

# Thru Tubing Technology

Product Catalogue



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## Thru-Tubing Technology Product Catalogue

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## Chosen for experience and expertise

A partner of choice. With 40 years of intervention industry expertise, Altus Intervention is a trusted partner to many of the world's leading energy companies.

We have an extensive range of equipment and technologies with highly-skilled personnel available for deployment from four regional hubs.

### Making Intervention Smarter

Altus Intervention is the well intervention specialist with a difference.

We have the experience, technologies and techniques like no other, enabling us to work smarter, adapting and delivering real change operationally and commercially.

### Thru Tubing Solutions

Our experienced technical planning team can deliver advanced downhole solutions by utilising an extensive inventory of thru-tubing products. When deployed by the Altus Intervention coiled tubing conveyance service, a truly turnkey intervention proposition can offer clients cost-effective remedial intervention results.



# Coiled Tubing Connectors

Thru-Tubing Technology

Thru-Tubing Technology <sup>TM</sup>Coiled Tubing Connectors

## Slip Type Connector

### FEATURES

- External connector engages with the outer diameter of the coiled tubing
- Uninterrupted bore for drop ball operations
- Slip ensures the axial load is transferred into the tubing, increasing the strength of the connector grip
- Comprises a top and bottom-sub which contains the slip and spacer ring
- Available in all sizes of coil
- Locking screws prevent back off of the service connection
- Anti-rotation screws prevent connector rotating once assembled
- Elastomeric seals

### BENEFITS

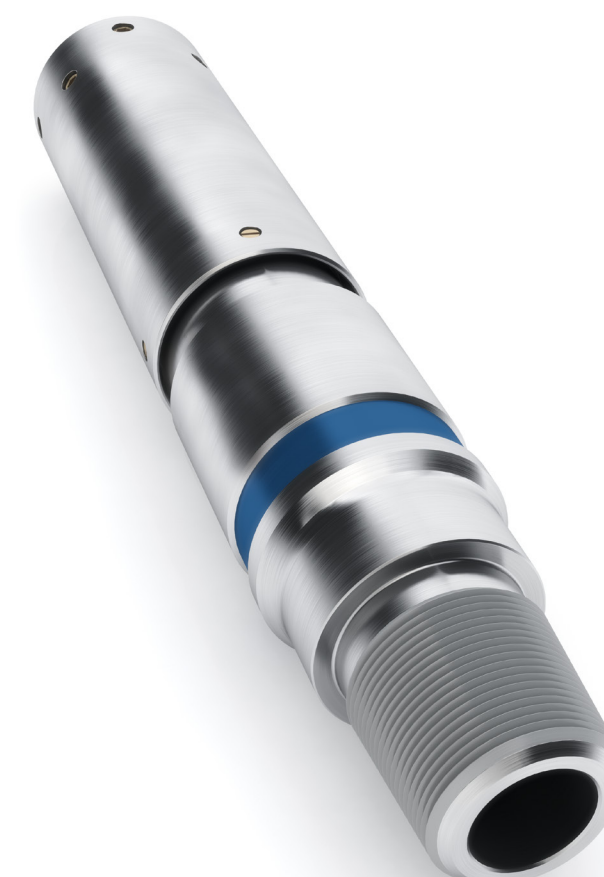
- Minimal coil dress required
- Field redressable

The Slip Type Connector is an external type connector that engages the outer diameter of the coil tubing.

The slip ensures that axial load is transferred into the tubing, increasing the strength of the connector grip on the tubing.

The connector design provides an uninterrupted bore for drop ball operations while locking screws prevent the service connection backing off and the anti-rotation screws prevent the coil tubing rotating inside the connector once assembled.

The Slip Type Coil Connector comprises of a top and bottom-sub, which contains the slip and spacer ring. The dressed coil is simply stabbed into the connector and the bottom-sub rotated with an overpull applied to set the slip. Finally, the bottom-sub is made up and the lock and anti-rotation screws fitted.



Tool Size	1-3/4"	2 - 1/8"	2-1/4"	2-7/8"	2-7/8"	3-1/8"
Coil Size (in)	1-1/4	1-1/2	1-3/4	1-3/4	2	2-3/8
End Connection	1-1/4" AMMT	1-1/2" AMMT	1-1/2" AMMT	2-3/8" PAC	2-3/8" PAC	2-3/8" PAC
Tensile Strength - Standard (lbs)	42,000	62,300	53,800	150,100	110,800	136,700
Tensile Strength - H2S (lbs)	30,500	45,300	39,100	109,100	80,500	99,400
ID (in)	0.750	1.000	1.000	1.375	1.375	1.375
Working Pressure (psi)	10,000	10,000	10,000	10,000	10,000	10,000

These values are obtained at the weakest point of the connector. Coil tubing strengths will vary depending upon the coil tubing size and material used.



Dimple-On Connector



FEATURES

- Robust and cost effective means of attaching a BHA to the coil
- Available in sizes 1-1/4 inches to 2-7/8 inches
- One-piece design
- Provides superior mechanical strength

BENEFITS

- Two O-ring grooves provide added security in high-pressure applications
- Dimple design provides torque-through capabilities
- Reusable connectors furnished with standard O-rings simplifying field redress

The Dimple-On Connector is a one-piece design providing a robust, cost effective means of attaching a BHA to the coil.

The one-piece design incorporates two O-ring grooves providing added security in high-pressure applications. The Dimple-On Connector has superior mechanical strength comparable with tubing with the dimple design enabling torque-through capability.

Coil Tubing OD	1-1/4"	1-1/2"	1-3/4"	2"	2-3/8"	2-7/8"
Wall Thickness	TBA	TBA	TBA	TBA	TBA	TBA
OD (in)	TBA	TBA	TBA	TBA	TBA	TBA
End Connection	TBA	TBA	TBA	TBA	TBA	TBA
ID (in)	0.500	0.688	0.750	1.000	1.000	1.375
Tensile Strength (lbs)	50,160	57,860	77,305	107,910	143,990	245,931
Length (ft)	0.67	0.67	0.67	0.67	0.67	0.67
Working Pressure (psi)	10,000	10,000	10,000	10,000	10,000	10,000

Roll-On Connector

FEATURES

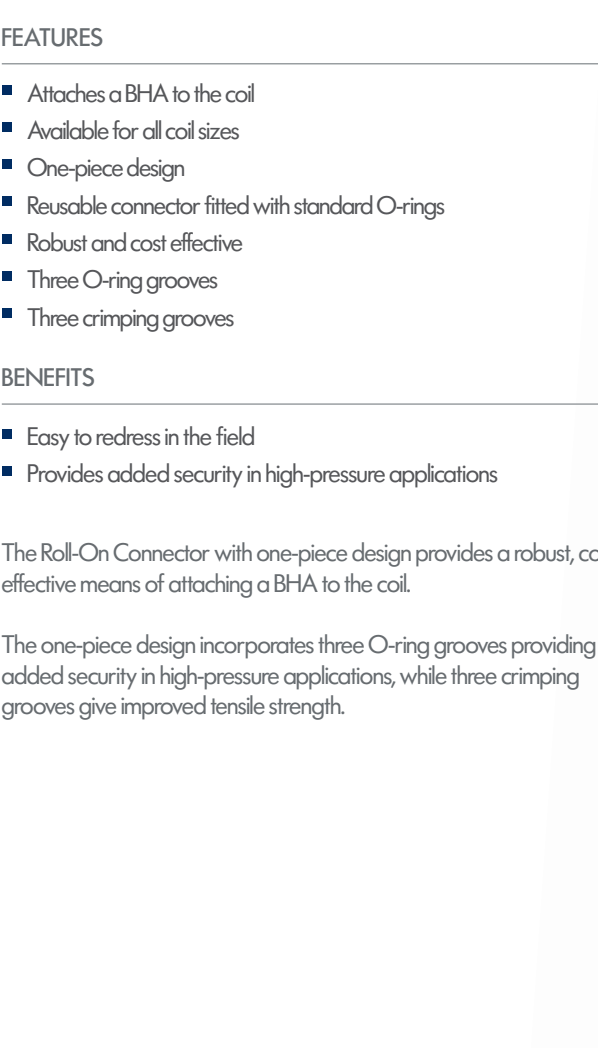
- Attaches a BHA to the coil
- Available for all coil sizes
- One-piece design
- Reusable connector fitted with standard O-rings
- Robust and cost effective
- Three O-ring grooves
- Three crimping grooves

BENEFITS

- Easy to redress in the field
- Provides added security in high-pressure applications

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

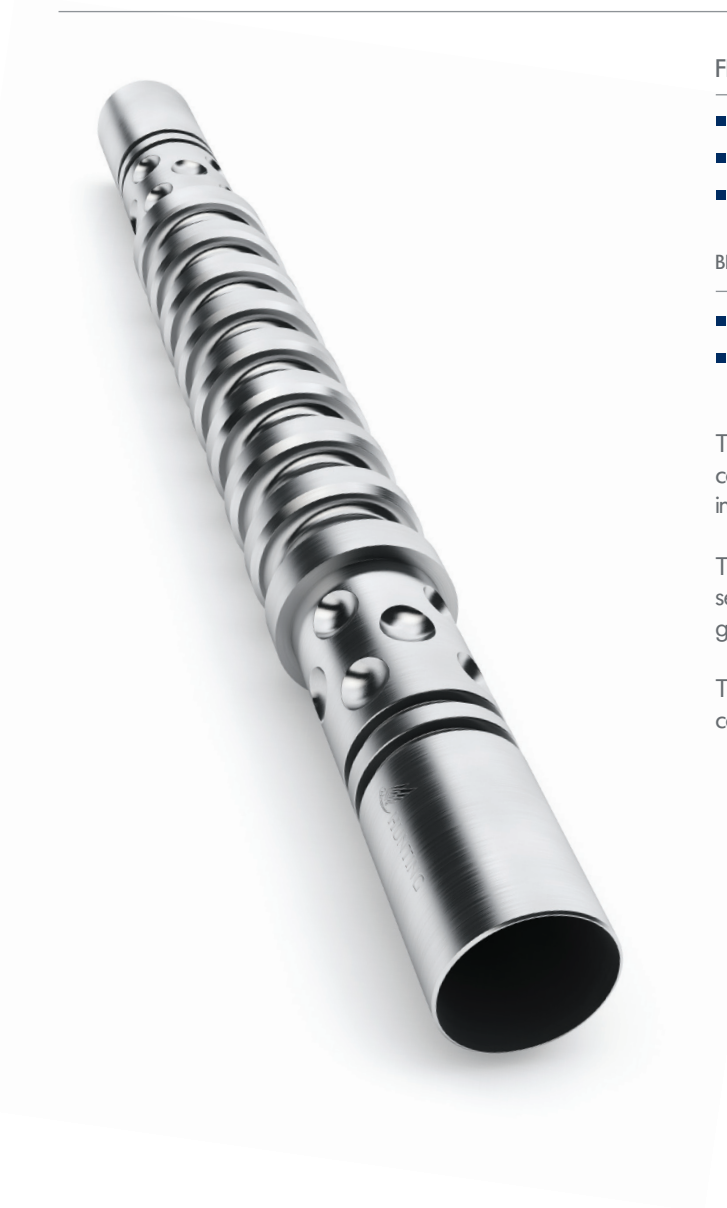
The one-piece design incorporates three O-ring grooves providing added security in high-pressure applications, while three crimping grooves give improved tensile strength.



Coil Tubing OD	1-1/4"	1-1/2"	1-3/4"	2"	2-3/8"	2-7/8"
Wall Thickness	TBA	TBA	TBA	TBA	TBA	TBA
OD (in)	TBA	TBA	TBA	TBA	TBA	TBA
End Connection	TBA	TBA	TBA	TBA	TBA	TBA
ID (in)	0.500	0.688	0.750	1.000	1.000	1.375
Tensile Strength (lbs)	23,870	38,390	69,080	77,440	178,860	165,110
Length (ft)	0.67	0.67	0.67	0.67	0.67	0.67
Working Pressure (psi)	10,000	10,000	10,000	10,000	10,000	10,000



Spoolable Connector



FEATURES

- Robust, cost effective joining of two sections of coil
- Available in coil sizes from 1-1/4 inches to 2-7/8 inches
- One-piece design

BENEFITS

- Available in both dimple-on and roll-on
- Available for all coil size

The Spoolable Connector with one-piece design provides a robust, cost effective means of joining two sections of coil. They are available in both dimple-on and roll-on styles.

The roll-on design incorporates three O-ring grooves providing added security in high-pressure applications. There are also three crimping grooves to give improved tensile strength.

The Spoolable Connector is available for any combination of coil tubing.

Coil Tubing OD	1-1/2"	1-3/4"	2"	2-3/8"	2-7/8"
Wall Thickness	TBA	TBA	TBA	TBA	TBA
ID (in)	0.688	0.750	1.000	1.313	1.750
Tensile Strength (lbs)	38,390	51,000	77,440	144,800	165,110
Length (ft)	1.54	1.46	1.46	1.54	1.56
Working Pressure (psi)	5K	5K	5K	5K	5K

Properties quoted for standard service materials.





Heavy Duty Motorhead Assembly

# Motorhead Assemblies

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FEATURES

- Compact tool string suitable for H2S and Standard Service Environments
- Dual flapper check valve assembly provides a uni-directional barrier between the well and above tubing
- A ball activated disconnect facility
- Dual operation circulating sub
- A torque thru facility
- Rupture disc included as standard
- Impact, shock loading, torque and straight pull tolerant design
- Large thru bore
- Standard internal GS profile

BENEFITS

- Fully adjustable disconnect and circulating shear values
- Restricted rig up heights

The Motorhead Assembly is a compact tool string that incorporates a variety of features including:

- <sup>TM</sup> dual flapper check valve assembly
- <sup>TM</sup> ball activated disconnect facility
- <sup>TM</sup> and a dual operation circulating sub

The tool also features a torque through facility, in addition to a standard internal GS fishing neck profile.

The dual flapper check valves provide a uni-directional barrier between the well and the tubing above. The disconnect facility provides a means of disconnecting from a stuck tool string by simply dropping a ball.

The circulating sub introduces a flow path from the tool’s inner diameter to the annulus. However, if for any reason circulation through the tool string is lost, a rupture disc option is included as standard.



Tool Size	1 - 11/16"	1 - 3/4"	2 - 1/8"	2 - 7/8"
End Connection	1" AMMT	1-1/4" AMMT	1-1/2" AMMT	2-3/8" PAC
Tensile Strength (lbs)	33,860	47,000	62,000	120,300
ID (in)	0.406	0.406	0.563	0.688
Length (ft)	2.30	2.21	2.38	2.73
Drop Ball Size (Disc. in)	0.500	0.500	0.750	0.875
Drop Ball Size (Circ. in)	0.438	0.438	0.625	0.750
Fish Neck Size	1-1/2" GS	1-1/2" GS	2" GS	3" GS
Working Pressure in (psi)	10,000	10,000	10,000	10,000



# Check Valves

Thru-Tubing Technology

## Dual Flapper Check Valve

### FEATURES

- Provides a means of adding a uni-directional barrier to BHA
- The flapper provides a pressure tight barrier in one direction but enables flow in the opposite direction
- Designed to open fully to give a large uninterrupted bore through the tool for drop ball activated subs

### BENEFITS

- Two removable flapper cartridges
- Field redressable

The Dual Flapper Check Valve provides a means of adding a uni-directional barrier to a BHA.

The flappers provide a pressure-tight barrier in one direction, while enabling flow in the opposite direction.

The Dual Flapper Check Valve consists of a two-piece housing assembly that contains two removable flapper cartridges. The flappers are spring loaded in the closed position and are designed to open fully to give a large, uninterrupted bore through the tool.

The tool is easily redressed and the orientation of the flappers can be reversed depending on operational requirements.



Tool OD	1 - 11/16"	2 - 1/8"	2 - 7/8"
End Connection	1" AMMT	1 - 1/2" AMMT	2 - 3/8" PAC
Tensile Strength (lbs)	45,000	77,000	145,000
ID (in)	0.750	0.813	1.030
Length (ft)	1.09	0.98	1.15
Working Pressure (psi)	10,000	10,000	10,000



# Disconnects

Thru-Tubing Technology

Thru-Tubing Technology <sup>TM</sup> Disconnects

## Heavy Duty Disconnect

### FEATURES

- Provides a means to disconnect the upper BHA from a stuck fish via a drop ball and hydraulic pressure
- Impact, shock loading, torque and straight pull tolerant design
- Operates below jars and impact hammers
- Standard internal GS profile

### BENEFITS

- Fully adjustable disconnect values
- Burst disc facility
- Field redressable

The Heavy Duty Disconnect is a torque through disconnect that is released via a drop ball and hydraulic pressure.

This tool enables the operator to drop a ball and pressure-up in order to disengage from a stuck fish or BHA. The tool can handle straight pull, impact, jarring and torque loads without affecting the release mechanism.

This tool is designed to operate below jars or impact hammers. When pump pressure is applied, the drop ball lands out on a ball seat, and screws shear allowing the release piston to move down, de-supporting the threaded collet fingers, thus allowing the upper half of the assembly, complete with drop ball to be retrieved to surface. A standard internal fishing neck is left looking up for future retrieval operations.

The tool can be fitted with a burst disc in the Bottom-sub in order to re-establish circulation if required.



Tool OD	1 - 11/16"	2 - 1/8"	2 - 7/8"
End Connection	1" AMMT	1 - 1/2" AMMT	2 - 3/8" PAC
Tensile Strength (lbs)	33,860	62,000	120,300
Ball Seat ID (in)	0.344	0.469	0.560
Length in (ft)	1.44	1.60	1.86
Drop Ball Size (in)	0.375	0.500	0.625
Fish Neck Size	1-1/2" GS	2" GS	3" GS
Working Pressure (psi)	10,000	10,000	10,000

Properties quoted for sour service materials.



## Dual Circulating Sub

### FEATURES

- Designed as a circulating safety component within the BHA
- Design features include a shear out ball seat coupled with a burst disc

### BENEFITS

- Field redressable
- Simple drop ball design to activate

The Dual Circulating Sub is designed as a circulating safety component within the BHA.

The design features a Shear-Out Ball Seat coupled with a Burst Disc.

In the event that circulation is lost during a coiled tubing operation, an increase in applied pressure to the tubing will burst the disc, which will regain a sufficient circulation rate to pump a ball.

Pressure can then be applied to the tubing to shear the shear screws and shift the piston to regain maximum circulation.



# Dual Function Circulating Subs

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Tool Size	1 - 11/16"	2 - 1/8"	2 - 7/8"
End Connection	1" AMMT	1 - 1/2" AMMT	2 - 3/8" PAC
Tensile Strength (lbs)	57,217	77,305	245,931
Ball Seat ID (in)	0.375	0.438	0.563
Drop Ball Size (in)	0.438	0.500	0.625
Length in (ft)	0.54	0.54	0.58
Working Pressure (psi)	10,000	10,000	10,000





# Joins & Stems

Thru-Tubing Technology

## (Carsac) - Torque Thru Quick Connector

### FEATURES

- Self-aligning tool string connector capable of withstanding high degrees of torque in both directions
- Eliminates the problems of connecting the BHA when there is no means of rotation
- Simple robust design

### BENEFITS

- Field redressable

The Torque Thru Quick Connector is a self-aligning tool string connector, capable of withstanding high degrees of torque in both directions.

It eliminates the problems of connecting the coiled tubing when there is no means of rotating either the tubing or the BHA.

The Torque Thru Quick Connector locking taper feature allows each section of the tool string to simply 'stab-in' and centralize before the torque drive teeth positively engage into the female lower sub.

The primary locking collar is then screwed down to lock the two sections together. The secondary locking collar can then be screwed down to secure the joint and prevent the primary collar from backing off.



Tool OD	1 – 11/16"	2 - 1/8"	2 - 7/8"
End Connection	1" AMMT	1-1/2" AMMT	2-3/8" PAC
Tensile Strength (lbs)	30,000	77,305	105,000
ID (in)	0.560	0.875	1.000
Length (ft)	1.54	1.58	1.60
Working Pressure (psi)	10,000	10,000	10,000



Torque Thru Knuckle Joint



FEATURES

- The Torque Thru Knuckle Joint provides a full 15-degree angular deviation and internal pressure seal
- The ball and socket of the knuckle have keys that prevent rotation, while still allowing full angular movement
- Provides additional flexibility in the tool string when positioned above the manipulation tool

BENEFITS

- Can be used with long tool strings
- Torque thru capability
- The additional flexibility allows tools to run in restricted or highly deviated wells

The Torque Thru Knuckle Joint provides a full 15-degree angular deviation and internal pressure sealing throughout the full deviation of the tool.

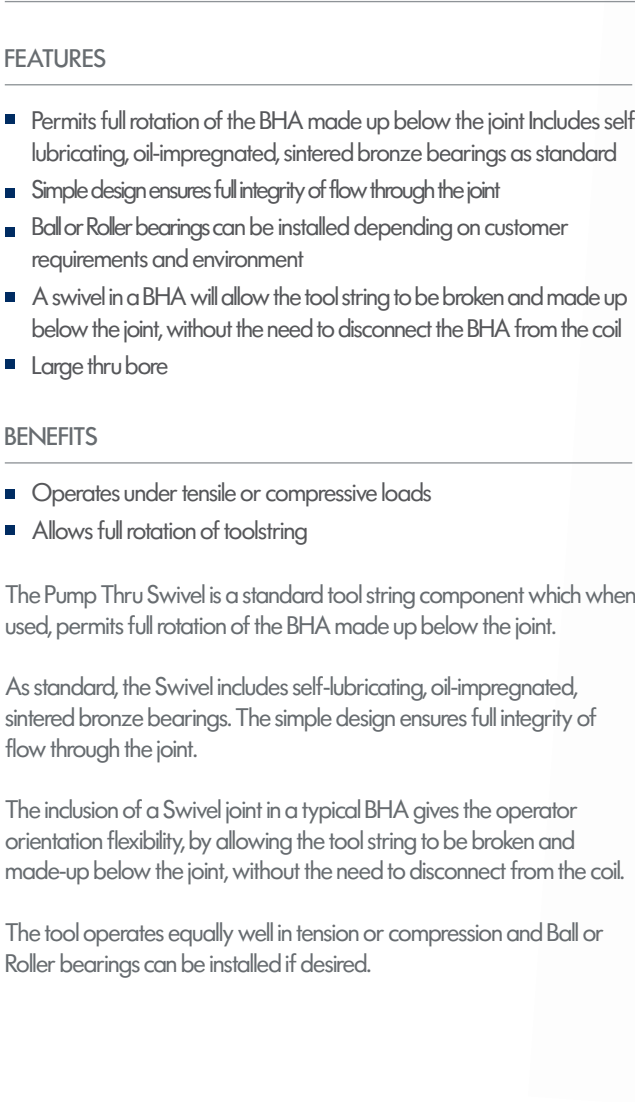
The ball and socket of the knuckle have keys that prevent rotation, while still allowing full angular movement.

The Torque Thru Knuckle Joint can provide additional flexibility in the tool string when positioned above the manipulation tool. This additional flexibility is often necessary when the bore of the hole, which the tool is running through, is restricted and/or highly deviated.

Multiple Torque Thru Knuckle Joints can be incorporated in particularly long tool strings.

Tool OD	1-11/16"	2 - 1/8"	2 - 7/8"
End Connection	1" AMMT	1-1/2" AMMT	2-3/8" PAC
Tensile Strength (lbs)	30,000	40,000	100,000
ID (in)	0.406	0.530	0.750
Length (ft)	1.10	1.00	1.24
Working Pressure in (psi)	5,000	5,000	5,000

Pump Thru Swivel



FEATURES

- Permits full rotation of the BHA made up below the joint Includes self lubricating, oil-impregnated, sintered bronze bearings as standard
- Simple design ensures full integrity of flow through the joint
- Ball or Roller bearings can be installed depending on customer requirements and environment
- A swivel in a BHA will allow the tool string to be broken and made up below the joint, without the need to disconnect the BHA from the coil
- Large thru bore

BENEFITS

- Operates under tensile or compressive loads
- Allows full rotation of toolstring

The Pump Thru Swivel is a standard tool string component which when used, permits full rotation of the BHA made up below the joint.

As standard, the Swivel includes self-lubricating, oil-impregnated, sintered bronze bearings. The simple design ensures full integrity of flow through the joint.

The inclusion of a Swivel joint in a typical BHA gives the operator orientation flexibility, by allowing the tool string to be broken and made-up below the joint, without the need to disconnect from the coil.

The tool operates equally well in tension or compression and Ball or Roller bearings can be installed if desired.

Tool OD	1-3/4"	2-1/8"	2-7/8"
End Connection	1-1/4" AMMT	1-1/2" AMMT	2-3/8" PAC
Tensile Strength (lbs)	35,000	37,000	100,000
ID (in)	0.438	0.500	1.030
Length (ft)	1.05	1.00	1.20
Working Pressure (psi)	5,000	5,000	5,000



Sleeve Stabilizer

FEATURES

- Used to centralize the coiled tubing BHA at points within the wellbore where problems of centralization occur
- Assist in providing centralization, allowing easier location of tools during fishing
- Provides general stability in the tubing
- Full through bore
- One body mandrel can accommodate a range of sleeve diameters

BENEFITS

- Allows the assembly to rotate while being supported by external flutes and eliminates possible wear
- Field redressable

The Sleeve Stabilizer is used to centralize the coiled tubing BHA at points within the wellbore where problems of centralization are paramount.

The Sleeve Stabilizer is designed to be included as part of the coiled tubing work string to assist in providing centralization, allowing easier location of tools during fishing and/or to provide general stability in the tubing.

The Sleeve Stabilizer has a full flow through bore allowing the passage of drop balls. The advantage of this tool is that it allows the assembly to rotate while being supported by the external flutes, thus eliminating possible wear.



# Toolstring Stabilizers

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Tool Size	2 - 1/8"	2 - 7/8"
End Connection	1 - 1/2" AMMT	2 - 3/8" PAC
Tensile Strength (lbs)	77,305	245,931
ID (in)	1.00	1.38
Length (ft)	2.08	1.83
Working Pressure (psi)	10,000	10,000



# Nozzles

Thru-Tubing Technology

Thru-Tubing Technology™ Nozzles

## Bull Nose Jetting Nozzles

### FEATURES

- Downhole jetting
- Cement placement operations
- Multi-port nozzle giving full radial coverage

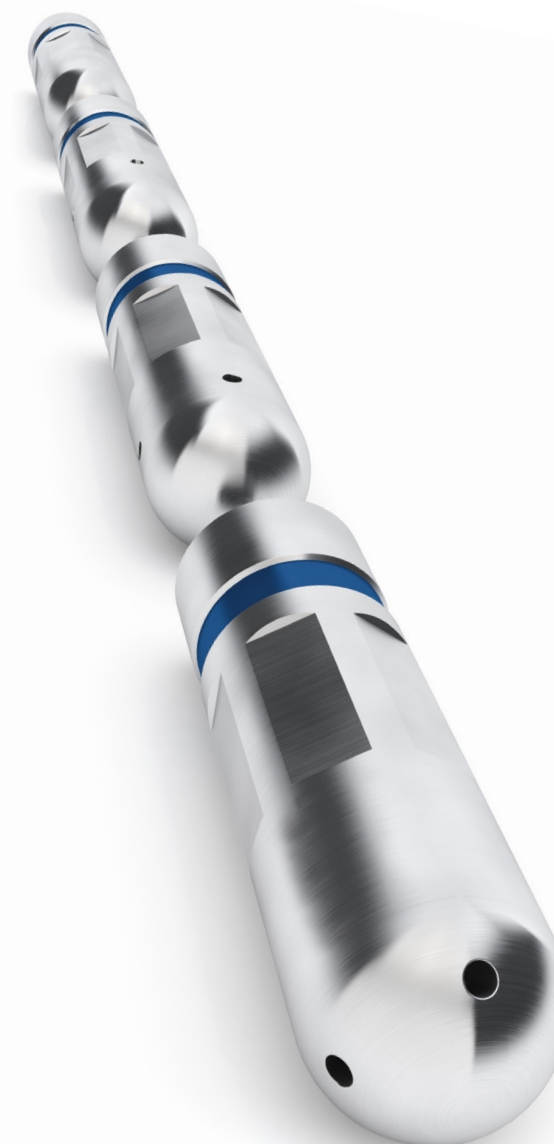
### BENEFITS

- Various port configurations for different operations
- A single large port for cement placement operations
- Robust design
- Design to suit all operational requirements

The Bull Nose Jetting Nozzles are available in both single or multiport designs.

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

The multi-port nozzle is designed to give full radial coverage over the completion tubular during well intervention operations, while the porting can be manufactured in any combination of up, down and side jetting with port sizes to match the optimum performance for each size of nozzle.





Variable Jetting Sub



FEATURES

- Multi-ported nozzle for clean out, scale removal and other jetting operations
- Single piece body and multiple tapped holes positioned at various angles within the sub
- Holes accommodate hardened jetting nozzles or blank plugs
- Flexibility to use or blank off specific ports; use for backward, side, downward or multiple jetting applications

BENEFITS

- Flexible configuration for varying operations
- Multiple jet direction
- Robust design
- Field adjustable
- Various nozzle sizes and number of ports

The Variable Jetting Nozzle is a multi-ported sub for clean out, scale removal and other such jetting operations.

Consisting of a single piece body the Variable Jetting Nozzle has multiple tapped holes positioned at various angles within the sub. These holes accommodate hardened jetting nozzles or blank plugs, giving the flexibility to use or blank off specific ports, so the tool can be used for backward, sideward, downward or for multiple jetting applications.

A variety of replaceable nozzle sizes are available so that the required jetting flow area can be adjusted in the workshop or in the field should operations dictate.

Spincat Wash Tool

FEATURES

- Simple self-rotating high-pressure jetting action for downhole tubular cleaning
- Nozzle sizes from 0.090-inches – 0.155-inches available
- Temperatures up to 200℃
- Up to thirty per cent HCL and Nitrogen injection
- Self-rotating assembly
- Compatible with acids and other corrosive fluids

BENEFITS

- High-pressure fully utilising pump power
- Long-lasting attack tips that can outlast tungsten carbide jets

The Spincat family of tools provides a simple, self-rotating high-pressure jetting action for downhole tubulars.

Maximised jet power is delivered to the tubing walls by rotational speed controlled by the viscous fluid governor. By using only a few rotating jets, this results in hard-hitting power.

The replaceable jets are highly efficient, cleaning recesses and irregular surfaces without damaging tubing in the well. The tools can be used at temperatures up to 200℃, and with up to thirty per cent HCL and Nitrogen injection.

Because of the high-efficiency nozzle design and the unique seven-step manufacturing process, the attack tips are the best quality and longest lasting tip we are aware of.

The flow straightener corrects power-robbing turbulence, ensuring excellent jetting results. Tests have shown that the attack tips can outlast even tungsten carbide jets.



Model	SC-168	SC-212	SC-250	SC-287
Pressure (psi)	5,000	5,000	5,000	5,000
Flow Range (bpm)	0.7 - 1.3	0.5 - 2	0.7 - 3.0	1.0 - 3.0
Flow Rating (Cv)	2.3	4.6	7.5	7.5
Outside Dia. (in)	1.68	2.12	2.50	2.875
Length (in)	9.8	12.3	16.0	15.6
Connection	1" AMMT	1-1/2" AMMT	1-1/2" AMMT	2-3/8" PAC
Rotation Speed (rpm)	150-200	150-200	80-150	80-150
PSI Loss @ 1bpm (psi)	330	83	31	31
Max Temp	200 Deg C	200 Deg C	200 Deg C	200 Deg C



## WellDrill & WellDrill XTR Downhole Motor

### FEATURES

- Positive displacement motor which produces optimum reliability and power output with maximum efficiency for today's thru-tubing demands
- All motors are dyno tested in house and supplied with a test certificate to measure performance data and ensure motor performance is maintained
- Comes in a variety of sizes and configurations
- Industry leading components
- Fully established and field proven reliability
- Accurate performance data

### BENEFITS

- Experienced service and support

The Altus Intervention Downhole Motor incorporates industry leading power and bearing sections.

Using specifically selected components based on realtime merit, this positive displacement motor produces optimum reliability and power output, with maximum efficiency for today's Well Intervention thru tubing demands.

Motor performance can vary quite dramatically depending on wear, tear or even tolerance stack-up and for this reason, every motor is dyno tested inhouse - pre and post operation - and supplied with Test Certification. This ensures that 100% accurate performance data is supplied on a motor-to-motor basis, rather than relying upon theoretical values.

The motor can be tailored to the planned well intervention operation, whether it is a high-temperature environment, low bottom hole pressure or an aggressive fluid application.

The high performance Altus Intervention are now fully established within our fleet, having successfully performed numerous thru-tubing milling, underreaming and cutting operations.

With "Uniform Wall Advantage" these motors offer strength, durability and increased power output making them the smart choice for optimum performance in extreme environments, N2 applications and high-temperature applications.

Technical Information overleaf >



# Motors

Thru-Tubing Technology



WellDrill & WellDrill XTR Downhole Motor  
Technical Information

Motor Size	Lobe Ratio	Number of Stages	Power Section	Overall Length (ft)	Motor Connections	Flow Rate GPM
1-11/16"	5:6	4.0	WellDrill	8.25	1" AMMT	25-45
2-1/8"	5:6	6.0	WellDrill	11.1	1-1/2" AMMT	20-50
2-7/8"	5:6	3.5	WellDrill	2.0	2-3/8" PAC	60-125
2-7/8"	5:6	3.5	WellDrill XTR	12.9	2-3/8" PAC	60-120

Motor Size	Bit Speed (rpm)	Max. Operating Pressure (psi)	Operating Torque (ft/lbs)	Max. Recommended WOB (lbs)	Max. Overpull (lbs)	Max. Operating Temp. F
1-11/16"	375-675	1100	200	2800	17000	<320
2-1/8"	244-160	1320	300	4500	23800	<320
2-7/8"	201-419	771	632	6500	42700	<320
2-7/8"	200-400	875	1100	6500	42700	<320





## Mills

# Mills & Washover Shoes

Thru-Tubing Technology

## FEATURES

- Used on a variety of operations such as scale and cement milling
- Operations also include plug removal, fish dressing and reaming
- Restriction enlargement as well as general cleanout and debris removal operations
- Range of mill sizes starting from 1-3/4" diameter
- Can be designed and manufactured to suit specific applications
- Proven technology

## BENEFITS

- Quick manufacturing time
- Robust design
- Extensive range in stock

We can supply a full range of Mills for all thru-tubing applications, including a variety of operations such as:

- <sup>TM</sup>Scale and cement milling
- <sup>TM</sup>Plug removal
- <sup>TM</sup>Fish dressing
- <sup>TM</sup>Reaming
- <sup>TM</sup>Restriction enlargement
- <sup>TM</sup>Or any other general cleanout or debris removal operations

We can design and supply the following range of Mills, starting at sizes from 1-3/4" diameter:

- <sup>TM</sup>Crushed carbide dressed
- <sup>TM</sup>Insert dressed
- <sup>TM</sup>Diamond impregnated
- <sup>TM</sup>PDC insert

Although an extensive variety of styles and sizes are available from our stock, generally mills are designed and manufactured to suit specific applications.

As well as taper, convex, concave, flat-bottomed, stage and string mills, bespoke designs are manufactured to suit specific fishing necks or other similar profiles, eccentric milling operations or any other unique application.

A variety of cutting structure, diameter and connection configurations can be supplied.





## Washover Shoes

### FEATURES

- Used for various operations such as plug removal, fish dressing and any other clean out or debris removal operations
- Many variations available including crushed carbide, carbide insert dressed, diamond impregnated and PDC type

### BENEFITS

- Large inventory
- Proven technology
- Robust design

Design and supply of various types of crushed carbide, carbide insert dressed, diamond impregnated and PDC type.

Although an extensive variety of styles and sizes are available from our stock, generally Shoes are designed and manufactured to suit specific applications. In addition to flat, scalloped or castellated-bottomed Shoes, bespoke designs are produced to suit specific applications.

A variety of cutting structure, diameter and connection configurations can be supplied.

### FEATURES

- Enlarging a section of the wellbore
- Removes scale or cement from a tubular beneath a restriction
- Three-blade design for optimum stability
- Continuous uninterrupted through-bore
- Jetting option to the blades is included as standard
- The debris tolerant design limits the amount of debris ingress
- Load shoulder to ensure hinge pins are not subjected to shear loads

### BENEFITS

- Dress options include carbide inserts, PDC inserts, crushed carbide
- Field redressable

The WellDrill™ Tri-Reamer is a hydraulically actuated underreamer used for removing scale or cement from the wellbore beneath a restriction.

The robust, three-blade design ensures the blades are not only well supported during operation, but that they also provide optimum stability compared with similar dual-blade designs.

The tool has a continuous, uninterrupted through-bore, which reduces flow erosion and as a result, significantly increases the tool life.

A jetting option to the blades is included as standard, however it can be simply disabled should operational conditions dictate.

## WellDrill Tri-Reamer





# Tubular Severance

Thru-Tubing Technology



## Hydraulic Anchor



### FEATURES

- Anchoring bottom hole assemblies within tubulars
- High expansion/body outer diameter ratio
- Facilitates gripping inside large inner diameters
- Fully retained and automatically retractable blades
- Allows drop balls to pass through the tool with the added benefit of reducing flow turbulence

### BENEFITS

- Uninterrupted through bore
- Four blade guarantee stability within the tubular
- Field redressable

The Hydraulic Anchor is primarily a device for anchoring bottom hole assemblies within tubulars.

The Anchor incorporates a variety of unique features, some of which include the following:

- ™A “high expansion/body” outer diameter ratio, which facilitates gripping inside large inner diameters below small restrictions.
- ™An un-interrupted through bore, allowing drop balls to pass through the tool with the benefit of reducing flow turbulence.

The blades are fully retained prior to flowing through the tool and are pulled back into the body when flow stops. Four blades guarantee centrality within the tubular and maximum stability.

The Anchor is flow operated; hydraulic pressure moves pistons within the tool body forcing the blades out until they grip the tubular. When flow stops, a compression spring returns the pistons to their start position, pulling the blades back in and holding them closed. The Anchor is run as part of any BHA that needs to be positively located within a section of tubing. A typical example would be a pipe cutting operation.

One size of anchor blade suits a range of inner diameters.

## Hydraulic Pipe Cutter

### FEATURES

- The severing of down hole tubulars
- Variety of features enhance the operation of the tool
- A dual piston which doubles the axial force into the knives
- Activation fluid is diverted up the tool to flush and assist with the cut
- Knives are dressed with premium and coated machine tool inserts, enabling a fast and clean cut

### BENEFITS

- Field redressable

The Hydraulic Pipe Cutter is a device for severing down hole tubulars.

Activation fluid is diverted up the tool to flush and prevent cuttings interfering with the cut. The knives are dressed with premium and coated machine tool inserts, enabling a fast and clean cut.

The pipe cutter can be deployed on a positive displacement motor or jointed pipe. Flow, down through the tool generates an internal pressure that causes the dual piston to actuate. As the pistons move up within the tool, cams lift the three cutter knives out.

Upon completion of the cut, flow is ceased and a compression spring forces the dual piston back to its starting position.





## External Heavy Duty Pulling Tool

### FEATURES

- Means of engaging, locating and pulling on standard, external fishing necks
- Variety of nozzle sizes to suit specific operating parameters
- Suit all standard external profiles

### BENEFITS

- Field redressable
- Simple robust design

The External Heavy Duty Pulling Tool is a cost effective means of engaging, locating and pulling on standard, external fishing necks.

This tool allows the operator to engage the fishing neck by either:

- Flowing - to pump the latch back
- Or mechanically - by pushing the latch back and allowing the tool to snap on to the profile

Flow through a nozzle, fitted to the nose of the core, creates an internal pressure which actuates an unbalanced piston, allowing the latch to become de-supported and pass on to or off the external fishing neck profile.



# Fishing Tools

Thru-Tubing Technology



## Flow Release GS Pulling Tool



### FEATURES

- Means of engaging, locating and pulling on standard, internal fishing necks
- Variety of nozzle sizes to suit specific operating parameters
- Suit all standard internal and GS profiles

### BENEFITS

- Simple robust design
- Field redressable

The Flow Release GS Pulling Tool is a cost effective means of engaging, locating and pulling on standard internal fishing necks.

This tool allows the operator to engage the fishing neck by either:

- Flowing - to pump the latch back
- Or mechanically - by pushing the latch back and allowing the tool to snap into the profile

Flow through a nozzle fitted to the nose of the tool creates an internal pressure that actuates an unbalanced piston, allowing the Latch to become de-supported and pass into the internal fishing neck profile.

## Flow-Release Overshot



### FEATURES

- Provides a means of engaging, locating and pulling on plain end fish or damaged external fishing necks
- Allows the operator to engage the fishing neck by allowing the grapple to locate over the fish
- An overpull is applied to the tool and hardened grapple teeth bite into the fish enabling it to be retrieved
- Hydraulic and Mechanical actuation

### BENEFITS

- Each tool size can engage a whole range of diameters by changing out the grapple
- Field redressable

The Flow-Release Overshot provides a means of engaging, locating and pulling on plain end fish or damaged external fishing necks.

This tool allows the operator to engage the fishing neck by either:

- Flowing - to pump the latch back
- Or mechanically - by pushing the latch back and allowing the grapple to locate over the fish

As an overpull is applied to the tool, case hardened grapple teeth bite into the fish enabling it to be retrieved. The tool can be released from the fish by flowing through the tool.

By changing out the grapple, each tool size can engage a whole range of diameters and additionally, the flow actuation can also be adjusted by fitting a different sized nozzle.



## Flow-Release Spear



### FEATURES

- Device for fishing downhole equipment with a damaged internal fishing neck
- A device for fishing tubular sections lost within the wellbore
- Can be supplied with a complete range of hardened slips for varying internal diameters
- A selection of nozzles to vary the activation flow rate are also available

### BENEFITS

- Simple robust design
- Field redressable

The Flow-Release Spear is a device for fishing either:

Downhole equipment with a damaged internal fishing neck

Tubular sections lost within the wellbore

To engage the fish, simply set down weight allowing the slip to collapse into the bore. When an overpull is applied, the slips will take hold of the fish.

To release from the fish, simply set down weight and flow through the tool. This creates the differential pressure required to de-support the slip and allow it to collapse and release.

The Flow-Release Spear can be supplied with a complete range of hardened slips for varying internal diameters and a selection of nozzles to vary the activation flow rate are also available.

## Bi-Directional Shifting Tool



### FEATURES

- Available to suit all standard type 'B' shifting profiles
- Device used to selectively open and close sliding sleeves
- Flow activated
- One chassis suits a range of profiles
- Maximum bearing contact area
- Fully independent dogs

### BENEFITS

- Dual-action for opening or closing sliding sleeves
- Field redressable

The Bi-Directional Shifting Tool is a device used to selectively open or close sliding sleeves.

The tool can be fitted with bi-directional dogs, allowing the operator to shift the sleeve in either direction, in a single run. Alternatively, the standard uni-directional dogs can be fitted and easily rotated within the chassis to either open or close the sliding sleeve.

The Shifting Tool is run with the shifting dogs in the retracted position, and once at the required depth, fluid flow through the tool causes the retainer sleeves to move, allowing each independent dog to activate. The dog profile can then engage the sliding sleeve profile, shift the sleeve and automatically disengage from it. Stopping the flow allows the springs to return the retainer sleeves and retract the dogs back into the closed position.

The Shifting Tool is available to suit all brands and sizes of sliding sleeves and can also be supplied with either positive or selective dogs. As a result of the 360-degree dog coverage, the design provides superior contact compared to similar tools.

Additionally, each chassis can be assembled to cover a range of profile sizes.



Hydraulic Up/Down Jar



FEATURES

- Available in sizes 1-11/16-inches to 2-7/8-inches
- Straight pull-and-push jarring tool
- No setting or adjustment is required before going down the hole or during operations
- Jar can deliver a wide range of blows from low to high, by varying the applied load

BENEFITS

- Robust design
- Thru-bore accessibility

The Hydraulic Up/Down Jar is a straight pull-and-push jarring tool, uniquely designed to contain a minimal number of parts for easy and dependable operation.

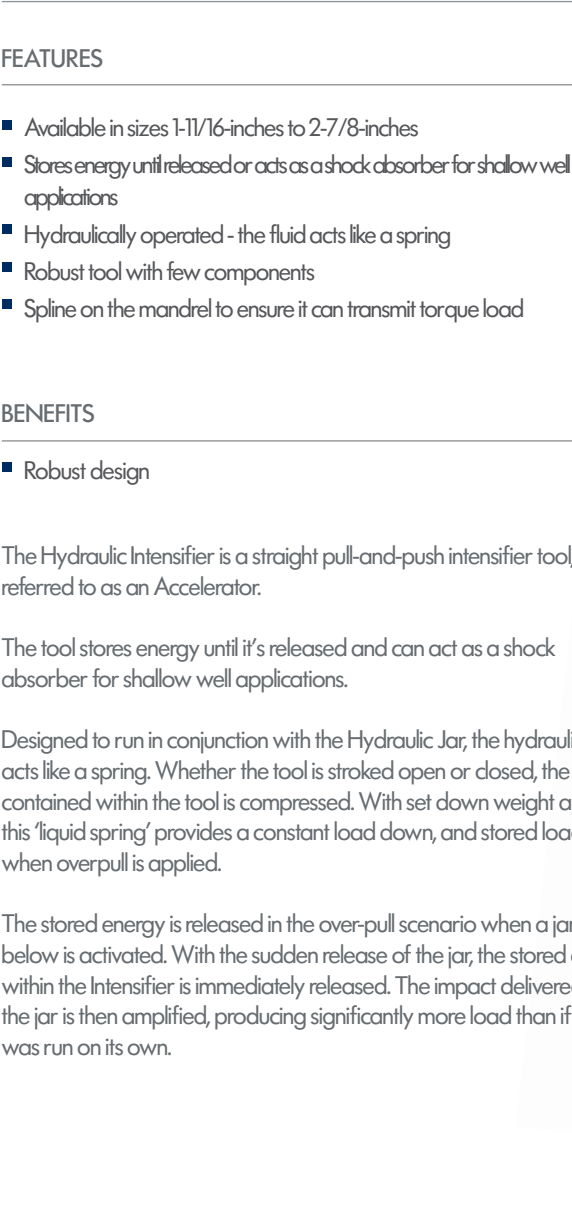
Setting or adjustment is not required before going in the hole and the operator can easily and simply control the intensity of the jarring impact by varying the applied load.

The Jar can deliver a wide range of blows, from low to very high impact forces. The unrestricted inner diameter permits the passage of drop balls through the Jar to release/active tools fitted below.

Run in conjunction with the Intensifier, this impact force can be significantly increased.

Tool Size	1 - 11/16"	2 - 1/8"	2 - 7/8"
End Connection	1" AMMT	1 - 1/2" AMMT	2 - 3/8" PAC
ID (in)	0.56	0.75	1.00
Length Closed (ft)	5.75	5.58	7.00
Max Overpull (lbs)	10,000	18,000	32,000
Max Push in lbs	10,000	18,000	32,000
Max Lift after Jarring	50,000	95,000	195,000

Hydraulic Intensifier



FEATURES

- Available in sizes 1-11/16-inches to 2-7/8-inches
- Stores energy until released or acts as a shock absorber for shallow well applications
- Hydraulically operated - the fluid acts like a spring
- Robust tool with few components
- Spline on the mandrel to ensure it can transmit torque load

BENEFITS

- Robust design

The Hydraulic Intensifier is a straight pull-and-push intensifier tool, often referred to as an Accelerator.

The tool stores energy until it's released and can act as a shock absorber for shallow well applications.

Designed to run in conjunction with the Hydraulic Jar, the hydraulic fluid acts like a spring. Whether the tool is stroked open or closed, the fluid contained within the tool is compressed. With set down weight applied this 'liquid spring' provides a constant load down, and stored load when overpull is applied.

The stored energy is released in the over-pull scenario when a jar below is activated. With the sudden release of the jar, the stored energy within the Intensifier is immediately released. The impact delivered by the jar is then amplified, producing significantly more load than if the jar was run on its own.

Tool Size	1 - 11/16"	2-1/8"	2 - 7/8"
End Connection	1" AMMT	1 - 1/2" AMMT	2 - 3/8" PAC
ID (in)	0.56	0.75	1.00
Length Neutral (ft)	6.33	7.25	8.67
Max Overpull (lbs)	10,000	18,000	32,000
Max Push (lbs)	10,000	18,000	32,000
Max Lift after Jarring (lbs)	50,000	95,000	195,000



Impact Hammer



FEATURES

- Available in sizes 1-11/16-inches to 2-1/4-inches
- A device used to create impact in either an upward or downward direction
- Can be run for applications that require bi-directional impact forces
- Activated by flow, combined with compression or pull force

BENEFITS

- Can be configured to deliver impact in all directions

The Impact Hammer is a device used to create impact in either an upward or downward direction in operations such as:

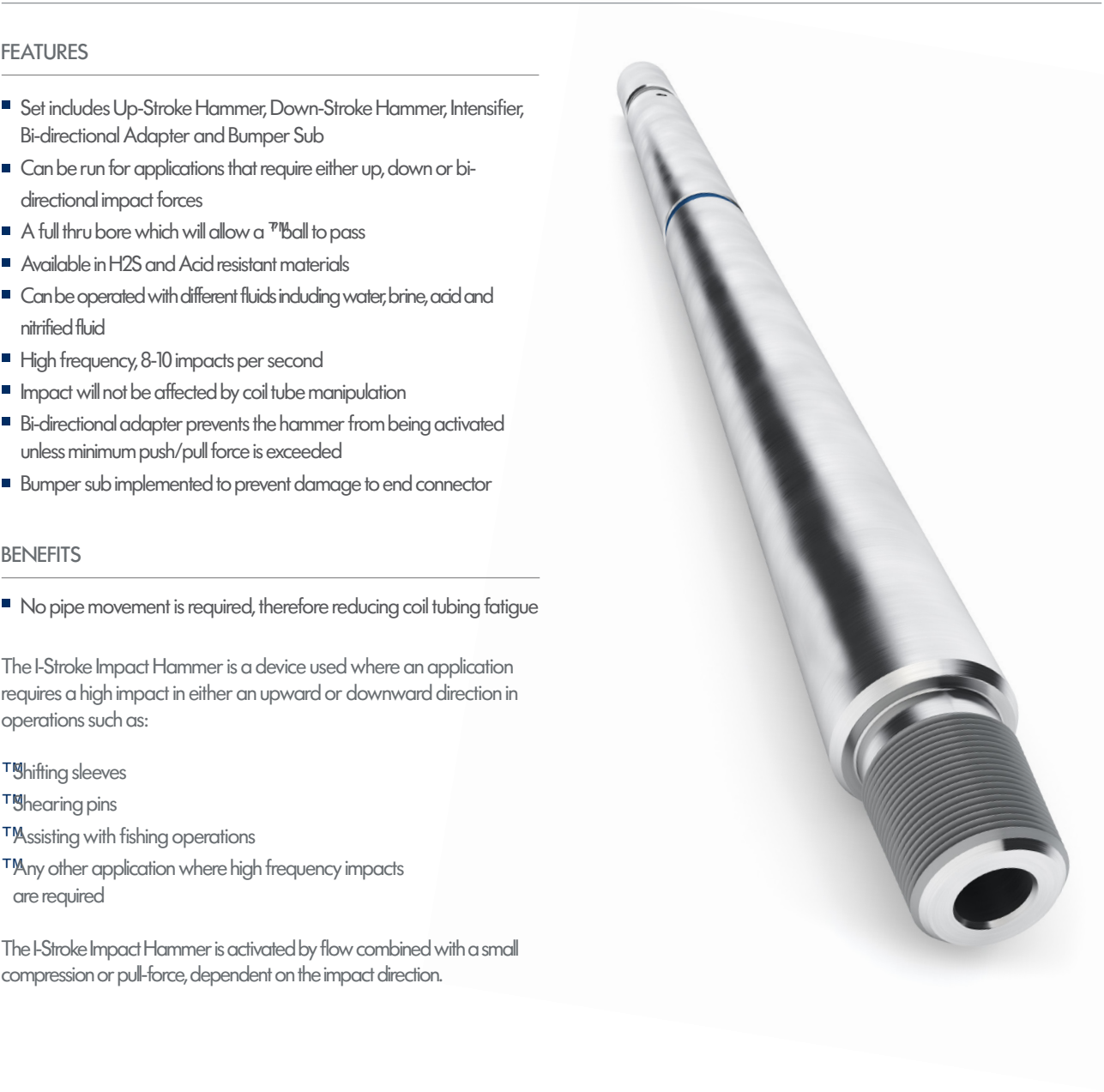
- Shifting sleeves
- Shearing pins
- Assisting with fishing operations
- Any other application where high frequency impacts are required.

The tool can be run for applications that require bi-directional impact forces and such applications need an Intensifier to be integrated into the hammer BHA.

The Impact Hammer is activated by flow combined with compression or pull force, dependent on the impact direction.

Size/Type	1 - 11/16" Dual Acting Impact Hammer Set
Connections	1" AMMT Box x Pin
Pump Rate	10 - 40 GPM
Operating Pressure	500 - 3,000psi
Push / Pull	200 - 2,000lbs
Impact Frequency	60 - 600 hits per minute
Min Yield	46,900lbs
Max Torque	300ft-lbs

I-Stroke Impact Hammer Set



FEATURES

- Set includes Up-Stroke Hammer, Down-Stroke Hammer, Intensifier, Bi-directional Adapter and Bumper Sub
- Can be run for applications that require either up, down or bi-directional impact forces
- A full thru bore which will allow a 7/16" ball to pass
- Available in H2S and Acid resistant materials
- Can be operated with different fluids including water, brine, acid and nitrified fluid
- High frequency, 8-10 impacts per second
- Impact will not be affected by coil tube manipulation
- Bi-directional adapter prevents the hammer from being activated unless minimum push/pull force is exceeded
- Bumper sub implemented to prevent damage to end connector

BENEFITS

- No pipe movement is required, therefore reducing coil tubing fatigue

The I-Stroke Impact Hammer is a device used where an application requires a high impact in either an upward or downward direction in operations such as:

- Shifting sleeves
- Shearing pins
- Assisting with fishing operations
- Any other application where high frequency impacts are required

The I-Stroke Impact Hammer is activated by flow combined with a small compression or pull force, dependent on the impact direction.

Tool Size	2-1/8"
End Connection	1-1/2" AMMT
Tensile Strength (lbs)	43,000
Inside Diameter (in)	0.55
Max. Operating Temp	300°F
Operating Flow range	13 – 79 gal/min
Impact Forces	21 – 37 Klbs
Max Pressure (psi)	3,000



Flow-Activated Tubing End/Nipple Locator



FEATURES

- Available in sizes to suit most nipple profiles
- Used at the end of production tubing for depth correlation
- Designed to allow the device to be run with location latch in the retracted position
- Flow activated multiple on/off function
- Mechanical emergency release and tool de-activation function

BENEFITS

- Field redressable

The Flow Activated Tubing End Locator is a device used for the location of nipple profiles and/or the end of the production tubing for depth correlation.

The design allows the device to be run with the location latch retracted, therefore eliminating wear of the latch and damage to the tubing. Flow through the tool creates the differential pressure required to activate the mechanism, enabling the latch to ride up onto the cone. Stopping the flow retracts the latch.

The design incorporates a shear release mechanism that can be used to 'switch off' the tool or provide an emergency release if required.

The Tubing End Locator can be functioned repeatedly. If, for some reason, the locator is no longer required to be used during the operation or has become jammed, the shear feature can be activated by a straight pull or upward jarring. This shears out the cone and by slacking-off weight, retracts the latch. Subsequent flow through the tool simply pushes the cone down the tool, where it is retained via a body lock ring.

A variety of latches can be supplied to suit profiles or tubing inner-diameter.

Mechanical Tubing End Locator

FEATURES

- Device is used to help locate nipple profiles
- Used at the end of production tubing for depth correlation
- Adjustable push/pull loads to suit most nipple profiles
- Emergency shear release facility
- Large through bore

BENEFITS

- Field redressable

The Mechanical Tubing End Locator is a device used for location of nipple profiles and/or the end of the production tubing, for depth correlation.

The design incorporates an emergency shear mechanism.

The Tubing End Locator disc spring mechanism, which supports the dogs in the open position, can be repeatedly functioned as chosen. The quantity of disc springs installed can be varied to give the desired indication loads for a particular application.

If, for some reason, the dogs become jammed as a result of debris ingress, the emergency shear feature can be activated by upward jarring. This function produces enough movement to un-support the dogs, enabling tool retrieval.

A variety of dogs can be supplied to suit profiles or tubing inner-diameters. Additionally, the pull through/push through load can be adjusted to suit specific applications.



Tool Size	2"	2-7/8"
End Connection	1-1/2" AMMT	2 - 3/8" PAC
Tensile Strength (lbs)	47,750	89,700
OD range of dogs	2-1/2" thru 3"	3-1/2" thru 5"
Length (ft)	1.46	1.88
Working Pressure (psi)	5,000	5,000



## Wireline Grab



### FEATURES

- Retrieves wire that has broken in the tubing or wellbore
- Two or three flexible prongs extending downwards
- Pointed barbs are welded to the inside of the prongs to form hooks and allow easier retrieval of the broken wire
- Flexible design to allow for it to bend
- Any combination of style, outer diameter and thread connection available

### BENEFITS

- Simple design
- Robust construction

The Wireline Grab is used to fish broken wire from the tubing.

The Coiled Tubing Wireline Grab consists of two or three flexible prongs extending downwards. Pointed barbs are welded to the inside of the prongs in order to form hooks that will catch the looped end of the broken wire.

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 by-pass.

## Wireline Spear



### FEATURES

- Retrieves wire that has broken in the tubing or wellbore
- Any combination of style, outer diameter and thread connection is available

### BENEFITS

- Simple design
- Robust construction

The Wireline Spear is used to fish broken wire from the tubing.

The Coiled Tubing Wireline Spear consists of a box up connection with a centre prong extending downwards. Pointed barbs are welded to the prong in order to form hooks that catch the looped end of the broken wire. A Stop Ring with a specific outer diameter is fitted to the prong and additionally, the Wireline Spear also allows flow through.

The Wireline Spear Stop Ring can be gauged for the tubing it is to be run in. The prong ends of the Spear will increase in outer diameter until just below the diameter of the Stop Ring.



Mini Tongs

FEATURES

- Safe working for the rig floor and service shop
- Make-up and break-out of connections on small tools and tubulars
- Compact size
- Hydraulically controlled and operated via a pneumatic power pack
- Use both vertically and horizontally

BENEFITS

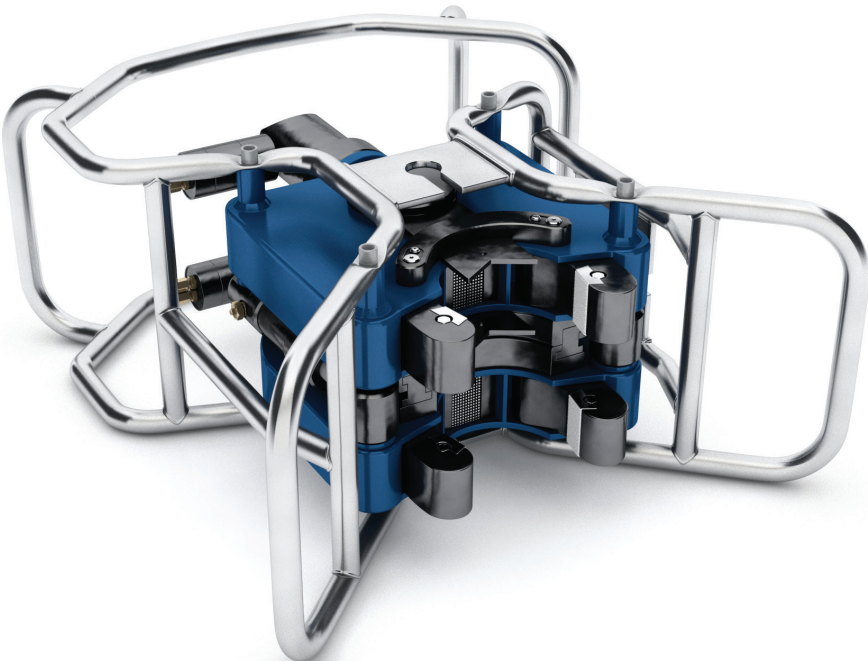
- Simple to use
- Robust design
- Extensive field runs to ensure a long and trouble free life of the unit

The Mini Tong is designed with rig floor and service shop safety in mind.

Easily handled, hydraulically controlled and operated via a pneumatic power pack, it can be used both vertically and horizontally.

During its development, extensive industry operator input was obtained to ensure the unit’s practicality. Its compact size provides a safe and easy way to make-up and break-out connections on small tools and tubulars.

We maintain, calibrate and service these units on a regular basis to ensure a long, trouble-free life while avoiding unsafe operating conditions and premature breakdown of parts.



Surface Equipment

Thru-Tubing Technology



## Additional Tools

### Contact our Rental Team

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In addition to the tools contained in this catalogue,  
We can also source or supply the following tools:

If you don't see the tool you require, please contact us.

- Venturi Jet Junk Basket (VJJB)
- Sequencing Valves
- Free Travel Tool
- Bowen Series 150 Overshot
- Continuous Coil Overshot (CCO)
- Agitator
- Kelly Valves
- Deployment Bars
- Pump in Subs
- Fishing Magnets
- Reverse Circulating System
- Seeker Tool System
- Dimple Jig System
- Lubricated Bumper Sub
- Crossovers
- Back Pressure Valves
- Alligator Grab
- Snipper Overshot
- Cable By-Pass Sub
- Packer Milling Tools
- LIB
- Flow Diversion Tool
- Flow/Tension Release Disconnect

