BONITAS ENERGI SOLUSI

THRU - TUBING TOOLS
CATALOG

www.bonitasenergisolusi.com

TABLE OF CONTENTS

About Us

PT Bonitas Energi Solusi is a provider of downhole tools and equipment, specializing in Thru-Tubing Tools Asset Management, Thru-Tubing Tools Field Services, and Thru-Tubing Tools Sales. We offer comprehensive solutions for the maintenance, servicing, and sales of downhole tools described below, whether they are part of our own inventory or that of our clients. With extensive expertise, we provide reliable and efficient services both within Indonesia and internationally, ensuring optimal tool performance and availability for our clients in the oil and gas industry.

RANGE OF SERVICES

- Thru-Tubing Tools Asset Management
- Thru-Tubing Tools Field Service
- Thru-Tubing Tools Sales

Thru Tubing Tools

OUR LIST OF TOOLS

- **Coiled Tubing Tools**
  - Basic Coiled Tubing Tools
  - Wellbore Cleanout Tools
  - Milling Tools
  - Fishing Tools
  - Auxiliary Tools
  - Depth Correlation Tools
  - Special Application Tools

- **Intervention Tools**
  - Bridge Plugs
  - Cement Retainers
  - Setting Tools
  - Tubing Punchers
  - Tubing Cutters
  - Ultra-High Expansion Tools
  - Straddle System Tools
  - Downhole Camera

- **Slickline Tools**
  - Wellbore Cleanout Tools
  - Test Tools
  - Gas Lift Operations Tools
  - Special Application Tools

- **Sand Control Tools**
  - Premium Screens
  - Auxiliary Tools

COILED TUBING TOOLS

- Basic Coiled Tubing Tools
- Wellbore Cleanout Tools
- Milling Tools
- Fishing Tools
- Auxiliary Tools
- Depth Correlation Tools
- Special Applications Tools

ROLL ON CONNECTOR

DESCRIPTION

The roll-on connector forms a sealed joint between the inside of the coiled tubing and the tool string or another line of coiled tubing which allows the attachment of the coiled tubing to the tool. The joint O.D. is the same as the coiled tubing.

The Roll-on connector has a series of radial grooves at its uppermost end which are positioned inside the coiled tubing. The coiled tubing is then rolled externally at points adjacent to the grooves using a roll-on tool.

DESIGN FEATURES

- Flush fitting with the CT OD
- High tensile strength
- Internal pressure seal
- Smooth transition from the CT ID to the ID of the connector
- Dual O-ring seal

CT OD	Thickness	Length	Bottom Connections
1.25”	0.095” WT	0.13”	1” SA Pin
1.25”	0.109” WT	0.13”	1” SA Pin
1.50”	0.095” WT	0.13”	1” SA Pin
1.50”	0.109” WT	0.13”	1” SA Pin
1.75”	0.095” WT	0.15”	1” AMMT Pin
1.75”	0.109” WT	0.15”	1” AMMT Pin

INTERNAL DIMPLE CONNECTOR

DESCRIPTION

The internal dimple connector forms a flush or reduced O.D. sealed joint between the coiled tubing and the CT tool string. The connector O.D. matches the coiled tubing or the tool string O.D. The internal dimpling tool is used to dimple the coiled tubing into the dimples in the connector. This is a strong connector capable of transmitting torque.

DESIGN FEATURES

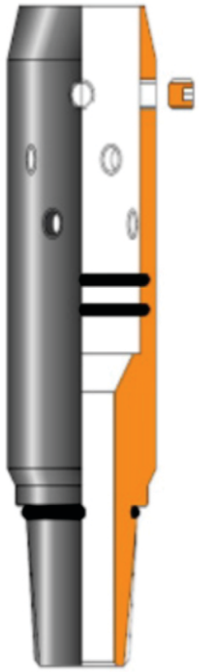
- High tensile strength
- High torsional strength
- Easy makeup
- Dual O-ring seal

CT OD	Thickness	Length	Bottom Connections
1.25”	0.095” WT	0.52”	1” SA Pin
1.25”	0.109” WT	0.52”	1” SA Pin
1.50”	0.095” WT	0.52”	1” AMMT Pin
1.50”	0.109” WT	0.52”	1” AMMT Pin
1.75”	0.095” WT	0.15”	1” AMMT Pin
1.75”	0.109” WT	0.15”	1” AMMT Pin

EXTERNAL DIMPLE CONNECTOR

DESCRIPTION

The External Dimple Connector forms a full bore sealed joint between the outside of the coiled tubing and the CT tool string. The joint O.D. matches the tool string. A pattern of set screws, in the body of the connector are locked into pre-formed dimples made on the outside of the coiled tubing using a Dimpling tool. This is a very strong connector capable of transmitting torque.



DESIGN FEATURES

- High tensile strength
- High torsional strength
- Easy makeup
- Dual O-ring seal

CT OD	Thickness	Length	Top Connections
1.25”	1.690”	5.25”	1” SA Pin
1.50”	2.000”	5.25”	1” AMMT Pin
1.75”	2.125”	5.25”	1-1/2” AMMT Pin

TORQUE SLIP CONNECTOR

DESCRIPTION

The Torque Slip Connector is a high strength connector for demanding milling operations. The Torque Slip Connector features a torque resistant slip that is keyed to the connector lower body. Making up the Torque Thru Slip Connector at the wellsite is both fast and safe with the makeup torque applied, locking the connector securely to the coiled tubing.

Increasing the tensile and torque loads applied to the Torque Slip Connector increases the force with which the rotationally locked tapered Slip grips the coiled tubing. The Torque Slip Connector is therefore rated to exceed the maximum torque from motors of the same toolstring size and can be relied upon for the most demanding applications.

DESIGN FEATURES

- Fast and safe to makeup to Coiled Tubing
- Suitable for all milling operations
- Torque rating exceeds motors of the same size

CT OD	Thickness	Bottom Connections	Max Torque
1.25”	1.690”	1” AMMT Pin	750 lbs.
1.25”	2.125”	1-1/2” AMMT Pin	1,000 lbs.
1.50”	2.125”	1-1/2” AMMT Pin	1,300 lbs.
1.50”	2.375”	1-1/2” AMMT Pin	1,600 lbs.
1.75”	2.875”	2-3/8” PAC Pin	2,000 lbs.

MOTORHEAD ASSEMBLY (STANDARD)

DESCRIPTION

The motorhead assembly is a robust BHA that combines standard coil tubing bottom hole components in one assembly. These components are, the dual flapper check valve, hydraulic disconnect and the dual circulation valve.

The dual flapper check valves provide directional well control during well operations thus preventing inflow of wellbore fluids to the coil tubing. 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.

The extreme duty motorhead assembly features a torque through facility, in addition to a standard internal GS fishing neck profile. It is designed to withstand the heavy demands of milling, jarring, impact hammers, perforating, and CT operations where high shock loads, vibrations, tensile force and/or torque forces are expected.

DESIGN FEATURES

- Easy to assemble/disassemble & inexpensive to redress
- High torque ability

Tool OD	Connections	Length	Pressure Range
1.500”	1” AMMT Box x Pin	30.00”	10,000 psi
1.687”	1” AMMT Box x Pin	30.00”	10,000 psi
1.750”	1” AMMT Box x Pin	27.00”	10,000 psi
2.000”	1-1/2” AMMT Box x Pin	25.00”	10,000 psi
2.125”	1-1/2” AMMT Box x Pin	22.50”	10,000 psi
2.875”	2-3/8” PAC Box x Pin	30.50”	10,000 psi

The MotorHead Assembly tool comes in two options: The MotorHead Assembly (Standard) and The MotorHead Assembly (Extreme Duty)

TWIN FLAPPER CHECK VALVE

DESCRIPTION

The Twin Flapper Check Valve (TFCV) forms a standard part of the coiled tubing bottom hole assembly which provides unidirectional well control during well intervention operations; thus preventing inflow of the wellbore fluids to the coil tubing.

The twin flapper check valve consists of a two-piece housing assembly containing two removable flapper cartridges. The flappers are spring loaded in the closed position thus allowing no wellbore fluid ingress. The flapper cartridges have combined elastomeric and metal seating, providing efficient low- and high-pressure sealing. They are designed to open fully when required to supply a large, uninterrupted bore through the tool for fluid or drop balls.

DESIGN FEATURES

- Full bore fluid passage for balls, darts, and plugs
- Easily removable flapper catridges of unitary constructions
- Easy to redress

Size	OD	Connections
1-1/2”	0.500”	1” AMMT Box x Pin
1-11/16”	0.690”	1” AMMT Box x Pin
1-3/4”	1.750”	1” AMMT Box x Pin
2-1/8”	2.125”	1-1/2” AMMT Box x Pin
2-3/8”	2.375”	1-1/2” AMMT Box x Pin
2-3/4”	2.750”	1-1/2” AMMT Box x Pin

STRAIGHT BAR

DESCRIPTION

The Straight bar provides a means of extending the tool string while maintaining the maximum through bore. The tubular section between the top and bottom sub can be interchanged to vary the length of the straight bar, offering an ideal solution to spacing out tools within the tool string without compromising the flow requirements of flow activated or jetting tools.

The Straight bar is manufactured from solid bar and the relatively small ID ensures maximum weight displacement. It can be used in conjunction with the CT hydraulic jar and accelerator to provide supplementary mass during jarring operation.

DESIGN FEATURES

- Full flow through bore
- Solid construction

OD	Connections	Strength
1.688”	1” AMMT Box x Pin	35,040 lbs.
1.688”	1” AMMT Box x Pin	35,040 lbs.
1.750”	1” AMMT Box x Pin	35,040 lbs.
1.750”	1” AMMT Box x Pin	35,040 lbs.
2.000”	1-1/2” AMMT Box x Pin	51,680 lbs.
2.125”	1-1/2” AMMT Box x Pin	42,866 lbs.

CT HYDRAULIC RELEASE JOINT

DESCRIPTION

The Hydraulic Disconnect is designed to provide a hydraulic release mechanism within a Coiled Tubing bottom hole assembly (BHA), whilst maintaining a high torque-through facility for use in conjunction with down hole motors.

The Hydraulic Disconnect is activated by dropping a ball via the coiled tubing to seat inside the Disconnect Sub. The coil is then pressured up to shear release screws within the Disconnect Sub. The pressure at which the tool is activated / released is determined by the number of shear screws installed leaving a standard GS internal type fish neck profile for future retrieval of the lower BHA section.

DESIGN FEATURES

- High torque rating
- Large thru bore
- Drop ball operated
- Short make-up length
- Standard Benoil rupture disc port
- Disconnect Sub fitted with standard GS type internal fish neck profile
- Available in a range of sizes to suit industry standard CT diameters and BHA's
- Simple, robust design ensuring ease of operation for the end user
- Selected components QPQ treated
- Hexagonal flats for safe make-up & break-out
- Connection options to suit customer requirements
- Corrosion resistant materials

Actual OD	Max ID	Disconnect GS Profile	Make up Length
1.500"	0.328"	1-1/2"	16.72"
1.562"	0.328"	1-1/2"	16.73"
1.687"	0.515"	1-1/2"	17.00"
1.750"	0.515"	1-1/2"	17.06"
2.000"	0.577"	2"	17.37"
2.125"	0.640"	2"	17.63"
2.250"	0.640"	2"	17.63"
2.375"	0.640"	2"	18.00"
2.500"	1.020"	3"	20.97"

CROSSOVERS

DESCRIPTION

The crossover connects two tools with varying or similar end connections. It is available in pin × pin, pin × box, and box × box configurations. The crossover is optimized for the shortest possible overall length.

DESIGN FEATURES

- Full range of connections available
- Upon request, longer crossovers can be manufactured to aid in tool spacing

FULL-BORE NOZZLE

DESCRIPTION

The full-bore nozzle is placed at the bottom of the coiled tubing string and has a box threaded connection; hence it can be run with connectors, check valves, or other downhole tools. The Full-Bore Nozzle, commonly referred to as “Cement Nozzle” is a single ported, through bore nozzle primarily designed for the placement of cement slurry during a shut off operation.

DESIGN FEATURES

- Suited for a wide range of CT sizes
- Designed to suit cementing operational requirements
- Full bore opening for high pressure rates
- Easy to operate
- Simple construction

OD	Top Connections	Tool Length
1.500”	1” AMMT Box	5.0”
1.687”	1” AMMT Box	5.0”
2.125”	1-1/2” AMMT Box	6.0”
2.375”	1-1/2” AMMT Box	6.0”
2.875”	2-3/8” PAC Box	7.0”
3.125”	2-3/8” PAC Box	7.0”

MULTI-PORT WASH TOOL

DESCRIPTION

The multi-port wash tool is a non- rotational wash tool, which enables circulation to be directed through its nozzles. The body of this tool is furnished with basic grub screw nozzles that is field adjustable.

The multi-port wash tool has a wide fan of multi directional-choked jetting ports giving maximized jetting coverage. The chokes can be changed out to adjust jetting velocity. When used in conjunction with a jetting indexing tool, the multi-port wash tool will achieve 360 degree rotation.

DESIGN FEATURES

- Simple and robust construction
- Easily redressed in the field
- Adjustable flow ports

OD	Top Connections	Jetting Ports
1.500”	1” AMMT Box	12 x 0.08”
1.689”	1” AMMT Box	12 x 0.08”
1.750”	1” AMMT Box	12 x 0.08”
2.125”	1-1/2” AMMT Box	12 x 0.08”
2.375”	1-1/2” AMMT Box	12 x 0.08”
2.875”	2-3/8” PAC Box	12 x 0.08”

CT DOWNHOLE FILTER

DESCRIPTION

The Down Hole Filter is configured within the Coiled Tubing BHA to trap and contain unwanted debris inadvertently pumped via the Coiled Tubing.

The Down Hole Filter assembly incorporates a removable stainless steel wire wrapped screen insert. Dependent upon the application a screen slot size, measured in microns, is selected to suit the level of filtration and flow rate required.

DESIGN FEATURES

- Available in a range of sizes to suit industry standard Coiled Tubing BHA's
- Removable screen inserts supplied in a selection of slot sizes
- Corrosion resistant materials
- Connection options to suit customer requirements
- Simple, robust design ensuring ease of operation for the end user
- Selected components QPQ treated
- Hexagonal flats for safe make-up & break-out

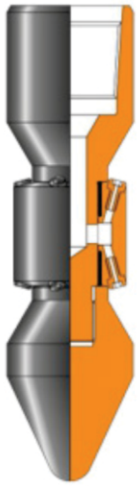
Actual OD	Make up Length
1.687"	46.68"
1.750"	46.74"
2.125"	48.02"
2.875"	51.10"

ROTARY WASH TOOL

DESCRIPTION

The rotary wash tool is designed to be used for both jetting and circulating operations when cleaning or washing the inside of the tubing.

The rotary wash tool operates on the principle of applied fluid pressure. The coiled tubing fluid flow, rotate the multi-choked ported barrel in a continuous motion, directing the fluid jet to the wall of the tubing in a wide arc, giving excellent spray coverage.



DESIGN FEATURES

- Flow-Activated (No drop balls required)
- Low pressure actuation
- Forward and reverse jetting
- Easy to operate
- Simple construction
- Numerous jetting ports

OD	Top Connections	Jetting Ports
1.687”	1” AMMT Box	12 x 0.08”
1.750”	1” AMMT Box	12 x 0.08”
2.125”	1-1/2” AMMT Box	16 x 0.08”
2.500”	1-1/2” AMMT Box	16 x 0.08”
2.875”	2-3/8” PAC Box	16 x 0.08”
3.125”	2-3/8” PAC Box	16 x 0.08”

ROTARY JETTING TOOL

DESCRIPTION

The rotary jetting tool is a dedicated high-pressure rotating wash tool suitable for tough downhole cleanout operations. The CT rotary jetting tool uses a unique spiral mandrel wash path in order to rotate the nozzles in a controlled manner without relying on a fluid filled chamber within the tool.

The high-pressure jet nozzles deliver a powerful cleaning force to enable the penetration of the typical hydrates, parafin wax, barium, calcium or mineral scales commonly found in wellbores, without damaging the pipe structure. The unique method of controlling the nozzle rotation works on the principle of applied fluid pressure, which causes the nozzle to rotate and jet the fluid against the tubing wall in a full 360° rotating action. The rotational speed of the nozzles is consistent throughout the job.

DESIGN FEATURES

- Simple self-rotating high-pressure jetting action
- Operates over a wide variety of pressures / flow rates
- Interchangeable wear resistant nozzles and easy to redress
- Controlled nozzle rotation throughout the whole job

OD	Top Connections	Jetting Ports	Rotational Speed (RPM)
1.687”	1” AMMT Box	12 x 0.08”	150 - 200
1.750”	1” AMMT Box	12 x 0.08”	150 - 200
2.125”	1-1/2” AMMT Box	12 x 0.08”	150 - 200
2.500”	1-1/2” AMMT Box	12 x 0.08”	80 - 150
2.875”	2-3/8” PAC Box	12 x 0.08”	80 - 150
3.125”	2-3/8” REG Box	12 x 0.08”	80 - 150

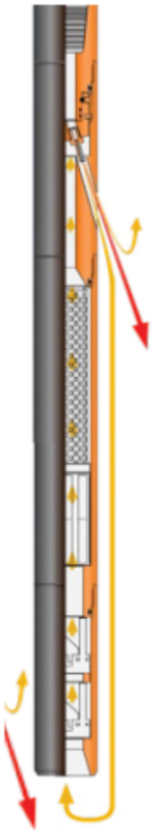
VENTURI JUNK BASKET

DESCRIPTION

The Venturi junk basket is a tool used to retrieve junk (garbage and debris) from the wellbore. At the point when fluid is pumped through the string of the coiled tubing and out through the nozzles in the Venturi chamber, a vacuum is created. Fluid is sucked from the bottom of the tool to exit back through the Venturi tubes. Most of this fluid mixes with the pressurized fluid to be recirculated around the bottom of the tool.

The tool is basically a powerful vacuum cleaner that may be used with fluid, multiphase fluids, foams, or gases. The nozzles in the tool are simply changed out for the available pump rate, fluid. A debris filter screen is placed before the Venturi chamber to prevent debris from blocking the Venturi tubes.

A hollow magnetic section with a finger-type trap catches junk and debris, which is then carried from the well inside the tool. Barrel extensions are available to increase the volume of junk which may be carried. The tool is not dependent on the hole size to work, a 3 1/8 in. OD tool to retrieve debris from 7 in. casing.



OD	ID	Jetting Ports	Length
1.688”	0.469”	1” AMMT Box	33”
1.740”	0.469”	1” AMMT Box	33”
2.063”	1”	1-1/2” AMMT Box	33”
2.250”	1”	1-1/2” AMMT Box	37”
2.625”	1”	1-1/2” AMMT Box	42”
3.125”	1”	2-3/8” PAC Box	42”

Venturi Basket Size	Extension Tube Length
1-3/4”	4 & 6
2-1/16”	4 & 6
2-1/4”	4
2-5/8”	2 & 4
2-5/8”	5 & 5

RUGGED MILLING MOTOR

DESCRIPTION

The rugged milling motor is an engineered, high performance tool that delivers exceptional service under aggressive wellbore conditions. Designed to suit operations involving repeated vibration and various operational variables.

The rugged milling motor is tailored to the typical well intervention downhole condition, whether it is a high temperature environment, low bottom hole pressure or an aggressive fluid application. It can be utilized for scale milling, plug removal, cement milling, debris removal, drilling and under-reaming. The positive displacement motors allow optimum reliability for technically challenging environments.

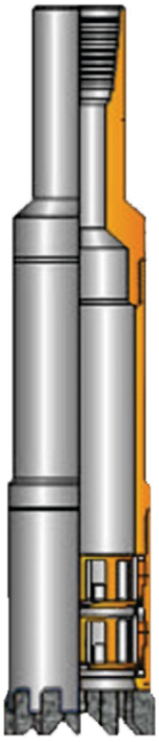
DESIGN FEATURES

- High flow rates - higher annular velocity
- High torque ratings to reduce stalls
- Rotor catch feature
- Sealed bearing assembly
- Robust design optimized for ERM

OD	Connection	Length	Bit Speed (RPM)
1.688”	1” AMMT Box x Box	7.9”	185 - 370
2.125”	1-1/2” AMMT Box x Box	11.3”	400 - 880
2.875”	2-3/8” PAC Box	12.9”	250 - 520

FLAT BOTTOM JUNK MILL

DESCRIPTION



Designed to meet the needs of customers requiring various bladed combinations or cutting face geometry, Junk mills are designed to help mill away objects downhole that cannot be recovered through conventional fishing methods. The integral design and cutting structure provide improved strength and durability. The insert technology provides for longer mill life and increased rate of penetration for light or heavy milling and will handle any well clean-up operational requirement, from simple cement removal, to removal of tubulars and downhole restrictions and to the grinding of the toughest downhole tools into pieces which can be circulated from the well.

Our fleet of junk mills are available in 2 standard design; Flat bottom junk mill and bladed junk mills with large circulation ports and ample fluid channels.

Flat bottom Junk mill are more hard-facing and have a longer tool life. Typically suited to clean up loose junk in wellbores.

DESIGN FEATURES

- Integral blades
- Large circulation ports and watercourses
- Slightly concave mill-head bottom restricts fish to the center of the mill head for better access control
- Milling solutions cover the full range of tubing sizes

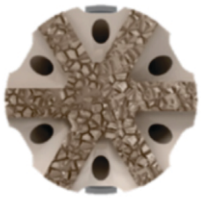
Mill OD Range	Top Connection	Fish Neck Length
1.75” - 2.5”	1” AMMT Pin	6 in.
2.5” - 3.5”	1-1/2” AMMT Pin	6 in.
3.5” - 4.5”	2-3/8” REG Pin	12 in.

BLADED JUNK MILL

DESCRIPTION

The Bladed junk mill is designed to mill any type of junk or debris from the wellbore, including, but not limited to; bit cones, bits, cement, packers, squeeze tools, perforating guns, reamers, reamer blades etc.

The blade design holds junk to be milled under the milling face and cuts continually rather than sweeping the junk ahead of the blades, within the mill face are large circulation ports which improve fluids circulation for cooling and facilitate cuttings removal. The junk mills should be a quarter inch. less than the minimum inside diameter of the tubing.



DESIGN FEATURES

- Available sizes are 1.75” up to 4.5”
- Integral blades
- Rugged, durable construction extends milling time per trip for maximized milling efficiency
- Large circulations ports and watercourses

Mill OD Range	Top Connection	Fish Neck Length
1.75” - 2.5”	1” AMMT Pin	6 in.
2.5” - 3.5”	1-1/2” AMMT Pin	6 in.
3.5” - 4.5”	2-3/8” REG Pin	12 in.

CONCAVE MILL

DESCRIPTION

The design of the face of this mill helps keep the fish centered during milling operations. It is especially well suited for drilling up bit cones and other loose objects.

DESIGN FEATURES

- Available in a range of sizes to suit standard coiled tubing BHA's
- High flow capability
- Corrosion resistant materials

Mill OD Range	Top Connection	Fish Neck Length
1.75" - 2.5"	1" AMMT Pin	6 in.
2.5" - 3.5"	1-1/2" AMMT Pin	6 in.
3.5" - 4.5"	2-3/8" REG Pin	12 in.

TAPERED MILL

DESCRIPTION

Tapered mills are designed specifically for milling through tight spots in tubulars as well as removing restrictions from tubing string or collapsed or deformed tubulars. They can also be run ahead of other milling tools to clean out “bird nest”.

The geometry of the tapered mill is well designed such that it penetrates very gradually, shaving cement or corroded part off the tubing and enlarging restrictions within the completion string.

DESIGN FEATURES

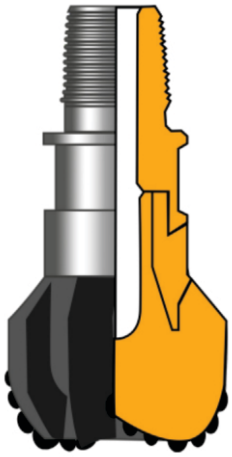
- Geometry is optimized to enlarge restriction
- Available in a wide range of sizes
- Available in standardized fish neck
- Integral blades

Mill OD Range	Top Connection	Fish Neck Length
1.75” - 2.5”	1” AMMT Pin	6 in.
2.5” - 3.5”	1-1/2” AMMT Pin	6 in.
3.5” - 4.5”	2-3/8” REG Pin	12 in.

PDC BITS

DESCRIPTION

Polycrystalline diamond compact bits, commonly called PDC bits, are made with synthetic diamond cutters and are known for their wide application range and rate of penetration (ROP) potential. The PDC bit is designed to reduce motor stall and keep the cutting small. It creates a stable drilling environment which in turn protects the cutting elements and extends the life of the diamond cutters.



DESIGN FEATURES

- Tougher cutting structure
- Utilizes premium PDC cutters
- Increased wear resistance of gage pads

OD	Top Connection	Length
1.500”	1” AMMT Pin	30.00”
1.687”	1” AMMT Pin	30.00”
2.125”	1-1/2” AMMT Pin	30.00”
2.875”	2-3/8” PAC Pin	30.50”
3.125”	2-3/8” REG Pin	30.50”

COILED TUBING INTENSIFIER

DESCRIPTION

The coiled tubing intensifier is a straight pull-and-push jarring tool that employs patented combinations of hydraulics and mechanics. The unique design allows for easy and dependable operation. No setting or adjustment is required before going in the hole or after the fish is engaged. The operator can easily and simply control the intensity of the jarring blows by varying the applied load. The coiled tubing intensifier is designed to operate in conjunction with the CT jar to supply force acceleration during the jarring stroke. The comparatively large ID permits the use of drop balls to actuate tools below the jar.

DESIGN FEATURES

- Increased impact ratios above existing industry tools
- Industry-leading impact values
- Shorter, more robust design
- Enhanced seal technology to ensure reliability

OD	Top Connection	Total Stroke	Total Stroke
1.500”	1” AMMT Box x Pin	56.30”	6”
1.687”	1” AMMT Box x Pin	74.50”	6”
2.125”	1-1/2” AMMT Box x Pin	85.00”	7”
2.875”	2-3/8” PAC Box x Pin	92.50”	8”
3.125”	2-3/8” REG Box x Pin	93.63”	8”

DUAL ACTING HYDRAULIC CT JAR

DESCRIPTION

The dual acting hydraulic coiled tubing jar delivers repeatable upward or downward jarring during a CT operation. It is a stable and highly dependable closed hydraulic system for hydrostatic pressure. This gives the coiled tubing operator the ability to control the pressure of the force delivered by varying the over-pull or push that is initiated.

The hydraulic CT jar utilizes a fleld proven precision system so that applied tension or compression gives consistent, reproducible jar strokes. Once the jar internal piston exits the detent, a sudden release of stored energy accelerates the jar mandrel which then suddenly, at the end of its travel, creates a jarring impact. A single detent design keeps the overall length short whilst maintaining high load ratings.

DESIGN FEATURES

- High jarring loads and high loads, Special fluid reduces time variation with temperature
- Jar wear constrained to economical redress pans reducing lifetime operating costs
- Easy to redress
- Full flow through the bore
- Specifically designed for CT use
- Efficient valve seating for deviated applications
- Closed and balanced hydraulic system

OD	Connections	Total Stroke	Total Stroke
1.500”	1” AMMT Box x Pin	50.80”	11”
1.687”	1” AMMT Box x Pin	50.80”	11”
2.125”	1-1/2” AMMT Box x Pin	56.70”	12”
2.875”	2-3/8” PAC Box x Pin	58.45”	12”

CT BI-DIRECTIONAL IMPACT HAMMER

DESCRIPTION

The Bi-Directional Impact Hammer conveys a controllable high frequency up or down impact to a downhole device. The frequency and magnitude of the impacts delivered are controlled via the flow rate and applied force.

Its short length and the ability to configure the impact hammer as up only, down or bi-directional make the impact hammer suitable for many applications including shifting sleeves, breaking disks, pulling plugs, scale removal cleanouts, tubing swaging and broaching. The ability to deliver high frequency impacts without the necessity to cycle the coiled tubing make the impact hammer an attractive alternative to using a jar.

The impact hammer stroker tool is also available to optimize the performance of the impact hammer when there is little effective length of coiled tubing above the hammer. The bi-directional impact hammer is manufactured from high grade materials and has an operating mechanism that does not rely on elastomer performance, making the tool suitable for corrosive and high temperature environments.

DESIGN FEATURES

- Compact length and high frequency controllable up and down impacts
- Can be figured as up hammer, down hammer, or bi-directional hammer
- Reduces coiled tubing fatigue compared with jarring
- Mechanism does not rely on elastomeric seals making it suitable for use in corrosive and high temperature wells

OD	Connections	Up Hammer Length	Down Hammer Length	Bi-Directional Length
1.690”	1” AMMT Box x Pin	28.50”	32.50”	52.00”
2.125”	1-1/2” AMMT Box x Pin	29.50”	33.10”	53.50”
2.785”	2-3/8” AMMT Box x Pin	31.00”	34.00”	55.00”

CT HIGH TORQUE INDEXING TOOL

DESCRIPTION

The high torque indexing tool can be utilized in any application where a high torque rotation of the BHA is required. Hydraulic toolstring pressure is converted to torque of up to 600ft-lbs and a pre-determined rotation of 15°-45°. Each time the toolstring pressure is bled off and increased, the High Torque Indexing Tool cycles again, resulting in another toolstring rotation.

The High Torque Indexing Tool can also be used to hook difficult fish, jet tunneling applications and stimulation. A mechanical conversion kit is also available, which converts the High Torque Indexing Tool so that, set down weight results in rotation of the BHA.

DESIGN FEATURES

- High Torque for rotating heavy BHA's
- Adjustable rotation from 15° to 45°
- Can be used for applications requiring orientation including fishing, jetting tunneling, cleanouts and stimulation

OD	Connection	Length
1.687"	1" AMMT Box x Pin	37.00"
1.750"	1" AMMT Box x Pin	37.00"
2.125"	1-1/2" AMMT Box x Pin	41.00"
2.250"	1-1/2" AMMT Box x Pin	41.00"
2.875"	2-3/8" PAC Box x Pin	54.98"

CT GS FLO-ACTIVATED TOOL

DESCRIPTION

The Coiled Tubing GS flo-activated pulling tool is a hydraulic release action used for running or retrieving downhole tools with standard size internal fishing necks. The GS flo-activated pulling tool has a dog, enabling 360° bear engagement to the fishing neck and amplifying the bearing burden load. Discharge is accomplished by expanding coiled tubing flow or pressure to work a cylinder which separates the center from the dog. The GS hydraulic pulling tool is accessible in sizes covering most standard inner fishing neck diameter. The tool happens to use a choke inserted in the core so the shear pins or drop balls won't be necessary to activate the tool.

DESIGN FEATURES

- Full hydraulic operation
- Multiple latch and release capability
- Proven dog design
- Available to catch a wide range of internal fish neck
- Safety shear function

OD	ID	Top Connection	Tensile Strength
1.5”	0.25”	1” AMMT Box	30,000 lbs.
2”	0.25”	1” AMMT Box	23,499 lbs.
2.5”	0.39”	1-1/2” AMMT Box	29,287 lbs.
3”	0.39”	2-3/8” PAC Box	50,686 lbs.
3.5”	0.39”	2-3/8” PAC DSI Box	60,000 lbs.
4”	0.39”	2-3/8” PAC DSI Box	67,000 lbs.

CT FLO-RELEASE SPEAR

DESCRIPTION

The coiled tubing releasable spear is a hydraulic release action tool used for fishing downhole tools with internal necks or cylindrical parts of broken tools without a fish neck that have been lost in the well.

The releasable spear has collets arranged over a decreased mandrel. To engage a fish, simply set down weight and flow through the tool, jar upwards to make the teeth nibble and take hold of the fish. To release the fish, simply set down weight and flow through the tool, this action separates the tapered mandrel from the collets. The Releasable Spear is available in sizes covering a wide range of fishing diameters.

DESIGN FEATURES

- Flow activated
- Hardened & double tempered slips
- Robust construction
- Variable slip sizes for each tool

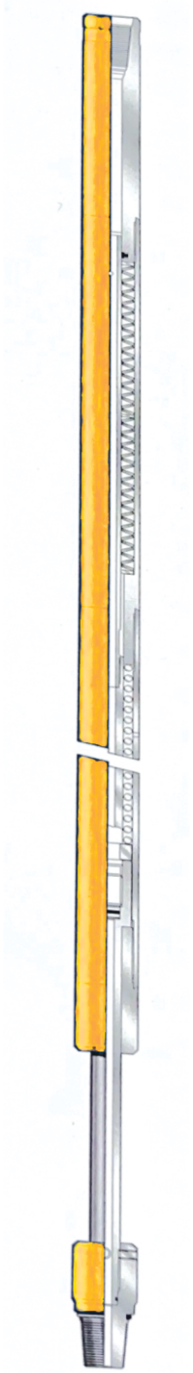
OD	ID	Top Connection	Catch Range
1.810”	0.25”	1-1/2” AMMT Box	1.12” - 2.38”
2.250”	0.39”	1-1/2” AMMT Box	1.88” - 3.00”
2.730”	0.39”	1-1/2” AMMT Box	2.38” - 3.50”
2.875”	0.39”	2-3/8” PAC Box	2.125” - 3.50”
3.110”	0.39”	2-3/8” PAC Box	2.62” - 3.88”

CT HAMMERHEAD INTENSIFIER

DESCRIPTION

The Hammerhead Intensifier is designed to be run in conjunction with a Bi Directional Impact Hammer. The Hammerhead Intensifier greatly increases the upward or downward impact generated by the Bi Directional Hammer function.

The Hammerhead Intensifier is a device that is capable of generating high frequency, short stroke impacts in either an upwards or downwards direction. The sub is generally used where impact vibration in conjunction with an applied push or pull force will assist in the recovery of stuck fish from within the wellbore. In conjunction with the push or pull force of the CT, the Hammerhead Intensifier provides the necessary acceleration to enhance the Bi Directional Hammer impact.



DESIGN FEATURES

- Available in a range of sizes to suit industry standard Coiled Tubing BHA's
- Suitable for high temperature environments
- Compact design ideal for restricted height applications
- Simple, robust design ensuring ease of operation for the end user
- Selected components QPQ treated
- Hexagonal flats for safe make-up & break-out
- Connection options to suit customer requirements

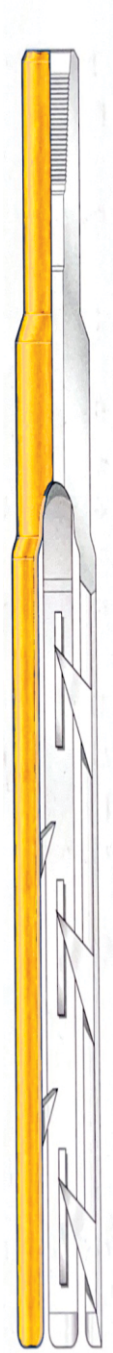
Actual OD	Make up Length
1.687”	57.15”
1.750”	57.15”
2.250”	78.38”
2.875”	80.82”

CT FLO-THRU ADJUSTABLE WIRE FINDER GRAB

DESCRIPTION

The Flo-Thru Adjustable Wire Finder Grab is used during fishing operations to locate & retrieve parted slickline or braided line back to surface.

The finder finger OD can be altered by simply rotating the adjustable finder skirt over the tapered main body. The finder skirt is then locked in to place at the desired running OD to suit the well geometry. The unique main body design provides extensive options of tool configuration. The interchangeable grab arms can be removed and the tool can be run solely as a wire finder to locate and ball up the top of the wire. Incorporating a ported lead impression block, magnet or centre spear further extends the operating envelope of this unique system.



DESIGN FEATURES

- Adjustable Finder Fingers to suit varied tubing ID's / restrictions
- Removable 2, 3 or 4 pronged grab arms options
- Multiple configurations
- Inventory Reduction
- Connection options to suit customer requirements
- Simple, robust design ensuring ease of operation for the end user
- Selected components QPQ treated
- Hexagonal flats for safe make-up & break-out

To Suit Tubing Size	Adjustment Range	Prong Grab Arm Options
2-3/8"	1.750" - 1.992"	2
2-7/8"	2.200" - 2.441"	2 or 3
3-1/2"	2.720" - 2.992"	2 or 3
4"	3.310" - 3.548"	2 or 3
4-1/2"	3.600" - 3.992"	2, 3, or 4
5"	3.800" - 4.330"	2, 3, or 4
5-1/2"	4.530" - 4.904"	2, 3, or 4
7"	5.720" - 6.184"	2, 3, or 4

CT FLO-ACTIVATED ALLIGATOR GRAB

DESCRIPTION

The Flo-Activated Alligator Grab is designed to retrieve damaged or broken objects from within the well bore..

Increasing the flow to a predetermined rate allows the jaws to open, reducing pump rate allows the two opposing jaws of the Alligator Grab to snap closed & clamp tightly 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 varied by adjusting the spring tension prior to running in the hole, the activation flow rate can also be altered by replacing inter-changeable orifice inserts in a range of internal diameters.

DESIGN FEATURES

- Fully adjustable jaw tension for optimal grip force
- Flow activated jaws operated by pumping rate
- Serrated jaws to improve grip
- Available in a range of sizes for various operational applications
- Connection options to suit customer requirements
- Simple, robust design ensuring ease of operation for the end user
- Selected components QPQ treated
- Hexagonal flats for safe make-up & break-out

Actual OD	Make up Length
1.689”	24.83”
2.125”	24.93”
2.875”	27.60”

CT PORTED CENTRE SPEAR

DESCRIPTION

The Ported Centre Spear is used during fishing operations primarily to retrieve tightly compacted, parted slickline or braided cable to surface.

The Ported Centre Spear is generally used when a traditional wire grab has been unsuccessful. The barbs, positioned around a centre mandrel allow for a more efficient penetration into a tight ball of wire, compared to the pronged arm style of a wire grab. As the Ported Centre Spear is effectively non- releasable, it is generally run with a hydraulic disconnect arrangement directly above it to provide a release feature if the parted wire cannot be retrieved back to surface.

DESIGN FEATURES

- Available in a range of sizes to suit all completion designs
- Ideal for use with Adjustable Wire Finder range
- Unique thru-welded barbs for added strength
- Simple, robust design ensuring ease of operation for the end user
- Ported feature allows debris to be washed ahead of the BHA
- Connection options to suit customer requirements
- Selected components QPQ treated
- Hexagonal flats for safe make-up & break-out

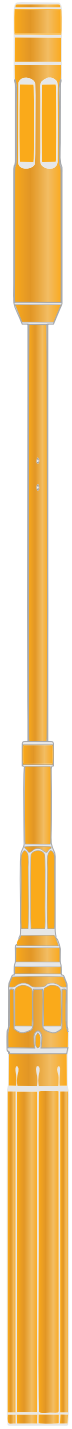
Actual OD	Make up Length
2.250”	21.63”
2.375”	22.00”
2.875”	24.96”

CT FLO-THRU ADJ. WIRE FINDER RETRIEVER

DESCRIPTION

The Flo-Thru Adjustable Wire Finder Retriever is used during fishing operations to locate and retrieve parted slickline or braided cable in a single run.

The finder finger OD can be altered by simply rotating the adjustable finder skirt over the tapered main body. The finder skirt is then locked in to place at the desired running OD to suit the well geometry. Upon reaching the top of the wire, the flexible design of the finder skirt will guide the parted line into the body of the Finder Retriever. Pulling out of hole at this point will close the mandrel and trap the line firmly within the Finder Retriever, enabling recovery.



DESIGN FEATURES

- Indicator ports to determine mandrel movement
- Adjustable Finder Fingers to suit varied tubing ID's / restrictions
- Inventory reduction
- Connection options to suit customer requirements
- Simple, robust design ensuring ease of operation for the end user
- Selected components QPQ treated
- Hexagonal flats for safe make-up & break-out

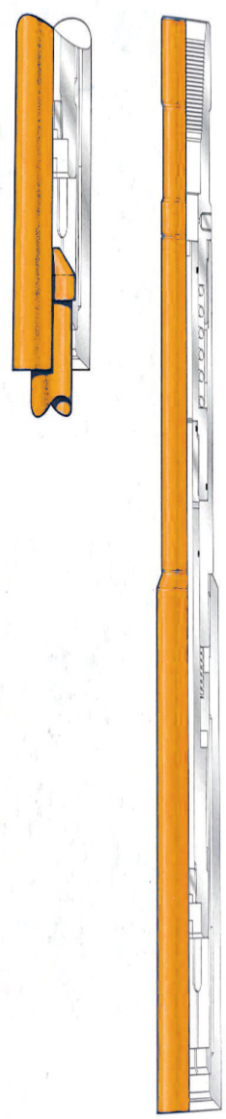
To Suit Tubing Size	Adjustment Range
2-3/8”	1.750” - 1.992”
2-7/8”	2.200” - 2.441”
3-1/2”	2.720” - 2.992”
4”	3.310” - 3.548”
4-1/2”	3.600” - 3.992”
5”	3.800” 4.330”
5-1/2”	4.530” - 4.904”
7”	5.720” - 6.184”

CT HEAVY DUTY PULLING TOOL

DESCRIPTION

The Heavy Duty Pulling Tool is designed to engage the full 360 degree underside of all external type fish necks and reaches without the need for separate Cores.

Incorporating the unique Arm-Align feature for easy re-pinning, it is typically used in heavy jarring applications as the full contact radius of the collet fingers provides a greater load bearing area than the dogs of a standard type pulling tool. This design ensures the Heavy Duty Pulling Tool and the fish neck to be recovered is less prone to damage during fishing operations. The unique ratchet locking feature ensures the collet fingers remain in the release position whilst disengaging from the external fish neck.



DESIGN FEATURES

- · Simplistic, ergonomic design for rapid redress
- The Arm-Align® feature for integral re-arming and shear pin alignment
- Multi-Reach core for ALL known reaches for inventory reduction and cost saving
- One piece collet fingers with increased contact area between collet fingers and fish neck
- Multiple Shear Pin options increasing operational flexibility
- Optional Bell Guide Housings available
- Connection options to suit customer requirements
- Simple, robust design ensuring ease of operation for the end user
- Selected components QPQ treated
- Hexagonal flats for safe make-up & break-out

CT FLO-RELEASE SLIMLINE PULLING TOOL

DESCRIPTION

The Slimline Flo-Release Pulling Tool is designed for the setting and retrieval of down hole items fitted with external type fish necks.

The OD of the Slimline Pulling Tool has been specifically optimised to pass through the majority of No-Go nipple profiles whilst being able to maintain maximum strength through the assembly. The Slimline Pulling Tool is operated by setting down weight to engage the external fish neck. If the device cannot be recovered, setting down weight and increasing the coil flow rate will activate the core piston allowing the pulling tool to disengage from the external fish neck.

DESIGN FEATURES

- Minimal components including one piece collet design
- No requirement for pawls or small, hard-to-install parts
- Slim running OD without compromising strength
- Interchangeable orifice nozzles
- No shear pin required, offering unlimited tool functions
- Simplistic, ergonomic design for rapid redress
- Optional Bell Guide Housings available
- Connection options to suit customer requirements
- Simple, robust design ensuring ease of operation for the end user
- Selected components QPQ treated
- Hexagonal flats for safe make-up & break-out
- Pin Punch Slot for simple release at surface

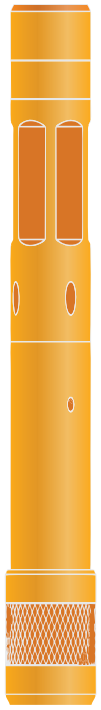
Minimum OD	To Engage Fish Neck
1.687”	1.187”
1.765”	1.375”
2.180”	1.750”
2.720”	2.312”
3.115”	2.750”
3.600”	3.125”

CT HIGH POWER/HIGH TEMPERATURE MAGNET

DESCRIPTION

The Ported High Power/High Temperature Magnet is designed to recover damaged, dropped or broken metallic objects from the well bore.

The high strength samarium cobalt magnetic insert is particularly suited for use in high temperature wells where most common rare earth magnets will lose their strength after exposure to heat. The outer sleeve of the housing is manufactured from non-magnetic stainless steel. This focuses the magnetic flux downwards and guarantees effortless conveyance in the well. A set of ports in the tool allows circulation through the CT string to aid with removal of debris from the top of the fish.



DESIGN FEATURES

- High temperature resistant samarium cobalt magnetic insert rated to 660 Deg F
- Flat bottom option for optimum strength
- Circulation ports to aid in debris removal from the top of a fish
- Sprung Sleeve option for assisting recovery of smaller objects
- Available in a range of sizes
- Bespoke options available to suit a range of applications
- Aluminium protector supplied as standard for safe handling
- Stainless steel outer sleeve for ease of conveyance in the well
- Connection options to suit customer requirements
- Selected components QPQ treated
- Hexagonal flats for safe make-up & break-out

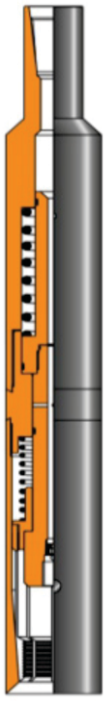
N/B: The Ported High Power/High Temperature Magnets are available in a range of diameters and thread connections to suit client requirements.

CT FLO-RELEASE OVERSHOT

DESCRIPTION

The flo-release overshot is a hydraulic release, external catch tool used for fishing downhole tools or parts of broken tools without a fishneck or that have been lost in the well tubing.

The flow releasable overshot has hardened grapple slips arranged inside a tapered bowl. To engage a fish, the tool is kept running in hole until it over releases the slip to latch onto the fish, an overpull is then applied and the grapple teeth bites into the fish, enabling it to be retrieved. Release from the fish is achieved by increasing flow or pressure to operate a piston which disengages the tapered bowl from the grapple-slips. This release mechanism is what differentiate the releasable overshot from the standard non-releasable overshot.



DESIGN FEATURES

- Hydraulic release
- Hardened grapple-slip teeth
- Simple, robust construction
- Easy redress
- Large grapple-slip size range for each tool
- Optional integral bell guide bowl available

OD	ID	Top Connection	Catch Range
1.850”	0.14”	1” AMMT Box	0.5” - 1.5”
2.125”	0.14”	1-1/2” AMMT Box	0.5” - 1.75”
2.250”	0.14”	1-1/2” AMMT Box	0.5” - 1.75”
2.625”	0.14”	1-1/2” AMMT Box	0.5” - 2.0”
3.250”	0.14”	2-3/8” PAC Box	0.5” - 2.25”

CT FLO-RELEASE OVERSHOT - Fishing Data

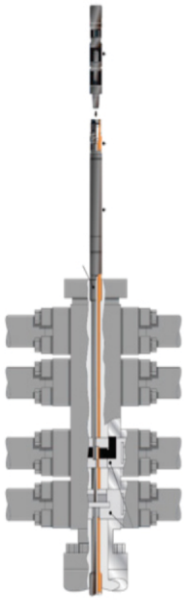
Overshot Size	2”	2-1/8”	2-1/2”	3”	3-1/2”
Max OD	1.850”	2.125”	2.250”	2.625”	3.250”
Catch Range	0.5” - 1.5”	0.5” - 1.75”	0.5” - 1.75”	0.5” - 2.0”	0.5” - 2.25”
Slip Size	Catch Range	Catch Range	Catch Range	Catch Range	Catch Range
1/2”	1/2” - 9/16”	1/2” - 9/16”	1/2” - 9/16”	3/8” - 9/16”	
5/8”	9/16” - 11/16”	9/16” - 11/16”	9/16” - 11/16”	9/16” - 3/4”	1/2” - 11/16”
3/4”	11/16” - 13/16”	11/16” - 13/16”	11/16” - 13/16”		11/16” - 7/8”
7/8”	13/16” - 15/16”	13/16” - 15/16”	13/16” - 15/16”	3/4” - 15/16”	
1”	15/16” - 15/16”	15/16” - 15/16”	15/16” - 15/16”	15/16” - 1-8/16”	7/8” - 1-1/16”

DEPLOYMENT SYSTEM

DESCRIPTION

The deployment system is an application work string used where the toolstring length exceeds the capacity of the lubricator section. By using a deployment system the BHA deployment can be staggered.

The deployment system is a combination of three components, a deployment bar, HT Joint and a dual ball Kelly cock valve. The diameter of the wasted section of the deployment bar is matched to the size of coiled tubing being used, and retains full bore flow-through. Closing the ball valves in the kelly cock valve gives a double barrier to the wellbore.



DEPLOYMENT BAR TECHNICAL SPECIFICATIONS

Size	Tool OD	Connections	Length	Scaling OD/ BOP Ram
1-11/16”	1.688”	1” AMMT Box x Pin	132” Make Up	0.5” - 1.5”
1-11/16”	1.688”	1” AMMT Box x Pin	72” Make Up	0.5” - 1.75”
1-3/4”	1.750”	1” AMMT Box x Pin	72” Make Up	0.5” - 1.75”
1-3/4”	1.750”	1” AMMT Box x Pin	48” Make Up	0.5” - 2.0”

CARSAC HT JOINT TECHNICAL SPECIFICATIONS

Size	Tool OD	ID	Connections	Length
1-11/16”	1.688”	0.500”	1” AMMT Box x Pin	15.12”
1-11/16”	1.750”	0.437”	1” AMMT Box x Pin	14.00”
1-3/4”	1.750”	0.500”	1” AMMT Box x Pin	14.25”
2-1/8”	2.125”	0.875”	1-1/2” AMMT Box x Pin	14.25”

DUAL BALL KELLY COCK VALVE TECHNICAL SPECIFICATIONS

Size	Tool OD	ID	Connections	Length
1-11/16”	1.688”	0.500”	1” AMMT Box x Pin	14.00”
2-7/8”	2.875”	0.968”	2-3/8” PAC Box x Pin	19.00”
2-7/8”	2.875”	0.968”	2-3/8” PAC Box x Pin	22.65”
2-7/8”	2.875”	0.968”	2-3/8” PAC DSI Box x Pin	19.99”

COILED TUBING BLEED-OFF SUB

DESCRIPTION

The CT bleed off sub is a short tool that can be placed anywhere in a CT tool string, where there is a possibility of a trapped pressure, when used in conjunction with a dual ball Kelly cock valve, it can be useful in deploying tools in the well.

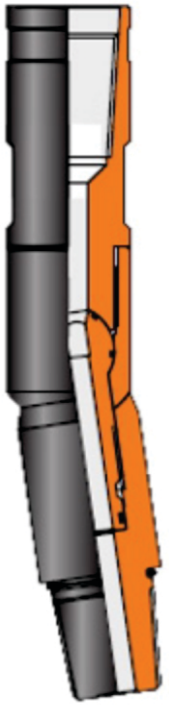
DESIGN FEATURES

- Pressure can be manually bled off at the surface with hex socket wrench
- Functions as a deploying tool, when used along with a dual ball kelly cock valve

Size	Tool OD	ID	Connections	Length
7/8”	2.875”	1.25”	3/8” PAC DSI Box x Pin	8”
1/8”	3.125”	1.25”	3/8” PAC DSI Box x Pin	8”

KNUCKLE JOINT

DESCRIPTION



A knuckle joint within the toolstring enables the BHA pass unrestricted over nipple shoulders, tubing crossovers and other points where a rigid toolstring may encounter difficulty.

The coiled tubing knuckle joint (rotating) is a fully sealed joint that provides the CT tool string with an inclusive 15° of flexible deviation and allows a full 360° rotation. The I.D. at the knuckle is beveled in order to maximize the bore when the joint is at full deviation. The ball and socket of the knuckle provides the rotation and angular deviation of the tool. This flexibility is required when the bore of the hole is restricted or highly deviated.

Multiple rotating knuckle joints can be used in particularly long tool string.

DESIGN FEATURES

- Full flow through bore
- Internal pressure seal
- 15° angular deviation
- Full 360° rotation

OD	Connections	Length
1.500”	1” AMMT Box x Pin	8.50”
1.688”	1” AMMT Box x Pin	10.00”
1.750”	1” AMMT Box x Pin	9.25”
2.125”	1-1/2” AMMT Box x Pin	10.00”
2.375”	1-1/2” AMMT Box x Pin	10.00”

TUBING END LOCATOR

DESCRIPTION

The CT Tubing End Locator is a hydraulic action tool that is often retractable and is used to identify the tubing end for the purpose of depth correlation. The typically retractable arms of the tool will migrate into the extended position when CT flow/pressure is increased to the tool. A steady upward movement of the CT, while maintaining CT flow/pressure, will bring the extended arms into contact with the tubing entrance point and cause an over pull to be visible. The arms will retract after the maximum over draw has been reached, and the tubing end locator will pull through.

DESIGN FEATURES

- The tagging can be repeated as many times as required
- Suited to most common tubing sizes
- Easy to deploy

Outside Diameter	Inside Diameter	Tubing/Casing Size
1.688”	0.38”	2-3/8” - 3-1/2”
2.125”	0.69”	2-7/8” - 3-1/2”
2.625”	0.90”	3-1/2” - 4-1/2”
3.940”	1.06”	5” - 6”

COILED TUBING TENSION SET PACKER (J-SLOT)

DESCRIPTION

The Coiled Tubing Tension Set Packer is one of the most versatile tools on the market today. The Coiled Tubing Tension Set Packer is a full-opening, retrievable packer that includes J-slot mechanism, mechanical slips, packet elements and hydraulic slips. In application the Coiled Tubing Tension Set Packer may be run as a tension packer or a compression packer and is set and released by a simple set down and pick up motion of the coiled tubing., thus allowing for it to be set and released multiple times in one run.

Multiple rotating knuckle joints can be used in particularly long tool string.

DESIGN FEATURES

- Packer can be set and released fully without rotating the tubing
- Uses a J-Slot mechanism that makes it easy to set & release
- The packer can be set and relocated as many times as necessary with simple manipulation
- Compact and Short - increases the efficiency of handling, shipping, and storing of the tool
- Available in low to high pressure applications

Tubing Size					Packer	
OD	Weight	ID Range Min	ID Range Max	Tool Size	Element	Cone and Guage Ring
2-3/8”	4.70” - 5.80”	1.750”	1.995”	1-11/16”	1.632”	1.688”
2-7/8”	6.40” - 8.60”	2.187”	2.187”	2-1/8”	2.062”	2.125”
3-1/2”	9.30” - 12.70”	2.625”	2.992”	2-9/16”	2.500”	2.562”
4-1/2”	12.60” - 15.10”	3.826”	3.958”	3-1/2”	3.500”	3.562”

FLO-ACTIVATED SHIFTING TOOL

DESCRIPTION

A high expansion hydraulically driven, bi-directional tool called the Flo-Activated Shifting tool is used to selectively open and close sleeves inside the completion string. The tool can be set up with single-acting keys to either open or close sleeves, or it can be set up with bi-directional keys to shift sleeves in both directions in a single trip. When the tool is run, the keys are in the retracted position, and the flow rate is increased to expand the keys and locate the target sleeve profile. The tool will automatically disengage from the profile once the sleeve has been moved completely to the desired position.

DESIGN FEATURES

- Bi-directional and single directional options
- Selectively engages desired profile
- Simple, robust design ensuring ease
- Ball Drop Capability
- Connection to suit customer requirements

Actual OD	Tubing Range
1.750”	2-3/8” - 3-1/2”
1.687”	2-3/8” - 3-1/2”
2.200”	2-7/8” - 4-1/2”
2.875”	4” - 5-1/2”
3.125”	4” - 7”

MULTI CYCLE CIRCULATING SUB

DESCRIPTION

To enable frequent switching of flow channels between the annular and forward-facing flow, the Multi Cycle Circ Sub is used. The tool switches between circulating modes each time a high flow rate followed by a low flow rate sequence is carried out, and it stays in that position until the next cycle is carried out. It is the perfect tool for a variety of applications because it doesn't need a steady high flow rate to stay in either position.

DESIGN FEATURES

- Suitable for high temperature environments
- Torque-thru capability
- Simple, robust design ensuring ease
- Connection to suit customer requirements

Actual OD	Make Up Length
1.687”	22.00”
1.750”	22.00”
2.125”	25.35”
2.250”	25.35”
2.875”	30.27”

FLO-DIVERTER SUB

DESCRIPTION

The annular flow channel is diverted into the Coiled Tubing BHA below using the Flo-Diverter Sub. The Coiled Tubing is used to pump and propel a drop ball. The ball seats and isolates the annular flow path from the CT once it reaches the diverter sub. The flow is then routed into the BHA, which is directly beneath the Diverter Sub, through a number of gun-drilled apertures. The Diverter Sub is frequently employed in connection with setting/initiation devices for inflatable/retrievable packers, but it is also frequently included into a BHA during perforating operations when using a pressure activated-type fire head.

DESIGN FEATURES

- Drop Ball activated
- No shear screws required
- Simple, robust design ensuring ease
- Connection to suit customer requirements
- Brief make-up length

Size	Actual OD
1.687”	1.687”
1.750”	1.750”
2.125”	2.125”
2.375”	2.250”
2.875”	2.875”
3.125”	3.125”

INTERVENTION TOOLS

- Bridge Plugs
- Cement Retainers
- Setting Tools
- Tubing Punchers
- Tubing Cutters
- Ulta-High Expansion Tools
- Straddle System
- Downhole Camera

PERMANENT BRIDGE PLUG

DESCRIPTION

We offer an industry leading portfolio of permanent bridge plugs. The coiled tubing permanent bridge plugs are ideal for a range of applications where secure, permanent pressure barrier is essential such as a major plug-andabandonment work. Our permanent bridge plugs are designed to mechanically convert external pressure into additional sealing force using metal grippers and can all withstand differential pressures of up to 7,500 PSI at 350°F.

These versatile and dependable plugs increase the efficiency of isolation or plugging operations.

DESIGN FEATURES

- Simple design
- Non-retrievable
- Compact design

Tubing Size	Plug OD	ID Setting Range: Min	ID Setting Range: Max	Pressure Rating
2-3/8”	1.800”	1.759”	2.107”	10,000 psi
2-7/8”	2.110”	2.125”	2.563”	10,000 psi
2-7/8”	2.225”	2.340”	2.525”	10,000 psi
3-1/2”	2.500”	2.530”	2.810”	10,000 psi
3-1/2”	2.700”	2.670”	3.258”	10,000 psi
4”	3.120”	3.340”	3.732”	10,000 psi

Note: Refer to C.3 SETTING TOOLS to see the setting tools options.

DRILLABLE BRIDGE PLUG

DESCRIPTION

We offer an industry leading portfolio of bridge plugs. The drillable bridge plug is designed to be permanently set in either tubing or casing. This plug can hold large pressure differentials at elevated temperatures (10,000psi/350°F) and it's commonly used for temporary or permanent zonal Isolation, well abandonment, tubing pressure tests, and stimulations.

This plug is constructed such that it can be removed by means of drilling or milling if required and an adequate amount of sand or cement must be dumped above the plug to prevent damage from perforating shock.

DESIGN FEATURES

- Can be removed by milling operation
- Can withstand a wide range of pressure at elevated temperatures
- Compact and dependable

Tubing Size	Plug OD	ID Setting Range: Min	ID Setting Range: Max	Pressure Rating
2-3/8"	1.800"	1.759"	2.107"	10,000 psi
2-7/8"	2.110"	2.125"	2.563"	10,000 psi
2-7/8"	2.225"	2.340"	2.525"	10,000 psi
3-1/2"	2.500"	2.530"	2.810"	10,000 psi
3-1/2"	2.700"	2.670"	3.258"	10,000 psi
4"	3.120"	3.340"	3.732"	10,000 psi

Note: Refer to setting tools page to see setting tools option

RETRIEVABLE BRIDGE PLUG

DESCRIPTION

Our Bridge Plugs are suitable for use in various applications such as zonal isolation in wells with multiple perforated zones; set as a barrier for plug and abandonment work; or used for zonal isolation during high pressure stimulation; acidizing or cementing operations. The running OD is designed to pass most common completion nipple profiles and expand and set in its nominated tubing size and weight.

The bridge plug lower slips are activated by stopping the wireline quickly to shock shear the activation pin, setting down weight then engages the lower slips with the tubing wall. Jarring down sets the element and then further jarring down sets the upper slips. A lock ring traps the setting force into the element so that it will not release during subsequent pressure. The bridge plug is available as permanent and retrievable bridge plugs and can be set on coiled tubing using hydrostatic setting tool reversals.

DESIGN FEATURES

- Set with standard toolstring tools including Link Jar and GS Tool
- Simple setting procedure for dependable operation
- Can be converted to deploy injection valves and standing valves
- Can be run on Coiled Tubing
- Prong Plug or Melon Plug type

Tubing Size	Tubing Weight	Tool Size	Pressure Rating
2-3/8”	4.6#	1.88”	5,000 psi
2-7/8”	6.4#	2.25”	10,000 psi
3-1/2”	10.2#	2.72”	10,000 psi
4-1/2”	12.6#	3.72”	10,000 psi

Note: Refer to setting tools page to see setting tools option

CEMENT RETAINERS

DESCRIPTION

The compact and dependable cast iron cement retainer is a rugged and compact tool with a positive, pressure balanced sliding valve or flapper valve arrangement for pressure containment. It is available in a range of tubing sizes and can be set hydraulically on coiled tubing or run and set on electric wireline.

Two variants of cement retainers are available; both are designed to prevent the backflow of fluids, are easily drillable and are set in either a single trip or in two trips.

The two-trip cement retainer can be set on coil tubing using a hydraulic setting tool or on wireline using the pressure setting tool. Whilst the one trip cement retainer is set only on coiled tubing.

DESIGN FEATURES

- Coiled tubing or electric line set — Can be set by mechanical or hydraulic methods on tubing or run and set on electric line
- Drillable cast iron construction
- Faster, safer run-in - Run-in speed is up to the operator
- Tests tubing - Tubing can be tested before squeezing by picking up to close the valve and applying pressure
- Holds final squeeze pressure - Automatic closing of the valve when picking up or removal of stringer, ensures holding the squeeze under final pressure as cement is circulated out

Tubing Size	Plug OD	ID Setting Range: Min	ID Setting Range: Max	Pressure Rating
2-3/8”	1.800”	1.759”	2.107”	5,000 psi /10,000 psi
2-7/8”	2.110”	2.125”	2.563”	5,000 psi /10,000 psi
2-7/8”	2.225”	2.340”	2.525”	5,000 psi /10,000 psi
3-1/2”	2.500”	2.530”	2.810”	5,000 psi /10,000 psi
3-1/2”	2.700”	2.670”	3.258”	5,000 psi /10,000 psi
4”	3.120”	3.340”	3.732”	5,000 psi /10,000 psi

Note: Refer to setting tools page to see setting tools option

WIRELINE PRESSURE SETTING TOOL

DESCRIPTION

The Wireline Pressure Setting Tool is used to deliver the stroke and force necessary to set tension bolt/shear ring releasing devices such as bridge plugs, packers, cement retainers, and others via wireline. A big power source (gas generator) that is electrically activated generates enough high-pressure gas. These tension bolts or shear rings, which frequently affix the downhole tools to the setting tool, might be severed by the gas pressure pressing against the piston area. In some models, a multi-stage version of the tool is made available. A stage is added, increasing the piston area to provide more force with the same power charge, enabling the use of greater tension bolt/shear ring values if necessary.

DESIGN FEATURES

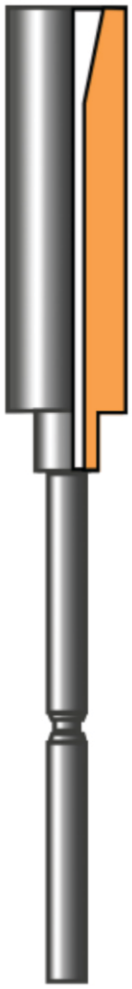
- Includes gas over hydraulic setting operation
- Does not require secondary igniter
- Uses spiral pins to prevent tool from presetting while running in the hole

Tool Size	Top Connection	Tool Length	Max Stroke
2-3/8”	1.315” EUE	52.56”	6.00”
2-7/8”	1.315” EUE	78.19”	10.31”
3-1/2”	2-3/8” EUE	73.70”	10.31”

WIRELINE ADAPTOR KITS

DESCRIPTION

The Wireline Adapter Kit is used in conjunction with wireline setting equipment such as cement retainers, bridge plugs, and packers. It has an Adjustor Sub, Setting Sleeve, and Tension Mandrel. When engaged, the setting sleeve applies pressure to the equipment below the HST. Consequently, it becomes active. The Tension Mandrel connects the WLAK to the Release Stud to complete a full pack-off and break the release stud, which liberates the tool for POOH. Tensile loads can be transmitted into the machinery in this way.



DESIGN FEATURES

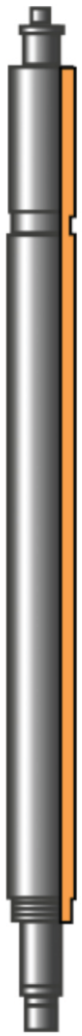
- Enhanced annular clearance
- Parts that are sealed in and secure
- Operation is simple
- Suitable with Wireline Pressure Setting Assembly
- Characterized by flexible subs

Casing Size	Tool OD	Wireline Setting Toolbox Up
3-1/2”	2.750”	#05
4-1/2”	2.750”	#05
4-1/2”	3.620”	#05

ELECTRO-MECHANICAL SETTING TOOL

DESCRIPTION

Our electro-mechanical downhole setting tool can set or unset plugs and packers in a variety of tubing and casing sizes. It can deliver up to 150,000 pounds of force. Any conveyance technique, including slickline, digital slickline, electric line, and coiled tubing, can be used with K-Set.



DESIGN FEATURES

- Non-Explosive plug setting tool
- No special software or surface power supply required
- Simple to use and virtually no redress costs
- Suitable for any conveyance method
- Depth Correlation attribute

K-Set OD	M/U Length	Weight	Stroke Length	Max Time Standard Full Stroke
1.688”	5.8 ft	27.7 lbs	12.75”	18 mins
2.125”	4.2 ft	34.2 lbs	10.00”	17 mins
2.720”	5.4 ft	66.6 lbs	10.00”	16 mins
3.600”	4.8 ft	108 lbs	10.00”	18 mins
4.100”	6.0 ft	125 lbs	10.00”	20 mins

FLO-ACTIVATED SETTING TOOL

DESCRIPTION

The Flo-Activated Setting Tool is made to set cement retainers, packers, and bridge plugs utilizing coil tubing, production tubing, or work string. This makes it appropriate for horizontal applications and coil tubing since no rotation is needed. Move the ball in a circle to the hydraulic setting tool, then apply the necessary pressure there before disconnecting. As the tubing emerges from the hole, it will automatically drain.

DESIGN FEATURES

- Horizontal application suitability
- Suitable for many applications
- Operation is simple
- Zero rotation required

Type	Outer Diameter
Type 5	1.750”
Type 2125	2.125”
Type 10	2.750”
Type 20	3.812”

ONE-TRIP FLO-ACTIVATED SETTING TOOL

DESCRIPTION

The One-Trip Flo-Activated Tool is made to squeeze or spot cement in one trip after running and thoroughly setting the One-Trip Sleeve Valve Cement Retainer. It is advised for wells with deviations when the environment is unsuitable for mechanical or wireline set cement retainers. It is perfect for applications on drill pipe or tubing because of its straightforward operation and quick clean-up. Simply run the tool to the preset setting depth, drop the ball, and then pressurize either the drill pipe or tubing to shear release without turning it. The One-Trip Flo-Activated Setting Tool automatically accounts for setting travel, fully sets the One-Trip Cement Retainer, unlocks the ball seat, closes the circulation ports, opens the bypass, and closes the circulation ports.

DESIGN FEATURES

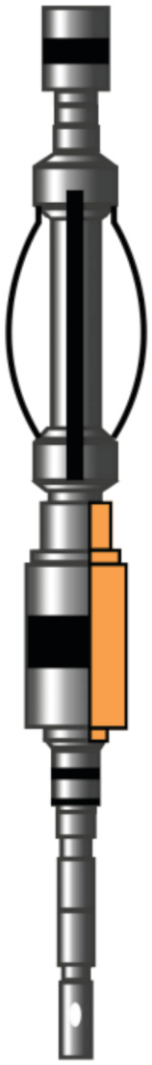
- Wide Range Applications
- Accommodates Deviated Wells
- Operation is simple
- Straightforward operations

Tubing Size	Outer Diameter
2-3/8”	1.995”
2-7/8”	2.441”
3-1/2”	2.992”
4-1/2”	3.958”

STINGER ASSEMBLY

DESCRIPTION

In a two-trip cement retainer appication, a stinger is run on coil tubing or Eline in a second trip and stung into the cement retainer. Squeeze operation can now begin. The stinger assembly functions mainly to operate the valve in a CT/WL set cement retainer. Straight pick-up closes the valve and sets down weight and opens the sleeve valve.



DESIGN FEATURES

- Provides positive control when the work string is picked up to close the sleeve valve
- Re-engages each time the work string is lowered to open the sleeve valve
- Helps prevent the seal from pumping out during pumping operations or tubing testing
- One size operates several sizes of retainers

Casing Size	Casing Weight	Stinger Assembly Size	Stinger Assembly Connection
3/8”	4.6 ppf	2”	1/2” AMMT Box
7/8”	6.4 - 7.9 ppf	2.150”	1/2” AMMT Box
1/2”	7.7 - 10.2 ppf	2.750”	3/8” PAC Box

SLICKLINE TUBING PUNCH

DESCRIPTION

When there is a need to access the behind of the casing for whatever reason or in the case of annular cementing, the tubing punch is employed. Before deployment, the running string is assembled by connecting the Slickline Tubing Punch Tool to the setting tool. A straightforward hydraulic system powers or releases the tool directly by moving the Main Piston upwards or downwards. The procedure can start after the running string is positioned at the necessary punching depth.

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DESIGN FEATURES

- Aligned Punching
- Single Punch
- Multi Punch

Tubing Size	Tubing Weight	Hole Size	Number of Holes
2.875”	6.4 - 8.6 lb/ft	0.375” - 0.715”	Up to 8
3.500”	7.7 - 12.7 lb/ft	0.375” - 0.715”	Up to 8
4.500”	12.6 - 15.1 lb/ft	0.375” - 0.715”	Up to 8

FLO-ACTIVATED TUBING PUNCH

DESCRIPTION

The Flo-activated Tubing Punch is designed for limited penetration to allow an inner tubing or casings string to be perforated without damage. The Flo-Activated Tubing Punch provides operating force for the field-proven mechanical punch mechanism. The mechanical punch mechanism drives a punch through the tubing wall and continues to stroke thereby retracting the punch back into the tool body.

The Flo-Activated Tubing Punch provides operating force for the field proven mechanical punch mechanism. The mechanical punch mechanism drives a punch through the tubing wall and continues to stroke thereby retracting the punch back into the tool body.

DESIGN FEATURES

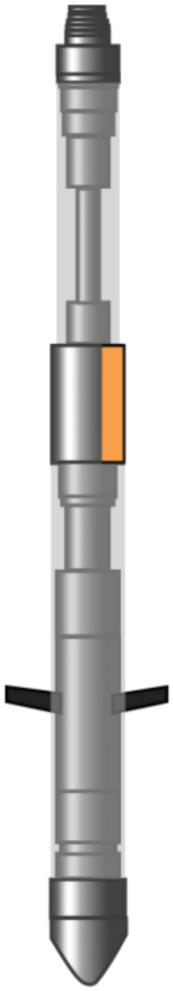
- Single hole punches per CT run
- Trustworthy mechanical proven punching mechanism
- Safety release mechanism

Outer Diameter	Standard Connection	Tubing/Casing Size
1.84”	1.00” AMMT	2-3/8” 4.0 - 4.7#
2.19”	1.50” AMMT	2-7/8” 6.4 - 7.9#
2.69”	1.50” AMMT	3-1/2” 7.7 - 10.2#
3.65”	2.375” PAC	4-1/2” 12.6#

FLO-ACTIVATED TUBING CUTTER

DESCRIPTION

The three-bladed Flo-Activated Tubing Cutter is a tool used in workover, fishing, and abandonment operations to cut production tubing, drill pipe, and small diameter casing strings. A motor is used to deploy the Flo-Activated Tubing Cutter, which is used to retrieve or drop tubulars into the well hole. When the motor starts to rotate and the flow rate is raised, the carbide-dressed blades in the tool expand into the tube wall. Normally, the BHA would be held in place. The blades are forced further into the tube wall by greater flow rate and RPM, resulting in a precise and effective cut.



DESIGN FEATURES

- Aligned Punching
- Single Punch
- Multi Punch

Actual OD	Standard Range
1.687”	2.87” - 3.50”
2.125”	3.50” - 5.00”
2.875”	4.50” - 7.00”
3.125”	4.50” - 7.00”

FLO-ACTIVATED ANCHOR

DESCRIPTION

During rotary cutting operations, the Coiled Tubing string is normally secured and centered inside the tubing using the Flo-Activated Anchor. Increased flow rate shifts a piston and activates the anchor to secure the Coiled Tubing BHA within the well-bore as it is deployed to the appropriate depth. From that moment onward, any applied load is transmitted through the Anchor to the tube wall rather than the tools below. The anchors retract back into place as the flow rate decreases.

DESIGN FEATURES

- Drop ball capability
- Rugged anchor design
- Shear release mechanism
- Operational ease

Actual OD	Standard Range
1.687”	2.460”
2.125”	3.070”
2.875”	4.190”
3.125”	4.630”

ELECTROMECHANICAL CUTTING TOOL

DESCRIPTION

A non-explosive, non-lithium downhole cutting tool, the electromechanical cutting tool can be used in memory mode on coil tubing or slickline or in real-time on digital slickline or electric line. It provides 0% debris and non-flaring cuts in tension or compression. The tool records an electronic signature and a mechanical telltale for CUT confirmation, making sure that downhole criteria are present to assess the job's success. The ability to deliver the cut by mechanical or real-time slickline may be the tool's most important feature, providing clients with a more affordable option than other electric line-cutting instruments now in the market.

DESIGN FEATURES

- Non-explosive
- Tensional and compressional cuts
- Various conveyance methods - CT, Eline, Slickline
- Tubing cut, casing cut, packer mandrels cut, & slickline pipe cut
- Realtime or memory mode

Pipe Size	Cut OD	Length	Weight	Max Wall Thickness
4.500”	3.600”	8.05 ft	188.7 lbs	Up to 15.1 ppf
5.500”	4.500”	8.05 ft	228.9 lbs	Up to 26.0 ppf

HIGH EXPANSION PLUG

DESCRIPTION

When ultra-high expansion is needed, the Ultra High Expansion Plug is designed for deployment in Thru-tubing applications. High pressure seal integrity is provided at extremely high expansion ratios by the expanding metal element. The plug can be employed with coil tubing, slickline, and e-line.

DESIGN FEATURES

- Optional deployment services
- Standard pressure rating and expansion ratio combinations
- Flexible deployment options
- Ultra-high expansion ratios

OD	Pressure Rating	Temp Rating	Tubing
2.125”	4,500 psi	125°C	4-1/2”
2.125”	3,500 psi	125°C	5-1/2”
2.125”	2,000 psi	125°C	7”
2.125”	2,000 psi	125°C	7”

PLUG STRADDLE SYSTEM

DESCRIPTION

Our slickline set plug technology was used to produce The Straddle System, a versatile modular straddle system. It is intended for use with slickline intervention for full installation and recovery. The Straddle can save time and money by avoiding the need for rig work over because it is simple to use and simple to repair. The system consists of an upper and lower straddle that, depending on the application, can be fitted with various inserts over the straddled zone.

DESIGN FEATURES

- No explosive setting tool required
- Production optimization by removing unwanted water or gas Flexible Deployment options
- Install gas lift at any location within the wellbore
- Slickline set and recovered with a standard slickline tool string

Tubing Size	Tubing Weight
2-3/8”	4.70 lb/ft
2-7/8”	7.80 - 8.60 lb/ft
2-7/8”	6.50 lb/ft
3-1/2”	9.30 - 10.20 lb/ft

PACKER STRADDLE SYSTEM

DESCRIPTION

An isolation straddle packer system can be installed using the Thru-Tubing Packer through wireline, coiled tubing, or jointed pipe. Modular latching seal extensions can be run in segments to accomplish a straddling over a longer time when pressure control is necessary and/or lubricator height restricts running length. This method can be used to install gas lift or jet pumps, isolate zones, patch tubing holes, and offer zone isolation.

DESIGN FEATURES

- Positive indicating Latch Seal
- Superior sealing and anchoring system
- Dual seal bore design provides full opening ID thru Latch Seal
- Modular design allows adjustable and unlimited length

Tubing Size	Tubing Wt.	Packer OD	Gage Ring	ID Bore	Length
2-3/8”	4.70 lb/ft	1.800”	1.810”	1.000”	42.62”
2-7/8”	7.80 - 8.60 lb/ft	2.110”	2.166”	1.250”	43.94”
2-7/8”	6.50 lb/ft	2.225”	2.290”	1.380”	39.97”
3-1/2”	9.30 - 10.20 lb/ft	2.700”	2.725”	1.625”	45.54”

DOWNHOLE CAMERA

DESCRIPTION

The downhole camera technology enables operators to gather earlier not known depth precise and up-to-date, even real-time information regarding the status of the given wellbore, facilitating detailed and highly visualized borehole investigations and allowing operators to particularly focus on their surveys on examined well sections quickly and efficiently. The downhole camera family enables all kinds of deployment methods (fiber, slickline, wireline, E-line) or even with CT (coiled tubing) units available in both the online (real-time) connected and memory card mode among extreme temperature and pressure conditions, but in every case the Full HD quality recording is guaranteed.

DESIGN FEATURES

- Compatible for all kinds of deployment
- Full HD quality recording is guaranteed
- Improved and Unique Lens Cleaning Technology cameras

Camera Type	OD	Length	Resolution	Frame Rate	Battery Life
Fiber Optic Real Time	2.125”	7.14ft/19.96ft	1920 x 1080	60 frame/sec	36 hrs.
Slickline Memory	2.125”	4.60ft/10.33ft	1920 x 1080	60 frame/sec	36 hrs.
E-Line Realtime	2.125”	5.11ft/12.00ft	1920 x 1080	60 frame/sec	36 hrs.

SLICKLINE TOOLS

- Wellbore Cleanout Tools
- Test Tools
- Gas Lift Operations
- Special Application Tools

DIAMOND BROACH

DESCRIPTION

The Diamond Broach uses hardened diamond-shaped cutting profiles that are intended to remove well bore tube constraints. A bypass hole through the center of the broach, which is available in a variety of diameters to fit the well geometry, enables it to travel through fluid with little resistance and lessens the hydraulic cushioning effect during jarring.

DESIGN FEATURES

- 360 deg. cutting face
- Suitability to customer requirements
- Hardened cutting profiles
- Ensures tubing restriction removal

Nominal Tubing Size	To Suit Sizes Up To	Fish Neck	Connection
2-3/8”	2.000”	Optional	Optional
2-7/8”	2.500”	Optional	Optional
3-1/2”	3.000”	Optional	Optional
4-1/2”	4.000”	Optional	Optional
5-1/2”	5.000”	Optional	Optional

ROTARY BROACH SYSTEM

DESCRIPTION

The Rotary Broach System is made to remove tenacious tubing obstructions like sand and hard scale deposits in the well bore. The helical milled slots' brief torque-action during downward jarring, assaults the restriction directly and radially, aiding in the breakdown of stubborn deposits. The Broach Shoe sizes can be produced individually to meet customer requirements because they are created around a standard Rotary Mandrel.

DESIGN FEATURES

- Available in a range of sizes to suit all completion designs
- 360 deg. cutting face
- Suitability to customer requirements
- Hardened cutting profiles
- Ensures tubing restriction removal
- Hexagonal flats for safe make-up & break-out

Mandrel OD	To Suit Sizes Up To	Fish Neck	Connection
1.500”	3.000”	Optional	Optional
1.875”	4.000”	Optional	Optional
2.500”	6.000”	Optional	Optional

COLLAPSIBLE BROACH

DESCRIPTION

Like the Fixed Broach choices, the Collapsible Broach has the extra safety benefit of shrinking in diameter while jarring upwards. To prevent unnecessary stress on a particular point and guarantee the running OD is maintained, the Collapsible Broach is strengthened by adding a number of support profiles as it expands to its maximum running OD during broaching. The degree of material hardness is crucial.

DESIGN FEATURES

- 360 deg. cutting face
- Suitability to customer requirements
- Hardened cutting profiles
- Ensures tubing restriction removal
- Hexagonal flats for safe make-up & break-out

Mandrel OD	To Suit Sizes Up To	Fish Neck	Connection
1.875”	2.000”	Optional	Optional
2.500”	2.500”	Optional	Optional
3.500”	3.000”	Optional	Optional
5.000”	6.500”	Optional	Optional

PINEAPPLE BROACH

DESCRIPTION

The Pineapple Broach incorporates hardened cutting profiles which are designed to clear tubing restrictions in the well bore. Supplied in a range of sizes to suit the well geometry, a sucker rod box thread in the lower end of the broach allows for deployment of multiple broaches or other utility type tools below.

DESIGN FEATURES

- Hexagonal flats for safe make-up & break-out
- Connection below to allow deployment of multiple broaches and other tools
- Hardened cutting face
- Ensures tubing restriction removal

Nominal Tubing Size	To Suit Sizes Up To	Fish Neck	Connection
2-3/8”	2.000”	Optional	Optional
2-7/8”	2.500”	Optional	Optional
3-1/2”	3.000”	Optional	Optional
4-1/2”	4.000”	Optional	Optional
5-1/2”	5.000”	Optional	Optional

TAPERED CUT BROACH

DESCRIPTION

Tapered cut broach is designed as a downhole file to remove tubing restriction such as rust. The Tapered Cut Broach is a tubing scraper tool used to gradually widen out the tubing or nipple when thick scale has built up. It has cutting faces that tapered gradually and can act as a downhole file to remove tubing restriction such as rust.

DESIGN FEATURES

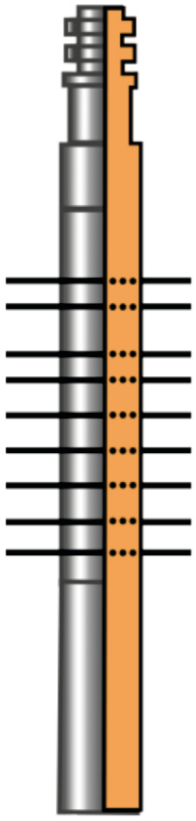
- Easy to use
- Suitability for heavy scale removal
- Easy to redress

Size	Fish Neck	OD	Connection
1.250”	1.188”	1.19 - 1.25”	15/16 UN
1.500”	1.188”	1.25 - 1.50”	15/16 UN
2.000”	1.375”	1.50 - 2.00”	15/16 UN
2.500”	1.375”	2.00 - 2.50”	15/16 UN
3.000”	1.750”	2.50 - 3.00”	1-1/16 UN

HEDGEHOG BRUSH BROACH

DESCRIPTION

To clean materials off tubing, profile nipples, safety valves, and other completion accessories, use the Hedgehog Brush. High strength alloy bristles are collected and used in a special design; they won't fall into the well like the wire strands on a traditional wire brush. Effective tubing cleaning is ensured by complete 360-degree coverage. Depending on the application, the bristle diameter and bristle mandrel diameter can be adjusted to provide efficient scratching, brushing, or polishing.



DESIGN FEATURES

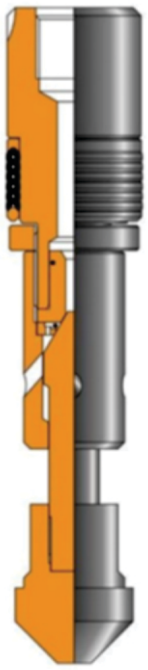
- Effectively cleans tubing faster
- 360 deg coverage
- Adjustable configurations to scratch, brush, or polish
- High strength alloy bristles
- Available mandrels to suit tubing sizes

Size	Fish Neck	OD	Connection	Tubing/Casing Size
1.500”	1.375”	2.00”	15/16 UN	2-3/4” 4.7#
1.500”	1.375”	2.50”	15/16 UN	2-7/8” 6.4#
1.875”	1.750”	2.50”	1-1/16 UN	2-7/8” 6.4#
1.875”	1.750”	2.50”	15/16 UN	3-1/2” 9.2#
2.125”	1.750”	3.00”	1-1/16 UN	3-1/2” 9.2#
2.125”	1.750”	4.00”	1-1/16 UN	4-1/2” 12.6#

NO-GO NIPPLE TEST TOOL

DESCRIPTION

The NO-GO Nipple Test Tool is a straightforward wireline pack-off device that is made to land and seal into appropriate tubing no-go nipples so that the tubing above may be pressure tested to pressures of up to 10,000 psi. The NO-GO Test Tool can also be used for other things, as such making it possible for hydraulic set packers to be activated. A straightforward drop valve is inserted at the fishing neck during well testing to help bleed down the pressure. By latching it with a proper external catch pulling tool and picking up wireline strain, the valve will rise off seat and let fluid pressure drain away.



DESIGN FEATURES

- Compatible Tubing No-Go Nipples
- Pressure tested up to 10,000 psi
- A simple drop valve

Fish Neck	Running & Pulling Tool	Nipple Size
1.188”	150DTISB	1.710”
1.375”	200DTISB	1.875”
1.375”	200DTISB	2.125”
1.375”	200DTISB	2.188”
1.375”	200DTISB	2.313”
1.375”	200DTISB	2.562”

SELECTIVE NIPPLE TEST TOOL

DESCRIPTION

The Selective Nipple Test Tool is a specialized device that can be used to seal off and pressure test compatible tubing selective nipples with pressures of up to 10,000psi. This wireline pack-off tool comes with spring-loaded trip dogs that can be activated to fit into a specified locating nipple profile. Once the well testing is completed, a drop valve is included at the fishing neck to help bleed down the pressure. The valve can be easily lifted off seat using a suitable external catch pulling tool and wireline tension, allowing fluid pressure to drain away.

DESIGN FEATURES

- Compatible Tubing No-Go Nipples
- Pressure tested up to 10,000 psi
- A simple drop valve

Fish Neck	Running & Pulling Tool	Nipple Size
1.188”	150DTISB	1.710” R
1.375”	200DTISB	1.875” R
1.375”	200DTISB	2.125” R
1.375”	200DTISB	2.188” R
1.375”	200DTISB	2.313” R
1.375”	200DTISB	2.562” R

NIPPLELESS TUBING TEST TOOL

DESCRIPTION

The Nippleless Tubing Test Tool is used to test for the location of a leak in the tubing. The test tool is packed off by shearing the activation pin before attempting to pressure test the tubing. By simply setting down weight, the nippleless test tool can be adjusted as many times as necessary while being transported up and down the tubing.

DESIGN FEATURES

- Ability to determine location of tubing leak
- Ability to set down weight securely

Fish Neck	Running & Pulling Tool	Nipple Size
1.375”	1.85”	15/16 UN
1.750”	2.25”	1-1/16 UN
2.313”	2.72”	1-1/16 UN
2.313”	3.72”	1-9/16 UN

WIRELINE KICKOVER TOOL

DESCRIPTION

The 1” and 1-1/2” Gas Lift Valves can be installed and removed using the OK & OM Type Kickover Tools (KOT) in a variety of Side Pocket Mandrels (SPM).

DESIGN FEATURES

- Hexagonal flats for safe make-up & break
- Quick Connections can be supplied to prevent tool damage from stilson wrenches and increase tool life
- Industry proven function including kick arm and trigger mechanisms
- Roller Swivel Subs available to convert to suit deviated wells
- Fully shearable to ensure safe recovery

Nominal Tubing Size	Actual OD	To Suit Glv	Catcher	Fish Neck
2-2/8”	1.750”	1”	Optional	Optional
2-7/8”	2.062”	1”	Optional	Optional
2-7/8”	2.223”	1-1/2”	Optional	Optional
3-1/2”	2.739”	1-1/2”	Optional	Optional

WIRELINE ROLLER KICKOVER TOOL

DESCRIPTION

No matter which way the Side Pocket Mandrel (SPM) is oriented, the Kickover Tool (KOT) with its improved friction-reducing roller swivel design can install and retrieve 1” and 1-1/2” Gas Lift Valves in deviated well bores. The Slick Kickover Tool is simple to use and maintain thanks to important industry-proven mechanics within the KOT trigger and kick arm as well as the user-friendly maintenance advantages of the distinctive roller swivel design.

DESIGN FEATURES

- Suited but not limited to deviated wells
- Hexagonal flats for safe make-up & break-out
- Improved bypass area to improve deployment in fluid
- Supplied in most roller wheel diameters to suit customer requirements
- Multiple, easy to access service points for simple maintenance

Nominal Tubing Size	Actual OD	To Suit Glv	Catcher	Fish Neck
2-2/8”	Up to 1.813”	1”	Optional	Optional
2-7/8”	Up to 1.925”	1”	Optional	Optional
2-7/8”	Up to 2.250”	1-1/2”	Optional	Optional
3-1/2”	Up to 2.720”	1-1/2”	Optional	Optional

GAS LIFT STRADDLE

DESCRIPTION

The GLV Straddle is a modular straddle system created to allow for the easy retrofit of a gas lift valve (GLV) into a well. The system makes use of the tubing perforator and is constructed using standard slickline set plug technology. Slickline intervention can be used to fully install and recover the system. The GLV Straddle is simple to use and simple to redress. By avoiding work over and maximizing production in already-existing wells, it can save time and money. A gas lift sub is installed across the straddled zone of an upper and lower straddle that make up the system.

DESIGN FEATURES

- Fully slickline installed and retrieved
- Install gas lift at any location within the well
- Revive gas lift in wells with failed valves
- Simple to install, recover and redress
- Cost effective solution for production optimization

Outside Diameter	Pressure Rating	Running Tool	Pulling Tool	Tubing/Casing Size
2.25”	5,000 psi	250DTIGS	200DTIGS	2-7/8” 6.4#
2.72”	5,000 psi	300DTIGS	250DTIGS	3-1/2 9.2#
3.72”	5,000 psi	400DTIGS	300DTIGS	4-1/2” 12.6#

TUBING STOP

DESCRIPTION

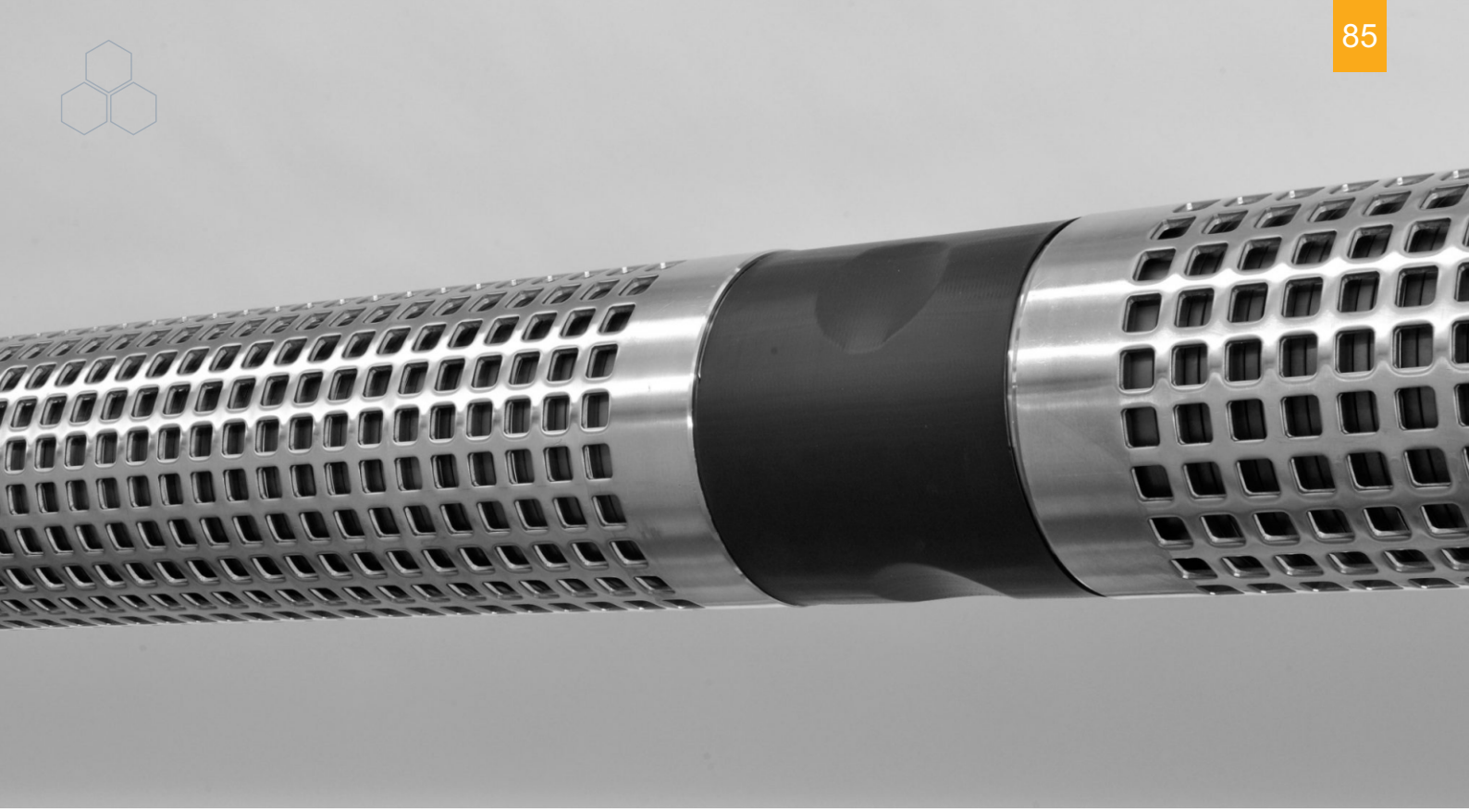
In tubing without a profile nipple, the Tubing Stop is an anchoring tool that can be used to produce a no-go type top. It can be used as an upper stop to secure tools, so they don't move up the well as well as a lower stop for downhole equipment. Many configurations are available and they include: External Fish Neck or Internal Fish Neck, Heavy Wall or High Expansion configuration, Flow Bypass through the Fish Neck, Threaded Lower Connection to carry Gauges, Spring Activated Slips, Shear out Ratchet Lock Ring to prevent release in High Flow Wells.

DESIGN FEATURES

- Possibility of being set anywhere in the tubing
- Run and pulled with standard GS or standard External Fish Neck Pulling Tools
- Multiple Configurations available to suit application

Bonitas Engineering and Equipment Company offers alternate sizes, materials and thread connections for product customization.

Size	Fish Neck
1.71”	1.188”
1.88”	1.375”
2.12”	1.375”
2.18”	1.375”
2.31”	1.375”
2.56”	1.375”



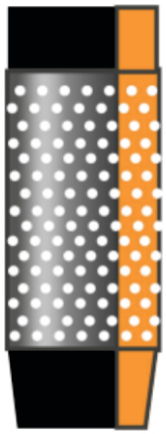
SAND CONTROL TOOLS

- Premium Screens
- Flo-Activated Retrievable Packer
- Auxiliary Tools

PREMIUM SCREENS

DESCRIPTION

To create a single monolithic sand control screen that is strong and has improved filtration specificities, premium metal mesh sand control screens offer a unique screen design containing multiple diffusion-bonded layers of woven metal mesh.



DESIGN FEATURES

- Suitable for open-hole and cased-hole completions
- Suitable for vertical, horizontal, & deviated oil and gas wells
- Suitable for thermal applications
- Eliminates welds within the filter media
- Optimal filtration and uniform flow
- Annealed alloy against corrosion

Base Pipe Nominal OD	Nominal OD	Screen OD	Perf Size	Perf Density	Pipe Open Flow Area (1%)
3.5”	2.992”	4.078”	0.375”	96	8.0%
4.0”	3.476”	4.578”	0.500”	72	9.4%
4.5”	4.000”	5.048”	0.500”	72	8.3%
5.0”	4.408”	5.578”	0.500”	84	8.8%

PREPACK SCREENS

DESCRIPTION

PrePack screens can be used as a screen in gravel packs where it is challenging to achieve 100% packing and there is a risk of premature screen outs as a dependable and affordable alternative to gravel packs in some applications. The PrePack screen will act as a backup in the event of voids.

DESIGN FEATURES

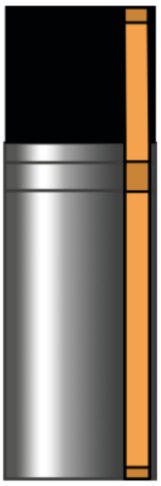
- Suitable for harsh environment
- Suitable for shallow wells & workover programs
- Suitable for both open-hole and cased-hole completions
- High Open flow area
- Optimal filtration and uniform flow
- Rig time saving

Standard Wrap					
Base Pipe Nominal OD	Nominal OD	Screen OD	Perf Size	Perf Density	Pipe Open Flow Area (1%)
2.375”	1.995”	2.86”	0.375”	48	5.9%
2.875”	2.441”	3.38”	0.375”	60	6.1%
3.500”	2.992”	4.06”	0.375”	72	6.0%
4.000”	3.476”	4.55”	0.500”	48	6.2%

Direct Wrap					
Base Pipe Nominal OD	Nominal OD	Screen OD	Perf Size	Perf Density	Pipe Open Flow Area (1%)
2.375”	1.995”	2.76”	0.375”	48	5.9%
2.875”	2.441”	3.28”	0.375”	60	6.1%
3.500”	2.992”	3.96”	0.375”	72	6.0%
4.000”	3.476”	4.45”	0.500”	48	6.2%

WIREWRAP SCREENS

DESCRIPTION



There are two kinds – standard wrap and direct wrap. The standard Wire Wrap Screen is made out of a wire-wrapped jacket that is made independently of the base pipe. The pre-fabricated Wire Wrap Screen jacket is placed over the perforated base pipe and then welded to the base pipe with end rings, giving the customer the option of modular make-up. The Cased Hole Application works best with this screen. The direct Wire Wrap entails wire wrapped directly around the base pipe to provide a high-strength screen with mechanical properties that are either equal to or superior to those of the unperforated liner. This screen is best used in open-hole applications with long laterals and wells that have severe doglegs.

DESIGN FEATURES

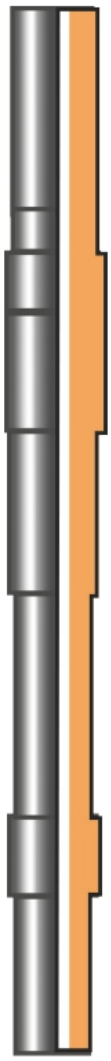
- Used for pump protection
- Standalone, gravel pack and frac pack completions
- Suitable for both open-hole and cased-hole completions
- Uniform precise slot openings for sand control
- Thermal applications

Standard Wrap					
Base Pipe Nominal OD	Nominal OD	Screen OD	Perf Size	Perf Density	Pipe Open Flow Area (1%)
2.375”	1.995”	2.86”	0.375”	48	5.9%
2.875”	2.441”	3.38”	0.375”	60	6.1%
3.500”	2.992”	4.06”	0.375”	72	6.0%
4.000”	3.476”	4.55”	0.500”	48	6.2%

FLO-ACTIVATED RETRIEVABLE PACKER

DESCRIPTION

Change description to “The Flo-Activated Packer System is a retrievable dual seal bore packer deployable via coiled tubing, jointed pipe, or wireline. Retrieval is accomplished by straight pull to release. It utilizes a proven multi-durometer packing system located above bi-directional caged slips. The standard differential pressure rating is 5000 psi at 300º F. Customizations are available for special sizes, corrosive environments, higher temperature or pressure requirements. Available for tubing sizes 2-3/8” to 5-1/2”.



DESIGN FEATURES

- Positive position indicating mechanism
- Pressure & vertical movements enables packer setting
- Applicable in deep deviated & horizontal wells
- Cased hole Gravel Pack and High-Rate Water Packs

Casing OD	Casing Weight	Packer Size	Packer Seal Bore	Packer	ID Thru Seals	Accessory Sizes
7”	23 -29 lbs/ft	2-7/8” X 7”	3.250”	5.955”	2.406”	80 - 32
7”	32 - 35 lbs/ft	2-7/8” X 7”	3.250”	5.810”	2.406”	80 - 32
7”	23 - 29 lbs/ft	3-1/2” X 7”	4.000”	5.955”	2.992”	80 - 40
7”	32 - 35 lbs/ft	3-1/2” X 7”	4.000”	5.810”	2.992”	80 - 40

GRAVEL PACK EXTENSION

DESCRIPTION

Gravel-packing-ports sub with a closing sliding sleeve are included in the Gravel Pack Extension above a seal bore sub. The Shifting Tool can be spaced with the use of the bottom extension during gravel pack operations to ensure proper shifting to various positions. The Sliding Sleeve is closed as the Shifting Tool is pulled through when the Crossover Tool is pulled after the gravel pack is complete. capable of handling 50,000 lbs. of high strength proppant and pumping slurries up to 20 bbls/min.

DESIGN FEATURES

- Gravel-packing ports sub
- Precise Shifting Capability

Casing OD	Casing Weight	Packer Size	Packer Seal Bore	Packer	ID Thru Seals	Accessory Sizes
7”	23 -29 lbs/ft	2-7/8” X 7”	3.250”	5.955”	2.406”	80 - 32
7”	32 - 35 lbs/ft	2-7/8” X 7”	3.250”	5.810”	2.406”	80 - 32
7”	23 - 29 lbs/ft	3-1/2” X 7”	4.000”	5.955”	2.992”	80 - 40
7”	32 - 35 lbs/ft	3-1/2” X 7”	4.000”	5.810”	2.992”	80 - 40

BONITAS ENERGI SOLUSI

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