Lock O.D.	No-Go I.D.	80,000 psi	95,000 psi	120,000 psi
7"	32 lb/ft	6.094"	5.969"	5.812"	5.900"	5.963"	5.935"	5.855"	10,000 psi	12,000 psi	15,000 psi
7"	35 lb/ft	6.004"	5.879"	5.750"	5.830"	5.812"	5.790"	5.704"	10,000 psi	12,000 psi	15,000 psi
7"	38 lb/ft	5.920"	5.795"	5.625"	5.700"	5.750"	5.735"	5.642"	10,000 psi	12,000 psi	15,000 psi
7"	44 lb/ft	5.720"	5.595"	5.500"	5.590"	5.625"	5.610"	5.517"	10,000 psi	12,000 psi	15,000 psi
5 1/2"	20 lb/ft	4.778"	4.653"	4.562"	4.615"	4.625"	4.598"	4.517"	12,500 psi	15,000 psi	15,000 psi
5 1/2"	23 lb/ft	4.670"	4.545"	4.437"	4.495"	4.562"	4.535"	4.454"	12,500 psi	15,000 psi	15,000 psi
5 1/2"	26 lb/ft	4.548"	4.423"	4.313"	4.400"	4.313"	4.302"	4.205"	12,500 psi	15,000 psi	15,000 psi
4 1/2"	13.5 lb/ft	3.920"	3.795"	3.750"	3.795"	3.750"	3.735"	3.663"	15,000 psi	15,000 psi	15,000 psi
4 1/2"	15.1 lb/ft	3.826"	3.701"	3.625"	3.685"	3.688"	3.678"	3.620"	15,000 psi	15,000 psi	15,000 psi

Generic Flow Control Equipment



Elmar R and Elmar RN Landing Nipples

The Elmar R and Elmar RN are landing nipples specifically designed for use with heavy weight tubing. Both will locate, seal and retain their corresponding lock types, and feature specific key profiles and seal bores for exact matching. The Elmar RN also features a no-go profile for pressure and fluid control.

Features and Benefits

- Generic design
- Fixed and standard size range
- Suitable for heavy weight tubing
- Tensile strength equivalent or greater than tubing

When Ordering Please Specify

- Seal bore size
- Tubing weight
- Nipple type
- Tubing thread
- Tubing size
- Tubing material

Standard Materials

- AISI 4140 80Ksi
- AISI 4140 110Ksi
- 13Cr 80Ksi

Elmar R and Elmar RN Landing Nipple Standard Sizes

Seal Bore	Tubing Size
1.710"	2 3/8" 5.8 lb/ft
1.781"	2 3/8" 4.6 lb/ft
2.125"	2 7/8" 8.6 lb/ft
2.188"	2 7/8" 7.8 lb/ft
2.313"	2 7/8" 6.4 lb/ft
2.562"	3 1/2" 12.7 lb/ft
2.875"	3 1/2" 7.7 lb/ft
3.125"	4" 11.0 lb/ft
3.437"	4 1/2" 18.8 lb/ft
3.688"	4 1/2" 16.8 lb/ft
3.813"	4 1/2" 15.5 lb/ft
4.125"	5" 18.0 lb/ft
4.313"	5" 13.0 lb/ft
4.562"	5 1/2" 20.0 lb/ft
5.875"	7" 32.0 lb/ft
5.963"	7" 29.0 lb/ft

Elmar X and Elmar XN Landing Nipples

The Elmar X and Elmar XN are landing nipples specifically designed for use with standard weight tubing. Both will locate, seal and retain their corresponding lock types, and feature specific key profiles and seal bores for exact matching. The Elmar XN also features a no-go profile for pressure and fluid control.

Features and Benefits

- Generic design
- Fixed and standard size range
- Suitable for heavy weight tubing
- Tensile strength equivalent or greater than tubing

When Ordering Please Specify

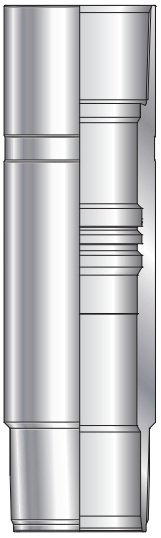
- Seal bore size
- Tubing weight
- Nipple type
- Tubing thread
- Tubing size
- Tubing material

Standard Materials

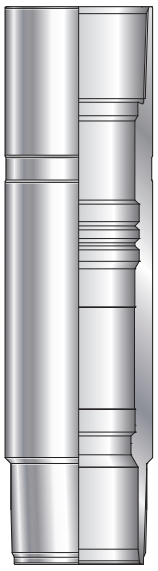
- AISI 4140 80Ksi
- AISI 4140 110Ksi
- 13Cr 80Ksi

Elmar X and Elmar XN Landing Nipple Standard Sizes

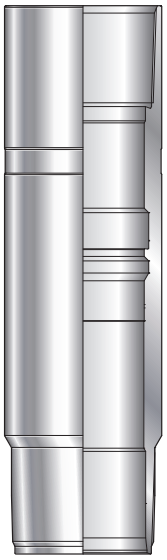
Seal Bore	Tubing Size
1.875"	2 3/8" 4.6 lb/ft
2.313"	2 7/8" 6.4 lb/ft
2.750"	3 1/2" 9.2 lb/ft
2.813"	3 1/2" 9.2 lb/ft
3.313"	4" 9.5 lb/ft
3.813"	4 1/2" 11.6 lb/ft
4.313"	5 1/2" 26 lb/ft
4.562"	5 1/2" 20 lb/ft



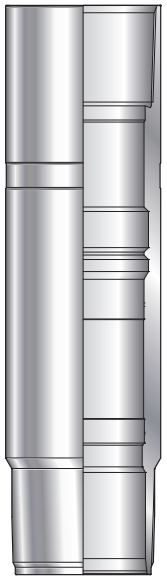
Elmar R Landing Nipple



Elmar RN Landing Nipple



Elmar X Landing Nipple



Elmar XN Landing Nipple

elmar@nov.com nov.com/elmar

Elmar X Lock Mandrels

The Elmar X lock mandrel is a specialized piece of equipment designed to provide a setting point for flow control equipment, including plugs, chokes and gauge hangers. It is usually run and retrieved on slickline, but may be run with coiled tubing using a flow activated RX running tool. When deployed, the Elmar X lock mandrel is locked into a selective Elmar X landing nipple within the tubing string to secure.

Features and Benefits

- Suitable for standard weight tubing
- Retractable Locking Key
- Will engage in multiple same size nipples in the tubing string
- Selective by running tool
- Holds pressure from above and below
- Large I.D. for higher flow volumes

When Ordering Please Specify

- Seal bore size
- Material

Standard Materials

- AISI 4140 80Ksi
- AISI 4140 110Ksi
- 13Cr 80Ksi

Standard Sizes
Seal Bore
1.875"
2.313"
2.750"
2.813"
2.875"
3.313"
3.813"
4.313"
4.562"

Elmar XN Lock Mandrels

The Elmar XN lock mandrel is a specialized piece of equipment designed to provide a setting point for flow control equipment, including plugs, chokes and gauge hangers. It features a bottom No-go valve for improved pressure and fluid control, and when deployed is locked into a selective Elmar XN landing nipple within the tubing string to secure. It is usually run and retrieved on slickline, but may be run with coiled tubing using a flow activated RX running tool.

Features and Benefits

- Suitable for standard weight tubing
- Retractable Locking Key
- Used as bottom of selective tubing strings
- Used in taper string application
- Holds pressure from above and below
- Large I.D. for higher flow volumes

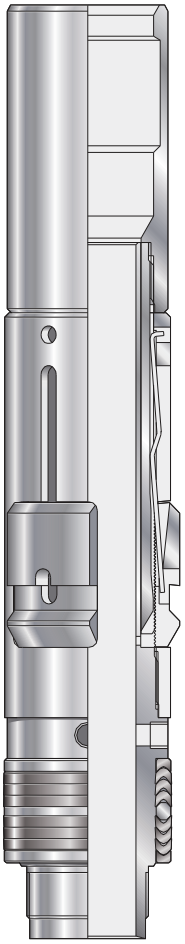
When Ordering Please Specify

- Seal bore size
- Material

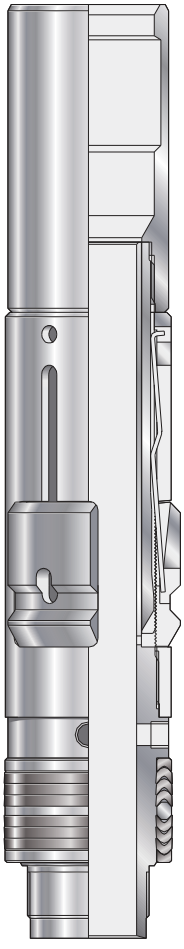
Standard Materials

- AISI 4140 80Ksi
- AISI 4140 110Ksi
- 13Cr 80Ksi

Standard Sizes
Seal Bore
1.875"
2.313"
2.750"
2.813"
2.875"
3.313"
3.813"
4.313"
4.562"



Elmar X Lock Mandrel



Elmar XN Lock Mandrel

Elmar XO Equalizing Valve

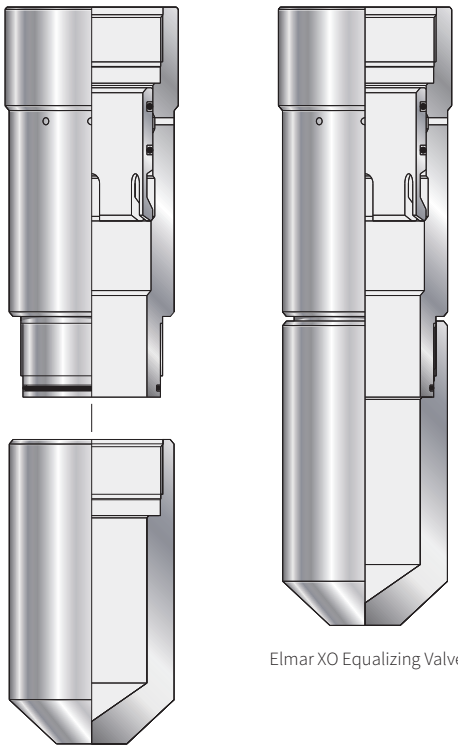
The Elmar XO equalizing valve is a melon type valve for standard weight tubing. It is available in a wide variety of materials and seal bore sizes, and features a no-go shoulder, allowing it to be used with Elmar X and Elmar XN locks. It is designed to be run and pulled in the open position in a single run, allowing for quick and easy deployment. The valve can be opened or closed using a running tool for ease of operation.

Features and Benefits

- Suitable for standard weight tubing
- Suitable for Elmar X and Elmar XN Locks
- Usually run with a valve plug and well as the lock
- Gives fluid bypass during running and retrieving operations
- Can be used with standing valve subs
- Includes the no-go shoulder for the XN Plug assembly
- One run to pull and one run to set
- Not suitable for use in wells with a lot of sand/sediment

When Ordering Please Specify

- Seal bore size
- Material



Elmar XO Equalizing Valve

Elmar PX Equalizing Valve

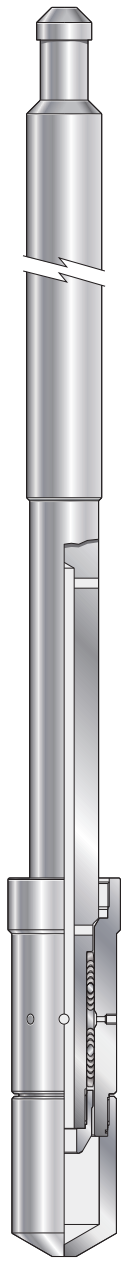
The Elmar PX equalizing valve is a prong type valve for standard weight tubing, specifically designed for wells with high levels of sand and sediment. It is available in a wide variety of materials, fish neck types and seal bore sizes, and features a no-go shoulder allowing it to be used with Elmar X and Elmar XN locks. It is designed to be run and pulled in the open position, making deployment and retrieval both safer and easier, but can be opened or closed using a prong for ease of operation.

Features and Benefits

- Suitable for standard weight tubing
- Suitable for Elmar X and Elmar XN Locks
- Gives fluid bypass during running and retrieving operations
- Includes the no-go shoulder for the XN plug assembly
- Two runs to pull and two runs to set
- Suitable for use in wells with a lot of sand/sediment
- The Prong normally has an external fish neck but can be supplied with and internal fish neck
- Length of prongs can be extended for wells with heavy sand or sediment settlement

When Ordering Please Specify

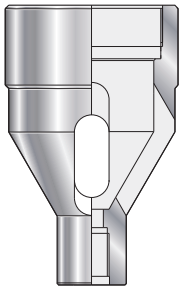
- Seal bore size
- Material
- Fish neck type
- Prong length



Elmar PX Equalizing Valve

Bomb/Gauge Hanger for X and XN Locks

The bomb or gauge hanger is designed as a hanging point for logging equipment such as gauges. It is available in a wide variety of materials and thread connections, and can be designed to work with a number of lock sizes and types. It is deployed by threading to the bottom of the lock, and features a no-go shoulder allowing it to function with no-go nipples.



Bomb/Gauge Hanger

Features and Benefits

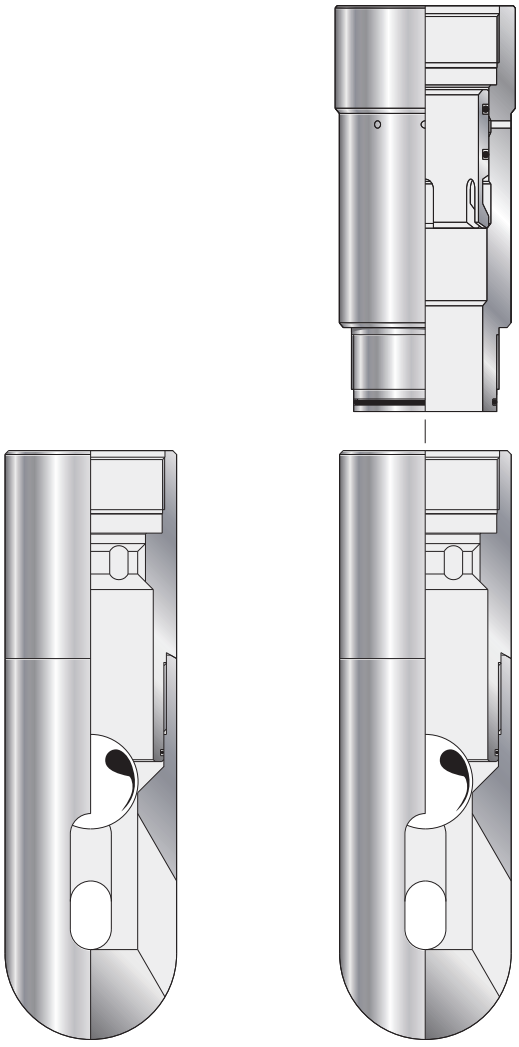
- Upper thread connection to lock
- Fluid bypass ports
- Lower thread to suit gauge or bomb hangers
- No-go shoulder to locate in bottom no-go nipple

When Ordering Please Specify

- Lock size and type
- Material
- Lower thread connection

Standing Valve for X and XN Locks

Our standing valve assembly is designed to hold pressure from above, and is best suited for applications such as testing the tubing string and setting packers. It is available in a wide variety of materials, and can be designed to work with a number of lock sizes and types. It is designed to be deployed by threading to the bottom of the lock, or below an XO equalizing valve if equalization is required prior to retrieval.



Standing Valve

Features and Benefits

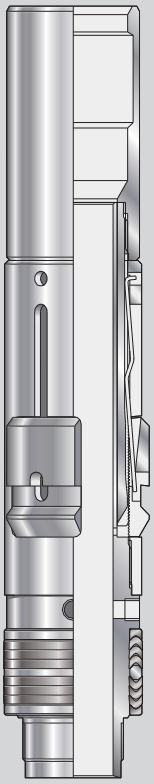
- Upper thread connection to lock or XO equalizing valve
- Fluid bypass ports.
- Metal to metal sealing from ball and seat
- No-go shoulder to locate in bottom no-go nipple for valve connected directly to lock
- Allows fluid to flow from below

When Ordering Please Specify

- Lock size and type
- Material
- If XO equalizing valve is being used

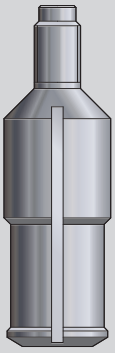
Slickline Running and Pulling Tools for Elmar X/Elmar XN Locks and Plugs

Elmar X or XN Lock Size	Elmar X Running Tool	XX Running Prong	GS Pulling Tool	GU Adaptor	XX Pulling Prong
1.875"	B117-001	00-03976	B086-001	B086-010	00-02152
2.313"	B117-002	00-08168	B086-002	B086-009	00-03460
2.750"	B117-041	00-17214	B086-003	B086-011	00-04269
2.813"	B117-003	00-17214	B086-003	B086-011	00-04269
2.875"	B117-007	00-17214	B086-003	B086-011	00-04269
3.313"	B117-004	00-17211	B086-004	B086-011	00-17208
3.813"	B117-008	00-09852	B086-005	B086-011	00-09853
4.313"	B117-027	00-17213	B086-005	B086-011	00-17212
4.562"	B117-009	00-04177	B086-006	B086-013	00-04178

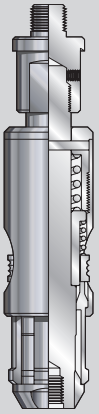


Elmar X or Elmar XN Lock

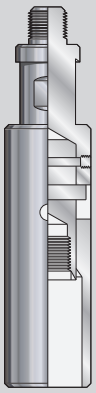
Elmar X Running Tool



XX Running Prong



GS Pulling Tool



GU Adaptor

XX Pulling Prong

Elmar R Lock Mandrels

The Elmar R lock mandrel is designed to function with heavy weight tubing and to provide a setting point for flow control equipment such as plugs, chokes and gauge hangers. It is available in a wide variety of materials and seal bore sizes, and features a bidirectional pressure seal and retractable locking key. It is designed to match with a Elmar R landing nipple, and may be run on slickline or on coiled tubing using a flow activated RX running tool.

Features and Benefits

- Suitable for heavy weight tubing
- Retractable locking key
- Will engage in multiple same size nipples in the tubing string
- Selective by running tool
- Holds pressure from above and below

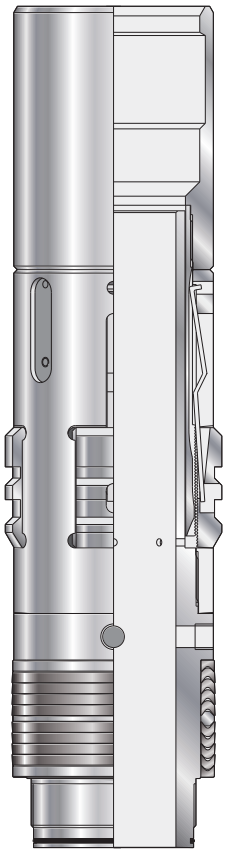
When Ordering Please Specify

- Seal bore size
- Material

Standard Materials

- AISI 4140 80Ksi
- AISI 4140 110Ksi
- 13Cr 80Ksi

Standard Sizes
Seal Bore
1.710"
1.781"
2.125"
2.188"
2.313"
2.562"
2.875"
3.125"
3.250"
3.437"
3.688"
3.813"
4.125"
4.313"
4.562"
5.875"
5.963"



Elmar R Lock Mandrel

Elmar RN Lock Mandrels

The Elmar RN lock mandrel is designed to function with heavy weight tubing and to provide a setting point for flow control equipment such as plugs, chokes and gauge hangers. It is available in a wide variety of materials and seal bore sizes, and features a bidirectional pressure seal and retractable locking key. It is designed to match with a Elmar RN bottom no-go landing nipple, and may be run on slickline or on coiled tubing using a flow activated RX running tool.

Features and Benefits

- Suitable for heavy weight tubing
- Retractable locking key
- Used as bottom of selective tubing strings
- Used in taper string application
- Holds pressure from above and below

When Ordering Please Specify

- Seal bore size
- Material

Standard Materials

- AISI 4140 80Ksi
- AISI 4140 110Ksi
- 13Cr 80Ksi

Standard Sizes
Seal Bore
1.710"
1.781"
2.125"
2.188"
2.313"
2.562"
2.875"
3.125"
3.250"
3.437"
3.688"
3.813"
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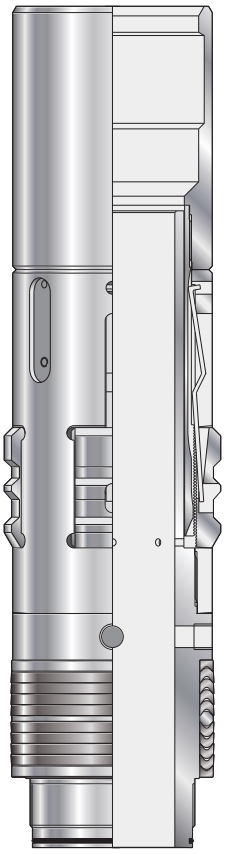
4.313"
4.562"
5.875"
5.963"



Elmar RN Lock Mandrel

Elmar RO Equalizing Valve

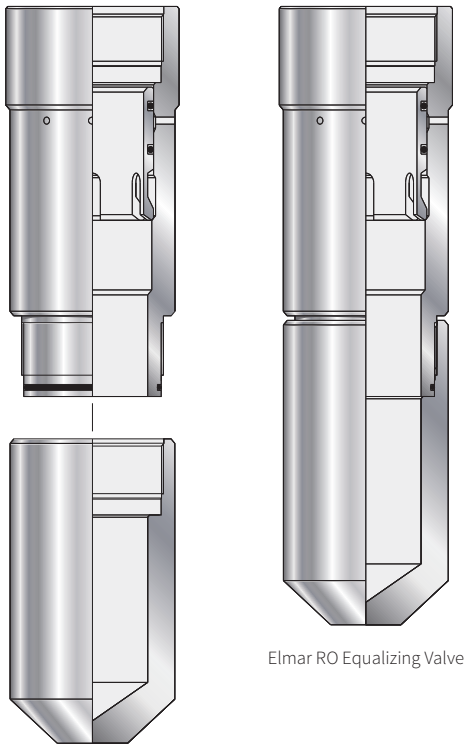
The Elmar RO equalizing valve is a melon type valve for standard weight tubing. It is available in a wide variety of materials and seal bore sizes, and features a no-go shoulder, allowing it to be used with Elmar R and Elmar RN locks. It is designed to be run and pulled in the open position in a single run, allowing for quick and easy deployment. The valve can be opened or closed using a running tool for ease of operation.

Features and Benefits

- Suitable for standard weight tubing
- Suitable for Elmar R and Elmar RN Locks
- Usually run with a valve plug and well as the lock
- Gives fluid bypass during running and retrieving operations
- Can be used with standing valve subs
- Includes the no-go shoulder for the RN plug assembly
- One run to pull and one run to set
- Not suitable for use in wells with a lot of sand/sediment

When Ordering Please Specify

- Seal bore size
- Material



Elmar RO Equalizing Valve

Elmar PR Equalizing Valve

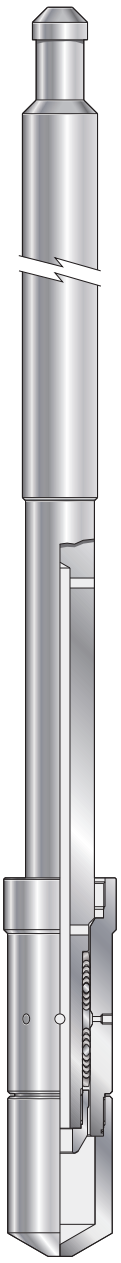
The Elmar PR equalizing valve is a prong type valve for standard weight tubing, specifically designed for wells with high levels of sand and sediment. It is available in a wide variety of materials, fish neck types and seal bore sizes, and features a no-go shoulder allowing it to be used with Elmar R and Elmar RN locks. It is designed to be run and pulled in the open position, making deployment and retrieval both safer and easier, but can be opened or closed using a prong for ease of operation.

Features and Benefits

- Suitable for standard weight tubing
- Suitable for Elmar R and Elmar RN locks
- Gives fluid bypass during running and retrieving operations
- Includes the no-go shoulder for the RN plug assembly
- Two runs to pull and two runs to set
- Suitable for use in wells with a lot of sand/sediment
- The prong normally has an external fish neck but can be supplied with and internal fish neck
- Length of prongs can be extended for wells with heavy sand or sediment settlement

When Ordering Please Specify

- Seal bore size
- Material
- Fish neck type
- Prong length



Elmar PR Equalizing Valve

Bomb/Gauge Hanger for R and RN Locks

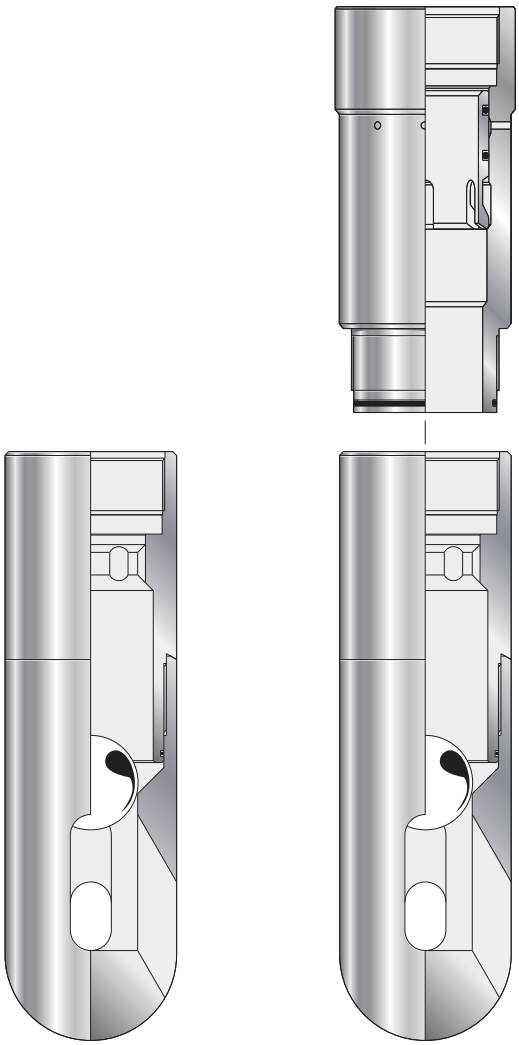
The bomb or gauge hanger is designed as a hanging point for logging equipment such as memory gauges. It is available in a wide variety of materials and thread connections, and can be designed to work with a number of lock sizes and types. It is deployed by threading to the bottom of the lock, and features a no-go shoulder allowing it to function with no-go nipples.

Features and Benefits

- Upper thread connection to lock
- Fluid bypass ports
- Lower thread to suit gauge or bomb hangers.
- No-go shoulder to locate in bottom no-go nipple

When Ordering Please Specify

- Lock size and type
- Material
- Lower thread connection



Standing Valve

Standing Valve for R and RN Locks

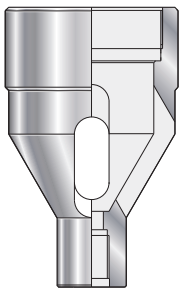
Our standing valve assembly is designed to hold pressure from above, and is best suited for applications such as testing the tubing string and setting packers. It is available in a wide variety of materials, and can be designed to work with a number of lock sizes and types. It is designed to be deployed by threading to the bottom of the lock, or below an RO equalizing valve if equalization is required prior to retrieval.

Features and Benefits

- Upper thread connection to lock or RO equalizing valve
- Fluid bypass ports
- Metal to metal sealing from ball and seat
- No-go shoulder to locate in bottom no-go nipple for valve connected directly to lock
- Allows fluid to flow from below

When Ordering Please Specify

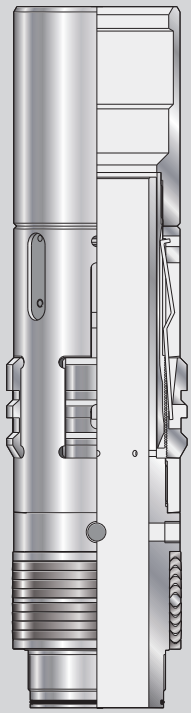
- Lock size and type
- Material
- If RO equalizing valve is being used



Bomb/Gauge Hanger

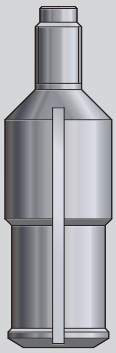
Slickline Running and Pulling Tools for Elmar R/Elmar RN Locks and Plugs

Elmar R or Elmar RN Lock Size	Elmar R Running Tool	RR Running Prong	GS Pulling Tool	GU Adaptor	RR Pulling Prong
1.710"	B117-010	TBA	B086-028	B086-029	TBA
1.781"	B117-011	L-9841090133	L-9811078817	B086-071	L-9841090136
2.125"	B117-030	L-9841090133	B086-010	B086-017	L-9841090136
2.188"	B117-031	00-17207	B086-052	TBA	00-17210
2.313"	B117-012	00-17207	B086-002	B086-009	00-17210
2.562"	B117-013	00-08168	B086-002	B086-009	00-03460
2.875"	B117-049	00-33238	B086-003	B086-011	00-33239
3.125"	B117-014	00-16128	B086-004	B086-011	00-16127
3.250"	B117-015	00-16128	B086-004	B086-011	00-16127
3.437"	B117-036	00-16128	B086-004	B086-011	00-16127
3.688"	B117-016	00-17096	B086-005	B086-011	00-31419
3.813"	L-17878948-001	TBA	B086-005	B086-011	TBA
4.125"	B117-043	00-17213	B086-005	B086-011	00-17212
4.313"	B117-044	00-31417	B086-005	B086-011	00-31418
4.562"	B117-040	00-30722	B086-005	B086-011	00-30723
5.875"	L-9831094902	00-30726	B086-049	B086-013	00-30727
5.963"	L-9831094902	00-30726	B086-049	B086-013	00-30727

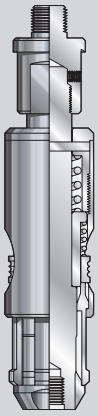


Elmar R or Elmar RN Lock

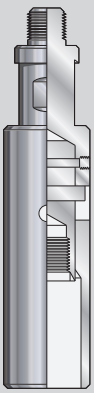
Elmar R Running Tool



RR Running Prong



GS Pulling Tool



GU Adaptor

RR Pulling Prong

Elmar 'N' Test Tool

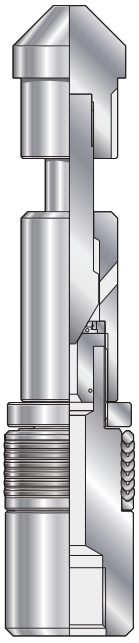
The Elmar N test tool is a system designed to test tubing for leaks. It is offered in a number of bore sizes, and can locate and seal on any no-go nipple profile. It can be run and pulled using the same standard overshot type pulling tool, and allows for fluid equalization during retrieval, making the process simpler and safer.

Features and Benefits

- Run and pulled using the same slickline tool
- Sits on no-go shoulder in nipple
- Equalization by picking up fish neck
- Allows fluid to flow from below during run in hole
- Pressure can be applied from above

When Ordering Please Specify

- No-go nipple seal bore size



Elmar 'N' Test Tool

Elmar 'X' Selective Test Tool

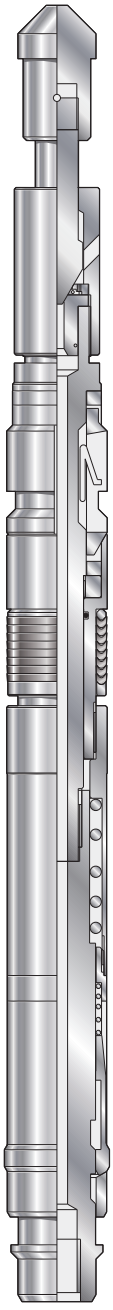
The Elmar X test tool is a system designed to test tubing for leaks. The keys can be set or retracted as needed, seal on any X or XN nipple profile, including no-go systems. In a typical selective tubing strings, the tool functions by locating the XN nipple at the bottom of the string, and then being pulled upwards to the X nipples until the leak is identified. It is offered in a number of bore sizes, and allows pressure to be applied from above and fluid flow from below during operation.

Features and Benefits

- Keys can be retracted or set in floating position
- Retracted keys set in floating position by picking up through nipple
- Sits on key profile in selective nipples
- Sits on no-go shoulder of no-go nipples
- Equalization by picking up fish neck
- Allows fluid to flow from below during run in hole
- Pressure can be applied from above
- Can be set in an X profile in an SSD

When Ordering Please Specify

- Seal bore size



'X' Selective Test Tool

Check Set Tool

The check set tool is used to check that a X, XN, R or RN lock mandrel has been set correctly in the tubing nipple. It is available for a number of different lock sizes, allows for easy visual inspection and can be reset as often as needed.

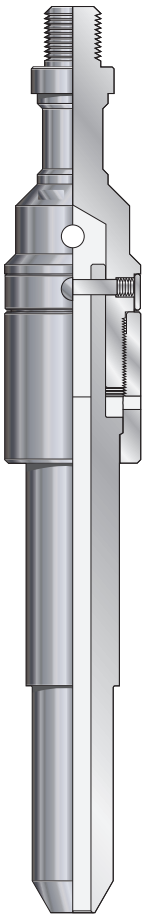
The collet style operates by means of a split ring, which is lowered into place on the lock mandrel and jarred down. When the tool is pulled out of hole, the location of the split ring will indicate the position of the fish neck and indicate if action is required.

Features and Benefits

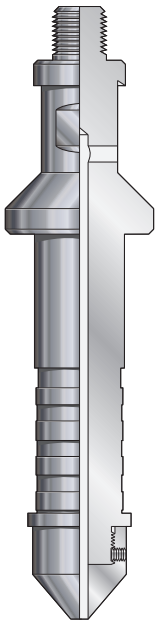
- Easy visual indication that the lock has been set correctly
- Tool can be re-set as many times as is required

When Ordering Please Specify

- Lock size
- Lock type



Shear Pin Check Set Tool



Collet Check Set Tool

Shear Pin Check Set Tool

With the shear pin style, the tool is run in hole and jarred down on top of the lock. If the pins shear then this indicates that he lock has been set correctly.

Features and Benefits

- Easy visual indication that the lock has been set correctly.
- Tool can be re-set as many times as is required

When Ordering Please Specify

- Lock size
- Lock type

Elmar 'R' Selective Test Tool

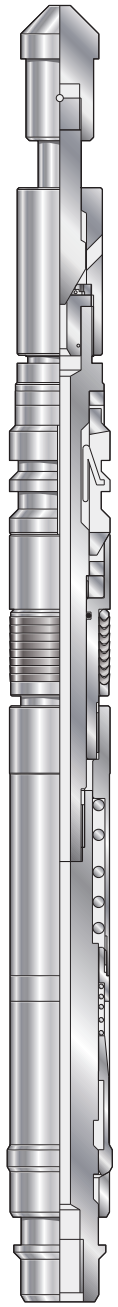
The Elmar R test tool is a system designed to test tubing for leaks. The keys can be set or retracted as needed, seal on any R or RN nipple profile, including no-go systems. In a typical selective tubing strings, the tool functions by locating the RN nipple at the bottom of the string, and then being pulled upwards to the R nipples until the leak is identified. It is offered in a number of bore sizes, and allows pressure to be applied from above and fluid flow from below during operation.

Features and Benefits

- Keys can be retracted or set in floating position
- Retracted keys set in floating position by picking up through nipple
- Sits on key profile in selective nipples
- Sits on no-go shoulder of no-go nipples
- Equalization by picking up fish neck
- Allows fluid to flow from below during run in hole
- Pressure can be applied from above
- Can be set in an R profile in an SSD

When Ordering Please Specify

- Seal bore size



'R' Selective Test Tool

NOV Standing Valves

NOV Standing Valves are designed to land and seal in any no-go type landing nipples with seal bores. The tool can be used to test tubing for leaks and set hydraulic production packers. It can be run and pulled using the same standard overshot type pulling tool and allows for fluid equalization before retrieval, making the process simpler and safter.

Features and Benefits

- Run and pulled using the same slickline tool
- Run and pulled in one operation
- Equalization by picking up fish neck and shearing pin
- Designed to suit any no-go nipple with seal bore
- Allows fluid to flow from below during run in hole
- Will to suit deviated wells
- Pressure can be applied from above

When Ordering Please Specify

- No-Go Nipple seal bore size and type
- Material required
- Required working pressure
- Sal requirements

Standing Valve

Elmar FB-2 Style Equalizing Check Valves

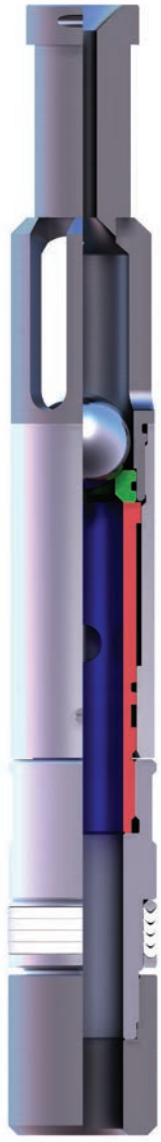
The Elmar FB-2 Style Equalizing Check valve is also sometimes known as a standing valve. The Elmar FB-2 Equalizing Check Valve is designed to seat on the top no-go shoulder of a Elmar F nipple and is offered in a number of bore sizes. The tool seals from above and is designed to test tubing for leaks. It is usually run using an Elmar C-1 running tools and pulled using a Jar Up to release such as and Elmar RB or Elmar JUC Pulling Tool.

Features and Benefits

- Run using an Elmar C-1 running tool
- Pulled using generic Jar Up pulling tool such as an RB or JUC
- Sits on no-go shoulder in nipple
- Equalisation by picking up fish neck and shearing pins
- Allows fluid to flow from below during run in hole
- Pressure can be applied from above

When Ordering Please Specify

- No-go seal bore size and type



FB-2 Style Equalizing Check Valve

Elmar RB-2 Style Equalizing Check Valves

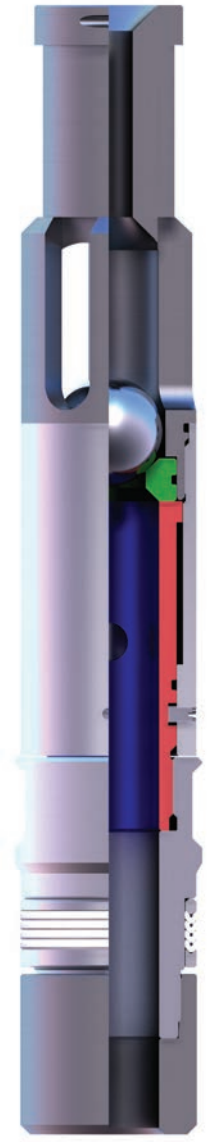
The Elmar RB-2 Style Equalizing Check valve is also sometimes known as a standing valve. The Elmar RB-2 Equalizing Check Valve is designed to seat on the bottom no-go shoulder of a Elmar R nipple and is offered in a number of bore sizes. The tool seals from above and is designed to test tubing for leaks. It is usually run using an Elmar C-1 running tools and pulled using a Jar Up to release such as and Elmar RB or Elmar JUC Pulling Tool.

Features and Benefits

- Run using an Elmar C-1 running tool
- Pulled using generic Jar Up pulling tool such as an RB or JUC
- Sits on no-go shoulder in nipple
- Equalisation by picking up fish neck and shearing pins
- Allows fluid to flow from below during run in hole
- Pressure can be applied from above

When Ordering Please Specify

- No-go seal bore size and type



RB-2 Style Equalizing Check Valve

TRSCSSV Hold Open/Protection Sleeves

We offer four styles of Hold Open Protection Sleeves. The simplest version is the 'No-Go Sub' sleeve. This tool is run and pulled using a GS Pulling Tool and is designed to sit on the no-go of the nipple profile. It is held in position only by gravity and, if used, the friction of O-Ring Seals.

The second version is the 'Collet Snap-In' Sleeve. Again this is run and pulled using just a GS Pulling Tool. This tool however has an 'easy in hard our collet' in order to provide additional resistance to being accidently pulled out of the safety valve during intervention operations.

The 'Collet Lock-in' Sleeve also has a collet to snap into the key profile in the nipple. This collet can be locked into the nipple profile by a locking mandrel. The 'Collet Lock-In' Sleeve provided a more secure lock into the nipple profile and is this fit is usually verified by a pull test in the region of 20,000 lbs. The tool can both be run and pulled using a GS Pulling Tool with a probe for the locking mandrel or it can be run using an AL Running Tool with a probe and then pulled using a GS Pulling Tool with a probe.

To maximise the through bore both the 'No-Go Sub' and the 'Collet Snap-In' Sleeve can be manufactured from one piece.

Another option for a protection sleeve for the TRSCSSV during intervention is a Drop Off 'Collet Snap-In' Sleeve. Rather than installing the sleeve in a separate intervention run this sleeve is run in the well and installed as part of the intervention tool string it is also retrieved as the string is pulled from the well.. This saves two runs to independently run and pull the sleeve. The ID of the sleeve is not critical as the interventions tools are below the sleeve in the intervention tool string.

Non-Sealing Junk Basket/Tool Catcher/ Valve Catcher

Features and Benefits

- Provides a barrier against larger debris
- Protects seal bore of nipple
- Sits on no-go profile of nipple
- Run and pulled using GS Pulling Tool
- No probes or prongs required
- Perforations in bottom sub for fluid by-pass
- Located below GLV's to catch dropped GLM's

Non-Sealing Junk Basket/ Tool Catcher/Valve Catcher

'Collet Snap-In' Sleeve

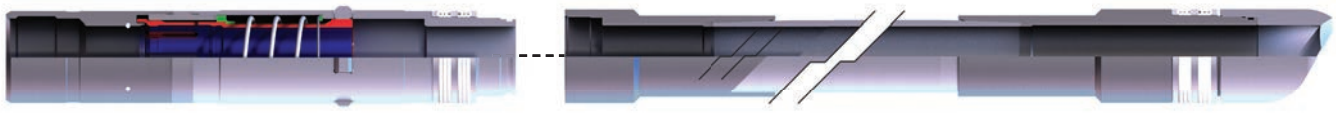
'Collet Lock-in' Sleeve

Drop Off 'Collet Snap-In' Sleeve

Isolation Sleeves

The isolation sleeve can locate and lock into the nipple above a safety valve, SSD or TRFC and enable that tool to be isolated in the event of failure or leakage. The assembly consists of a lock and a straddle sleeve with the straddle sleeve sealing in the lower seal bore. The sleeve can be made to any length to suit the tool it is set in. The lock is run using standard running and pulling tools.

Providing we have sufficient detail of a nipple profile NOV can supply retrofit A Series locks to suit any no-go nipple profile.

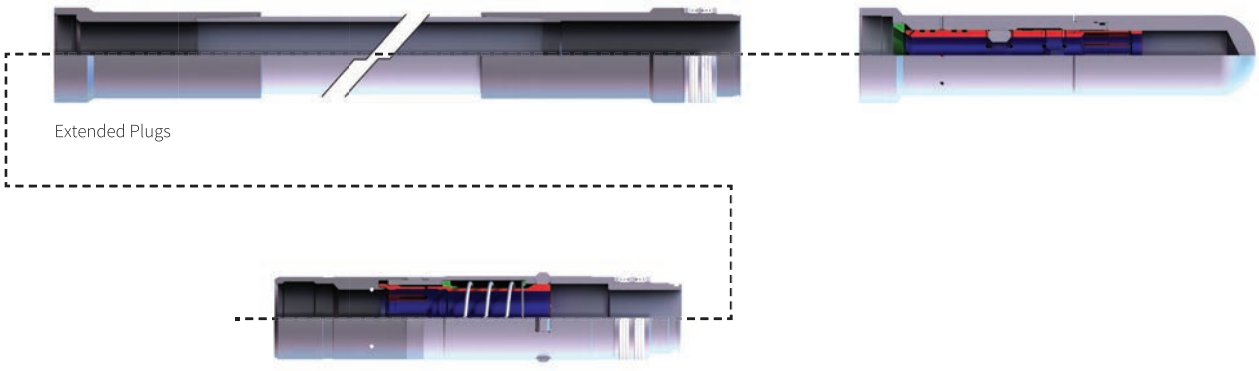


Isolation Sleeves

Extended Plugs

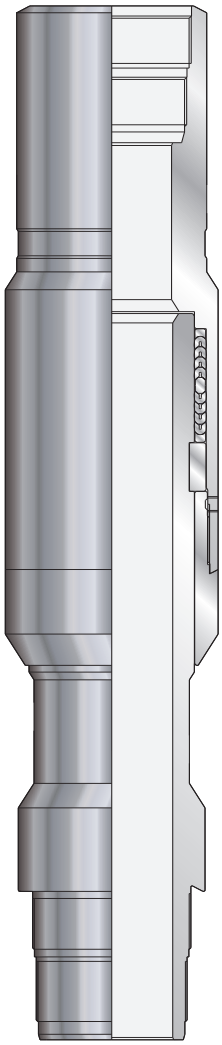
In the event of failure leading to the leakage of a Flow Control device a plug can be installed in the device that will seal in both the upper and lower seal bores and isolate the leakage. The assembly consists of a lock, straddle sleeve and an equalizing device (usually a melon type equalizing device). Standard running and pulling tools are used to run and pull the extended plug except for the requirement for extended running and pulling prongs.

Providing we have sufficient detail of a nipple profile NOV can supply retrofit A Series locks to suit any no-go nipple profile.



Extended Plugs

Completion Accessories



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Tubing Completion Swivel Joints

Our tubing completion swivel joints allow the completion string to be rotated safely while maintaining pressure integrity. These systems are available in a wide variety of sizes, threads, weights, materials and pressure ratings, and feature a V packing seal stack to maintain full seal integrity through the working life of the tool. All tubing completion swivel joints are designed with a tensile strength at least equal to, if not better than, the strength of the tubing being used.

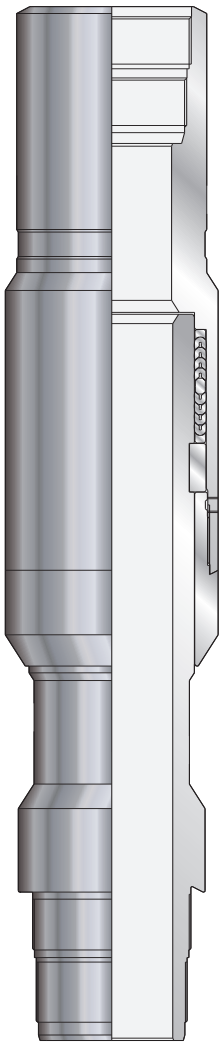
The tool is designed to allow rotation at the surface to assist in the makeup of modules or for orientation of the tool string, and can be designed to lock at the surface if required.

Features and Benefits

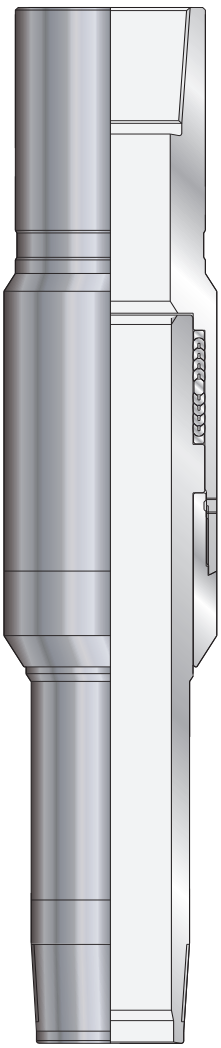
- Maximum flow area
- Minimized outside diameter
- Can be lockable
- V packing seals
- Tensile strength equivalent or greater than tubing

When Ordering Please Specify

- Tubing size
- Tubing weight
- Tubing thread
- Tubing material
- Pressure rating



Tubing Completion Swivel Joint



Tubing Completion Swivel Joint

Pump Out Plugs

Our pump out plug is used to deploy tubing into live wells where a temporary pressure barrier is required. They can either feature a solid core plug, a drop ball sleeve or a plug with a ball valve that allows the tubing to fill up during installation. These cores are designed to accurately shear out at a known pressure by over-pressuring from above, allowing the barrier to be safely expended when the surface integrity of the well is completed, leaving the full bore open for use.

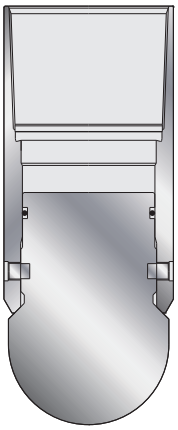
The pump out plug cores are retained in the body of the tool with calibrated shear screws. This allows for adjustments to be made in the field as needed, and a re-entry guide can be incorporated into the tubing shear plug design if required. Both the plug body and core material can be designed to suit customer specifications, and this tool is available in a variety of thread and bore sizes, as well as customizable shear pressure ratings.

Features and Benefits

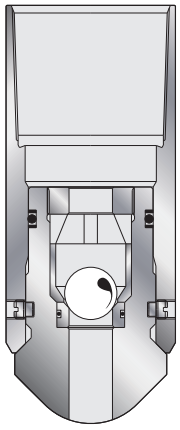
- Run and pulled
- Simple design
- No loading on shear pins when pressured from below
- Typical pump out shear range of between 500 psi and 8000 psi
- Full bore after activation
- Low cost

When Ordering Please Specify

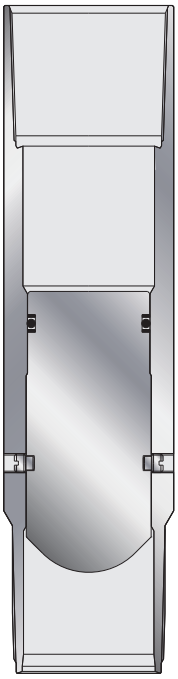
- No-go nipple seal bore size
- Tubing thread
- Tubing material
- Tubing shear plug type
- Required maximum shear pressure
- Bottom end type



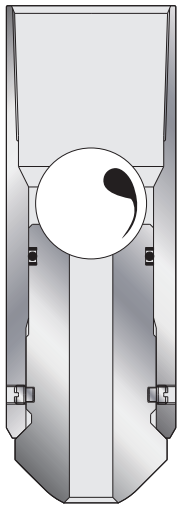
Solid Pump Out Plug
with Bullnose



Pump Out Plug
with integral Standing Valve



Solid Pump Out Plug
with threaded bottom connection



Drop Ball
Pump Out Plug

Injection Valves

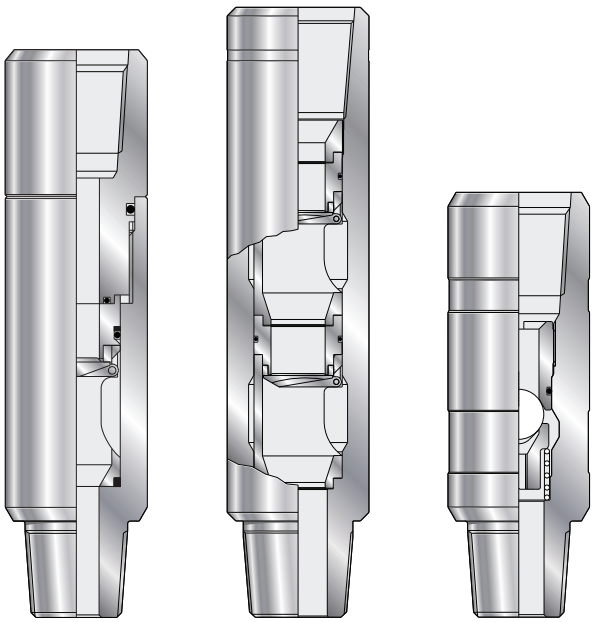
We offer a variety of injection valves for use in water, gas and steam injection operations. These valves are bottom end types specifically designed to prevent the tubing from filling during installation, but will allow the fluid to be injected into the bore as needed. They are available with either ball and seat valves or flapper valves, with single or dual barriers, and come in a wide variety of threads and materials.

Features and Benefits

- Simple design
- Low cost
- The plug body material and core material can be designed to suit customer specifications
- Re-entry guide can be incorporated into the injection valve design
- Available in all tubing sizes from 2 3/8" to 7"

When Ordering Please Specify

- Tubing thread
- Tubing material
- Check valve type
- Dual or single barrier
- Bottom end type



Injection Valves

Wireline Entry Guides

The wireline entry guides are the lowest components in the tubing string and are used for the safe re-entry of wireline tools from the casing into the tubing string. The bottom guide end of the our wireline entry guide is bevel edged and opens to the full internal diameter of the tubing string.

Certain tools, such as the tubing end locator or the sample bailer, are designed to be run out of the end of the tubing to perform their task. The wireline entry guide, with its internal bevel, guides the wireline toolstring back into the tubing. Wireline entry guides are available in all tubing sizes from 2 3/8" to 7".

Features and Benefits

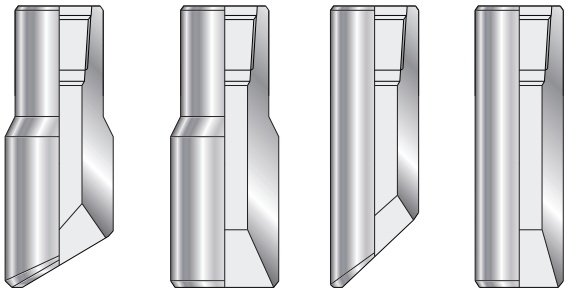
- Simple rugged design
- Lowest component in tubing string
- Guides tools back into tubing safely
- Available in standard muleshoe, standard round end, slimline muleshoe and slimline round end configuration
- Half mule shoe option
- Low cost

When Ordering Please Specify

- Tubing thread
- Tubing material
- Configuration

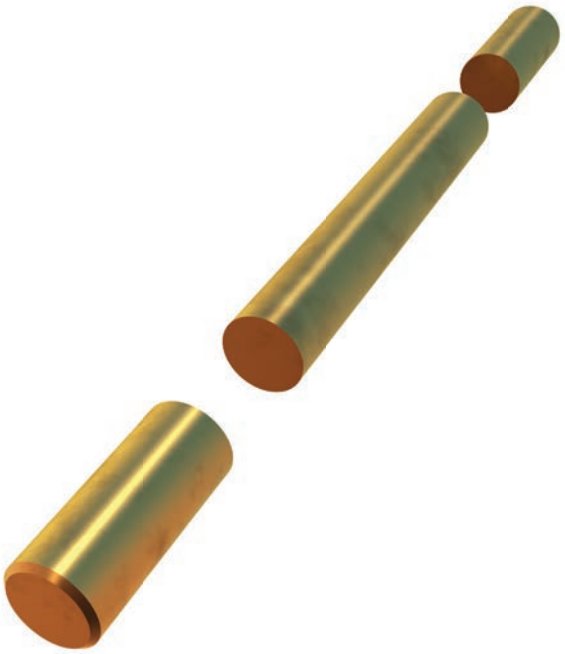
Typical Engineering Data

Tubing		Minimum Casing Size Guide		Maximum	Drift
O.D. (Inches)	Weight (lb/ft)	O.D. (Inches)	Weight (lb/ft)	O.D. (Inches)	I.D. (Inches)
2 3/8	4.70	4 1/2	20	3.063	1.901
2 7/8	6.50	5 1/2	17	4.500	2.347
		7	23	5.875	
3 1/2	9.30	5 1/2	17	4.500	2.867
		7	23	5.875	
4 1/2	12.75	6 5/8	24	5.563	3.833
5 1/2	17.00	7	23	6.050	4.767



Wireline Entry Guides

Additional Reference Information



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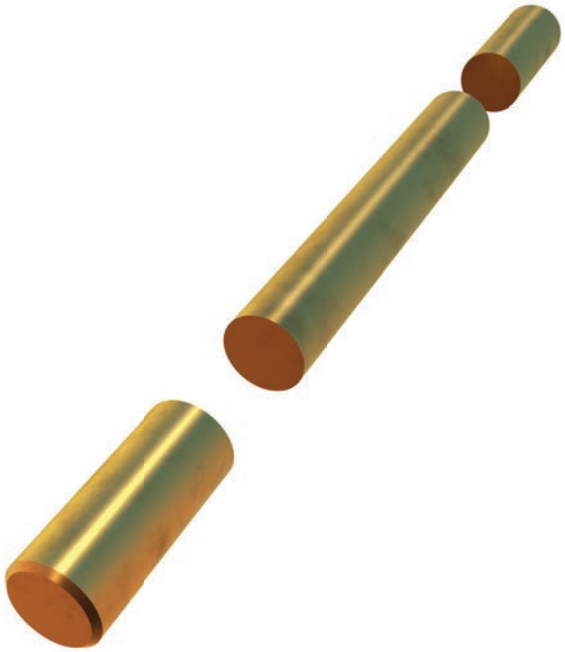
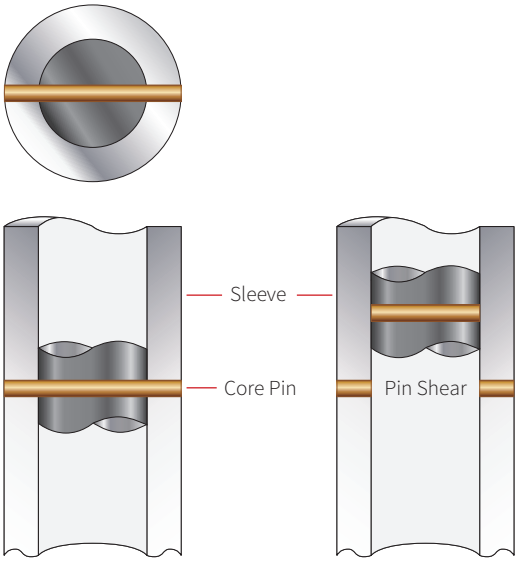
Shear Pin Data

Brass Shear Strength				
			Min	Max
			40,500 psi	43,000 psi
Screw	Diameters	Areas (sq in)	Shear Strength (lbs)	
Size	Minor	Minor	Min	Max
⅛"	0.125"	0.012"	497	528
3⁄16"	0.187"	0.027"	1112	1181
¼"	0.25"	0.049"	1988	2111
5⁄16"	0.312"	0.076"	3096	3288
⅜"	0.375"	0.110"	4473	4749
7⁄16"	0.437"	0.150"	6074	6449
½"	0.500"	0.196"	7952	8443

Mild Steel Shear Strength				
			Min	Max
			58,000 psi	59,400 psi
Screw	Diameters	Areas (sq in)	Shear Strength (lbs)	
Size	Minor	Minor	Min	Max
⅛"	0.125"	0.012"	712	729
3⁄16"	0.187"	0.027"	1593	1631
¼"	0.25"	0.049"	2847	2916
5⁄16"	0.312"	0.076"	4434	4541
⅜"	0.375"	0.110"	6406	6561
7⁄16"	0.437"	0.150"	8699	8909
½"	0.500"	0.196"	11388	11663

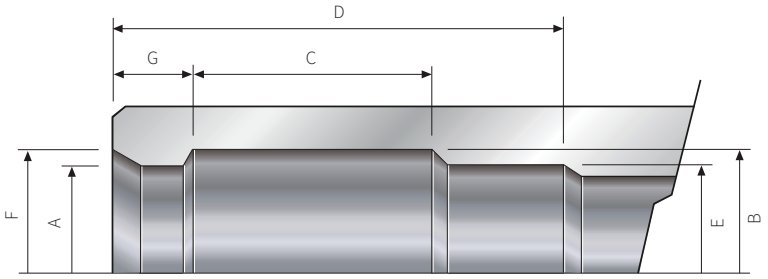
N.B. Figures shown are values shown for shearing across one face, when shearing acoss two faces please double the amount. These figures are representative and were tested under good conditions.



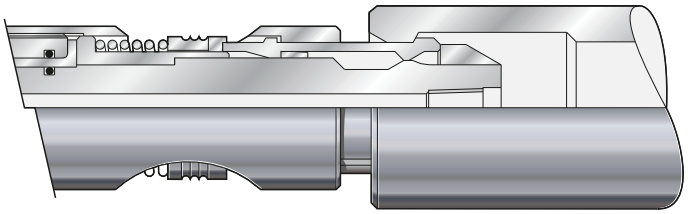


‘GS’ Internal Fishneck Reference Table

‘GS’ Internal Fishneck Reference Table								
Nominal Tool Size	**Tubing Size O.D.**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
1 1/4"	1.66"	0.88”	1.03”	0.97"	1.97"	0.88"	1.00"	0.42"
1 1/2"	1.90"	1.06"	1.22"	1.47"	2.97"	1.06"	1.16"	0.54"
1 1/2"	2.062"	1.06"	1.22"	1.47"	2.97"	1.06"	1.16"	0.54"
2"	2 3/8"	1.38"	1.57"	1.47"	2.97"	1.38"	1.59"	0.54"
2 1/2"	2 7/8"	1.81"	2.00"	1.47"	2.97"	1.81"	1.98"	0.54"
3"	3 1/2"	2.31"	2.50"	1.47"	2.97"	2.31"	2.47"	0.54"
3 1/2"	4"	2.62"	2.81"	1.47"	2.97"	2.62"	2.78"	0.54"
Special 4"	4"	2.75"	2.94"	1.47"	2.97"	2.75"	2.91"	0.54"
4"	4 1/2"	3.12"	3.31"	1.47"	2.97"	3.12"	3.35"	0.54"
5"	5 1/2"	4.00"	4.19"	1.47"	2.97"	4.00"	4.16"	0.54"
5.62"	5 5/8"	4.75"	5.00"	1.47"	2.97"	4.75"	4.98"	0.54"
7"	7"	5.38"	5.62"	1.47"	2.97"	5.38"	5.60"	0.54"
7 3/4"	7 3/4"	6.25"	6.50"	1.47"	2.97"	6.25"	6.48"	0.54"



‘GS’ Running/Pulling Internal Fishneck Dimensions



Slickline Reference Information

Elmar Universal Pulling Tools

Nominal Size	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"
Part Number	B118-005	B118-007	B118-001	B118-002	B118-073	B118-118	B118-011
Corresponding To	JDC, SM	JDS, JUS, SS, RS, SB	JDS, JUC, RB, SB, JDC, RS, SS, RJ, JUL, JUS	JDS, JUC, RJ, JDC, RB, SB, JUS, RS, SS	JDS, JUC, RJ, JDC, RB, SB, JUS, RS, SS	SB, RB,RS	JDS, JUS, JDC, RB, JUS, RS, SB
Max O.D. 1.29"	1.29"	1.437"	1.86"	2.25"	2.72"	3.20"	3.75"
Fish Neck on Tool	1.187"	1.187"	1.375"	1.375"	1.750"	2.313"	2.313"
Thread Connection	15/16-10UN	15/16-10UN	15/16-10UN	15/16-10UN	1 1/16-10UN	1 1/16-10UN	1 9/16-10UN
To Engage Fish Neck	0.875"	1.187"	1.375"	1.750"	2.313"	2.75"	3.125"
Weight	2Kgs	2kgs	4kgs	5kgs	9kgs	12kgs	13kgs
Length (Shear-down)	16.75"	17.04"	22.45"	23.61"	23.75"	21.76"	24.00"
Length (Shear-up) Short Reach	NA	NA	19.02"	20.28"	20.55"	18.44"	20.73"
Length (Shear-up) Med Reach	15.00"	15.05"	19.82"	21.08"	21.40"	19.14"	21.38"
Length (Shear-up) Long Reach	15.25"	15.60"	20.37"	21.58"	21.85"	19.84"	22.00"

Breech Lock Connection

Connection	Standard Service			H_2S Service		
	SWL (lbs)	Yield (lbs)	UTS (lbs)	SWL (lbs)	Yield (lbs)	UTS (lbs)
1 1/2"	46,280	51,420	65,090	33,650	37,390	47,330
1 7/8"	61,420	68,250	86,390	44,670	49,630	62,820
2 1/2"	120,390	133,770	169,330	87,550	97,280	123,140

HDC Connection

Connection	Standard Service			H_2S Service		
	SWL (lbs)	Yield (lbs)	UTS (lbs)	SWL (lbs)	Yield (lbs)	UTS (lbs)
1 1/2"	58,970	65,520	84,000	41,810	46,450	58,800
1 7/8"	91,960	102,180	131,000	65,200	72,440	91,700
2 1/2"	164,970	183,300	235,000	116,960	129,950	164,500

QLS Connection

Connection	Standard Service			H_2S Service		
	SWL (lbs)	Yield (lbs)	UTS (lbs)	SWL (lbs)	Yield (lbs)	UTS (lbs)
1 1/2"	47,420	59,280	76,000	37,350	41,500	53,200
1 7/8"	77,200	96,520	127,000	54,050	67,560	88,900
2 1/2"	120,580	150,720	192,000	84,400	105,500	134,400

Abbreviations

D = diameter	π = Pi = 3.142	r = radius	SG = Specific Gravity
BHP – Bottom Hole Pressure		psi = pounds per square inch	
ft = feet	in = inch	m = meter	lbs = pounds
Fluid Gradient = psi/ft		Fluid Density = lbs/galloninch	
PI = Productivity Index		BBLS – Barrels	
KPa – Kilo Pascals – KN/m^2			

Selection of NOV 'A' Series Lock Sizes

Tubing size	Nipple Seal Dia. Nom. Lock Size	ANN Nipple No-Go	AAL Lock Max. O.D.	ATL Lock Max. O.D.
2 7/8"	2.250"	2.135"	2.237"	2.300"
2 7/8"	2.312"	2.205"	2.300"	2.350"
3 1/2"	2.562"	2.375"	2.550"	2.610"
3 1/2"	2.750"	2.653"	2.735"	2.790"
3 1/2"	2.812"	2.715"	2.790"	2.865"
4"	3.125"	2.980"	3.105"	3.212"
4"	3.215"	3.077"	3.195"	3.285"
4"	3.312"	3.145"	3.290"	3.400"
4"	3.437"	3.260"	3.420"	3.550"
4 1/2"	3.562"	3.450"	3.545"	3.607"
4 1/2"	3.625"	3.538"	3.610"	3.685"
4 1/2"	3.688"	3.550"	3.678"	3.735"
4 1/2"	3.750"	3.663"	3.735"	3.790"
5"	3.812"	3.725"	3.795	3.865"
5"	4.215"	4.103"	4.205"	4.260"
5 1/2"	4.313"	4.205"	4.302	4.400"
5 1/2"	4.437"	4.330"	4.420"	4.495"
5 1/2"	4.500"	4.393"	4.485"	4.560"
5 1/2"	4.562"	4.454"	4.535"	4.615"
5 1/2"	4.625"	4.520"	4.598"	4.700"
7"	4.750"	4.643"	4.735"	4.810"
7"	5.625"	5.515"	5.610"	5.700"
7"	5.812"	5.725"	5.800"	5.900"
7"	5.875"	5.780"	5.860"	5.950"
7"	5.984"	5.877"	5.970"	6.050"

Slickline Reference Information

Typical Tubing Size/Nipple Size for X and XN Nipples				
Tubing Size	**Tubing Weight**	**Drift**	**Seal Bore**	**XN No-Go**
2 3/8"	4.6 lb/ft	1.901"	1.875"	1.791"
2 7/8"	6.4 lb/ft	2.347"	2.313"	2.205"
3 1/2"	10.7 lb/ft	2.797"	2.750"	2.635"
3 1/2"	9.2 lb/ft	2.867"	2.813"	2.666"
4.00"	9.5 lb/ft	3.423"	3.313"	3.135"
4 1/2"	11.6 lb/ft	3.875"	3.813"	3.725"
5 1/2"	26.0 lb/ft	4.423"	4.313"	3.987"
5 1/2"	20.0 lb/ft	4.653"	4.562"	4.455"

Typical Tubing Size/Nipple Size for R and RN Nipples				
Tubing Size	**Tubing Weight**	**Drift**	**Seal Bore**	**RN No-Go**
2 3/8"	5.8 lb/ft	1.773"	1.710"	1.565"
2 3/8"	4.6 lb/ft	1.901"	1.781"	1.645"
2 7/8"	8.6 lb/ft	2.165"	2.125"	1.942"
2 7/8"	7.8 lb/ft	2.229"	2.188"	2.015"
2 7/8"	6.4 lb/ft	2.347"	2.313"	2.136"
3 1/2"	12.7 lb/ft	2.625"	2.562"	2.334"
3 1/2"	7.7 lb/ft	2.943"	2.875"	2.675"*
4.00"	13.4 lb/ft	3.351"	3.125"	2.907"
4.00"	11.6 lb/ft	3.303"	3.250"	3.088"
4 1/2"	18.8 lb/ft	3.515"	3.437"	3.260"
4 1/2"	15.1 lb/ft	3.701"	3.688"	3.456"
4 1/2"	12.6 lb/ft	3.833"	3.813"	3.725"
5.00"	18.0 lb/ft	4.151"	4.125"	3.912"
5 1/2"	23.0 lb/ft	4.369"	4.313"	3.987"
5 1/2"	20.0 lb/ft	4.653"	4.562"	4.445"
7"	35.0 lb/ft	5.879"	5.875"	5.750"
7"	32.0 lb/ft	5.969"	5.963"	5.770"

Conversion Factors		
Multiply	**By**	**To Obtain**
Centimetre	0.3937	Inches
Foot	0.3048	Metres
Gallon	0.0238	Barrels
Gallon	3.785	Litres
Inch	2.54	Centimetres
Metre	3.281	Feet
Kilogram	2.2046	Pounds
Kilometre	0.6214	Miles
PSI	6.895	Kilopascal
Kilopascal	0.1451	PSI
Gallon US	0.8327	Gallon (Imperial)
PSI	0.0703	Kgs/sq. cm.
Kgs/sq. cm.	14.22	PSI
Barrels	0.15899	Cubic Meters

Wire Fall Back Per 1000ft					
	Tubing size				
Wire size	2 7/8"	3 1/2"	4 1/2"	5 1/2"	7"
0.092"	12	16	29	49	108
0.108"	11	15	27	40	90
0.125"	5	7	12	20	45
0.160"	3	4	7	12	27
3/16"	15	20	35	50	100
7/32"	20	25	45	65	125

Useful Formulas

1. Fresh Water
   Weight: - 8.33 pounds/US gallon
   Density: - 62.4 pounds/cu. ft. or 1000 kg/M3 or 1 kg/litre
   Gradient: - 0.433 psi/ft.
   Specific gravity: - 1
   API gravity: - 10˚
2. Circumference of a circle = π diameter (π=d) (π=3.14)
   Diameter of a circle = circumference ÷ π $(\frac{C}{\pi})$
   Radius of a circle = diameter $(\frac{d}{2})$
   Area of a circle = 0.7854 x d^2
3. Volume of a rectangular tank = Length x Width x Height (L x W x H)
4. Volume of a sphere = Diameter cubed x 0.5236 (d^3 x 0.5236)
5. Volume of circular tank = area x height
6. Weight per ft. of round bar stock or stem = diameter squared x 8 ÷ 3 $(\frac{d^2 x 8}{3})$
7. Rule of thumb for finding the fill up volume of any size pipe is the inside diameter squared equals barrels per 1000 ft. (ID2 = bbls/1000 ft.)
8. The volume of any size pipe is d^2 x 0.00009714 x depth = bbls
9. Centigrade x 1.8 + 32˚ = F˚ centigrade = fahrenheit - 32˚x 0.5555
10. 1 pascal = 1 newton/square metre
11. Force (pounds) = pressure (psi) x area (sq.in.)
12. Approximate hydrostatic head = 0.052 x wt/gal x depth in ft. (annulus calculation)
13. True hydrostatic head = gradient x true vertical depth
14. (Using S.I. units) approximate hydrostatics head in Kpa = kg/L x depth in metres x 9.81
15. To convert API gravity to specific gravity/relative density = 141.5 ÷ (131.5 + ˚API) = SG
16. To convert specific gravity to gradient = 141.5 ÷ SG - 131.5 = ˚API
17. To convert specific gravity to gradient = SG x 0.433
18. Drawdown = static BHP - flowing BHP
19. Productivity Index (PI) = bbls per day ÷ (static BHP - flowing BHP)

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